FEDERATION OF ASIAN PHARMACEUTICAL ASSOCIATIONS

ASIAN PHARMACEUTICAL LANDSCAPE REPORT

2023

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FAPA Asian Pharmaceutical Landscape Report 2023

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Available exclusively from the FAPA Website. This digital report is published for the benefit of FAPA member associations and other stakeholders in pharmacy practice, education, and healthcare systems. It aims to provide a comprehensive understanding of the pharmaceutical landscape in Asia to support evidence-informed decision-making and the advancement of the profession.

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Disclaimer:
The information contained in this online publication is based on data collected from FAPA member associations and other sources from June to October 2023. While every effort has been made to ensure the accuracy of the information, the publisher accepts no responsibility for errors or omissions or for any consequences arising from the use of the information contained in this report.

Federation of Asian Pharmaceutical Associations

ASIAN PHARMACEUTICAL LANDSCAPE REPORT 2023

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FOREWORD

The Asian Pharmaceutical Landscape Report represents an important step towards advancing pharmacy practice, education, and healthcare systems across Asia. In today's rapidly evolving healthcare environment, pharmacists play a pivotal role in ensuring patient safety, supporting universal health coverage and promoting health and wellness by optimizing treatment and prevention. To fully realize the potential of pharmacists within these contexts, there is a growing need to understand the unique landscapes of the pharmacy profession in each country, particularly within the countries and territories represented by Federation of Asian Pharmaceutical Associations (FAPA) member associations.

This report is the result of a collaborative effort to document and analyze the current state of pharmacy-related practices, educational frameworks, and health systems throughout Asia. It provides a baseline characterization of the profession across the region, highlighting areas of strength and identifying opportunities for development. By offering a comprehensive overview of pharmacy practice and education, the report serves as a roadmap for future strategic initiatives, fostering improved collaboration, evidence-based policymaking, and technical support across FAPA's member associations.

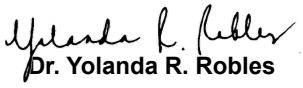
We have embarked on this project with the belief that by better understanding the diversity and commonalities of the pharmaceutical landscape, we can drive meaningful progress toward strengthening pharmaceutical systems and enhancing the quality of healthcare throughout Asia. The insights gained from this report will inform FAPA's technical agenda and will serve as a valuable resource for pharmacists, educators, policymakers, and healthcare leaders alike.

This report also underscores the importance of collaboration and solidarity among FAPA's member associations. By sharing knowledge, learning from one another's experiences, and working together to overcome challenges, we aim to elevate the pharmacy profession and make a lasting impact on healthcare systems in the region.

It is our hope that this report not only provides a deeper understanding of the pharmaceutical landscape but also inspires our members, stakeholders and pharmacy professionals. We extend our sincere gratitude to all those who contributed to the success of this project, particularly Professor Roderick Salenga, the chairperson of the FAPA Social and Administrative Pharmacy Section as the main proponent and sponsor of this report, and the hard-working core group that coordinated with focal persons and FAPA member associations that provided invaluable data, insights, and support.

Together, let us continue to forge a future where pharmacists are empowered to make lasting contributions to the health and well-being of our societies.

Sincerely,



Dr. Yolanda R. Robles
President (2021-2026)
Federation of Asian Pharmaceutical Associations (FAPA)

PREFACE

The pharmacy profession in Asia is currently navigating a complex landscape with both opportunities and challenges. In today's fast-changing world, the need for pharmacists to play a more significant role in healthcare is undeniable, but the barriers we face vary across our diverse region. Recognizing this, the Federation of Asian Pharmaceutical Associations (FAPA) has committed to gaining a deeper understanding of these challenges to drive informed decision-making and strategic planning for the future.

At the start of this term (2023-2026), there was a consensus among FAPA Bureau Members and Section Chairpersons on the importance of evidence-based program planning and therefore a situational analysis was sought to guide the direction of FAPA in setting our programs. This inspired the **Asian Pharmaceutical Landscape Report**—a landmark initiative, as it is the first time FAPA has produced a comprehensive report of this nature. This document will undoubtedly serve as a valuable resource for the association and its member organizations, offering critical insights into the current state of pharmacy practice, education, and health systems across the region.

The data presented in this report was collected between June and October 2023, sourced from both existing literature and focal persons from different countries represented by our member associations. Readers may notice that some information may be incomplete or may not yet be updated to the present situation since there may be limited information available in the public domain, especially in the english language. We therefore invite feedback from our member associations and stakeholders on this document, particularly if there are recommended reliable sources that could be updated in the next versions of this report. Your input is essential as we strive to improve the quality of information available on the pharmacy profession in Asia and ensure that it continues to serve the needs of our region.

While we acknowledge that there is no perfect data, the core group and focal persons strived to include and validate what they can during the data collection period in order to provide us an overview of the pharmacy profession and pharmacy education in the region. This accomplishment marks the beginning of a new system for continuous improvement, and this report will be updated every term, ensuring that FAPA's programs remain responsive and aligned with the evolving needs of our profession. The updating of this report will be part of an iterative process which involves two key steps: first, the **Asian Pharmaceutical Landscape Report** serves as the foundation; second, a **Technical Agenda Setting Workshop** updates our programs and targets based on the findings as well as recommendations from the previous term through different section meetings. These targets are then encapsulated in the **FAPA Roadmap** and action plan for each term, which will guide both FAPA's efforts and those of our member associations, addressing the most pressing issues facing pharmacists in our region.

Sincerely,

Christine Ching Benosa
Secretary-General
Federation of Asian Pharmaceutical Associations (FAPA)

BACKGROUND

To effectively manage pharmacy-related activities, projects, and programs across Asian countries, there is a need for a comprehensive understanding of the pharmaceutical landscape among Asian countries associated with the Federation of Asian Pharmaceutical Associations (FAPA). Given this, the primary goal of this project was to gain insights into the pharmacy practice, education, and health systems in Asian countries especially where FAPA has a presence through its member associations. Through this, tailored programs can be developed and healthcare could be improved in Asia through the pharmacy profession and other pharmaceutical system strengthening initiatives.

This project sought to first provide a baseline characterization and analyze the data to inform the future technical agenda of the federation and its members. This project includes an examination of the current state of pharmacy education, understanding the challenges and opportunities in the profession, and the identification of best practices and areas of excellence among Asian countries. This project encompasses aspects, such as healthcare policies, pharmacy workforce and education, regulatory frameworks, service delivery models, and the availability and accessibility of pharmaceutical services, among others. Ultimately, the project strives to equip FAPA and its member associations with the necessary knowledge and insights to drive improvements in the profession, pharmaceutical systems, and society.

Through the development of a general landscape profile for each associated country, the project aims to facilitate evidence-informed decision-making and impact-assessment, foster collaboration and knowledge-sharing among each country, and contribute to the overall advancement of the pharmacy profession and healthcare in Asia.

OBJECTIVES

This project generally aims to examine the current state of pharmacy practice, pharmacy education, and health system of Asian countries where FAPA has a presence through its member associations. Specifically, it aims to achieve the following:

Objective No. 1: **Characterize practice of pharmacy in Asian countries**

a. Identify the roles and responsibilities of pharmacists;
b. Describe the scope of pharmacy services provided, including but not limited to dispensing, patient counseling, and medication therapy management;
c. Describe the integration of pharmacists in multidisciplinary healthcare teams and collaborative practices;
d. Describe the use of technology and digital platforms in pharmacy practice;
e. Identify the regulatory frameworks and policies governing pharmacy practice; and
f. Describe the sociodemographic characteristics of pharmacists in the country.

Objective No. 2: **Characterize pharmacy education in Asian countries**.

a. Describe the availability and curricula of pharmacy education programs;
b. Describe the accreditation and quality assurance mechanisms for pharmacy education;
c. Describe the availability and utilization of experiential training and internship programs;
d. Describe the use of innovative teaching methods and technologies in pharmacy education;
e. Identify continuing professional development opportunities for pharmacists; and
f. Describe the sociodemographic characteristics of pharmacists in the academe and pharmacy students.

Objective No. 3: **Characterize the health system in Asian countries**.

a. Provide an overview of the health system organization and governance;
b. Describe key healthcare delivery models and mechanisms;
c. Describe the availability, accessibility of healthcare services, including primary, secondary, and tertiary care;
d. Identify relevant health policies, regulations, and frameworks governing the healthcare sector and the pharmaceutical sub-sector;
e. Describe the health workforce in terms of composition, training, and distribution;
f. Describe health financing models, including public and private expenditure on healthcare;

g. Present key health indicators and outcomes, such as disease burden, mortality rates, and healthcare utilization; and
h. Describe strengths, challenges, and potential areas for improvement.

Objective No. 4: **Develop visual representation of the pharmaceutical landscape of Asian countries**

a. Illustrate key findings and trends, such as infographics, charts, and maps; and
b. Present the visual representations in a clear and accessible format that facilitates understanding and comparison across FAPA .

METHODOLOGY

The first segment of the project consisted of administrative work and preparation of essential documents, such as the Terms of Reference document and Guidance document which were used as bases for the comprehensive List of objectives, sub-objectives, variables, and operational definitions and as bases for the data collection tool. A review of literature was conducted to identify the data that are to be included in the pharmaceutical landscape profiles. Initial discussions and consultations with the FAPA Bureau members, the Section Chairs, and the Secretariat were conducted to finalize the minimum required components of the landscape profiles for every Asian country. Once the list of data d for every Asian country was approved, a data collection tool in the form of a Google Sheet was constructed, which served as the primary instrument for data collection for this project (see Appendix C).

A comprehensive list of objectives, variables, and operational definitions was constructed (see Table 1) and then submitted to the FAPA Section Chairs and Secretariat who approved its use in the project. Other essential documents, such as the invitation letters (see Appendix A) were revised according to the comments provided by the Secretariat. The preparation of the documents and the approval of its use was conducted in a duration of 2 months.

An exhaustive literature review was performed by the research team of the project. Data on the pharmacy practice, pharmacy education, and health system (following the comprehensive List of objectives, sub-objectives, variables, and operational definitions) in the selected Asian countries were compiled and inputted in the Data collection tools. The year when the data was reported and the references from which the data were sourced from were also compiled.

Focal persons, who served as the validators and contributors of data in the data collection tool for their respective country, were endorsed by the FAPA headquarters. Invitation letters (see Appendix A and B) with an attached Orientation tool kit (see Appendix D) were sent to the Focal persons through email. Validation and revision of the data in the data collection tool were performed and coordinated between the research team and the Focal persons who agreed to participate in the project. The recommendations of focal persons with regards to the presentation of data on pharmacy practice, education, and health systems in their country were reflected in the tool. The literature review and the validation and revision of data in the data collection tool were conducted in a duration of 3 months.

Once the data from each selected Asian country had been compiled, the data was encoded for data cleaning and standardization. It was analyzed both quantitatively and qualitatively using frequency statistics (mean, median, mode, range, standard deviation) and thematic analysis. Data that skewed the findings of the statistical analysis were retained in the dataset. The key findings and insights were summarized and reported per variable and per Asian country. A summary report and a visual presentation of the data was prepared and the data was presented per variable and per Asian country. The coding and the analysis of the data were conducted in a duration of 3 weeks.

VARIABLES and OPERATIONAL DEFINITIONS

Below is a table that comprehensively lists the objectives of this project and its corresponding sub-objectives. Presented as well are the relevant variables under each sub-objective and their corresponding operational definitions.

Table 1. Comprehensive list of objectives, sub-objectives, variables, and operational definitions

Variable	Operational Definition
Objective 1: **Characterize practice of pharmacy in each FAPA associated-country**.	
Objective 1a: **Identify the roles and responsibilities of pharmacists**.	
Laws Regulating the Practice of Pharmacy	Refers to the different legally recognized laws and other legislation that regulate the practice of pharmacy in a country; this may be divided into its primary function for the practice of pharmacy (e.g., education, industry, clinical practice, etc.)
Practice Standards for Pharmacists	Refers to any professionally recognized guiding document that describes the best practices of a duly licensed and registered pharmacist among the different areas of pharmacy practice
Objective 1b: **Describe the scope of pharmacy services provided**, **including**, **but not limited to**, **dispensing**, **patient counseling**, **and medication therapy management**.	
Practice Settings and Emerging Fields	Refers to the different recognized practice settings and emerging fields of practice wherein duly licensed and registered pharmacists are currently practicing, such as community pharmacy, hospital pharmacy, industrial pharmacy, etc.
Number of Pharmacies by Type	Refers to the number (and proportion) of duly licensed and registered pharmacists working in each defined practice area of pharmacy, such as community pharmacy, hospital pharmacy, industrial pharmacy, etc.
Number of Community Pharmacy Outlets	Refers to the number of duly licensed and registered community pharmacy outlets in a country
Pharmacy Practice Hours	Refers to the different pharmacy practice hour schemes present in a given country, such as an 8-working hour system, a 12-working hour system, a 24/7 system, etc.
Roles of the Pharmacist during the COVID-19 Pandemic	Refers to the roles of pharmacists adopted, modified, or enhanced due to the circumstances brought about by the COVID-19 pandemic
Pharmaceutical Manufacture	Refers to the presence, or absence, of local and/or international manufacturing activities for pharmaceutical products within the country's legal jurisdiction
Pharmaceutical Import/Export	Refers to the presence, or absence, of importation and exportation activities for pharmaceutical products within the country's legal jurisdiction
Types of Pharmaceutical Products	Refers to the different types of pharmaceutical products currently manufactured, distributed, imported/exported, traded, or repacked within the country's legal jurisdiction
Number of Registered Pharmaceutical Products	Refers to the total number of registered pharmaceutical products in a given country
Local and Multinational Pharmaceutical Profiles	Refers to the current summarized list of local and multinational pharmaceutical profiles within a country's legal jurisdiction
Objective 1c: **Describe the integration of pharmacists in multidisciplinary healthcare teams and collaborative practices**.	
Stakeholders for the Practice of Pharmacy	Refers to the different legally recognized national stakeholders for the practice of pharmacy, such as the Agency for Health, National Regulatory Authority, Professional Regulatory Commission, etc.
National Organizations for Pharmacy	Refers to any federation or other organization of members of the legal profession or of a branch of the legal pharmacy profession co-extensive in territorial scope with any country which can reasonably claim to be substantially representative in that country of the members of the pharmacy profession
Current Thrusts and Directions of the Organization(s)	Refers to the current thrusts, initiatives, and future directions identified, recognized, or otherwise undertaken by each of the national organizations for pharmacy
Total Number of Members per Organization	Refers to the number of duly recognized members of each of the national organizations for pharmacy
Objective 1d: **Describe the use of technology and digital platforms in pharmacy practice**.	
Efforts and Initiatives in	Refers to any current efforts or initiatives related to the improvement of the practice of

the Practice of Pharmacy	pharmacy, and its possible future directions, in a given country
Objective 1e: **Identify the regulatory frameworks and policies governing pharmacy practice**.	
Agency for Health	Refers to the legally recognized principal health agency of a specific country
National Regulatory Authority	Refers to the legally recognized national regulatory authority responsible for ensuring that products are released for public distribution are evaluated properly and meet international standards of safety, efficacy, and quality
Professional Regulatory Commission	Refers to the legally recognized national agency that administers, implements, and enforces the regulatory laws and policies of the country with respect to the regulation and licensing of the various professions and occupations under its jurisdiction, including the enhancement and maintenance of professional and occupational standards and ethics and the enforcement of the rules and regulations relative thereto
Formulary System	Refers to the legally recognized laws and agencies and pharmacist involvement in the preparation, execution, and continuous improvement of the national formulary system within a given country
Health Technology Assessment	Refers to the legally recognized laws and agencies and pharmacist involvement in the preparation, execution, and continuous improvement of the health technology assessment system within a given country
Supply Chain Management	Refers to the legally recognized laws and agencies and pharmacist involvement in the preparation, execution, and continuous improvement of the supply chain management system within a country
Drug Pricing	Refers to the legally recognized laws and agencies and pharmacist involvement in the preparation, execution, and continuous improvement of drug pricing schemes within a given country
Objective 1f: **Describe the sociodemographic characteristics of pharmacists in the country**.	
Total Pharmacist Population	Refers to the number of duly licensed and registered pharmacists in a country (in thousands) at a given time
Ratio of Population to Pharmacist	Refers to the number of duly licensed and registered pharmacists per 10,000 inhabitants of a certain country at a given time; also known as Density of Pharmacists
Proportion of Registered Pharmacists Working Abroad	Refers to the proportion of pharmacists (originating from the country) working abroad to the number of pharmacists working in the said country
Geographic Designation	Refers to the number (and proportion) of duly licensed and registered pharmacists working in urban areas and percentage of pharmacists in rural at a given time
Age or Age Distribution	Refers to the average age, or divided per predefined age range, of all duly licensed and registered pharmacists
Sex of Pharmacists	Refers to number (and proportion) of biological males and biological females among the duly licensed and registered pharmacists in a given country
Age or Age Distribution by Sex	Refers to the average age, or divided per predefined age range, of all duly licensed and registered pharmacists who are either biological males or biological females
Objective 2: **Characterize pharmacy education in each FAPA associated-country**.	
Objective 2a: **Describe the availability and curricula of pharmacy education programs**.	
List or Number of Colleges or Schools Offering Pharmacy Education	Refers to the list or total number of colleges or schools that currently offer a recognized pharmacy program, such as undergraduate or postgraduate programs (e.g., public institutions, private institutions, etc.)
Numbers by Type of Colleges or Schools	Refers to the number of colleges or schools that currently offer a recognized pharmacy program, per type of institution (e.g., public institutions, private institutions, etc.)
Academic Programs/ Degrees Offered	Refers to the current summarized list of academic programs or educational degrees offered among the different colleges or schools of pharmacy in a given country
Length of each Academic Programs/Degrees	Refers to the total length (in years or semesters) of each of the recognized academic programs or educational degrees offered among the different colleges or schools of pharmacy in a country
Maximum Capacity	Refers to the average maximum capacity for new admissions among the different colleges or

for New Admissions	schools of pharmacy in a given country
Objective 2b: **Describe the accreditation and quality assurance mechanisms for pharmacy education**.	
Laws Regulating Pharmacy Education	Refers to the different legally recognized laws and other legislation that regulate pharmacy education in a country (e.g., regulation for students and educators, education system, internships, etc.)
Requirements for Admission or Admission Criteria	Refers to the current requirements for admission, or admission criteria, to enter an academic program or educational degree in pharmacy
Quality Assurance Mechanisms	Refers to any mechanisms or systems-in-place that continuously assure the quality of pharmacy education in the different colleges or schools of pharmacy
Objective 2c: **Describe the availability and utilization of experiential training and internship programs**.	
Description of Sites for Student Training	Refers to the different sites for student training, or internship, currently practiced or nationally recognized in a given academic program or educational degree in pharmacy
Tasks and Roles of the Interns	Refers to the current summarized list of tasks and roles assumed by the students enrolled in a given academic program or educational degree in pharmacy in each site for student training, or internship
Duration of Internships for Pharmacy Education	Refers to the total duration of student training, or internships, required to be completed by students enrolled in an academic program or educational degree in pharmacy
Objective 2d: **Describe the use of innovative teaching methods and technologies in pharmacy education**.	
Teaching Methods in Pharmacy Education	Refers to the best practices in pharmacy education, inclusive of innovative teaching methods and technologies, in a given country
Objective 2e: **Identify continuing professional development opportunities for pharmacists**.	
Specializations	Refers to any available opportunities for specialization for students enrolled in a given academic program or educational degree in pharmacy (e.g., residency programs for Doctor of Pharmacy academic programs, etc.)
Continuing Education for Graduated Professionals	Refers to any professionally recognized continuing education activities that may be attended or participated by graduated pharmacy students
Career Opportunities	Refers to the different career opportunities in the field of pharmacy available for the graduated students enrolled in a given academic program or educational degree in pharmacy
Special Accreditations and Certifications per Grant	Refers to the different special accreditations or certifications per grant that may be received by pharmacy students after completing a detailed and recognized training, certification, or licensing program
Objective 2f: **Describe the sociodemographic characteristics of pharmacists in the academe and pharmacy students**.	
Types of Teaching Staff	Refers to the current summarized list of different teaching staff currently employed in the different colleges or schools of pharmacy in a given country (e.g., instructors, lecturers, professors, etc.)
Employment Status	Refers to the current summarized list of the different employment statuses of the teaching staff currently employed in the different colleges or schools of pharmacy in a given country (e.g., part-time, full-time, etc.)
Area of Practice	Refers to the current summarized list of the different areas of pharmacy practice where the teaching staff are currently specialized in (e.g., education/teaching, research, patient care services, etc.)
Qualifications of Teaching Staff	Refers to the current summarized list of the academic qualifications of the teaching staff in the different colleges or schools of pharmacy (e.g., teacher's license, Master's/Doctorate Degree, etc.)
Number of Students Enrolled into the Program per Academic Program/Degree	Refers to the average number of students enrolled into each of the currently available academic programs/degrees of pharmacy in the different colleges or schools of pharmacy in a given country
Number of Students who Left the Program per Academic Program/Degree	Refers to the average number of students who left or did not finish each of the currently available academic programs/degrees of pharmacy in the different colleges or schools of pharmacy in a given country
Number of Students who Graduated per Academic	Refers to the average number of students who graduated from each of the currently a vailable academic programs/degrees of pharmacy in the different colleges or schools of pharmacy in a

Program/Degree	given country
Objective 3: **Characterize the health system in each FAPA associated-country**.	
Objective 3a: **Provide an overview of the health system organization and governance**.	
Geographic Location	Refers to the location of the country with regards to their coordinates or their bordering/ neighboring countries
Total Population	Refers to the number of people residing in a country (in millions) at a given time
Distribution of Population	Refers to the ratio of persons living in rural areas to persons living urban areas within a country
Age Dependency Ratio	Refers to the ratio of persons in the "dependent" ages (generally under age 15 and over age 64) to those in the "economically productive" ages (15-64 years) in the population
Adult Literacy Rate	Refers to the percentage of population aged 15 years and over who can both read and write with understanding a short simple statement on his/her everyday life
GDP per capita	Refers to the sum of gross value added by all resident producers in the economy plus any product taxes (less subsidies) not included in the valuation of output, divided by mid-year population in US dollars (US$), adjusted by the country's current inflation rate, or in the country's national currency
Objective 3b: **Describe key healthcare delivery models and mechanisms**.	
Description of the Health System	Refers to the overall healthcare system implemented in a given country
Laws Regulating the Health System	Refers to the different legally recognized laws and other legislation that dictate the health system and its implementation, maintenance, and quality management in a given country
Objective 3c: **Describe the availability and accessibility of healthcare services**, **including primary**, **secondary**, **and tertiary care**.	
Number of Primary Health Stations	Refers to the number of duly licensed and registered primary health stations in a given country
Number of Secondary Hospitals	Refers to the number of duly licensed and registered secondary hospitals in a given country
Number of Tertiary Hospitals	Refers to the number of duly licensed and registered tertiary hospitals in a given country
Objective 3d: **Identify relevant health policies**, **regulations**, **and frameworks governing the healthcare sector and the pharmaceutical sub-sector**.	
Key Laws, **Policies**, **and Frameworks Governing the Health Sector**	Refers to the different legally recognized laws and other legislation that regulate the healthcare sector and pharmaceutical sub-sector, specifically, but not limited to: a. Health professionals; b. Health establishments; c. Health-related products; and/or d. Professional regulation and licensure
Health Professional Role Overlaps	Refers to any role overlaps observed among healthcare professionals in a given country (*if any*)
Key Health Professionals	Refers to the identified key healthcare professionals in a given country, such as physicians, nurses, pharmacists, dietitians, therapists, social workers, laboratory technicians, radiologists, etc.
Objective 3e: **Describe the health workforce in terms of composition and distribution**.	
Number of Licensed Physicians	Refers to the number of duly licensed and registered physicians in a given country (*if any*)
Number of Licensed Nurses	Refers to the number of duly licensed and registered nurses in a given country (*if any*)
Number of Licensed Dietitians	Refers to the number of duly licensed and registered dietitians in a given country (*if any*)
Number of Licensed Therapists	Refers to the number of duly licensed and registered therapists, of all specialties, in a given country (*if any*)

Number of Licensed Social Workers	Refers to the number of duly licensed and registered social workers for health in a given country (*if any*)
Number of Licensed Laboratory Technicians	Refers to the number of duly licensed and registered laboratory technicians for health in a given country (*if any*)
Number of Licensed Radiologists	Refers to the number of duly licensed and registered radiologists in a given country (*if any*)
Number of Other Key Health Professionals	Refers to the number of other duly licensed and registered key health professionals in a given country (*if any*)
Objective 3f: **Describe health financing models**, **including public and private expenditure on healthcare**.	
National Budget for Healthcare	Refers to the portion of the national government's budget allotted for all health-related activities, inclusive of prevention, detection, treatment, maintenance, and information dissemination, in US dollars (US$), adjusted by the country's current inflation rate, or in the country's national currency
Current Health Expenditure as Proportion of GDP	Refers to the level of current total health expenditure as expressed as a percentage of GDP in US dollars (US$), adjusted by the country's current inflation rate, or in the country's national currency
Public Expenditure as Proportion of GDP	Refers to the level of current public health expenditure as expressed as a percentage of GDP in US dollars (US$), adjusted by the country's current inflation rate, or in the country's national currency
Private Expenditure as Proportion of GDP	Refers to the level of current private health expenditure as expressed as a percentage of GDP in US dollars (US$), adjusted by the country's current inflation rate, or in the country's national currency
Current Health Expenditure per Capita	Refers to the sum of public and private health expenditures as a ratio of total population in US dollars (US$), adjusted by the country's current inflation rate, or in the country's national currency
Healthcare Expenditure by Source of Fund	Refers to the proportions of healthcare expenditure divided by the amount of fund was used from a specific source of funds (e.g., e.g., government, social health insurance, out-of-pocket, private voluntary health insurance, traffic insurance, employer benefit, non-profit-making institutes, rest of the world) in US dollars (US$), adjusted by the country's current inflation rate, or in the country's national currency
Objective 3g: **Present key health indicators and outcomes**, **such as disease burden**, **mortality rates**, **and healthcare utilization**.	
Leading Causes of Mortality	Refers to the top ten (10) recognized causes of mortality in a given country
Leading Causes of Morbidity	Refers to the top ten (10) recognized causes of morbidity in a given country
Life Expectancy at Birth per Sex	Refers to the average number of years that a newborn could expect to live, if he or she were to pass through life exposed to the sex- and age-specific death rates prevailing at the time of his or her birth, for a specific year, in a given country, territory, or geographic area
Total Adult Mortality Rate per Sex	Refers to the probability of dying between the ages of 15 and 60 years (per 1 000 population) per year among a hypothetical cohort of 100 000 people that would experience the age-specific mortality rate of the reporting year
Health Literacy Rate	Refers to the degree to which individuals have the ability to find, understand, and use information and services to inform health-related decisions and actions for themselves and others
Objective 3h: **Describe strengths**, **challenges**, **and potential areas for improvement**.	
Status of or Perceptions towards Pharmacists	Refers to the perceptions of citizens, health professionals, and/or other stakeholders towards pharmacists in a given country
Current Issues in the Practice of Pharmacy	Refers to the issues, hindrances, and/or barriers that impair the optimal practice of pharmacy in a given country
Perceived Strengths of Pharmacists	Refers to the perceptions of citizens, health professionals, and/or other stakeholders on the strengths of pharmacists and pharmacy practice in a given country

RESULTS and DISCUSSION

Objective 1: Characterization of the Practice of Pharmacy in each FAPA associated-country

Sub-objective 1A: Identification of the Roles and Responsibilities of Pharmacists

Variable 1A-1: Pharmacy Practice Regulation across the Globe

Regulating the practice of pharmacy is crucial for ensuring continuous access to safe, efficacious, and quality pharmaceutical products and healthcare services, as well as their effective and efficient use, toward improving and promoting health for the whole society. In a comprehensive analysis of 24 countries, it is evident that every country has a well-defined legal framework for overseeing and regulating the practice of pharmacy. These regulations serve as a primary guidance and function in various aspects of pharmacy, including education, industry, and clinical practice. Here is an overview of the pharmacy practice regulations in each country:

Afghanistan
- Pharmacy Regulation (2007)
- Medicine Law (2008)

Australia
- Health Practitioner Regulation National Law
- Australian Therapeutic Goods Act (1989)
- Pharmacy Practice Act 2006 No. 58
- Pharmacy Practice Regulation (2008)

Bangladesh
- Drugs Act (1940)
- The Bengal Drug Rules (1946)
- Pharmacy Ordinance (1976)
- Drug (Control) Ordinance (1982)
- National Drug Policy (2005)
- Drug (Control) Ordinance Amendment Act (2006)
- National Drug Policy (2016)

Cambodia
- Law on the Management of Pharmaceuticals (Pharmaceutical Law) (1996)
- Amendment on the Law on the Management of Pharmaceuticals (2007)
- Law on Drug Control (2011)

Hong Kong
- Import and Export Ordinance
- Public Health and Municipal Services Ordinance
- Pharmacy and Poisons Ordinance

India
- Pharmacy Act (1948)

Indonesia
- Law No. 36 Year 2009 on Health
- Government Regulation No. 51 Year 2009 on Pharmaceutical Works

Japan
- Pharmaceutical and Medical Device Act
- Poisonous and Deleterious Substances Control Law
- Narcotics and Psychotropics Control Law

Jordan
- Narcotic Drugs and Psychotropic Substances Law (1988)
- Temporary Drug and Pharmacy Law No. 80 of 2001
- Ministry of Health's Public Health Act (2008)
- The Drug and Pharmacy Law No. 12 of 2013

Korea
- Separation of Prescribing and Dispensing (SPD) Act (2000)
- Pharmaceutical Affairs Act
- Medical Device Act
- Korea Health Personnel Licensing Examination Institute Act

Macau
- Decree-Laws, Administrative Regulations, and Laws related to pharmacy practice, narcotics, and pharmaceutical products

Malaysia
- Registration of Pharmacist Act (1951)
- Other acts and regulations related to pharmacy practice and pharmaceutical products

- New Regulation for Licensing Pharmaceutical Establishments, No. 162 for the year 2019

Mongolia
- Law on Drugs and Medical Devices (1998)
- State Policy on Medicines and Health
- National Medicines Policy of Mongolia (NMPM)

Myanmar
- National Drug Law (1993)
- Amendment to National Drug Law (2014)
- Public Health Law (1972)

Nepal
- Nepal Pharmacy Council Act (2057)
- Drug Act (2035)
- Narcotic Drugs (Control Act) 2033
- National Drug Policy

Pakistan
- Pharmacy Act (1967)
- Drug Regulatory Authority of Pakistan (DRAP) Act (2012)
- Drugs Act (1976)
- Dangerous Drugs Act (1930)

Papua New Guinea
- National Medicines Policy (2014)
- Medicines and Cosmetics Act (1999)

Philippines
- Pharmacy Law
- Food, Drugs, and Cosmetics Act
- Generics Act (1988)
- Special Law on Counterfeit Drugs
- Comprehensive Dangerous Drugs Act
- Universally Accessible Cheaper and Quality Medicine Act (2008)
- Food and Drug Administration Act (2009)

Singapore
- Pharmacists Registration Act (2007)
- Pharmacy Practice Act of Singapore

Sri Lanka
- National Medicines Regulatory Authority Act
- Medicines Regulations of National Medicines Regulatory Authority Act
- Clinical Trial Regulations of National Medicines Regulatory Authority Act
- Poisons, Opium, and Dangerous Drugs Ordinance

Taiwan
- Pharmaceutical Affairs Act
- Pharmacists Act

Thailand
- Drug Control Act
- Professional Control Act
- Pharmaceutical Profession Act

United Arab Emirates
- Federal Law No. 8 of 2019 on Medical Products, Pharmacy Profession, and Pharmaceutical Establishments (Pharmaceutical Law)
- Federal Law No. 5 of 1984 (Medical Licensing Law)
- Federal Law No. 14 of 1995 (Medicine Importation Law)

Vietnam
- Law on Pharmacy (Law No. 105/2016/QH13)

Each country has established a legal framework that ensures that the practice of pharmacy is conducted safely, ethically, and in the best interest of public health. These regulations encompass a wide range of areas, from drug manufacturing and distribution to clinical practice and professional standards, emphasizing the critical roles of pharmacists in health systems worldwide. The regulation of pharmacy practice is a complicated and multifaceted process that varies considerably across nations. Nevertheless, there are patterns and similarities in the legal frameworks regulating pharmacy practice throughout the world:

1. **National Pharmacy Act**: Numerous nations have enacted National Pharmacy Acts or comparable laws that serve as the legal foundation for the practice of pharmacy. These laws frequently define pharmacists' duties, responsibilities, and licensure requirements. The Pharmacy Act of 1948 in India and the Pharmacy Act of 1967 in Pakistan are some examples.

2. **National Regulatory Body**: Most nations have a designated regulatory body that is responsible for supervising and enforcing pharmacy practice standards. These organizations ensure that pharmacists adhere to the laws and ethical standards. For instance, the UAE has Federal Law No. 8 of 2019 on Pharmaceutical Law.

3. **Control of Medications**: Pharmacy regulations are replete with laws pertaining to the control of medications. They regulate the management, production, distribution, sale, prescription and use of pharmaceutical products. These regulations are essential to guaranteeing the safety and quality of pharmaceutical products. The Australian Therapeutic Goods Act of 1989 and the Japanese Pharmaceutical Affairs Law are some examples.

4. **Drugs and psychoactive substances**: Numerous nations have laws governing the distribution and control of narcotics and psychoactive substances. These laws are indispensable for addressing potential drug abuse and ensuring that these substances are judiciously used for legitimate medical purposes. The Jordanian Narcotic Drugs and Psychotropic Substances Law and the United Nations Convention on Psychotropic Substances are some examples.

5. **Regulation of Pharmaceutical Products**: Numerous nations have formulated comprehensive drug policies that regulate pricing, accessibility, and regulation of pharmaceutical products. These policies aim to increase population access to essential medications. Such policies include Bangladesh's National Drug Policy and Malaysia's Control of Drugs and Cosmetic Regulations.

6. **Pharmaceutical Education**: Numerous nations have legislations that outline the requirements for pharmaceutical education and training, such as the accreditation of pharmacy institutions and the licensing of pharmacy professionals. Examples include the Nepal Pharmacy Council Act of 2057 and the National Competency Standards Framework for Pharmacists in Australia.

7. **Professional standards of conduct**: Numerous nations have enacted ethical and professional conduct codes for pharmacists. These codes establish standards for professional conduct and patient care. The Code of Professional Conduct for Registered Pharmacists in Hong Kong and the Singapore Pharmacy Council: Code of Ethics serve as examples.

8. **Clinical Trials and Research**: Regulations governing clinical trials and research involving pharmaceutical products are crucial for ensuring patient safety and research integrity. India's Pharmacy Practice Regulations (2015) and Bangladesh's Guidelines on Good Clinical Practice for Trials of Clinical Products (2015) are examples.

9. **Public Health Legislation**: Public health laws and pharmacy regulations may intersect, especially in regards to disease control and pharmaceutical interventions. Relevant examples are Afghanistan's Decree of President enforcing the Medicine Law (2008) and Thailand's Drug Control Act.

10. **International Agreements**: Some nations are signatories to international conventions and agreements pertaining to the regulation of pharmaceutical products and narcotics. These international agreements have an effect on national pharmacy laws. For instance, Cambodia adheres to the 2005 United Nations Convention against Illicit Trafficking in Narcotic Drugs and Psychotropic Substances.

Despite the fact that each country tailors its pharmacy practice laws to its unique health system and societal requirements, there are common themes and legal frameworks that underpin the practice of pharmacy globally.

These laws are intended to protect public health, assure the quality and safety of pharmaceutical products, and regulate pharmacists' professional conduct and practice.

Variable 1A-2: **Elevating Pharmacy Practice: International Practice Standards**

Pharmacists play a vital role in health systems worldwide. They ensure continuous access to safe, efficacious, and quality pharmaceutical products and healthcare services, as well as promote their rational and responsible use. To uphold these standards, countries across the globe have implemented practice guidelines and standards for pharmacists. These professionally recognized documents guide pharmacists in various areas of pharmacy practice. Here is an overview of practice standards from different countries:

Afghanistan
- Ministry of Public Health regulations on licensing

Australia
- National Competency Standards Framework for Pharmacists in Australia (2016)
- Professional Practice Standards (PSA)
- Standard for the Uniform Scheduling of Medicines and Poisons (the SUSMP) of The Poisons Standard
- National Medicines Policy
- Various guidelines from Pharmacy Board of Australia

Bangladesh
- Guidelines on Good Clinical Practice for Trials on Clinical Products
- Guideline for Good Manufacturing Practice (GMP)
- Clinical Trial Standard Operating Procedures

Cambodia
- Code of Ethics for Pharmacists (2014)
- ASEAN Common Technical Requirements (ACTR) and ASEAN Common Technical Dossier (ACTD)

Hong Kong
- Code of Professional Conduct for Registered Pharmacists (2017)

India
- Pharmacy Council of India Pharmacy Practice Regulations (2015)

Indonesia
- Minister of Health Regulations on Pharmaceutical Service Standards
- Guidelines on Good Manufacturing Practice (2018)
- Drug distribution standard set for good distribution practice (GDP)

Japan
- Enforcement Ordinance and Regulations of the Pharmaceutical and Medical Device Act
- Notifications issued by the Ministry of Health, Labour, and Welfare

Jordan
- Drug and Pharmacy Law (2001)
- Ministry of Health's Public Health Act (2008)
- Narcotic Drugs and Psychotropic Substances Law (1988)

Korea
- Korean Good Manufacturing Practice (KGMP) standards
- Pharmaceutical Affairs Act

Macau
- Advocacy for the development of practice guidelines, especially for Traditional Chinese Medicine

Malaysia
- Framework for Good Governance in the Public Pharmaceutical Sector
- Code of Ethics for Pharmacists (2018)
- Guide to Good Dispensing Practice (2016)

- Malaysian National Medicines Policy (DUNAS) for 2017-2021

Mongolia
- National Medicines Policy of Mongolia (NMPM)
- Good manufacturing practices for pharmaceutical products
- General requirements of pharmacy

Myanmar
- National Drug Law of 1992

Nepal
- National Good Pharmacy Practice Guidelines
- Nepal Pharmacy Council Act (2057)

Philippines
- The Philippine Practice Standards for Pharmacists (PhilPSP)

Singapore
- Development Framework for Pharmacists (DFP)
- Competency Standards for Singapore Pharmacists
- Pharmacy Technician Entry-to-Practice Competency Standards

Sri Lanka
- Guidelines on Good Pharmacy Practice
- Guidelines on Good Distribution Practice
- Guidelines for Community Pharmacy Practice

Taiwan
- Pharmacist Act
- Regulations on Good Practices of Drug Dispensation

Thailand
- Code of Ethics of Pharmacy Profession

United Arab Emirates
- Pharmacy Standards
- Pharmacy Guidelines

Vietnam
- Competency Standards for Vietnam Pharmacist
- Regulations on Good Practice of Drug Retailers

These practice standards guide and empower pharmacists to provide optimal pharmaceutical care, maintain professional ethics, and ensure the highest standards of safety and efficacy in healthcare practices across diverse global landscapes.

Pharmacists, as essential healthcare professionals, are entrusted with a crucial role in the healthcare systems of various countries worldwide. They ensure that quality medicines are continuously accessible and optimally used by the whole society. To achieve this, countries have developed comprehensive practice standards and guidelines. These documents serve as the foundation for pharmacists' professional competency, conduct, and patient care. Notably, there are common themes and patterns in the standards of pharmacy practice throughout the world:

1. **Regulatory Oversight**: In most countries, there is a strong emphasis on regulatory oversight to ensure that pharmacists adhere to established professional standards. Regulatory bodies and government ministries are often responsible for overseeing and enforcing these standards.

2. **Professional Ethics**: Many countries, including Cambodia, Hong Kong, and Singapore, have established codes of ethics and professional conduct for pharmacists. These codes set forth the ethical principles that pharmacists are expected to follow in their practice.

3. **Medication Safety**: Medication safety is a universal concern, and guidelines related to the safe and effective management of medicines are common. For example, guidelines on good dispensing, good compounding, and good distribution practices are frequently mentioned.

4. **Clinical Practice**: Pharmacy practice is evolving to encompass a more clinical role. This is evident in the presence of guidelines related to clinical pharmacy practice, such as medication therapy management and pharmacotherapy guidelines.

5. **Manufacturing and Quality Standards**: Several countries have developed guidelines and regulations related to pharmaceutical manufacturing and quality control. These standards are vital for ensuring the safety, efficacy, and quality of medicines.

6. **Drug Control and Narcotics**: Many countries have specific laws and guidelines regarding the control of narcotics and psychotropic substances. This reflects the global concern for preventing drug abuse and misuse.

7. **Patient Care**: The guidelines often emphasize patient-centered care, with a focus on ensuring that patients receive the necessary information, counseling, and support related to their medications.

8. **Continuing Education and Professional Development**: Several countries highlight the importance of continuous education and professional development for pharmacists. These guidelines encourage pharmacists to stay updated with the latest developments in healthcare.

9. **International Standards**: Many countries align their pharmacy practice standards with international guidelines and standards, such as those set by the World Health Organization (WHO) and regional organizations, like ASEAN.

10. **Government Policies**: National healthcare policies and government initiatives play a significant role in shaping pharmacy practice standards. These policies often prioritize access to essential medicines and quality healthcare services.

In summary, while each country tailors its pharmacy practice standards to its unique health system and cultural context, there are common themes and patterns that reflect the global commitment to ensuring the highest standards of pharmacy practice. These standards are essential for institutionalizing the competencies of a pharmacist, maintaining public trust in the pharmacy profession and, most importantly, ensuring patient safety and well-being.

Sub-objective 1B: Description of the Scope of Pharmacy Services provided, including, but not limited to, dispensing, patient counseling, and medication therapy management.

Variable 1B-1: **Practice Settings and Emerging Fields**

Table 2. Practice settings and fields in Asian countries

Fields of practice	Frequency (n)	Percentage (%)
Hospital pharmacy	23	96.00
Industrial pharmacy	22	92.00

Community pharmacy	22	92.00
Pharmacy education, Pharmacy research	16	67.00
NGOs, Ministry of Health, Government	9	38.00
Clinical pharmacy	6	25.00
Regulatory affairs	6	25.00
Health promotion and Public health services	5	21.00
Medical laboratories and Biomedical laboratories	2	8.00
Private business/enterprise	2	8.00
Drug and poison information	2	8.00
Traditional medicine	1	4.00
Insurance industry	1	4.00

Over the years, the practice of pharmacy has significantly evolved and diversified, with pharmacists contributing their expertise to various disciplines of practice. An analysis of data from 24 countries reveals a diverse array of practice settings and emerging disciplines in which licensed and registered pharmacists are actively engaged.

The dataset contains information from 24 countries, offering a comprehensive overview of pharmacy practice settings and emerging disciplines across diverse regions, healthcare systems, and regulatory frameworks. This inclusiveness assures an exhaustive depiction of the global pharmacy landscape.

Hospital pharmacy (95.83%): Hospital pharmacy emerges as the most predominant field of practice, with 95.83% of countries reporting its presence. In hospital settings, pharmacists perform essential roles in patient care, medication management, and ensuring the safe and effective use of medications in hospital institutions.

Industrial pharmacy (91.67%): A significant proportion of nations recognizes industrial pharmacy as an essential practice context. In this discipline, pharmacists contribute to pharmaceutical manufacturing, quality control, and research on drug discovery and development.

Community pharmacy (91.67%): Community pharmacies are essential to the accessibility of healthcare. The services provided by community pharmacists include dispensing, patient counseling, and health promotion.

Pharmacy Education/Research (66.67%): A significant proportion of nations recognize pharmacy education and research as developing fields. This reflects an increasing emphasis on advancing pharmacy knowledge and cultivating future pharmacists.

NGOs, Ministry of Health, Government (37.50%): Pharmacists contribute their expertise to government agencies and non-governmental organizations, influencing public health policy and programs.

Clinical Pharmacy (25.00%): Clinical pharmacists actively participate in patient care teams, optimizing medication therapy, and ensuring safe, evidence-based practices.

Regulatory Affairs (25.00%): In regulatory duties, pharmacists play a crucial role in facilitating drug approval, drug safety monitoring, and regulatory compliance.

Health Promotion and Public Health Services (20.83%): Pharmacists participate in public health initiatives, health education campaigns, and health promotion campaigns.

Medical and Biomedical Laboratories (8.33%): Pharmacists apply their expertise to medical and biomedical laboratories to ensure accurate diagnostic testing and laboratory quality control.

Private Business/Enterprise (8.33%): Some pharmacists establish private businesses related to pharmaceutical products and healthcare services.

Drug and poison Information (8.33%): Pharmacists provide significant information and expertise on managing drug-related inquiries and toxicity control.

Traditional Medicine (4.17%): In particular nations, pharmacists participate in traditional medicine practices, as well as preservation and incorporation of traditional therapeutic techniques.

Insurance Industry (4.17%): Pharmacists contribute to the insurance industry by evaluating medication-related risks and providing coverage expertise.

Diverse pharmacy practice settings and emerging fields demonstrate the profession's adaptability and continued relevance in meeting the evolving healthcare requirements. Contributing to better health outcomes and healthcare system resiliency, pharmacists continue to play a vital role in healthcare delivery, public health, research, and numerous specialized areas. Further analysis and collaboration can shed light on the roles and effects of pharmacists in these diverse practice contexts, fostering innovation and excellence in the field.

Variable 1B-2: Number of Pharmacists by Type

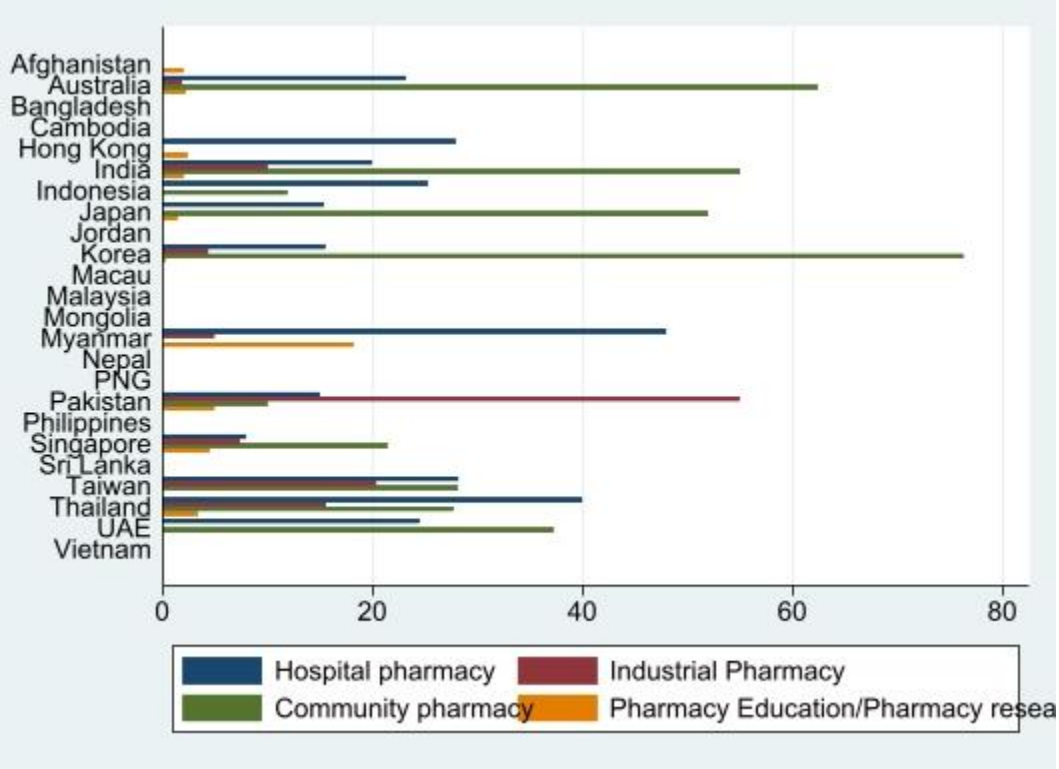


Figure 1. Number of pharmacists by type in every FAPA-associated country

The pharmacy profession is immensely diverse, with pharmacists working in a variety of practice settings and making unique contributions to the effective delivery of pharmaceutical products and healthcare services. An analysis of data from a selection of nations reveals the distribution of licensed and registered pharmacists across distinct practice areas. Below is a comprehensive overview.

Representation in Numerous Practice Areas:
The dataset contains information from multiple nations, providing a multifaceted perspective on pharmacy practice. Each practice area is a distinct facet of the profession of pharmacy, catering to specific healthcare requirements and services.

Community pharmacy: With an average of 38.20 pharmacies, community pharmacies emerge as an important practice area within the dataset. These pharmacies are frequently the first line of defense in healthcare, providing vital services to the public.

Hospital pharmacy: With a mean of 24.25 pharmacies, hospital pharmacies are equally significant. In hospital settings, pharmacists perform essential roles in patient care, medication management, and ensuring the safe and effective use of medications in healthcare institutions.

Diverse Specialized Fields:
Industrial Pharmacy: With an average of 14.96 pharmacies, this practice area is involved in pharmaceutical manufacturing, quality control, and research.

Pharmacy Education/Research in Pharmacy: This practice area, which has a mean of 4.14 pharmacies, focuses on advancing pharmacy knowledge and cultivating the next generation of pharmacists, despite its lesser size.

Non-governmental Organizations (NGO), Health Ministry, and Government: With an average of 19.10 pharmacies, government and NGOs pharmacists are instrumental in shaping public health policy, programs, and projects.

Clinical Pharmacy: With an average of 8.73 pharmacies, clinical pharmacists actively participate in patient care teams, optimizing medication therapy and ensuring safe, evidence-based practices.

Regulatory Affairs: This practice area, which is represented by an average of 12.85 pharmacies, is essential for drug approval, safety surveillance, and regulatory compliance.

Health Promotion and Public Health Services: With an average of 16.12 pharmacies, this practice area participates in public health initiatives, health education, and promotion campaigns.

Medical and Biomedical laboratories: Although there is only one pharmacy in this profession, laboratory pharmacists contribute to accurate diagnostic testing and laboratory quality control.

Private Business/Enterprise: Pharmacists who venture into entrepreneurship, with a mean of 33.32, establish private pharmaceutical and healthcare-related businesses.

Drug and Poison Information: One pharmacy specializes in drug-related inquiries and toxicity control.

Traditional Medical Practices: In particular nations, a practice area devoted to traditional medicine (mean: 0.70) incorporates traditional healing techniques.

Other specialized areas: Additional specialized areas, with an average of 14.00 pharmacies, contribute to various aspects of healthcare.

The diversity of pharmacy practice settings and emerging fields demonstrates the profession's adaptability and continued relevance in meeting evolving healthcare requirements. Pharmacists continue to play crucial roles in healthcare delivery, public health, research, and a variety of specialized fields, thereby contributing to improved health outcomes and healthcare system resilience. Further analysis can shed light on the specific roles and effects of pharmacists in these various practice settings, thereby fostering innovation and excellence in the field.

Variable 1B-3: Number of Community Pharmacy Outlets

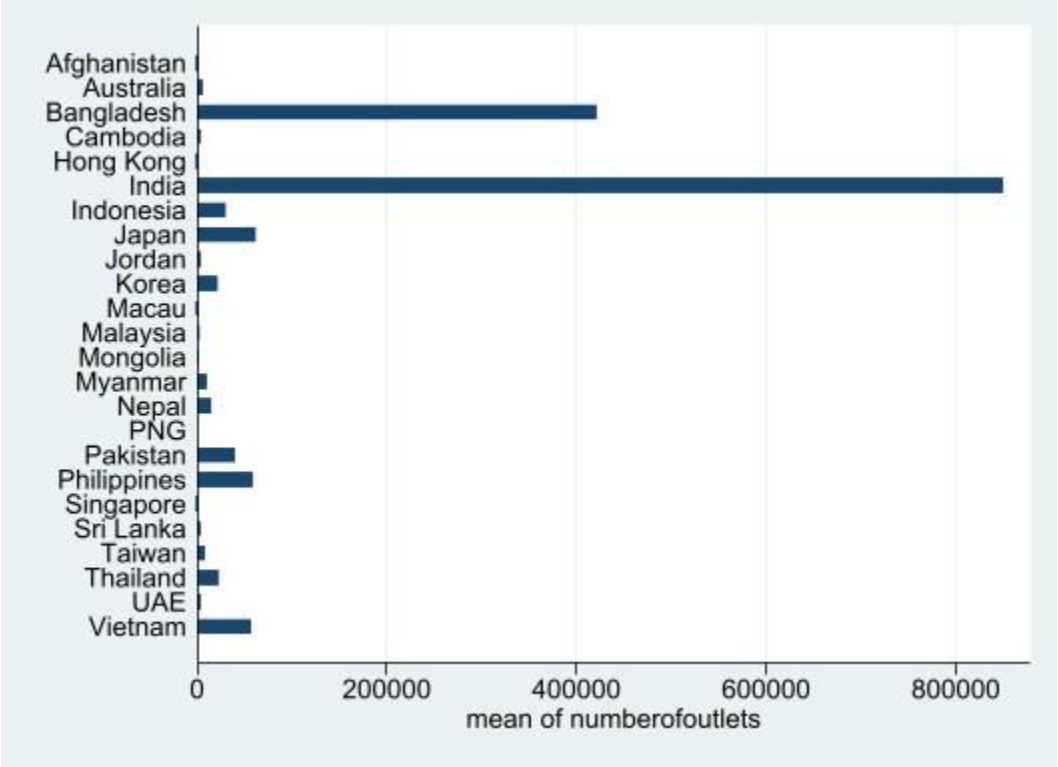


Figure 2. Number of community pharmacy outlets in every FAPA-associated country

The data provides us with valuable insights into the scope and distribution of these outlets. On average, the number of community pharmacy outlets per country stands at approximately 70,429.26, showcasing a significant variability with a standard deviation of 190,647.50. The range is quite extensive, spanning from a minimum of 287 to a maximum of 850,000 outlets.

As we explore this data further, we find that the median value is 8,234 outlets, indicating that half of the countries have fewer community pharmacy outlets than this value.

This variability reflects the diverse landscape of community pharmacy outlets across the countries in our study, highlighting the differences in healthcare infrastructure and access to pharmaceutical services.

Variable 1B-4: Pharmacy Practice Hours

Countries with **8-9 hours scheme**

Afghanistan
Hong Kong
Taiwan
Korea
Philippines
Mongolia
Thailand
Singapore
Macau
Bangladesh
Papua New Guinea
Sri Lanka
Jordan

Countries with **9-10 hours scheme**

Afghanistan
Philippines
India
Cambodia
Australia
Bangladesh
Japan
Malaysia
Macau
Myanmar
Korea
Vietnam
Taiwan

Countries with **14-15 hours scheme**

Mongolia
Macau
Indonesia
Australia
Cambodia

Countries with **24 hour scheme**

Vietnam
Mongolia
Nepal
Afghanistan
Korea
UAE
Hong Kong
India
Pakistan
Australia
Philippines
PNG
Singapore

Pharmacy practice hours are a crucial aspect of healthcare accessibility as they ensure that communities have access to essential medications and pharmaceutical services. Our research has revealed the wide variety of pharmacy practice hour schemes adopted by countries around the globe, demonstrating their dedication to meeting the healthcare needs of their respective populations.

Our dataset provides insights into the prevalence of these different practice hour schemes across the countries studied. For instance, the “8-9 hours” scheme is observed in 13 countries, while the “9-10 hours” and “24 hours” schemes are prevalent in the same number of countries. The “14-15 hours” scheme, indicating extended pharmacy hours, is present in 5 countries.

Countries with an 8-9 Hour Workday: The “8-9 hours” pharmacy practice scheme has been adopted by 13 countries. These countries, ranging from Afghanistan to Jordan, have selected this schedule to ensure that their pharmacies are open and accessible to patients during specific hours of the day. The “8-9 hours” scheme makes pharmaceutical care more accessible to both urban and rural communities.

Countries with 9-10 Hour Work Weeks: Additionally, 13 countries, including Myanmar, India, and Japan, have adopted the “9-10 hours” pharmacy practice scheme. This extended time frame reflects a commitment to providing healthcare access outside of the traditional working hours, in recognition of the varied requirements and schedules of patients.

Countries with 14-15 Hour Work Weeks: The “14-15 hours” of pharmacy practice scheme has been adopted by five nations, including Mongolia and Australia. These countries recognize the significance of extended pharmacy hours, catering to the healthcare requirements of communities that may require access to medications and advice on nights and during weekends.

Countries with a 24-hour clock: Notably, 13 nations have opted for a “24-hour” pharmacy practice scheme, providing pharmaceutical services around-the-clock. From Vietnam to Singapore, these nations ensure that patients have access to medications and medical advice at all hours of the day and night, accentuating the significance of accessibility and convenience.

The implications are: Different pharmacy practice hour schemes demonstrate the adaptability of healthcare systems to satisfy the specific needs of their populations. The choice of practice hours is influenced by population density,

cultural practices, and healthcare policies. The dedication to adaptable pharmacy services explicitly reflects a commitment to enhancing healthcare accessibility and patient outcomes.

The following are future considerations: This information encourages additional research into the influence of various pharmacy practice hour schemes on healthcare outcomes, medication adherence, and healthcare access. Comparative international studies can shed light on the best practices for optimizing pharmacy hours, thereby ensuring that patients have expeditious access to medications and services.

In conclusion, our examination of pharmacy practice hour programs across nations demonstrates the global commitment to expanding access to healthcare. These initiatives serve as a basis for ongoing discussions and research aimed at enhancing pharmaceutical care and ensuring that healthcare services are accessible to communities around the globe.

Variable 1B-5: Roles of the Pharmacist during the COVID-19 Pandemic

Table 3. Different roles of pharmacists during the COVID-19 pandemic

Roles	Frequency (n)	Percentage (%)
Information Dissemination and Counseling	21	88.00
Community Engagement and Support	8	33.00
Medication Procurement and Management	7	29.00
Infection Control and Prevention	7	29.00
Expanded Pharmacy Services	6	25.00
Storage and Distribution Oversight	5	21.00
Vaccination Activities	4	17.00
Telehealth and telepharmacy	3	13.00
Role in Vaccine Logistics	2	8.00
Adaptation to Drug Management	2	8.00

Analyzing the roles of pharmacists during the COVID-19 pandemic across 24 countries reveals various trends and patterns, highlighting how pharmacists have adapted to the evolving healthcare landscape. Frequencies and percentages demonstrate the prevalence of certain roles in these countries.

1. **Information Dissemination and Counseling**
    - Percentage: 87.50% (21 out of 24)
    - Frequency: Over 87.00% of the countries emphasized the role of pharmacists in educating the public about COVID-19, providing information, and offering counseling services. This widespread involvement underscores the importance of pharmacists as accessible healthcare resources.

2. **Medication Procurement and Management**
    - Percentage: 29.17% (7 out of 24)
    - Frequency: Around 29.00% of the countries, including India and Indonesia, focused on pharmacists' participation in medication procurement and management. This role ensured a steady supply of essential drugs during the pandemic.

3. **Vaccination Activities**

- Percentage: 16.67% (4 out of 24)
- Frequency: Approximately 17.00% of countries, such as Australia and Japan, actively involved pharmacists in vaccination activities. This highlights the expanding role of pharmacists in vaccine distribution and administration during public health crises.

4. **Telehealth and Telepharmacy**
   - Percentage: 12.50% (3 out of 24)
   - Frequency: In 12.50% of cases, as seen in Australia and Pakistan, pharmacists provided telehealth interventions, and conducted medication reviews and consultations through digital platforms. Telepharmacy emerged as a vital drug information service during the pandemic.

5. **Community Engagement and Support**
   - Percentage: 33.33% (8 out of 24)
   - Frequency: In about one-third of the countries, including Jordan and Macau, pharmacists were actively engaged in community support. They provided care packages, masks, sanitizers, and conducted telephone interviews to support their communities.

6. **Role in Vaccine Logistics**
   - Percentage: 8.33% (2 out of 24)
   - Frequency: Some countries, like Indonesia, recognized pharmacists' roles in vaccine logistic management. This highlights the vital part pharmacists play in ensuring the effective distribution of vaccines.

7. **Adaptation to Drug Management**
   - Percentage: 8.33% (2 out of 24)
   - Frequency: A few countries, such as Indonesia, witnessed pharmacists adapting their drug management practices, reducing non-COVID-19 pharmaceutical preparations. This shift demonstrates pharmacists' flexibility in responding to evolving healthcare needs.

8. **Infection Control and Prevention**
   - Percentage: 29.17% (7 out of 24)
   - Frequency: Around 29.00% of the countries, like Thailand and UAE, focused on pharmacists' roles in infection control and prevention. This involved counseling on preventive measures and ensuring appropriate protective equipment.

9. **Expanded Pharmacy Services**
   - Percentage: 25.00% (6 out of 24)
   - Frequency: Approximately 25.00% of countries, such as the Philippines and Singapore, witnessed pharmacists expanding their services, including electronic accessibility, administration of COVID-19 vaccines, and compounding of hand sanitizers.

10. **Storage and Distribution Oversight**
    - Percentage: 20.83% (5 out of 24)
    - Frequency: Over 20.00% of countries, like UAE and Sri Lanka, saw pharmacists playing a role in overseeing the storage and distribution of essential medical supplies, ensuring their quality and accessibility.

These trends showcase the vital roles and contributions of pharmacists during the COVID-19 pandemic. They ranged from information dissemination and counseling to medication procurement, vaccination, and community support. Pharmacists worldwide adapted their roles to meet the unique challenges posed by the pandemic, reinforcing their position as crucial and indispensable healthcare providers in times of crisis.

Variables 1B6-7: **Pharmaceutical Manufacture, Importation, and Exportation**

In the ever-changing healthcare and pharmaceutical landscape, pharmaceutical manufacturing and import or export activities are crucial to a country's healthcare infrastructure and economic development. A detailed analysis of 24 countries shows the status of pharmaceutical manufacturing and import/export operations worldwide. Below is an overview.

Pharmaceutical Manufacturing: A country's healthcare relies on pharmaceutical manufacturing. Local pharmaceutical production meets local healthcare demands and contributes to worldwide supply chains. In this dataset, all 24 countries legally manufacture pharmaceuticals. This shows self-sufficiency and the ability to produce medicines that are vital to achieve the health outcomes of populations.

Pharmaceutical Import/Export: A country's pharmaceutical trade involvement is shown by its imports and exports. Exporters and importers are crucial to the global pharmaceutical sector. Notably, all 24 countries in this dataset import and export pharmaceuticals legally. Their international pharmaceutical trade and healthcare access contributions are highlighted.

Insights and Implications:

1. **Healthcare Self-Sufficiency:** Countries with pharmaceutical manufacturing capabilities prioritize healthcare self-sufficiency. This is crucial for maintaining necessary pharmaceutical products and medicine supplies, especially during crises.

2. **Worldwide Trade Partners:** The countries' pharmaceutical import or export activities demonstrate their worldwide trade partnerships. They trade pharmaceutical products towards improving global healthcare.

3. **Diverse Contributions:** Each country's pharmaceutical manufacturing and trading strategy depends on its healthcare demands, economic interests, and regulations. The dataset helps explain these various approaches.

4. **Economic Impact:** Pharmaceutical manufacturing and trade create jobs, income, and healthcare innovation, thereby significantly influencing economic growth.

5. **Access to medications:** A strong pharmaceutical industry, including manufacture and commerce, improves population health by increasing access to important medications that adequately address major burdens of diseases.

Finally, the information showing pharmaceutical manufacturing and import/export activity in all 24 nations shows the global dedication to pharmaceutical self-sufficiency and active engagement in international pharmaceutical commerce. These actions boost healthcare resilience, economic growth, and global healthcare equity. More research and collaboration can elucidate these nations' complex pharmaceutical manufacture and trading.

Variable 1B8: Types of Pharmaceutical Products in each Asian country

Table 4. Types of Pharmaceutical Products in Asian countries

Pharmaceutical Product	Frequency (n)	Percentage (%)
Human (Western) Medicine	18	75.00
Biologicals, vaccines, biosimilars, Cell, tissue and gene therapy products	15	63.00

Medical devices, radiation devices, health-related devices	13	54.00
Cosmetic	10	42.00
Herbal medicine	9	38.00
Traditional	8	33.00
Veterinary Medicine	7	29.00
Prescription/special instruction drugs	6	25.00
Health supplements/vitamins	6	25.00
OTC	5	21.00
Other therapeutic goods, diagnostic, paramedical, surgical, radiopharmaceutical	5	21.00
Food products for infants and young children	4	17.00
TCM	3	13.00
Pharmaco-chemical, (Medicinal) raw materials	3	13.00
Unani	2	8.00
Homeopathic	2	8.00
Contract research and manufacturing products	2	8.00
Parenterals and fluid replacements	2	8.00
Complementary medicine	1	4.00
Bulk product	1	4.00
Ayurvedic	1	4.00
Food hygiene and safety	1	4.00
Ayush drug	1	4.00
Household hazardous/urban substances	1	4.00
Tobacco	1	4.00
GSL	1	4.00

To evaluate healthcare infrastructures and the accessibility of necessary pharmaceuticals and healthcare supplies, it is crucial to comprehend the pharmaceutical product landscape. This analysis sheds light on the wide range of pharmaceutical items that are now produced, distributed, imported/exported, traded, or repackaged within the borders of 24 countries. Here is a complete analysis, including the percentage distribution among these countries:

1. **Human (Western) medicine** (18 types)
    - Percentage distribution: 75.00%
    - Human medicines, available in a wide variety of formulations, make up a sizable percentage of the pharmaceutical industry, guaranteeing access to necessary therapies.

2. **Biological, vaccine, biosimilar, cell, tissue, and gene therapy products** (15 types)
    - Percentage Distribution: 63.00%

- Biological goods are essential for the treatment and prevention of disease, including vaccines and cutting-edge medicines.

3. **Health-Related Devices, Radiation Devices, and Medical Devices** (13 types)
    - Percentage Distribution: 54.00%
    - Medical devices are crucial for patient care and diagnostic procedures. These include health-related and diagnostic equipment.

4. **Cosmetics** (10 types)
    - Percentage Distribution: 42.00%
    - Cosmetic products improve personal care and appearance, improving total wellbeing.

5. **Herbal Medicines** (9 types)
    - Percentage Distribution: 38.00%
    - Herbal medications are in line with conventional medical procedures in that they harness the medicinal potential of natural components.

6. **Traditional Medicines** (8 types)
    - Percentage Distribution: 33.00%
    - Traditional medicines, which have a strong cultural foundation, nevertheless provide comprehensive healthcare solutions.

7. **Veterinary Medicines**
    - Percentage Distribution: 29.00%
    - Veterinary drugs meet the demands of animals in terms of health, assuring their welfare and effectiveness.

8. **Drugs on Prescription/With Special Instructions** (6 types)
    - Percentage Distribution: 25.00%
    - Prescription medications are essential for treating a variety of medical issues, and they frequently come with detailed instructions.

9. **Health Supplements/Vitamins**
    - Percentage Distribution: 25.00%
    - Vitamins and dietary health supplements support a person's general health and nutritional requirements.

10. **Over-the-Counter (OTC)** (5 types)
    - Percentage Distribution: 21.00%
    - OTC drugs are widely accessible without a prescription, providing convenience for frequent health conditions.

11. **Radiopharmaceutical, Diagnostic, Paramedical, Surgical, and Other Therapeutic Goods** (5 types)
    - Percentage Distribution: 21.00%
    - This category covers a wide range of goods, including radiopharmaceuticals, paramedical gear, surgical tools, and diagnostic tools.

12. **Food for infants and young children** (4 types)
    - Percentage Distribution: 17.00%
    - The nutritional requirements of newborns and young children are met by specialized food items, promoting optimal growth and development.

13. **Traditional Chinese Medicine** (3 types)
    - Percentage Distribution: 13.00%

- TCM is a collection of age-old treatments and therapies with strong roots in Chinese culture.

14. **Pharmaco-chemical (medicinal) raw materials** (3 types)
    - Percentage Distribution: 13.00%
    - The creation of pharmaceutical products begins with raw ingredients.

15. **Unani** (2 types)
    - Percentage Distribution: 8.00%
    - The ancient healing practices that gave rise to unani medicine are still practiced today.

16. **Homeopathic** (2 types)
    - Percentage Distribution: 8:00%
    - To stimulate the body's natural healing processes, homeopathic treatments use very diluted ingredients.

17. **Contract Research and Manufacturing Products** (2 types)
    - Percentage Distribution: 8.00%
    - Contract research and manufacturing services help in the development and manufacturing of pharmaceuticals.

18. **Parenterals and Fluid Replacements** (2 types)
    - Percentage Distribution: 8.00%
    - Fluid replacements and parenteral products are essential in critical care situations.

19. **Supplemental medicine** (1 type)
    - Percentage Distribution: 4.00%
    - Complementary medicine provides all-encompassing approaches to wellbeing and health.

20. **Bulk Product** (1 type)
    - Percentage Distribution: 4.00%
    - Bulk goods constitute the basis for a variety of pharmaceutical compositions.

21. **Ayurvedic** (1 type)
    - Percentage Distribution: 4.00%
    - Ayurvedic medications are based on conventional Indian medicine from long ago.

22. **Food hygiene and safety** (1 type)
    - Percentage Distribution: 4.00%
    - Food safety and hygiene products ensure that food is consumed safely.

23. **Ayush** (1 type)
    - Percentage Distribution: 4.00%
    - Ayush medicines play a crucial role in conventional Indian medical practices.

24. **Household hazardous/urban substances** (1 type)
    - Percentage Distribution: 4.00%
    - These products address domestic dangers and urban problems to improve public safety.

25. **Tobacco** (1 type)
    - Percentage Distribution: 4.00%
    - The pharmaceutical industry oversees the management of tobacco products in order to solve public health issues.

26. **General Sales List** (1 type)

- Percentage Distribution: 4.00%
- The goods on the General Sales List are accessible to everyone and are sold without a prescription.

The wide range of pharmaceutical goods available reflects the various and changing healthcare requirements of the 24 countries. Making decisions about healthcare and personal well-being requires the understanding of this broad spectrum by consumers, legislators, and healthcare professionals.

Variable 1B-9: Number of Registered Pharmaceutical Products

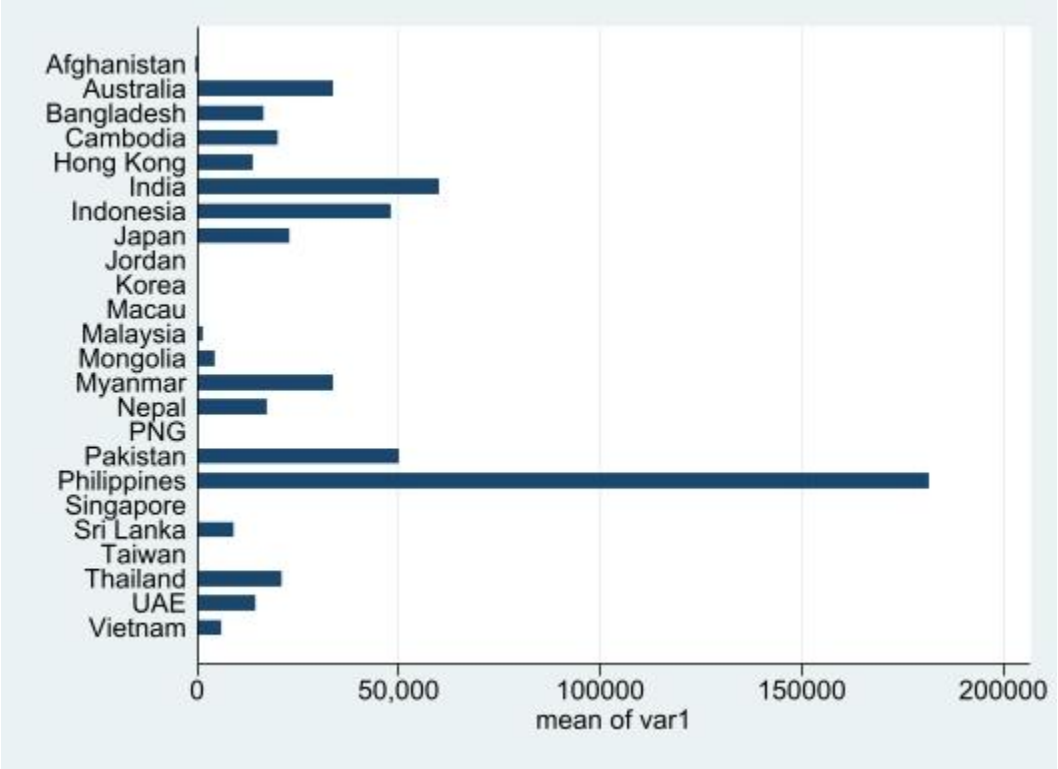


Figure 3. Number of Registered Pharmaceutical Products

The dataset provides valuable insights into the number of registered pharmaceutical products across 24 countries. The total number of registered pharmaceutical products across these countries is a substantial 552,999, showcasing the extensive range of medications and healthcare solutions available. The median value, which stands at 18,581, represents the middle point of this distribution, indicating that roughly half of the countries have fewer registered pharmaceutical products, while the other half have more.

The mean value of 30,722.17 illustrates the average number of registered pharmaceutical products per country, with some of them registering significantly more products, potentially reflecting diverse healthcare needs and pharmaceutical industries. However, it is important to note the considerable standard deviation of 41,356.65, highlighting the variability in the number of registered products across these countries. While some nations, like the Philippines, show a remarkably high count of 181,489 registered products, others, such as Afghanistan with 127 registered products, have significantly fewer.

This dataset not only underscores the global diversity in pharmaceutical products but also emphasizes the importance of ensuring access to a wide range of medications to address specific healthcare requirements and disease burdens in each country. It also raises questions about the factors influencing these disparities, such as population size, healthcare infrastructure, and regulatory policies, which can significantly impact the number of registered pharmaceutical products in a given nation. Further analysis and research may shed light on the reasons behind these variations and their implications for public health and healthcare systems.

Variable 1B-10: **Local and Multinational Pharmaceutical Profiles**

The analysis of local and multinational pharmaceutical profiles within the legal jurisdictions of 24 countries reveals a complex and dynamic landscape in the global pharmaceutical industry. This analysis showcases the prevalence of both local and multinational pharmaceutical companies in these countries, contributing to the diverse and multifaceted nature of healthcare and pharmaceutical access.

Local pharmaceutical companies are a cornerstone of the pharmaceutical sector in all countries studied. These local entities play a vital role in ensuring that pharmaceutical products are accessible to their populations, often catering to the specific healthcare needs of their communities. Whether it is through producing essential medications, conducting research, or fostering innovation, local pharmaceutical companies are deeply embedded in their respective healthcare ecosystems.

On the other hand, multinational pharmaceutical companies have also established a significant presence across 22 out of the 24 countries. These global players bring with them a wealth of resources, expertise, and a broad portfolio of pharmaceuticals. Their presence underscores the interconnectedness of the pharmaceutical industry on a global scale. Multinational companies often drive advancements in research and development, contributing to the availability of cutting-edge treatments and medications.

The coexistence of local and multinational pharmaceutical companies exemplifies the diverse approaches to healthcare and pharmaceutical access worldwide. Local companies are essential for tailoring pharmaceutical solutions to the unique needs of their regions, whereas multinational corporations provide access to a broader spectrum of pharmaceutical options and are often at the forefront of medical breakthroughs.

This analysis highlights the importance of both local and multinational pharmaceutical companies in ensuring the availability and accessibility of medications and healthcare solutions globally. The dynamic interplay between these two types of entities contributes to the ever-evolving landscape of the pharmaceutical industry, ultimately benefiting patients and healthcare systems in these countries.

Sub-objective 1C: Description of the Integration of Pharmacists in Multidisciplinary Healthcare teams and Collaborative Practices.

Variable 1C-1: **Stakeholders for the Practice of Pharmacy**

Analyzing the stakeholders involved in shaping pharmacy practice across various countries reveals several patterns. These stakeholders play pivotal roles in regulating, guiding, and advancing the practice of pharmacy within their respective countries. Here is a summary of these patterns:

Government Oversight: Regulatory Authorities: Nearly all countries have established regulatory authorities responsible for overseeing pharmaceuticals and pharmacy practice. These include agencies like the Ministry of Health, Department of Health, or Drug Control Committee. These entities ensure compliance with standards and regulations, safeguard public health, and promote best practices.

Pharmacy Associations: Professional Pharmacist Associations: Pharmacy associations, such as the Pharmaceutical Society of Taiwan or the Indonesian Pharmacist Association, are prevalent stakeholders. They work to advance the profession, advocate for pharmacists, and contribute to the development of pharmacy standards.

Education and Accreditation: Pharmacy Education: Many countries have institutions or departments within ministries responsible for regulating pharmacy education and accreditation. These entities ensure the quality and relevance of pharmacy programs, contributing to the training of future pharmacists.

Healthcare Authorities: Health Ministries: Most countries involve their health ministries in pharmacy practice regulation and development. These ministries often play a significant role in creating policies that impact pharmacy practice.

Industry Associations: Pharmaceutical Industry Associations: Associations related to the pharmaceutical industry, such as the Association of Indonesian Pharmacy Higher Education or the Pharmaceutical Research and Manufacturers Association in Thailand, contribute to shaping pharmacy practice standards and policies, especially concerning pharmaceutical products.

International Collaboration: World Health Organization (WHO): The WHO is a prominent international stakeholder that collaborates with national authorities and organizations to establish global standards for pharmaceuticals and healthcare.

Unique Stakeholders: Traditional Medicine: In some regions like Hong Kong and Macau, there is a focus on traditional medicine, leading to unique stakeholders like the Chinese Medicine Development Committee and Traditional Chinese Medicine-related bureaus.

Policy and Regulation Development: Advisory Committees: Australia and other countries have advisory committees that provide expertise and recommendations on various aspects of pharmacy practice, ensuring a multi-faceted approach to policy development.

While each country's pharmacy practice landscape is unique, these patterns highlight the critical role played by regulatory bodies, professional associations, and governmental organizations in shaping and advancing pharmacy practice on a global scale. Collaboration between these stakeholders is essential to ensure the highest standards of patient care and medication management.

Variable 1C-2: **National Organizations for Pharmacy**

National organizations for pharmacy play a pivotal role in representing and regulating the pharmacy profession within each respective country. These organizations are responsible for ensuring that pharmacists adhere to professional standards and guidelines, advocating for the profession's interests, and promoting the highest quality of healthcare services.

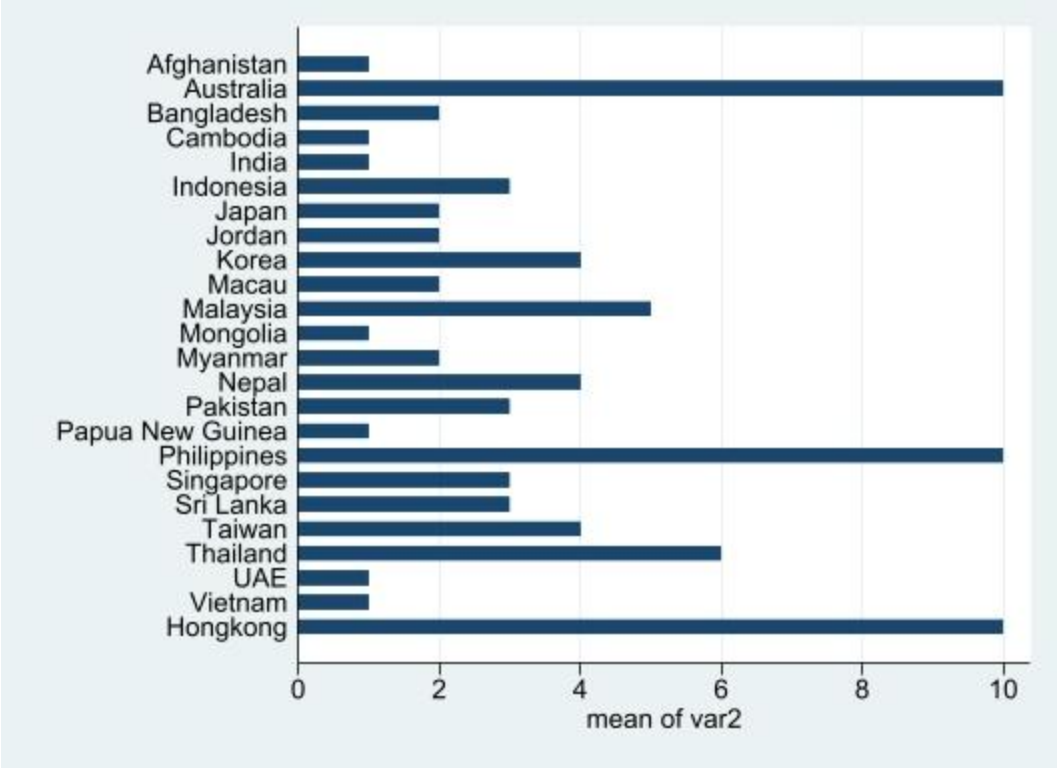


Figure 4. Number of Pharmaceutical Organizations in each Asian Country

Common Trends in National Pharmacy Organizations:

1. **Professional Representation**: In many countries, there is a clear demarcation of national organizations responsible for representing pharmacists' interests. These organizations act as the voice of the pharmacy profession, advocating for pharmacists' rights and welfare.

2. **Regulatory Oversight**: Several countries have regulatory bodies within their national pharmacy organizations, such as the Pharmacy Board of Australia and the Pharmacy and Poisons Board of Hong Kong. These bodies ensure that pharmacists comply with professional standards and guidelines.

3. **Education and Training**: National pharmacy organizations often take an active role in education and training. They collaborate with universities and educational institutions to ensure that pharmacy education aligns with current practice standards.

4. **Collaboration**: Many organizations, like the Pharmaceutical Society of Australia and the Philippine Pharmacists Association, collaborate with various stakeholders in the healthcare industry, including pharmaceutical manufacturers and government agencies.

5. **Specialized Groups**: Some countries have specialized pharmacy associations, such as the Society of Hospital Pharmacists of Australia and the Federation of Taiwan Pharmacists Associations. These groups focus on specific aspects of pharmacy practice.

6. **International Affiliations**: Several national pharmacy organizations, such as the Indian Pharmaceutical Association and the Pharmaceutical Society of Taiwan, are affiliated with international bodies like the FIP (International Pharmaceutical Federation) and WHO, allowing for global collaboration and alignment of pharmacy standards.

7. **Community Engagement**: National organizations often engage with the community, as seen in the involvement of associations like the Community Pharmacist Association of the Philippines and the Community Pharmacy Association (Thailand).

8. **Pharmaceutical Industry**: Some countries, like Malaysia, have associations dedicated to the pharmaceutical industry, ensuring that the industry operates in compliance with ethical and legal standards.

As reflected from the trends and the number of organizations for each country, there is a strong commitment globally to fostering a robust pharmacy profession. These national organizations, along with their international affiliations, contribute to the development and maintenance of pharmacy standards and practices that ensure the safety and well-being of patients worldwide.

Variable 1C-3: **Current Thrusts and Directions of the Organization(s)**

Table 5. Initiatives of Pharmaceutical organizations in Asian countries

Common themes	Frequency (n)	Percentage (%)
Professional Development and Advancement	18	75.00
Public Health and Safety	15	62.50
Government Collaboration and Advocacy	14	58.33
Global engagement	8	33.33
Research and innovation	6	25.00

In a world where healthcare is constantly evolving, the role of pharmacists is essential in ensuring the well-being of communities across the globe. An analysis of 18 out of 24 national pharmaceutical organizations has unveiled intriguing insights into the trends and patterns shaping the direction of this crucial profession.

The foremost, unifying theme across all the countries analyzed is a resolute commitment to "Professional Development and Advancement." In every corner of the world, 75.00% of these organizations prioritize nurturing their experts through rigorous training, continuous education, and unwavering adherence to professional standards. This unanimous dedication underscores the global vision of empowering pharmacists to provide the best possible care to their patients.

This unwavering focus on professional growth often extends to an equally potent dedication to "Public Health and Safety." For the vast majority, a pharmacist's role is not confined to dispensing medications but is intrinsically linked to ensuring the rational and safe use of these medicines. It is a prominent theme in 15 out of 18 countries, representing 62.50% of the organizations surveyed. These pharmacists take center stage in initiatives that promote medication safety, thereby enhancing the health and well-being of their communities.

It is encouraging to see that "Government Collaboration and Advocacy" is not far behind. In a staggering 14 out of 24 countries, or 58.33% of the organizations, pharmaceutical organizations recognize the importance of collaborating with government authorities to shape policies and regulations that support their profession. Advocating for the interests of pharmacists and, by extension, the health of the population, is a shared commitment.

While the global stage beckons, as demonstrated by "Global Engagement," international collaborations and participation in global pharmaceutical events are increasingly being embraced. This trend is evident in 8 out of 24 countries, representing 33.33% of the organizations surveyed. These organizations seek to share their pharmaceutical knowledge and learn from the broader international community.

Innovation is the lifeblood of progress, and six out of 24 countries, or 25.00% of the organizations, have taken up the mantle of "Research and Innovation." They champion the development of pharmaceutical knowledge through research, innovation, and scientific advancement. By proactively addressing emerging challenges and opportunities, they shape the future of pharmacy practice.

Variable 1C-4: **Total Number of Members per Organization**

An analysis of the data on the total number of members per pharmacy organization was conducted from 13 out of 24 countries. Several themes emerge from this analysis:

1. **Size and Reach of Organizations**: The analysis reveals that the size and reach of pharmacy organizations are significant factors. Membership numbers indicate the scale of these organizations.
    - The Japan Pharmaceutical Association leads the list with 102,560 members.
    - The Indonesian Pharmacist Association in Indonesia boasts a substantial membership of 86,000 registered members.
    - The Pakistan Pharmacists Association has a robust membership of 50,000 registered pharmacists.
    - The Philippine Pharmacists Association (PPhA) is a large organization with over 15,000 members.
    - The Korean Pharmaceutical Association also has a significant membership base, with 60,000 members.

2. **Diversity in Membership**: The data shows that the composition of membership within organizations can be diverse. In some cases, membership includes pharmaceutical companies, higher education institutions, and even different types of professionals.
    - The Bangladesh Association of Pharmaceutical Industries comprises representatives from all pharmaceutical companies.
    - The Philippines stands out with multiple pharmacy organizations, such as the Philippine Association of Colleges of Pharmacy, which includes 65 higher education institutions, and the Drugstore Association of the Philippines with over 1,700 members.

3. **Government Representation** (23.08%): In some instances, pharmacy organizations have members who represent the profession within government bodies, such as councils and committees.
    - The Central Council of Pharmacy Council of India has a total of 74 council members who are part of this regulatory body.

4. **Industry Affiliation** (15.38%): Some organizations collaborate with the pharmaceutical industry. In particular, the Hong Kong Association of the Pharmaceutical Industry lists both full members and affiliate members.

5. **Association Size** (15.38%): The analysis shows that several organizations have smaller memberships, such as the Federation of Junior Chapters of the PPhA, the Philippine Society of Hospital Pharmacists, and the Ceylon Medical College Council.

6. **Limited Data** (15.38%): In some instances, the data is limited or not provided, making it challenging to draw specific conclusions. This is the case for Afghanistan, Cambodia, Macau, Mongolia, Myanmar, Singapore, Taiwan, Thailand, UAE, and Vietnam.

This thematic analysis provides insights into the diversity and size of pharmacy organizations in these 13 countries. Membership numbers are a key indicator of the influence and capacity of these organizations in promoting the pharmacy profession and serving their respective communities.

Sub-objective 1D: Describe the use of technology and digital platforms in pharmacy practice

Variable 1D-1: **Efforts and Initiatives in the Practice of Pharmacy**

After conducting an analysis of the data from 24 countries, several themes emerged, reflecting the efforts and initiatives in the practice of pharmacy. The following themes illustrate patterns and trends in these countries, with frequencies and percentages noted where applicable:

Table 6. Initiatives of Asian countries to improve the Practice of Pharmacy

Initiatives to Improve the Practice of Pharmacy	Percentage (%)
Regulatory Oversight and Collaboration	87.50
Clinical Pharmacy Advancement	52.40
E-Pharmacies and Digital Health	50.00
Pharmacist Training and Education	45.80
Pharmaceutical Industry and Business	41.70
Traditional Medicine and Integrative Practices	12.50
Community Pharmacy Innovations	20.80
Medication Safety and Quality	12.50
Research and Development	8.30
Pharmacy Competency Standards	8.30

1. **Regulatory Oversight and Collaboration** (87.50%)
    - The majority of countries emphasize the importance of regulatory oversight to ensure the quality and safety of pharmaceuticals.
    - Collaborative efforts with international organizations, such as the United States Agency for International Development and the World Health Organization, are common.

2. **Clinical Pharmacy Advancement** (54.20%)
    - Many countries are moving toward clinical pharmacy practices, which involve minimizing risks associated with medication use through collaborative approaches.
    - The development and update of standards for clinical pharmacy highlight this trend.

3. **E-Pharmacies and Digital Health** (50.00%)
    - About half of the countries are witnessing growth in e-pharmacies and digital health initiatives.
    - This trend includes the adoption of e-Governance, electronic sharing platforms, and the integration of pharmacists into digital systems for various purposes.

4. **Pharmacist Training and Education** (45.80%)
    - The emphasis on pharmacist training and education is notable in many countries.
    - The introduction of programs like the Pharm.D. program and the establishment of resident pharmacist positions reflect the commitment to improving the skills and knowledge of pharmacists.

5. **Pharmaceutical Industry and Business** (41.70%)
    - A significant number of countries are making efforts to promote the pharmaceutical industry and local businesses related to pharmaceuticals.
    - Initiatives like the Afghanistan New Market Development Project and the promotion of e-commerce are evidence of this trend.

6. **Traditional Medicine and Integrative Practices** (12.50%)
    - Some regions, like Hong Kong, emphasize traditional medicine and the integration of pharmacists to manage medications within traditional medicine contexts.

7. **Community Pharmacy Innovations** (20.80%)
    - Innovations in community pharmacy services, including drive-thru pharmacy services and patient counseling, are emerging in several countries.
    - Telepharmacy consultation and extended community pharmacy services are gaining traction.

8. **Medication Safety and Quality** (12.50%)
    - A few countries, such as Papua New Guinea, prioritize the safety, effectiveness, and quality of medicines through mechanisms such as marketing authorization systems and electronic prescribing.

9. **Research and Development** (8.30%)
    - Some countries invest in research and development by conducting studies and joint forums on pharmacy practice research.

10. **Pharmacy Competency Standards** (8.30%)
    - A small percentage of countries, like Vietnam, establish competency standards for pharmacists and regulate clinical pharmacy practices.

These themes collectively depict the diverse landscape of efforts and initiatives in the practice of pharmacy across the 24 countries. Regulatory oversight, clinical pharmacy advancement, and the growth of e-pharmacies are among the most prevalent trends, demonstrating a global commitment to enhancing pharmacy practice and healthcare outcomes.

Sub-objective 1E: Identification of Regulatory Frameworks and Policies Governing Pharmacy Practice.

Variable 1E-1: **Agencies for Health**

When examining the leading health agencies in various nations, a number of patterns emerge. These agencies are responsible for supervising and regulating health-related policies and services in their respective nations. Here are several noteworthy patterns:

1. **Health Ministry Dominance**: In the majority of nations, the Ministry of Health houses the primary health agency. Afghanistan, Bangladesh, Cambodia, India, Jordan, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, and Vietnam exhibit this pattern. Typically, these ministries are in charge of formulating and implementing health policies and regulations, assuring the delivery of healthcare services, and addressing public health issues.

2. **Departments of the Government**: Some nations, including Australia, Hong Kong, and Macau, have government agencies dedicated to health and healthcare-related issues. These departments collaborate closely with other agencies and organizations to administer diverse aspects of healthcare, such as public health, disease prevention, healthcare regulation, and healthcare education. In Australia, the Department of Health and Aged Care is responsible for the formulation of healthcare policy, whereas in Hong Kong, the Food and Health Bureau and the Department of Health play crucial roles.

3. **Multi-agency Strategy**: In a select number of nations, the supervision of healthcare is delegated to multiple agencies. In Indonesia, for example, the Ministry of Health, the Council of Healthcare Professionals, and Regional or District Health Offices are involved in healthcare regulation and administration. The Ministry of

Health and Welfare in South Korea highlights the significance of both health and welfare in their healthcare system.

4. **Legislative Bodies**: Some nations establish regulatory agencies to oversee healthcare services. The Hospital Authority of Hong Kong, for instance, provides inpatient and outpatient medical services. These statutory bodies are established to guarantee the efficient and effective delivery of healthcare services.

5. **Variations on a Name**: Despite the fact that many nations have Ministries or Departments of Health, their names vary. In the United Arab Emirates, for example, it is the Ministry of Health and Prevention (MoHAP). Ministry of Health and Welfare in Taiwan reflects a broader scope that encompasses social welfare.

6. **Global Restructuring**: Japan restructured the Pharmaceuticals and Public Health Bureau into the Pharmaceuticals Bureau under the Ministry of Health, Labour, and Welfare. This demonstrates how healthcare structures can adapt to changing requirements over time.

In conclusion, the patterns observed in the primary health agencies of various nations reveal a diversity of approaches to healthcare governance. In spite of the fact that many nations have a Ministry or Department of Health as their primary agency, the roles and responsibilities of these agencies can differ considerably. Some nations employ a multi-agency approach, while others have established statutory oversight bodies for healthcare services. These organizations play a significant role in shaping healthcare policies, regulations, and services in their respective nations.

Variable 1E-2: **National Regulatory Authorities**

Several patterns emerge when examining National Regulatory Authorities (NRAs) responsible for ensuring that products meet safety, efficacy, and quality standards:

1. **Oversight of the Government**: In many nations, NRAs operate under the auspices of the government and regulate pharmaceuticals and medical products. India (CDSCO), Jordan (Jordan Food and Drug Administration), Mongolia (Ministry of Health), Myanmar (Department of Food and Drug Administration), Nepal (Department of Drug Administration), Pakistan (Drug Regulatory Authority of Pakistan), and Vietnam (Drug Administration of Vietnam) are examples of regulatory agencies. By assuring the quality and safety of healthcare products, these government agencies play a crucial role in protecting public health.

2. **Specialized Regulatory Agencies**: Some nations establish specialized bodies to supervise the regulation of particular aspects of healthcare. In Australia, the Pharmacy Board of Australia regulates pharmacists, whereas Hong Kong's Department of Health oversees the safety, efficacy, and purity of medicines.

3. [**Combining Authorities**] In some nations, healthcare regulation is delegated to multiple agencies. The National Agency for Drug and Food Control (BPOM) is in charge of regulating pharmaceuticals and food products in Indonesia. Similarly, the Health Sciences Authority (HSA) of Singapore encompasses a variety of healthcare products and services.

4. **Independent Regulatory Bodies**: Japan's Pharmaceuticals and Medical Devices Agency (PMDA) operates independently to ensure the safety and efficacy of pharmaceuticals and medical devices. The PMDA has a specialized concentration on these products, demonstrating its commitment to regulation.

5. **Regional Supervision**: In the United Arab Emirates, the Ministry of Health and Prevention (MOHAP), the Dubai Health Authority (DHA), the Department of Health-Abu Dhabi (DOH), and the Sharjah Health Authority (SHA) regulate healthcare at the emirate level. This regional strategy permits the localization of healthcare regulation.

6. **Collaborative Efforts**: a number of nations collaborate with international organizations to ensure adherence to global standards. For instance, Taiwan's Food and Drug Administration actively participates in international regulatory networks in an effort to align itself with best practices.

In conclusion, patterns in National Regulatory Authorities disclose a variety of approaches to the regulation of healthcare products. Others divide responsibilities among specialized agencies or collaborate with international partners to guarantee product safety and quality, whereas some countries have centralized government bodies responsible for oversight. These NRAs play a crucial role in maintaining healthcare standards and protecting public health in their respective countries.

Variable 1E-3: **Professional Regulatory Commission**

When examining healthcare regulatory bodies responsible for overseeing various aspects of healthcare and healthcare professionals, we can identify several patterns:

1. **Pharmacy Boards and Councils**: Many countries have established Pharmacy Boards or Councils to regulate and oversee pharmacists and pharmaceutical practices. Examples include Australia (Pharmacy Board of Australia), Bangladesh (Pharmacy Council of Bangladesh), Cambodia (Pharmacist's Council of Cambodia), Hong Kong (Pharmacy & Poisons Board of Hong Kong), and Malaysia (Pharmacy Board, Ministry of Health Malaysia). These bodies play a crucial role in ensuring the competence and ethical conduct of pharmacists.

2. **National Commissions and Committees**: Some countries, such as Afghanistan, have established National Commissions and Committees specifically focused on public health and drug therapeutic matters. These bodies often collaborate with other regulatory authorities to set healthcare standards.

3. **Indian Pharmacopoeia Commission (IPC)**: India has a unique regulatory body, the IPC, which is responsible for setting and updating standards for drugs and medicines in the country. IPC's functions include publishing the Indian Pharmacopoeia (IP) and the National Formulary of India, contributing to the rational use of generic medicines.

4. **Pharmaceutical Control Agencies**: Indonesia has the Ministry of Health and the National Agency of Drug and Food Control (BPOM), which oversee various aspects of drug and food regulation. Additionally, they have a National Board of Pharmacy (KFN), which has been replaced with the Pharmaceutical Council. This combination of agencies ensures comprehensive pharmaceutical control.

5. **Licensing and Registration Authorities**: Mongolia's Ministry of Health is responsible for registering healthcare professionals and issuing licenses for practice. This ensures that only qualified individuals can provide healthcare services in the country.

6. **Professional Regulation Commissions**: Several countries, including the Philippines and Sri Lanka, have established Professional Regulation Commissions or Councils responsible for regulating various healthcare professions. These bodies ensure that healthcare practitioners adhere to ethical and professional standards.

7. **Multi-Council Systems**: Singapore utilizes a multi-council system, including the Singapore Medical Council (SMC) and Allied Health Professions Councils, to regulate a wide range of healthcare professionals, ensuring comprehensive oversight.

8. **Collaboration with Associations**: In some countries like Jordan, regulatory bodies work in association with professional associations, such as the Jordan Pharmaceutical Association, to oversee and regulate healthcare professionals effectively.

9. **Government Ministries**: Many countries place healthcare regulatory responsibilities under government ministries, such as the Ministry of Health. These ministries often collaborate with other organizations to ensure comprehensive healthcare regulation.

10. **Local and Provincial Health Departments**: In countries like Vietnam, healthcare regulation is a collaborative effort between national and provincial health departments, allowing for localized oversight.

In summary, patterns in healthcare regulatory bodies vary by country, with some focusing on specific professions like pharmacy, while others have more comprehensive oversight structures. These regulatory bodies play a crucial role in maintaining healthcare standards, ensuring the competence of healthcare professionals, and protecting public health.

Variable 1E-4: Formulary Systems

Formulary systems play a crucial role in regulating and guiding the use of pharmaceuticals within a healthcare system. These systems vary from country to country, reflecting different regulations, committees, and objectives. Here is an analysis of formulary systems across various countries, identifying patterns and trends:

Common Trends:

1. **Committees and Regulation**: Most countries have committees or regulatory bodies responsible for the development, review, and maintenance of their national formularies. These committees often consist of healthcare professionals, including pharmacists.

2. **National Health Policies**: Formularies are typically aligned with a country's national health policies and drug regulations to ensure that medicines are used effectively and safely.

3. **Updates and Reviews**: Many countries conduct periodic reviews and updates of their formularies to incorporate new drugs, remove obsolete ones, and modify clinical indications as necessary.

4. **Reference for Prescribing**: National formularies often serve as a reference for healthcare providers when prescribing medicines, promoting evidence-based practices.

Country-wise Analysis:

Afghanistan

Afghanistan's National Formulary is prepared by a committee consisting of pharmacy faculty and medical university professors. It undergoes regular reviews, and the Ministry of Public Health is responsible for its publication.

Australia

Australia has the Australian Pharmaceutical Formulary Handbook mandated by the Pharmacy Board of Australia. The South Australian Medicines Formulary standardizes the availability of medicines within public hospitals and health services in South Australia.

Bangladesh

The Bangladesh National Formulary supports healthcare providers in offering effective drug therapy based on limited resources, in line with the Bangladesh National Drug Policy.

Cambodia

Cambodia maintains an essential medicines list but provides a limited formulary, excluding certain medications and conditions. The

Hong Kong

Hong Kong has implemented the HA Drug Formulary to ensure equitable access to cost-effective

India

India publishes the National Formulary of India, initially by the Ministry of Health and later by the Indian Pharmacopoeia Commission.

essential medicines concept aligns with national health policies.

drugs through the standardization of policies on drug utilization.

It is based on the WHO model and incorporates expert opinions from healthcare professionals.

Indonesia

Indonesia's national formulary serves as a reimbursement policy and covers medicines for BPJS-Kesehatan. A committee is responsible for compiling the list of medicines in the NF.

Japan

Japan does not have a national formulary system. Only medicines approved by pharmaceutical authorities and listed on the National Health Insurance price list can be used for medical insurance purposes.

Jordan

The Jordan National Drug Formulary is published in collaboration with various healthcare institutions and is established under the National Medicines Policy of Jordan.

Korea

Korea has a National Health Insurance Formulary determined by the Ministry of Health and Welfare.

Macau

Macau is known to have hospital formularies, but there is no documentation of a national drug formulary.

Malaysia

Malaysia controls drugs available for public health care through the MOH Drug Formulary (MOHMF). It is used as a reference for medicines in MOH facilities.

Mongolia

Mongolia has a National Medicines Policy but lacks an implementation plan.

Myanmar

Myanmar has the Myanmar Pharmaceutical Index, but it doesn't appear to have a national formulary.

Nepal

Nepal has the National Formulary 2010, and its public health system follows policies on health service delivery.

Pakistan

Pakistan's Drug Regulatory Authority of Pakistan plays a crucial role in regulating pharmaceuticals.

Papua New Guinea

Papua New Guinea uses the National Drug Policy to maintain a Medical Store Catalogue, serving as a national essential drugs list.

Philippines

The Philippines has the Philippine National Formulary, managed by the Department of Health Pharmaceutical Division and the Formulary Committee.

Singapore

Singapore's National Drug Formulary is a consolidated reference for medication prescribing, dispensing, and administration, hosted on a public website.

Sri Lanka

Sri Lanka's Essential Medicines List aligns with the country's healthcare goals and is accessible to the population at an affordable price.

Taiwan

Taiwan has established a national formulary under its National Health Insurance system, ensuring reimbursement for listed pharmaceuticals.

Thailand

Thailand's formulary is managed by the Thai Food and Drug Administration.

United Arab Emirates

UAE has hospital formularies managed by Pharmacy and Therapeutics committees but does not appear to have a national drug formulary.

Vietnam

Vietnam has a Vietnamese National Drug Formulary.

Formulary systems serve as essential tools for ensuring the appropriate and cost-effective use of medicines within healthcare systems. While they share common trends such as committee involvement and alignment with national health policies, the specific details and structures of formulary systems vary widely among countries, reflecting the unique healthcare contexts and priorities of each nation.

Variable 1E-5: Health Technology Assessment

In analyzing the state of Health Technology Assessment (HTA) across the 24 countries, several trends and patterns emerge, shedding light on the varying levels of development and implementation of HTA systems.

Established HTA
- Established regulatory bodies (e.g., Therapeutic Goods Administration).
- Integrated approach between regulation and HTA efforts.

- **Australia**
- **Malaysia**
- **Philippines**
- **Singapore**
- **Thailand**

Limited Framework
- Indicates a gap in capacity for HTA.

- **Afghanistan**
- **Bangladesh**
- **Cambodia**
- **Myanmar**
- **Macau**
- **Papua New Guinea**
- **United Arab Emirates**

Emerging Interest
- Early stages of considering and exploring HTA.
- Capacity-building workshops and initiatives show growing interest

- **Mongolia**
- **Vietnam**

Lack of Legislation
- Face challenges in institutionalizing and standardizing HTA without specific legislative mandates.

- **Afghanistan**
- **Bangladesh**
- **Cambodia**
- **Myanmar**
- **Papua New Guinea**
- **United Arab Emirates**
- **Vietnam**

Frequency and Availability of HTA:
Limited HTA Framework: A significant trend is the absence or limited development of formal HTA frameworks in several countries, including Afghanistan, Bangladesh, Cambodia, Myanmar, Macau, PNG, and UAE. This indicates a gap in these nations' capacity to systematically evaluate health technologies for informed decision-making.

Emerging Interest: Some countries, such as Mongolia and Vietnam, are in the early stages of considering and exploring HTA, with capacity-building workshops and initiatives indicating a growing interest in implementing HTA in healthcare decision-making.

Established HTA Bodies: In contrast, countries like Australia, Malaysia, Singapore, and Thailand have established HTA organizations and structures, reflecting a well-developed system for evaluating health technologies.

Legislation and Regulation:
Lack of Legislation: Many countries, including Afghanistan, Bangladesh, Cambodia, Myanmar, PNG, UAE, and Vietnam, lack specific legislative mandates for HTA. This deficiency suggests that these nations may face challenges in institutionalizing and standardizing the HTA process.

Regulatory Authorities: In countries such as Australia, Malaysia, and Singapore, established regulatory bodies, such as the Therapeutic Goods Administration, oversee HTA as part of the healthcare system, aligning regulatory and HTA efforts.

Pharmacist Involvement:
Varied Pharmacist Participation: Pharmacist involvement in HTA processes varies across countries. In some countries like India, pharmacists play a significant role, reflecting the importance of their expertise in healthcare decision-making. Other countries may have limited pharmacist involvement, such as Japan, where HTA processes differ from standard practices.

Roles and Responsibilities: The roles and responsibilities of pharmacists within HTA systems differ; some are members of advisory councils, while others lead specific divisions within HTA organizations.

Data Availability:
Public Access to HTA Reports: The availability of HTA reports to the public also varies. In some countries like Afghanistan and Cambodia, HTA outcomes are not publicly accessible, limiting transparency in healthcare decision-making. In contrast, countries like Australia make HTA results accessible to inform clinical and policy decisions.

Partnerships and Capacity Building:
International Collaboration: Several countries engage in international collaborations or seek assistance from external organizations, like Thailand HITAP's support in Nepal, to build HTA capacity and inform healthcare policies.

Academic Involvement: Academic institutions are often considered stakeholders in HTA processes, as seen in Afghanistan and Cambodia.

Healthcare Decision-Making:
Impact on Decision-Making: The presence of HTA structures, as seen in Australia and Malaysia, indicates a systematic approach to influence healthcare decision-making, ensuring the adoption of evidence-informed practices.

Limited Economic Evaluation: While some countries require economic evaluations for drug pricing, the use of economic evaluation in pricing or reimbursement decisions is limited due to various factors like a lack of local expertise and clear guidelines, as in Jordan.

Institutional Alignment: The alignment of institutions, such as the Department of Health Research in India and the National Health Insurance Association in Taiwan, with HTA processes facilitates research translation into policymaking.

Overall Analysis:

There is a wide spectrum of HTA development and implementation across the 24 countries, with some nations having well-established systems and legislative support, while others are in the early stages of capacity building. The pharmacist's role in HTA varies, but their expertise in medication evaluation and cost-effectiveness analysis is increasingly recognized in countries with established HTA processes. International collaborations and partnerships play a crucial role in supporting the development of HTA capacity in countries where it is still emerging.

Statistical Analysis:

Frequency of HTA Systems: Approximately 12 out of 24 countries (50%) do not have established HTA systems, indicating a significant gap in HTA infrastructure.

Public Accessibility: Only around 7 out of 24 countries (29.17%) provide public access to HTA reports, indicating limited transparency in many nations.

Legislation: About nine (9) out of 24 countries (37.5%) lack specific legislation mandating HTA, indicating potential challenges in standardizing the HTA process.

Partnerships: Approximately eight (8) out of 24 countries (33.33%) engage in international collaborations or seek external assistance for HTA capacity building.

Impact on Decision-Making: In roughly nine (9) out of 24 countries (37.5%), the presence of HTA structures significantly impacts healthcare decision-making, promoting evidence-informed practices.

Variable 1E-6: Supply Chain Management

Analyzing the supply chain management in these 24 countries provides insights into different approaches to pharmaceutical regulation. Here are some notable patterns and trends:

1. **Compliance with International Standards**:
    - Percentage: 16.67% (4 out of 24)
    - Frequency: Several countries, including Taiwan, Thailand, the UAE, and Vietnam, have adopted or aligned their regulations with international standards, such as WHO Good DIstribution Practices and Good Manufacturing Practices. These countries account for about 17% of the studied nations, reflecting their commitment to ensuring pharmaceutical quality and safety.

2. **Diverse Regulatory Structures**:
    - Percentage: 12.50% (3 out of 24)
    - Frequency: Countries like Indonesia, Jordan, and Korea have varied regulatory landscapes. Indonesia has specific regulations for pharmaceutical service standards. Jordan still lacks a comprehensive supply chain management system for pharmacies, and Korea has room for more detailed regulations to address supply chain management.

Notable features per country:

1. **Stringent Regulations in Australia**: Australia has well-defined regulations and a national classification system for drugs. The Therapeutic Goods Administration (TGA) plays a significant role in controlling the import and supply of drugs. Australia is focused on public safety and ensuring that drugs meet specific standards, making it a robust pharmaceutical market.

2. **Legal Framework in Bangladesh:** Bangladesh has implemented the Drug and Cosmetics Act 2023 to regulate drug and cosmetic production and protect against the production and sale of adulterated drugs. However, the lack of pharmacists and an electronic drug management information system poses challenges in monitoring drug consumption and stock management.

3. **ASEAN Influence in Cambodia**: Cambodia, as a member of ASEAN, follows the ASEAN Common Technical Requirements and Dossier (ACTR and ACTD) for pharmaceutical regulation. The Department of Drugs and Food (DDF) has full discretion in regulating pharmaceuticals, and only licensed companies can import pharmaceuticals.

4. **Hong Kong's Licensing Control**: Hong Kong has a well-defined drug supply chain, with manufacturers, wholesalers, importer/exporters, and retailers subject to licensing control. The Pharmacy and Poisons Ordinance sets the standards, and regular inspections are conducted to ensure compliance.

5. **Complex Regulatory Framework in India**: India's pharmaceutical regulation is governed by several laws, including the Drugs and Cosmetics Act 1940, the Pharmacy Act 1948, and others. The Ministry of Health and Family Welfare and the Ministry of Chemicals and Petrochemicals are key entities responsible for pharmaceutical regulation. The regulatory landscape in India is comprehensive, reflecting its role as a major player in the pharmaceutical industry.

6. **Detailed Macau Regulations**: Macau's legislation covers both traditional Chinese and Western-type medicines. Importers, exporters, distributors, and pharmacists must be licensed and registered with the Health Department. The legislation is specific and covers various aspects of pharmaceuticals.

7. **Focus on Compliance in Malaysia**: Malaysia has stringent compliance requirements, including Good Manufacturing Practice (GMP) and Good Distribution Practice (GDP) guidelines. The country collaborates with international regulatory bodies to align its standards with global best practices.

8. **Decentralized Supply Chain in Mongolia**: Mongolia's pharmaceutical supply system is fully decentralized. The procurement of medicines is regulated by the Law on Public Procurement, and the current pharmaceutical sector faces challenges due to the lack of mark-up controls and electronic systems for monitoring consumption and stock management.

9. **Nepal's Recent Introductions**: Nepal introduced Good Storage and Distribution Practices (GSDP) in 2022, emphasizing the importance of proper storage and distribution of medicines.

These trends reflect the diversity in regulatory approaches and the evolving nature of pharmaceutical supply chain management in different countries. While some countries have established robust regulatory frameworks, others are in the process of developing more comprehensive systems. Compliance with international standards is a common theme, highlighting the global nature of the pharmaceutical industry and the need for stringent regulations to ensure public safety and product quality.

Variable 1E-7: Drug Pricing

This analysis provides an overview of the patterns and trends in drug pricing mechanisms among the selected countries, highlighting the prevalence of government regulation and the variations in their establishment over time.

The majority of countries have government-regulated drug pricing mechanisms in place. The range of years for government-regulated drug pricing is quite wide, indicating variations in the establishment of these regulations. On the other hand, market-driven drug pricing is more recent and has a narrower range of years. A few countries have no specific regulations on drug pricing, and this category includes countries with no available information (N/A).

Table 7. Drug Pricing Mechanisms of Asian Countries

Drug pricing mechanisms	Frequency (n)	Range	Standard deviation of establishment years
Government-regulated drug pricing	15	From 1954 (Australia) to 2023 (Cambodia)	Approximately 19 years
Market-driven drug pricing	6	From N/A (Macau) to 2023 (Thailand)	Approximately 10 years
No specific regulations on drug pricing	3	From N/A (Macau) to 2023 (Vietnam)	

Sub-objective 1F: Description of the Sociodemographic Characteristics of Pharmacists in Asian Countries

Variable 1F-1: Total Pharmacist Population

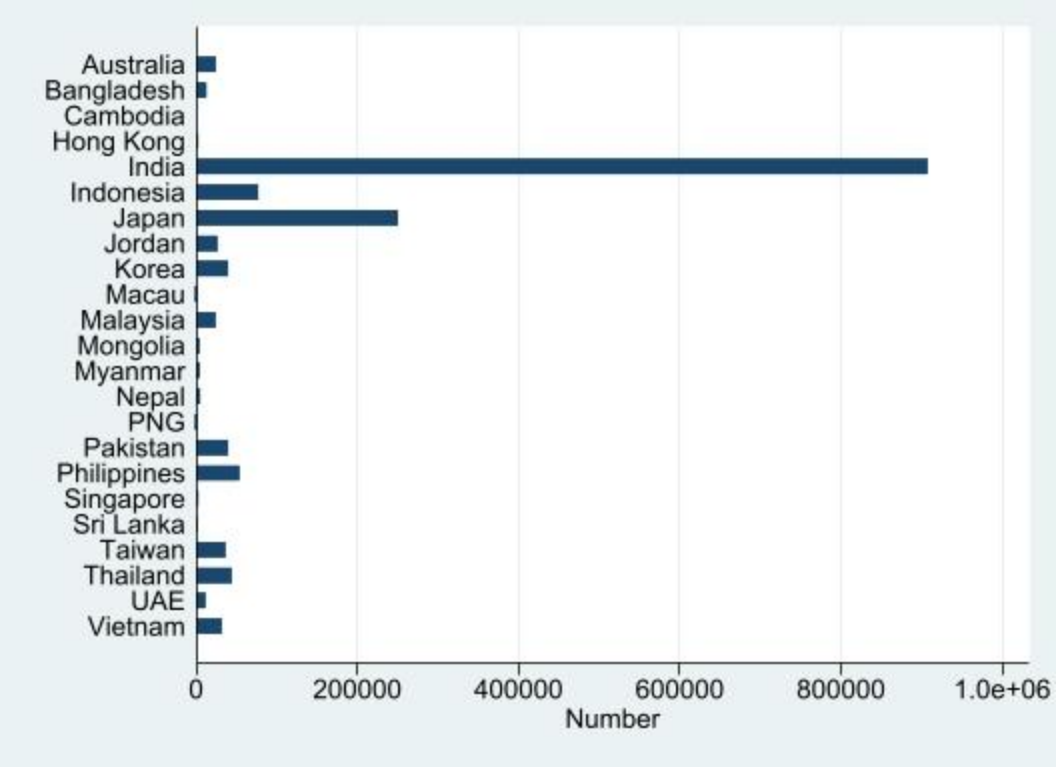


Figure 5. Number of Pharmacists in each Asian Country

An in-depth examination of the pharmacist populations, spanning from 2016 to 2023, offers a multifaceted view of the global landscape of pharmacy professionals. During this period, the total number of licensed and registered pharmacists worldwide reached a substantial 1,601,918, signifying the essential role they play in healthcare systems across the globe. This numerical overview is a crucial starting point for understanding the state of pharmacy in different countries. However, to gain a more comprehensive perspective, we need to delve further into the data to decipher the nuances in distribution and the underlying factors that contribute to the variances.

Looking at key statistical measures, we find that the median pharmacist population stands at 23,847. This median figure highlights that approximately half of the countries in this dataset have fewer than 23,847 pharmacists. On the other hand, the mean, which stands at 69,648.61, offers an average view of the pharmacist population. This wide gap between the median and the mean indicates that there are countries with a significantly higher number of pharmacists, skewing the average. The substantial standard deviation of 189,800.40 further emphasizes the variation in pharmacist numbers. This deviation signifies the extent to which the actual numbers deviate from the mean. In other words, the pharmacist populations across these countries are not evenly distributed but rather widely dispersed. This dispersion can be attributed to various factors, including differences in healthcare infrastructure, education systems, and healthcare policies.

One of the most striking observations is the range in pharmacist populations. The dataset spans from a minimum of just 79 pharmacists in some countries to a staggering maximum of 907,132 in others. These significant disparities are indicative of the diverse health systems and pharmacy practices across the globe. The factors contributing to these disparities include variations in population size, healthcare needs, and the role that pharmacists play in healthcare delivery.

The diversity in pharmacist populations across these countries reflects the dynamic nature of pharmacy practice on a global scale. Some countries maintain relatively smaller but highly specialized pharmacist populations, emphasizing the quality and expertise of their pharmacy workforce. In contrast, other countries boast large and multifaceted

pharmacist workforces that cater to the healthcare needs of substantial populations. The presence of both small and large pharmacist populations underscores the importance of tailoring strategies and policies to accommodate the unique contexts and requirements of each country.

These findings provide valuable insights into the ever-evolving field of pharmacy and healthcare. Understanding the variances in pharmacist populations allows countries to adapt their healthcare strategies, education systems, and regulatory frameworks to ensure the effective delivery of pharmaceutical services and, ultimately, better healthcare outcomes. As the healthcare landscape continues to transform, such data becomes indispensable for policymakers, educators, and healthcare professionals striving to meet the diverse needs of communities across the globe.

Variable 1F-2: Ratio of Population to Pharmacist

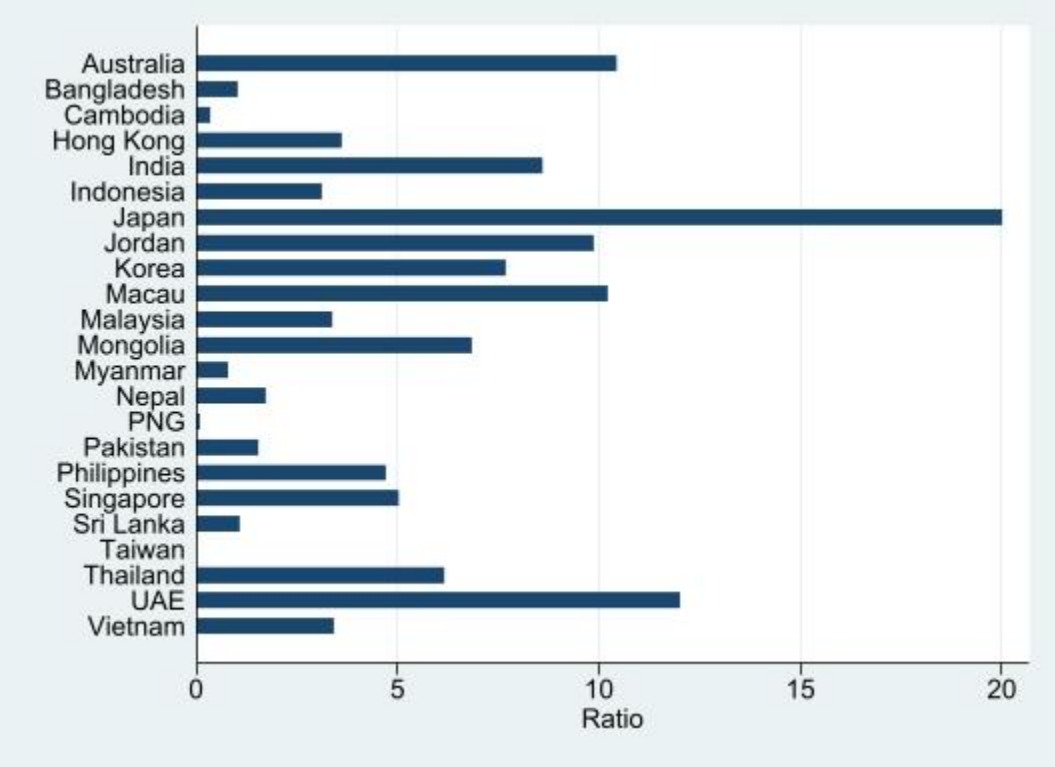


Figure 6. Ratio of Population to Pharmacist in Asian Countries

While assessing the pharmacist population offers valuable insights, it's equally important to consider the Ratio of Population to Pharmacist, also known as the Density of Pharmacists, to gain a deeper understanding of the accessibility of pharmaceutical services within each country. This metric, measured as the number of duly licensed and registered pharmacists per 10,000 inhabitants, provides a more nuanced perspective on the healthcare infrastructure and the level of pharmaceutical care available to the population.

The median Ratio of Population to Pharmacist stands at 3.6, which signifies that roughly half of the countries in the dataset have around 3.6 pharmacists per 10,000 inhabitants. However, when we examine the mean, which is slightly higher at 5.29713, we recognize that this average is influenced by countries with a more extensive network of pharmacists, which may be delivering services to larger segments of the population.

The significant standard deviation of 4.899334 indicates a considerable level of dispersion, suggesting a wide range of pharmacist-to-population ratios across the dataset. This variation is an essential consideration when evaluating

healthcare systems globally, as it underscores the diversity in healthcare infrastructure and the availability of pharmaceutical services.

The dataset reveals a spectrum of pharmacist-to-population ratios, spanning from a minimum of 0.079 in certain countries to a maximum of 20.01 in others. These disparities mirror differences in healthcare policies, education systems, and healthcare needs.

These findings are invaluable for assessing the accessibility of pharmacy services and healthcare quality in different countries. They enable policymakers, healthcare providers, and researchers to understand the distribution of pharmacists and tailor strategies to meet the specific needs of each population. As healthcare systems continue to evolve, this metric will play a vital role in ensuring that healthcare services are both equitable and of high quality, ultimately contributing to improved health outcomes on a global scale.

Variable 1F-3: Ratio of Population to Pharmacist

The "Proportion of Registered Pharmacists Working Abroad" metric offers insight into the percentage of pharmacists, originating from their respective countries, who have chosen to pursue their careers abroad. However, it's important to note that this data is available for only four out of 24 countries, spanning the years 2012 to 2021. The limited data availability during this period has implications for understanding the full picture of pharmacists' global mobility.

Afghanistan is one of these countries, with a notable number of pharmacists, ranging from 3,415 to 3,765, who have acquired overseas qualifications for pharmacy practice. These pharmacists have embarked on international journeys to contribute their expertise to foreign healthcare systems.

Cambodia, on the other hand, has witnessed a more modest but noteworthy migration, with approximately 0.42% of its pharmacists choosing to work abroad. This percentage, while small, signifies a willingness among Cambodian pharmacists to explore opportunities beyond their home country.

The Philippines demonstrates a similar trend, with an estimated 2.00% of its pharmacists opting for international careers. A notable historical context is provided by the Philippine Overseas Employment Administration, which documented 1,821 pharmacists and pharmacy assistants leaving the country to work abroad between 1997 and 2007. This highlights the long-standing tradition of Filipino pharmacists seeking professional growth overseas.

Singapore emerges as a significant player in the global mobility of pharmacists, with a substantial 6.40% of its registered pharmacists choosing to practice abroad. This sizable proportion indicates that Singaporean pharmacists are venturing into international healthcare settings, contributing their expertise to global health initiatives.

Despite the limited data available, the information provided by these four countries underscores the willingness of pharmacists to explore opportunities beyond their home nations. It also emphasizes the value of pharmacists' contributions on a global scale, as they offer their expertise to diverse healthcare systems worldwide. The quest for professional growth, knowledge exchange, and cross-border collaboration continues to shape the landscape of pharmacy practice, both at home and abroad.

Variable 1F-4: Geographic Distribution of Pharmacists

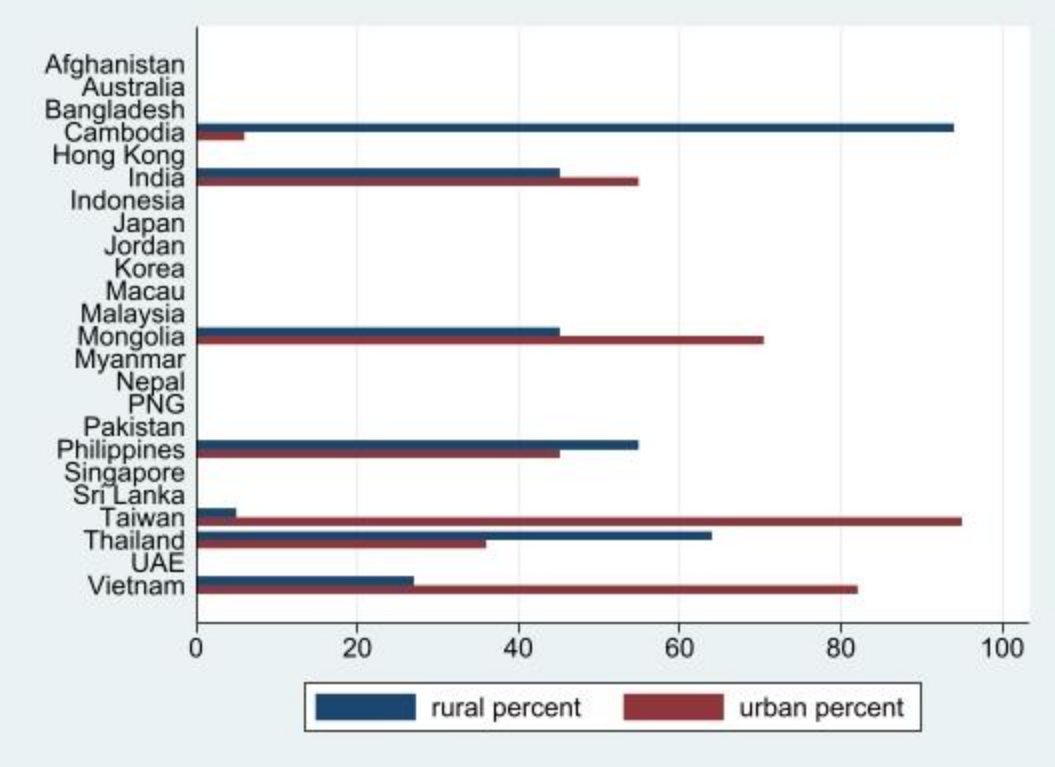


Figure 7. Geographic distribution (in the urban or rural setting) of Pharmacists in Asian Countries

The geographic distribution of pharmacists is crucial to ensuring that urban and rural communities have access to healthcare services. Examining the number and proportion of appropriately licensed and registered pharmacists in urban and rural areas of seven diverse countries, our research has delved into this crucial aspect of healthcare. This information provides a comprehensive view of the distribution of the healthcare workforce, highlighting the significance of equitable access to pharmaceutical care.

Our research focused on seven countries, each representing a unique healthcare landscape. These countries included both developed and developing nations, each with their own unique healthcare challenges and priorities. Our dataset extends from 2001 to 2022.

Key data elements:
Our dataset contains two essential variables: "rural percent" and "urban percent." These variables represent, respectively, the proportion of licensed and registered pharmacists operating in rural and urban areas. Rural percentages vary from 5% to 94%, whereas urban percentages range from 6% to 94%. The average percentage of rural residents is approximately 48%, while the average percentage of urban residents is approximately 56%.

The implications are:
The data demonstrates that pharmacists play a crucial role in both urban and rural healthcare contexts. Variations in workforce distribution reflect differences in healthcare infrastructure, population density, and healthcare access obstacles in each nation.

A geographically equitable distribution of pharmacists is essential for ensuring that all communities have access to pharmaceutical care and expertise, regardless of their location. The data emphasizes the efforts and policies countries have implemented to address disparities in healthcare between urban and rural areas.

The following are future considerations:

This dataset provides a foundation for future research into the influence of pharmacist distribution on healthcare outcomes, medication access, and healthcare equity. Comparative studies across countries and over time can provide insights into best practices for optimizing pharmacist workforce distribution and enhancing healthcare accessibility.

Additionally, policymakers can use these data to inform decisions regarding workforce planning and healthcare resource allocation, ensuring that pharmacists are strategically positioned to meet the healthcare requirements of diverse populations.

In conclusion, our analysis of pharmacist workforce distribution across seven countries and over two decades highlights the significance of equitable access to pharmaceutical care. This data is a valuable resource for researchers and policymakers attempting to improve healthcare access and outcomes for urban and rural communities across the globe.

Variable 1F-5: Age Distribution of Pharmacists

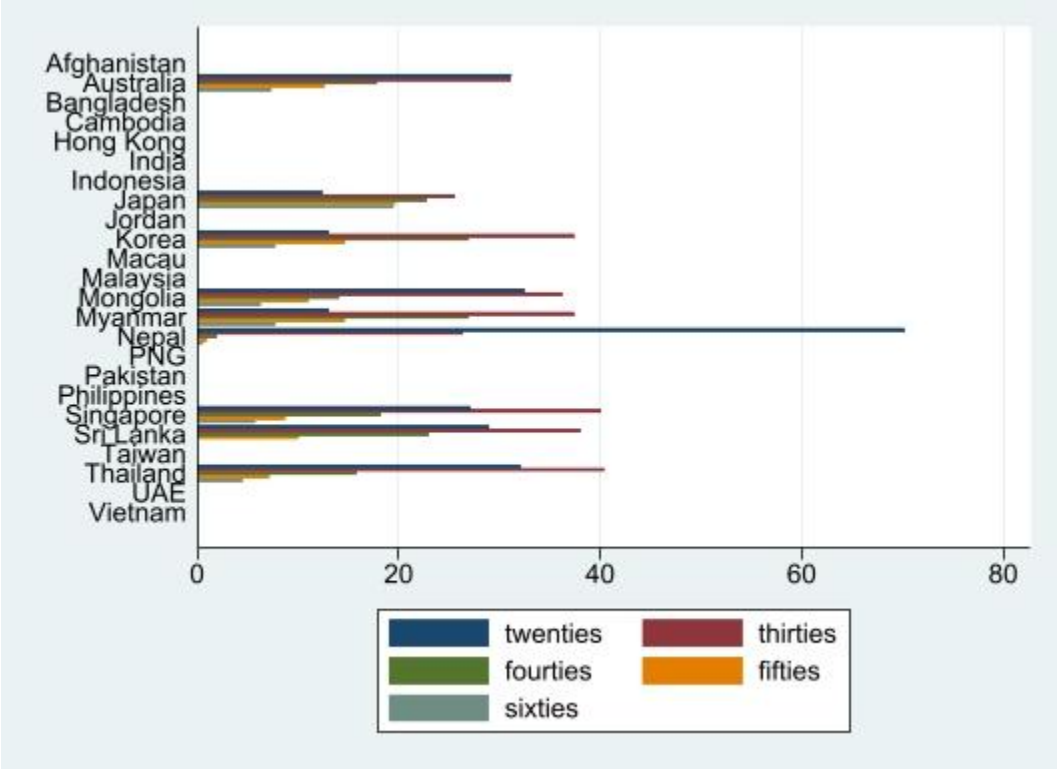


Figure 8. Age DIstribution of Pharmacists in Asian Countries

Understanding the age distribution of healthcare professionals, including pharmacists, is essential for evaluating workforce dynamics and effectively planning healthcare services. Based on data from nine (9) countries spanning the years 2013 to 2021, this thorough analysis casts light on the age distribution of properly licensed and registered pharmacists. Here is a comprehensive summary:

Diverse Populations Across Nations:
The dataset contains data from nine countries, providing a nuanced view of the age distribution of pharmacists. These nations represent diverse regions, healthcare systems, and economic conditions, providing a holistic view of the global pharmacy workforce.

Representation Across Generations:
Multiple age categories of pharmacists actively contribute to healthcare delivery, demonstrating the existence of a multigenerational workforce. The distribution of ages is segmented into predetermined age ranges:

- **Twentys** (**Ages 20 to 29**): Twentysomething pharmacists, who make up an average of 28.97% of the workforce, play a significant role in bridging the divide between professional education and practical application.

- **Thirties** (**Ages 30 to39**): With an average representation of 34.73% in the workforce, pharmacists in their thirties are instrumental in a variety of practice contexts, capitalizing on their experience and knowledge.

- **Forties** (**Ages 40 to 49**): Forty-year-old pharmacists, who make up 18.61% of the workforce, bring a unique combination of experience and adaptability to their roles.

- **Fifties** (**Ages 50 to 59**): Pharmacists in their fifties, who make up 11.08 percent of the workforce, continue to provide invaluable insight and leadership.

- **Sixties** (**Ages 60-69**): About 7.45% of the workforce is experienced pharmacists in their sixties, who offer a multitude of knowledge and mentoring.

Pharmacists in their thirties who are prominent:
The majority of pharmacists are between the ages of 30 and 39, making them the backbone of the workforce, according to the data. With an average age of approximately 34.73 years, their experience, expertise, and adaptability are crucial to healthcare delivery.

Important Implications and Insights:
A balanced age distribution guarantees the availability of pharmacists with differing levels of expertise and experience.

- Pharmacists in their twenties serve as a bridge between educational foundations and practical application.
- Pharmacists in their forties offer unique perspectives and competencies to a variety of practice settings.
- Those in their fifties and sixties provide the profession with invaluable leadership and guidance.
- The prominence of pharmacists in their thirties demonstrates the importance of their function in healthcare.

In conclusion, the age distribution of pharmacists across these ten countries reveals a diverse and multigenerational workforce. The prevalence of pharmacists in their thirties highlights the significance of their contributions to healthcare. Understanding the age distribution of pharmacists is crucial for workforce planning and preserving the quality of pharmaceutical care. The implications of this demographic distribution in the context of healthcare delivery and professional development can be the subject of additional research.

Variable 1F-6: Sex of Pharmacists

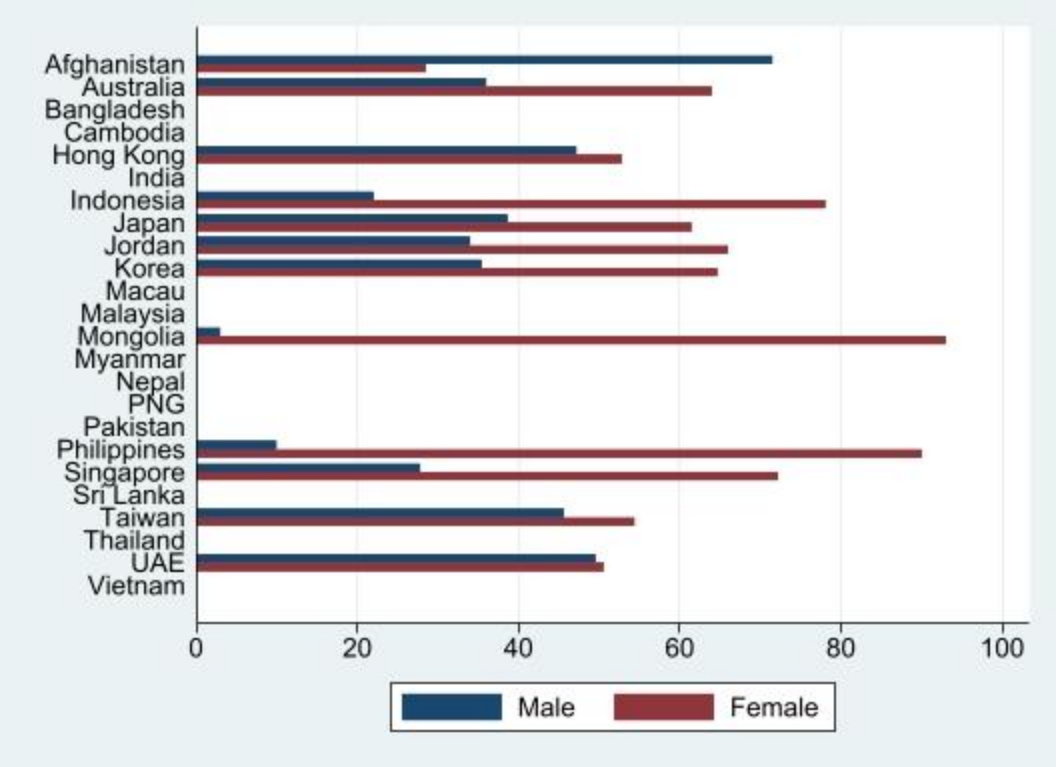


Figure 9. Sex of Pharmacists in Asian Countries

The importance of gender diversity in the healthcare sector is rising, with an emphasis on ensuring equal opportunities and representation for all. Our most current analysis, which covers the period from 2012 to 2023, offers important new information about the gender distribution among pharmacists who are legally licensed and registered in 12 different countries. This information highlights the significance of tackling gender inequities and illuminates how the pharmacy industry is changing.

Our study expanded its scope to 12 countries, each of which has a distinct healthcare system. Our data collection activities covered a wide range of countries with different healthcare systems and cultural backgrounds

The gender split is as follows:
The dataset looked at the quantity and percentage of legally licensed and registered pharmacists in each of the 12 countries who are biological men and women. The data showed interesting trends:

With a standard deviation of 18.31%, the average percentage of male pharmacists among these countries was roughly 35.05%. This reflects the uneven presence of men in the pharmacy industry.

In contrast, with a standard deviation of 17.70%, the average percentage of female pharmacists was roughly 64.62 %. This suggests that women are more likely to work in pharmacies throughout the examined countries.

Implications:

The information highlights the changing gender dynamics in the pharmacy industry. Despite the fact that women make up the majority of pharmacists in these countries, the level of gender inequality differs greatly. In order to address potential obstacles to access and advancement within the industry, it is essential to comprehend these discrepancies.

The dataset encourages further investigation into the variables impacting the gender distribution of pharmacists, such as social standards, educational possibilities, and labor laws. It serves as a basis for additional study targeted at advancing gender parity in the healthcare workforce.

Potential Future Research:

For scholars and decision-makers interested in gender representation and diversity in the healthcare workforce, this dataset is an invaluable resource. It opens the door to more research into the experiences and difficulties that male and female pharmacists have in other countries, as well as tactics for promoting inclusivity and equity.

Researchers can learn more about the most effective strategies for advancing gender diversity and building a more inclusive and representative pharmacy profession by looking at historical trends and making cross-national comparisons.

Our study of the gender distribution of pharmacists across 12 countries, spanning more than a decade, provides a comprehensive picture of gender dynamics in the pharmacy profession. It provides a crucial framework for continuous conversations and studies aimed at promoting gender equity and guaranteeing that everyone has an equal chance to succeed in the area of pharmacy.

Variable 1F-7: Age Distribution by Sex of Pharmacists

The dataset provides insights into the average age or age distribution of licensed and registered pharmacists, categorized by gender, in various countries. Let us explore the patterns and trends that emerge from this dataset:

Australia (**1999**):

The data indicates a notable age distribution difference between male and female pharmacists. While male pharmacists have higher representation in the 35-54 age range, female pharmacists are more prominent in the <30 and 30-44 age groups. This could reflect changes in gender distribution over the years.

Hong Kong (**2012**):

The dataset from Hong Kong provides median ages for males and females, showing that male pharmacists tend to be slightly older than their female counterparts.

Indonesia (**2022**):

The data for Indonesia demonstrates age distribution by gender. It is apparent that the majority of pharmacists in this dataset are female. The age distribution varies significantly, with a higher percentage of females in the <30 and 30-44 age groups. This could be indicative of a higher influx of female pharmacists in recent years.

Japan:

The dataset for Japan provides a detailed age distribution for both male and female pharmacists. Interestingly, there is a higher percentage of female pharmacists in most age groups. This may reflect changing demographics in the pharmacy profession.

Mongolia (**2020**):

The dataset from Mongolia offers a clear contrast in age distribution between male and female pharmacists. Female pharmacists are more concentrated in the younger age groups, while male pharmacists are relatively older on average. The dataset highlights gender differences in the age distribution of pharmacists.

These patterns and trends in the age and gender distribution of pharmacists are essential for understanding the composition of the pharmacy workforce in various countries. Factors like gender dynamics, education, and workforce policies likely contribute to these variations.

It is crucial to note that some countries, such as Afghanistan, Bangladesh, Cambodia, India, Jordan, Korea, Myanmar, Nepal, Pakistan, PNG, Sri Lanka, UAE, and Vietnam, lack data in this dataset. Further research and data collection are needed in these regions to provide a more comprehensive understanding of the age and gender distribution of pharmacists.

Objective 2: **Characterization of the Pharmacy Education in each FAPA associated-country**

Sub-objective 2A: **Description of the Availability and Curricula of Pharmacy Education Programs**

Variable 2A-1: Colleges or Schools Offering Pharmacy Education

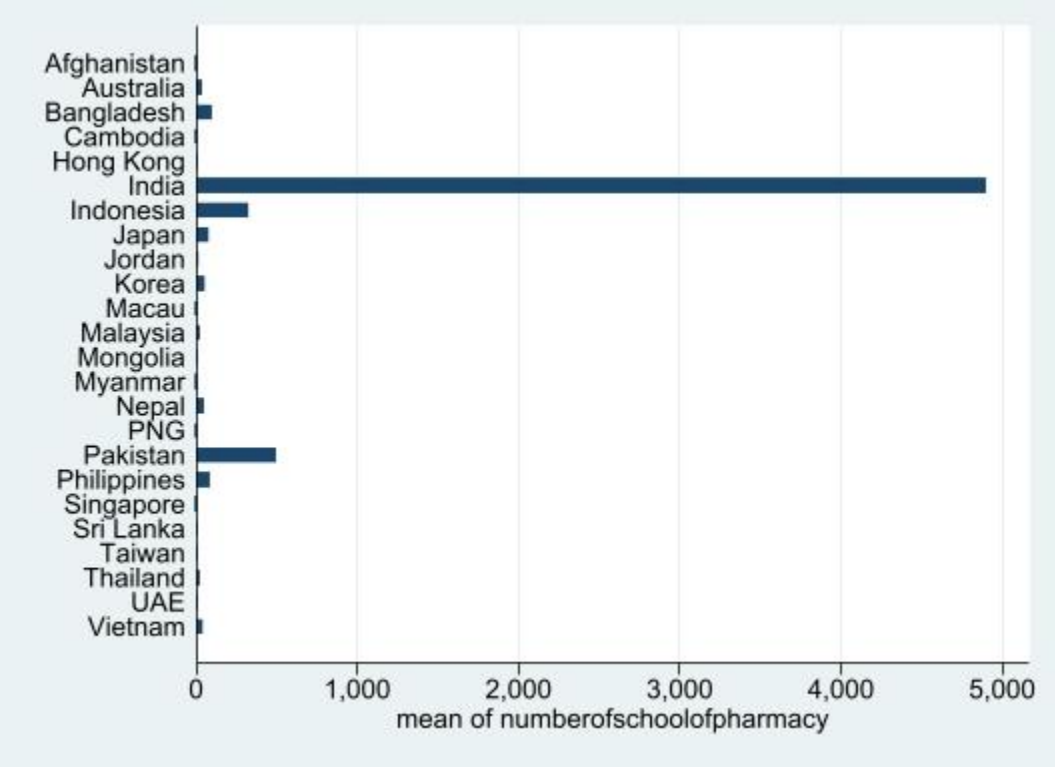


Figure 10. Mean number of Pharmacy Schools/Colleges in Asian Countries

Understanding the landscape of pharmacy education institutions is necessary for assessing the accessibility and availability of pharmaceutical training around the globe. This exhaustive overview provides information on the number of colleges and universities offering pharmacy education in 24 countries, casting light on the diversity and scope of available educational opportunities. Here is a comprehensive analysis:

The dataset contains information from twenty-four countries, providing a global perspective on pharmacy education. The mean number of institutions offering pharmacy education is approximately 260.58, with substantial variation

between countries. This diverse distribution highlights the varying emphasis placed on pharmacy education and the number and diversity of the pharmaceutical workforce in different regions.

From a minimum of one institution to a maximum of 4,898 institutions, the number of schools or colleges offering pharmacy programs illustrates the plethora of educational opportunities available to aspiring pharmacists around the globe. Whether public or private, these institutions play a crucial role in shaping the future of pharmacy professionals, nurturing excellence, and advancing pharmaceutical sciences.

The variety of educational institutions reflects the commitment of nations to satisfy the healthcare requirements of their respective populations. It also highlights the significance of global collaboration and knowledge sharing within the pharmaceutical community, assuring a well-trained and skilled workforce to address the evolving healthcare challenges of the twenty-first century.

Variable 2A-2: Colleges or Schools Offering Pharmacy Education

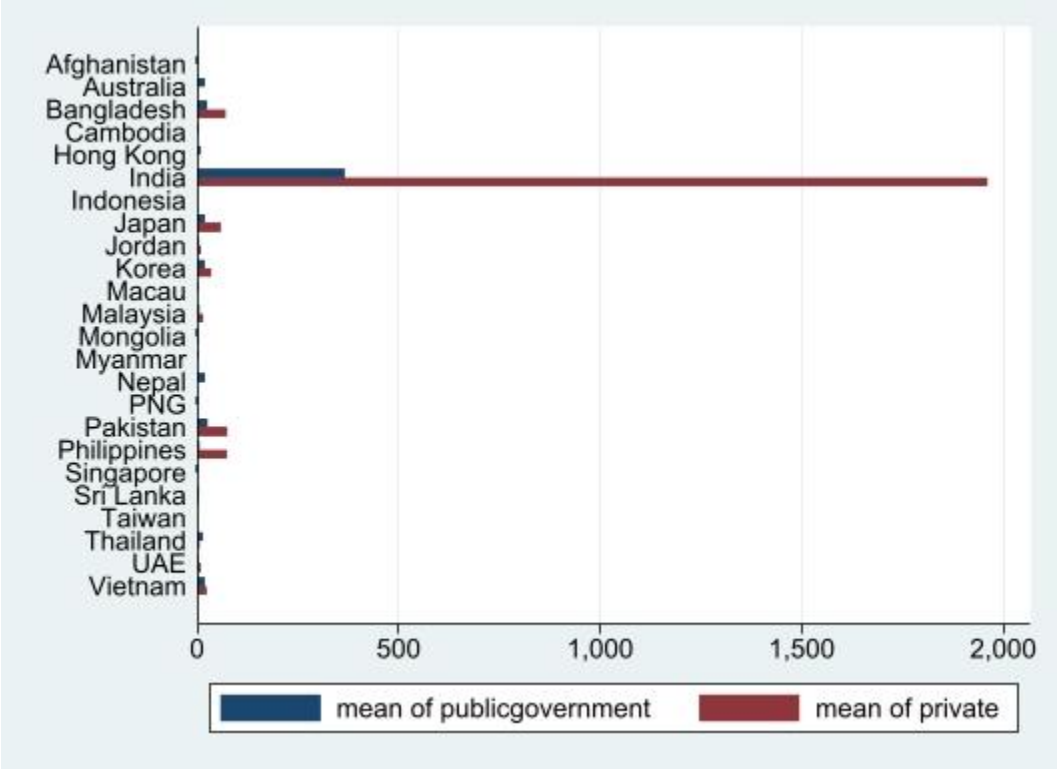


Figure 11. Diversity in Pharmacy Education Providers: Private and Public Institutions

Understanding the distribution of colleges or schools offering pharmacy education across different types of institutions is crucial for evaluating the accessibility and diversity of educational opportunities available to aspiring pharmacists. This exhaustive overview explores the number of such institutions based on whether they are public or private, providing valuable insights into the pharmacy education landscape. Here is a comprehensive summary:

Public or **Government Institutions**:

- Observed in 22 countries
- Mean: 25.73
- Standard Deviation 76.25
- Minimum: 1

- Maximum: 365

Public or government institutions are a fundamental aspect of pharmacy education, providing opportunities to aspiring pharmacists around the world. The dataset indicates that, on average, each of the 22 countries included in the study has approximately 25.73 public or government institutions offering pharmacy education. However, there is considerable variation, with the number of institutions ranging from one to 365 in a single country. This diversity demonstrates the commitment of governments to make pharmacy education accessible to a variety of students and contribute to the expansion of the pharmaceutical workforce.

Private Institutions:

- Observed in 13 countries
- Mean: 180.08
- Standard Deviation 535.85
- Minimum: 4
- Maximum: 1961

Private institutions also play a significant role in pharmacy education, providing distinct perspectives and educational opportunities. There are an average of 180.08 private institutions offering pharmacy programs across the 13 countries included in the dataset. As with public institutions, there is significant variation, with the number ranging from a minimum of four to a maximum of 1961 institutions in a single country. The presence of private institutions contributes to the diversity of educational approaches and ensures that a broad spectrum of students can pursue pharmacy education tailored to their needs and aspirations.

In conclusion, the diversity of pharmacy education providers, whether public or private, exemplifies the global commitment to cultivating a diverse pharmaceutical workforce. Public institutions guarantee accessibility and inclusivity, whereas private institutions provide additional options and perspectives. This comprehensive approach to pharmacy education is necessary for addressing the ever-changing healthcare challenges of the modern world and ensuring the continued excellence of pharmacy professionals.

Variable 2A-3: **Academic Programs/Degrees Offered**

Table 8. Degree Programs offered in Asian Countries

Degree Programs offered in Asian Countries	Frequency (n)	Percentage (%)
Bachelor in Pharmacy	22	92.00%
Master of Pharmacy	13	54.00%
PhD in Pharmacy	12	50.00%
PharmD	10	42.00%
Master of Clinical pharmacy	9	38.00%
Diploma in Pharmacy, Diploma in Pharmaceutical and Cosmetic Science Diploma in Pharmacy Management and Practice	8	33.00%
Master of Pharmaceutical Medicine/science	6	25.00%
Bachelor in Pharmaceutical Sciences	4	17.00%
Master in Social and Administrative Pharmacy	3	13.00%
Master of Pharmaceutical Industrial practice	3	13.00%
Dpharm	3	13.00%

PhD in Clinical Pharmacy	3	13.00%
PhD in Pharmacy and Pharmaceutical Sciences	3	13.00%
Pharmacy technician	2	8.00%
Master of Medical Biology (MMB)	2	8.00%
Graduate Certificate in Pharmacy practice	2	8.00%
Graduate diploma of Clinical Pharmacy	2	8.00%
Graduate Certificate of Pharmaceutical Public Health	2	8.00%
Graduate Certificate in Pharmacotherapy	2	8.00%
PhD in Pharmaceutical Science	2	8.00%
Diploma Pharmaceutical Science	2	8.00%
M. Phil. Pharmacy.	2	8.00%
Postgraduate pharmacy programs (Clinical Pharmacy, Pharmaceutical Chemistry, Pharmaceutical Technology, Pharmacology, Physiology, Social and Administrative Pharmacy)	2	8.00%
Bachelor of Pharmacy and Management	1	4.00%
M.Sc. Accreditation Chemistry.	1	4.00%
M. Phil. Advanced Pharmacy.	1	4.00%
Bachelor's degree in Pharmacy in Chinese Medicine	1	4.00%
Bachelor's degree in Biomedical science - Pharmaceutical Science and Technology	1	4.00%
Master of Philosophy in Chinese Medical Science	1	4.00%
Certificate Course in Career Development Pharmacy Management and Practice Certificate Course in Pharmacy Practice Certificate of Pharmacy Technician	1	4.00%
Advanced Certificate Course in Pharmacy Practice	1	4.00%
Elementary Diploma in Pharmacy (EDPharm)	1	4.00%
First-level Diploma of specialization in Pharmacy (FDSPharm)	1	4.00%
Second-level diploma of specialization in pharmacy (SDSPharm)	1	4.00%

Understanding the diversity and scope of academic programs and degrees offered by colleges and schools of pharmacy is essential for assessing the educational landscape of the pharmaceutical profession. This comprehensive overview presents a detailed analysis of the academic programs and degrees available in 24 countries, shedding light on the varied educational opportunities offered to pharmacy students. Here's a comprehensive breakdown:

1. **Bachelor in Pharmacy**:
    - Observed in 22 countries
    - Percentage: 92%

The Bachelor in Pharmacy program is a cornerstone of pharmaceutical education, available in 22 out of the 24 countries analyzed. With a substantial presence, this undergraduate degree provides aspiring pharmacists with a strong foundation in pharmaceutical sciences and practice, preparing them for diverse roles within the field.

2. **Master of Pharmacy**:

- Observed in 13 countries
- Percentage: 54%

The Master of Pharmacy program, available in 13 countries, offers advanced training and specialization in pharmaceutical sciences and clinical practice. It equips pharmacists with the knowledge and skills needed for advanced roles in healthcare.

3. **PhD in Pharmacy**:
    - Observed in 12 countries
    - Percentage: 50%

PhD programs in Pharmacy are available in 50% of the countries, providing opportunities for pharmacists to pursue advanced research and contribute to the field's scientific knowledge and innovation.

4. **PharmD**:
    - Observed in 10 countries
    - Percentage: 42%

The PharmD program, present in 10 countries, represents an advanced professional degree that combines clinical training with pharmaceutical expertise, preparing pharmacists for direct patient care roles.

5. **Master of Clinical Pharmacy**:
    - Observed in 9 countries
    - Percentage: 38%

The Master of Clinical Pharmacy program, available in 38% of the countries, focuses on specialized clinical training and practice, equipping pharmacists with the skills to optimize patient care.

6. **Diploma Programs**:
    - Observed in 8 countries
    - Percentage: 33%

Diploma programs in various pharmacy-related fields are available in 33% of the countries, offering focused training and expertise in specific aspects of pharmaceutical practice.

7. **Other Programs**:
    - Observed in varying numbers and percentages

Several other academic programs, including degrees, diplomas, and certificates, cater to specific niches within the pharmaceutical profession. These programs encompass a wide range of specialized areas, from pharmaceutical sciences to clinical practice and beyond.

In conclusion, the availability of diverse academic programs and degrees in pharmacy across these 24 countries underscores the global commitment to producing well-rounded and highly skilled pharmacists. These programs cater to a broad spectrum of interests and career paths within the pharmaceutical field, ensuring that pharmacists are equipped to address the evolving healthcare needs of their respective communities and beyond.

Variable 2A-4: **Academic Programs/Degrees Offered**

Table 9. Length of Degree Programs in Asian Countries

Length of Degree Programs	Frequency (n)	Percentage (%)
Certificate 3-6 months	4	17.00%

Training for registration 1 year	3	13.00%
Diploma 2-3 years	9	38.00%
Bachelor 4 years	16	67.00%
Bachelor 5 years	9	38.00%
Bachelor 6 years	2	8.00%
Masters 1.5 years	1	4.00%
Masters 3 years	7	29.00%
Masters 2 years	9	38.00%
Masters 4 years	1	4.00%
Graduate Certificate 2 years	4	17.00%
Graduate Diploma Certificate 2 years	1	4.00%
Professional program 1 year	1	4.00%
D.Pharm 2 years	1	4.00%
PharmD 6 years	7	29.00%
PharmD 2-3 years	5	21.00%
PhD 3-4 years	3	13.00%
PhD 2 years	1	4.00%
PhD >5 years	2	8.00%

The length of academic programs in pharmacy plays a vital role in shaping the education and training of future pharmacists. A comprehensive analysis of program durations across 24 countries reveals a diverse landscape that caters to the varying needs and aspirations of pharmacy students. Here is a breakdown of the duration of recognized academic programs and degrees offered:

1. **Certificate Programs**:
    - Duration: 3-6 months
    - Observed in 4 countries
    - Percentage: 17%

Certificate programs, spanning 3-6 months, are designed to provide targeted training and specialized knowledge in specific areas of pharmacy practice. They offer a relatively short yet focused educational experience.

2. **Training for Registration**:
    - Duration: 1 year
    - Observed in 3 countries
    - Percentage: 13%

Training programs that last for one year prepare students for professional registration as pharmacists. They provide a foundational understanding of pharmacy practice.

3. **Diploma Programs**:
    - Duration: 2-3 years
    - Observed in 9 countries
    - Percentage: 38%

Diploma programs, spanning 2-3 years, offer in-depth training and expertise in various aspects of pharmacy. They strike a balance between comprehensive education and program duration.

4. **Bachelor's Programs**:
    - Duration: 4-6 years
    - Observed in varying numbers and percentages

Bachelor's programs are a cornerstone of pharmacy education, with durations ranging from 4 to 6 years. They provide students with a solid foundation in pharmaceutical sciences and practice, preparing them for a wide range of roles in the field.

5. **Master's Programs**:
    - Duration: 1.5-4 years
    - Observed in varying numbers and percentages

Master's programs offer advanced training and specialization in pharmacy. They cater to students seeking in-depth knowledge and skills in specific areas of pharmaceutical practice.

6. **Graduate Certificate and Diploma Programs**:
    - Duration: 2 years
    - Observed in varying numbers and percentages

Graduate certificate and diploma programs, spanning 2 years, provide focused training and expertise for professionals looking to enhance their pharmacy careers.

7. **PharmD Programs**:
    - Duration: 2-6 years
    - Observed in varying numbers and percentages

PharmD programs, offered in several durations, combine clinical training with pharmaceutical expertise, preparing pharmacists for direct patient care roles.

8. **PhD Programs**:
    - Duration: 2-4 years and greater than 5 years
    - Observed in varying numbers and percentages

PhD programs in pharmacy provide opportunities for advanced research and contribute to the field's scientific knowledge and innovation.

In summary, the duration of pharmacy academic programs varies significantly across the 24 countries analyzed. This diversity ensures that aspiring pharmacists can choose programs that align with their educational and career goals. Whether pursuing short-term certificates or undertaking extensive doctoral studies, these programs collectively contribute to the development of a highly skilled and adaptable pharmaceutical workforce.

Variable 2A-5: **Maximum Capacity for New Admissions in Pharmacy Programs**

The capacity for new admissions to pharmacy schools varies greatly among countries, reflecting the diversity of educational institutions, healthcare requirements, and regulatory frameworks around the world. Common patterns and trends, as well as the overall capacity per country are illustrated below:

1. **Various Admissions Systems**: Admissions procedures for pharmacy programs vary greatly between nations. Some nations, such as India, have a set number of seats for various pharmacy schools, but others, such as Indonesia, have more flexible, self-regulated procedures.

2. **There is no fixed capacity**: Several countries, including Malaysia and the United Arab Emirates, do not have a set maximum number of new admissions. They place a premium on maintaining a good lecturer-to-student ratio and adjusting to the growing demand for pharmacy education.

3. **University-Related**: In some circumstances, the maximum capacity for new admissions is determined by the university. Hong Kong, for example, establishes a maximum capacity based only on the University of Hong Kong.

4. **Government Regulation**: In some countries, such as Japan and Thailand, public universities are regulated by the government, which might affect admission processes and capacity.

5. **Acceptance Rates**: The admission rate for pharmacy programs in Mongolia is specified, but it is based on a single university, the Mongolian University of Pharmaceutical Sciences.

6. **Diversified Capacity**: Japan has a diversified capacity, with different numbers of seats available at national, public, and private universities.

In summary, the maximum capacity for new admissions to pharmacy programs varies greatly, reflecting each country's unique demands and regulatory methods. While some countries have fixed capacity figures, others place a premium on maintaining advantageous faculty-to-student ratios and adapting to demand. The variety in admissions procedures and capacity estimates demonstrates the dynamic character of pharmacy education around the world.

Sub-objective 2B: Description of Accreditation and Quality Assurance Mechanisms for Pharmacy Education

Variable 2B-1: **Laws Regulating Pharmacy Education**

Table 10. Laws Regulating Pharmacy Education in Asian Countries

Laws Regulating Pharmacy Education in Asian Countries	Percentage (%)
Detailed regulations	79.20
Higher education legislation	62.50
Education frameworks	54.20
Professional licensing	54.20
Clinical Practice standards	41.70
Program accreditation	33.30
Higher education Framework Programs	33.30
Student Internship Programs	20.80
Academic Qualification Laws	16.70
Ministry regulations	12.50
Other legislations	8.30
No available data	8.30

To gain a comprehensive understanding of the regulations and standards governing pharmacy education across 24 diverse countries, we analyzed the available data. Here is a summarized overview of our findings, including a statistical analysis with frequency and percentages:

1. **Detailed Regulations**: Among the countries, the majority (79.2%) have detailed regulations for pharmacy education. These regulations often encompass curriculum standards, faculty qualifications, and student assessment methods. Examples include the "Pharmacy Council of India Education Regulations, 1991" and the "Law Number 12 of 2012 on Higher Education" in Indonesia.

2. **Education Frameworks**: A significant portion (54.2%) of the countries maintain a national education framework that outlines the structure and quality standards of higher education. Notable examples include the "National Competency Standards Framework of Pharmacists in Australia 2016" and "Cambodian National Qualification Framework (2014)."

3. **Professional Licensing**: Many countries (54.2%) require pharmacy students to meet specific licensing criteria upon graduation. These criteria, established by regulatory bodies such as the "Pharmacists Registration Act 2007" in Singapore, ensure that graduates are competent and safe practitioners.

4. **Higher Education Legislation**: A large proportion (62.5%) of the countries have enacted legislation related to higher education, often including provisions specific to pharmacy programs. These laws lay the groundwork for academic institutions to offer pharmacy degrees, as seen in the "Higher Education Act" in South Korea.

5. **Program Accreditation**: Program accreditation is practiced in 33.3% of the countries. Accreditation bodies evaluate pharmacy programs to ensure they meet predefined quality and competence standards. Examples include the "Australian Pharmacy Council Accreditation standards" and "Programme Standard for Pharmacy Programme in Malaysia."

6. **Student Internship Programs**: Some countries (20.8%) have established student internship programs, enabling pharmacy students to gain practical experience. For instance, the Philippines introduced the "FDA Circular No. 2023-005" for its student internship program.

7. **Clinical Practice Standards**: Clinical practice standards for pharmacists are prevalent in a significant number (41.7%) of the countries. These standards define the expectations and scope of clinical practice for pharmacists, with examples including the "Society of Hospital Pharmacists of Australia Clinical practice standards."

8. **Academic Qualification Laws**: A few countries (16.7%) have implemented laws specific to the academic qualifications required for pharmacy faculty members, ensuring they possess the necessary expertise and qualifications. Japan's "Pharmacists Act" is an example.

9. **Framework Programs**: A notable percentage of countries (33.3%) have introduced higher education framework programs to guide health sciences at the undergraduate level, reflecting the evolving nature of pharmacy education. For instance, Vietnam has "Circular on the Clinical pharmacy activities in hospitals Guideline."

10. **Ministry Regulations**: Some countries (12.5%) rely on their Ministry of Health or Higher Education to establish and monitor pharmacy education regulations. The "MOH-UAE Pharmacists and Technician Licensing Criteria (2017)" in the UAE is a relevant example.

11. **Other Legislation**: In a few cases (8.3%), countries have enacted unique legislation or regulations to govern specific aspects of pharmacy education, such as the "Law on Pharmacy (Law No. 105/2016/QH13)" in Vietnam.

12. **No Available Data**: For a couple of countries (8.3%), we cannot find available data or information regarding their pharmacy education regulations or standards.

These findings highlight a global trend towards structured pharmacy education systems. However, the specific regulations and standards can vary significantly between countries, reflecting diverse cultural, educational, and healthcare needs. Understanding these patterns can serve as a valuable resource for international collaboration, curriculum development, and quality assurance in pharmacy education.

Variable 2B-2: **Admission Criteria for Pharmacy Schools/Colleges in Asia**

Table 11. Requirements for Admission in Pharmacy Schools/Colleges in Asian Countries

Requirements	Frequency (n)	Percentage (%)
General Academic Requirements:	21	87.50
Entrance Exams:	11	45.80
English Language Proficiency:	10	41.70
High School Transcript:	7	29.20
Special Requirements:	3	12.50
Support Services and Remedial Courses:	2	8.30
Pathways:	2	8.30
Equivalency:	2	8.30
Additional Assessments:	1	4.20
Interviews and Non-Cognitive Assessments:	1	4.20
Level of Education:	Varies by country	Varies by country

Analyzing the admission criteria for pharmacy programs across 24 countries reveals some notable patterns and trends. These criteria encompass various aspects, including academic requirements, English language proficiency, entrance exams, high school transcripts, pathways, additional assessments, interviews, equivalency, special requirements, level of education, and support services.

Academic Requirements: One of the most prevalent trends in the admission criteria is the emphasis on academic requirements. A total of 21 out of 24 countries (87.5%) have set specific academic prerequisites for pharmacy program admission. These typically include completion of secondary education with a focus on science-related subjects such as biology, chemistry, physics, and mathematics. Applicants are often required to achieve a specific grade point average or attain a certain percentage in their high school education.

English Language Proficiency: English language proficiency is another significant factor in the admission criteria. A total of 10 countries (41.7%) expect students to demonstrate their proficiency in English through standardized tests like IELTS, TOEFL, or equivalent exams. This trend reflects the global nature of pharmacy education and the need for students to effectively communicate in English, especially in international programs.

Entrance Exams: Eleven countries (45.8%) require students to take entrance exams as part of their admission process. These exams often assess academic knowledge and, in some cases, include psychological tests. Entrance exams serve as a tool to evaluate a candidate's readiness for pharmacy education, ensuring that they have a strong foundation in relevant subjects.

High School Transcript: High school transcripts are integral to the admission criteria in seven countries (29.2%). A strong academic record in high school, especially in science and mathematics subjects, can significantly boost a student's chances of gaining admission to a pharmacy program.

Pathways and Additional Assessments: In several countries, students have multiple pathways to gain admission to pharmacy programs. These pathways may include A-level certificates, diploma programs, and bachelor's degrees in related fields. Moreover, some countries may require additional assessments or assessments tailored to their education system.

Interviews, Equivalency, and Special Requirements: Although less common, some countries include interviews and non-cognitive assessments in their admission process. Equivalency evaluations, where students' qualifications are evaluated for equivalence to the country's standards, are implemented in a couple of countries. Additionally, a few countries have special requirements, which can range from specific test scores to age limitations.

Support Services and Remedial Courses: Two countries (8.3%) offer support services and remedial courses to help students meet the necessary admission criteria. These services aim to ensure that students are adequately prepared for pharmacy education, even if they initially fall short of specific requirements.

Overall, the patterns and trends in admission criteria for pharmacy programs highlight the rigorous and comprehensive nature of pharmacy education worldwide. Institutions prioritize academic excellence, English proficiency, and standardized assessments to ensure that students are well-prepared for the challenges of the pharmacy profession. This data underscores the importance of academic performance and the need for international students to meet specific criteria to pursue pharmacy education in these countries.

Variable 2B-3: **Quality Assurance Mechanisms**

Analyzing the quality assurance mechanisms in pharmacy education across 24 countries reveals various approaches and trends in ensuring the quality of pharmaceutical education. Quality assurance mechanisms encompass accreditation bodies, regulatory bodies, and processes to continuously monitor and improve the quality of pharmacy education in colleges and schools of pharmacy.

Quality Assurance through Accreditation: Accreditation is a prominent quality assurance mechanism in many countries. It is used to evaluate and ensure that pharmacy education programs meet established standards. Among the 24 countries, 14 (58.3%) have dedicated accreditation bodies for pharmacy education. These include organizations such as the Australian Pharmacy Council, the Pharmacy Council of India, and the Pharmacy Council of Papua New Guinea. Accreditation provides a structured approach to quality assurance, setting standards and facilitating self-improvement within pharmacy education institutions.

Regulatory Bodies: Regulatory bodies are responsible for overseeing pharmacy education in various countries. In some cases, they play a crucial role in shaping the quality of education. For example, in Afghanistan, the Ministry of Higher Education (MoHE) coordinates the accreditation process, while in Cambodia, higher education institutions are under the jurisdiction of the Ministry of Health. In the United Arab Emirates (UAE), the National Qualifications Authority (NQA) and the Commission for Academic Accreditation (CAA) oversee quality assurance.

Self-Assessment and Evaluation: Several countries, including Japan, practice self-assessment and evaluation as a means of ensuring quality in pharmacy education. In Japan, universities perform self-evaluation, and an external body, the Institute for Pharmacy Education and Evaluation, conducts evaluations. Such self-assessment mechanisms encourage institutions to continuously monitor their quality and make improvements as needed.

Continuing Education and Professional Development: Some countries, like Hong Kong, emphasize continuing education as a quality assurance mechanism. The Pharmacy Central Continuing Education Committee in Hong Kong accredits quality continuing education programs for pharmacists and maintains records of their continuing education credits. This ensures that pharmacists stay updated with the latest knowledge and skills.

Regional and International Involvement: Several countries have sought involvement in regional and international quality assurance networks. Macau, for instance, joined international higher education quality assurance

organizations. By aligning with global standards and practices, institutions in these countries can improve the quality of pharmacy education.

Collaboration with Professional Associations: In countries like the Philippines, professional associations like PAASCU play a role in quality assurance. They monitor pharmacy programs and evaluate them periodically to maintain accreditation status.

Standards and Regulation: In Malaysia, pharmacy education quality assurance includes a specific focus on program monitoring, review, and continual quality improvement. Countries like Sri Lanka emphasize institutional quality reviews and program reviews, aligning with regulatory standards.

Emerging Trends: Emerging trends are seen in countries like Indonesia, where the establishment of an independent accreditation agency for various health professions reflects a growing awareness of the importance of specialized quality assurance mechanisms. Myanmar, despite not having a Pharmacy Council in place, is planning to implement a pharmacy licensing system that includes examinations, continuing education, and re-licensing.

Overall, the data indicates that quality assurance in pharmacy education is a global concern, and countries employ various strategies to ensure the quality of education and training. Accreditation and regulatory bodies, self-assessment, continuing education, international collaboration, and the involvement of professional associations are all prevalent trends that contribute to the quality assurance of pharmacy education. The emphasis on these mechanisms reflects the commitment to preparing pharmacists who can meet the highest standards and deliver quality healthcare services.

Sub-objective 2C: Description of Accreditation and Quality Assurance Mechanisms for Pharmacy Education

Variable 2C-1: **Description of Sites for Student Training**

The training and internship sites for pharmacy students play a pivotal role in shaping the practical experience they receive. The data from 24 countries reveal distinct patterns and trends in the types of sites used for pharmacy student training:

1. **Diverse Internship Sites**:
   - **Hospitals**: Across various countries, hospitals serve as key training sites for pharmacy students. These include hospital pharmacies, clinical settings, and specialized medical departments.
   - **Community Pharmacies**: Community pharmacies are prevalent training sites, enabling students to gain practical experience in serving the public and dispensing medications.
   - **Pharmaceutical Industry**: In many countries, pharmaceutical companies and manufacturing plants offer internships, providing students with insights into drug production and regulation.
   - **Government and Regulatory Bodies**: Students in several countries have opportunities to intern with government agencies and regulatory authorities responsible for drug safety and standards.
   - **Research and Laboratories**: Laboratories, research institutions, and survey work are significant sites, fostering skills in drug development, quality assurance, and data collection.
   - **Retail and Compounding Facilities**: Some countries incorporate retail pharmacies and compounding facilities in their training programs, promoting a well-rounded education.

   These diverse training sites ensure that pharmacy students gain a comprehensive understanding of the field.

2. **Lack of Internship Programs**: In some countries such as India, Myanmar, and Pakistan, specific data regarding internship programs for pharmacy students were not provided, indicating that the presence or recognition of these programs might be limited.

3. **Accreditation and National Recognition**: Several countries mention the importance of reputable or nationally recognized training sites, ensuring that students receive high-quality education.

4. **Varied Clinical Specialties**: In some countries, like Jordan and Singapore, students can gain exposure to various medical specialties during their internships, further enhancing their knowledge and skills.

5. **QA and Standards**: Some countries, like Malaysia and Sri Lanka, emphasize the importance of standards and quality assurance in the selection of training sites, ensuring that students receive the best possible education.

6. **Local Relevance and Regulatory Oversight**: The types of training sites often align with the specific needs and regulatory oversight within each country, highlighting the importance of tailoring education to local healthcare practices.

7. **Balance Between Academic and Practical Training**: The data indicate that pharmacy education is designed to offer a balance between theoretical knowledge gained in academic institutions and practical experience acquired through internships at these diverse sites.

These patterns and trends suggest a commitment to producing well-rounded and highly competent pharmacy professionals in each of these 24 countries. The diversity of training sites and the emphasis on accreditation and quality assurance mechanisms ensure that pharmacy students are well-prepared to meet the healthcare needs of their respective regions.

Variable 2C-2: **Tasks and Roles of the Intern**

Clinical Exposure and Patient Counseling: Many countries, including Afghanistan, Australia, Cambodia, India, Jordan, Nepal, Pakistan, Philippines, Singapore, Taiwan, UAE, and Vietnam, emphasize clinical exposure and patient counseling. This indicates that practical, patient-centered education is a significant focus across various regions.

Medication Management: Medication management, which includes tasks related to processing prescriptions, inventory management, and patient medication profiles, is consistently important in countries like Australia, Indonesia, Japan, Jordan, Korea, Malaysia, Thailand, and UAE.

Adverse Drug Reaction Reporting: The detection, assessment, and management of adverse drug reactions are important roles for pharmacy interns, as seen in Jordan.

Regulatory Understanding: Regulatory understanding is essential, especially in countries like Afghanistan, Australia, Bangladesh, India, Indonesia, and Philippines. This highlights the importance of legal and ethical aspects of pharmacy practice.

Research and Development: Roles related to research and development, particularly in the pharmaceutical industry, are emphasized in countries like Australia, Indonesia, and Philippines, reflecting the need for innovation in pharmacy practice.

Cross-Disciplinary Collaboration: Collaboration with other healthcare professionals is increasingly recognized, as seen in countries like Afghanistan, Australia, Cambodia, India, Jordan, Korea, and UAE.

Public Health and Education: Several countries, including Cambodia and Nepal, emphasize public health activities, such as educating local communities about hygiene and healthcare practices. This indicates a broader societal role for pharmacists.

Adaptation to Local Needs: Some countries adapt pharmacy training to local needs, as seen in Indonesia's focus on various aspects of the pharmaceutical industry and community health centers.

Compliance with Best Practices: Many countries prioritize compliance with best practices, such as Good Distribution Practices (GDP) and Good Pharmacy Practice (GPP), indicating adherence to international standards.

The common trends indicate that there is a global emphasis on practical, patient-centered education, medication management, regulatory understanding, and cross-disciplinary collaboration in pharmacy education. These trends reflect the evolving role of pharmacists as integral members of healthcare teams and the broader healthcare community. The specific tasks and roles may vary by country based on local healthcare needs and regulations.

Variable 2C-3: **Duration of Internships for Pharmacy Education**

Analyzing the duration of internships for pharmacy education across 24 countries reveals some interesting trends and patterns. Let us examine the statistical analysis of this data, including frequency, percentage, mean, mode, median, range, and standard deviation.

Table 12. Duration of Pharmacy Internship in Asian Countries

Duration of Internship	Percentage (%)
Less than 1,000 hours	12.50
1,000 - 5,000 hours	41.67
More than 5,000 hours	25.00
Varies	16.67

Trends and Patterns:

1. **Diverse Duration Ranges**: The durations of pharmacy internships vary significantly across countries, ranging from a minimum of 336 hours in Mongolia to a maximum of 67,200 hours in Singapore. This wide range indicates that there is no global standard for the duration of pharmacy internships.

2. **Majority Fall in 1,000 - 5,000 Hours Range**: The majority of countries (10 out of 24) require internships lasting between 1,000 and 5,000 hours. This range includes countries like Australia, India, Japan, and Korea. It reflects a common duration bracket in many regions.

3. **Significant Variation:** The standard deviation of approximately 2,911 hours highlights the significant variation in internship durations. This suggests that internship requirements are influenced by local policies, healthcare needs, and educational standards.

4. **Countries with Longer Internships**: Some countries, such as Singapore and Malaysia, stand out with exceptionally long internship durations, likely reflecting comprehensive pharmacy education programs. These countries aim to provide extensive hands-on experience to their pharmacy students.

5. **Varies**: Several countries, including Macau, Myanmar, PNG, and Vietnam, have unspecified or variable internship durations. This variability may be due to differences in program structures or flexibility in meeting educational requirements.

Less than 1,000 hours	1,000-5,000 hours	More than 5,000 hours	Varies
Afghanistan	Australia	Hong Kong	Macau
Bangladesh	Cambodia	Jordan	Myanmar
Mongolia	India	Malaysia	Papua New Guinea
	Indonesia	Philippines	Vietnam

Japan
Korea
Nepal
Pakistan
Taiwan
United Arab Emirates
Singapore
Thailand

Mean Duration: The mean duration of internships across all countries is approximately 3,123 hours.

Mode: There is no clear mode as each duration is unique.

Median: The median duration, when countries are ranked by hours, is approximately 1,440 hours. This indicates that half of the countries have internships shorter than this duration, and half have longer internships.

Range: The range, which is the difference between the maximum and minimum durations, is quite substantial, ranging from 336 hours (Mongolia) to 67,200 hours (Singapore).

Standard Deviation: The standard deviation measures the spread of durations around the mean. In this dataset, the standard deviation is approximately 2,911 hours, suggesting significant variability in internship durations across the 24 countries.

In summary, the analysis of pharmacy internship durations across 24 countries reveals a lack of standardized duration globally. Instead, there is a wide range of requirements influenced by local factors. The mean and median values provide insights into the typical duration, but the standard deviation underlines the diversity in internship practices. This diversity likely reflects the adaptability of pharmacy education to local healthcare needs and educational objectives.

Sub-objective 2E: Identification of Continuing Professional Development Opportunities for Pharmacists.

Variable 2E-1: **Specializations**

Analyzing the opportunities for specialization in pharmacy education across 24 countries reveals trends and patterns, including frequencies and percentages, which highlight the diversity of specialization options and the prevalence of certain areas of focus.

1. **Diverse Specialization Options**:
    - In all 24 countries, there are opportunities for pharmacy students to specialize in various fields, highlighting the diverse nature of pharmacy education worldwide.

2. **Clinical Pharmacy as a Common Specialization**:
    - Percentage: 66.67% (16 out of 24)
    - Frequency: Clinical pharmacy is a widely available specialization, with around 66.67% of countries offering it. This indicates the significance of clinical expertise within the pharmacy profession.

3. **Pharmaceutical Sciences and Technology**:
    - Percentage: 41.67% (10 out of 24)
    - Frequency: Approximately 41.67% of countries provide specialization in pharmaceutical sciences and technology, reflecting the importance of research and development in the pharmaceutical field.

4. **Pharmacology and Toxicology**:
    - Percentage: 33.33% (8 out of 24)

- Frequency: About 33.33% of countries offer specialization in pharmacology and toxicology, underscoring the importance of understanding the effects of drugs on the body.

5. **Industrial Pharmacy and Pharmaceutical Administration**:
   - Percentage: 25.00% (6 out of 24)
   - Frequency: One-fourth of the countries, including Australia and Thailand, offer specialization in industrial pharmacy and pharmaceutical administration. This reflects the need for professionals in pharmaceutical manufacturing and management.

6. **Pharmaceutical Chemistry and Pharmaceutical Formulation**:
   - Percentage: 25.00% (6 out of 24)
   - Frequency: Around 25.00% of countries have specialization options in pharmaceutical chemistry and formulation, demonstrating the focus on drug formulation and development.

7. **Pharmacognosy**:
   - Percentage: 16.67% (4 out of 24)
   - Frequency: Approximately 16.67% of countries, such as Australia and Thailand, offer pharmacognosy as a specialization. This emphasizes the study of natural products in pharmacy.

8. **Biopharmaceutical Sciences**:
   - Percentage: 16.67% (4 out of 24)
   - Frequency: About 16.67% of countries provide specialization in biopharmaceutical sciences, reflecting the growing importance of biotechnology in the pharmaceutical industry.

9. **Clinical Research**:
   - Percentage: 12.50% (3 out of 24)
   - Frequency: In 12.50% of countries, including Malaysia, specialization in clinical research is available, highlighting the need for professionals in research and development within clinical settings.

10. **Toxicology and Aesthetic Sciences**:
    - Percentage: 12.50% (3 out of 24)
    - Frequency: Aesthetic sciences and toxicology are offered as specializations in 12.50% of countries, like Thailand and UAE, illustrating the broad scope of pharmaceutical education.

11. **Post-Professional Programs**:
    - Percentage: 12.50% (3 out of 24)
    - Frequency: 12.50% of countries, such as Jordan and UAE, offer post-professional programs like PharmD, providing advanced education opportunities for pharmacists.

12. **Specialized Competency Standards**:
    - Percentage: 4.17% (1 out of 24)
    - Frequency: In 4.17% of countries, specialized competency standards in pharmaceutical care, industrial pharmacy, and consumer protection are recognized. This highlights the commitment to maintaining high standards in specialized fields.

These trends showcase the diverse range of specializations available to pharmacy students globally. Clinical pharmacy is a common specialization, emphasizing the importance of clinical expertise, while pharmaceutical sciences and technology, pharmacology, and industrial pharmacy are also widely recognized. The prevalence of these specializations reflects the evolving role of pharmacists in healthcare and research.

Variable 2E-2: **Continuing Education for Graduated Professionals**

The dataset from 24 countries regarding continuing education for graduated pharmacy professionals reveals several patterns and trends in the types of opportunities available, their nature, and the country-specific requirements:

Table 13. Availability of Continuing Professional Development (CPD) Opportunities in Asian Countries

CPD Availability	Frequency (n)	Percentage (%)
Availability of Continuing Education Opportunities	20	83.30
Lack of Opportunities	6	25.00

Continuing Education Opportunities: Many countries provide continuing education opportunities for pharmacy professionals. These opportunities include a wide range of activities, such as courses, webinars, symposiums, lectures, workshops, conferences, internet discussion groups, clinical case studies, journal reading, multiple choice questions, presentations, training, and publication of journal articles.

Lack of Opportunities: In certain countries (e.g., Afghanistan, India, Jordan, Myanmar), no mandatory continuing education requirements or opportunities exist. In countries like Jordan and Korea, there is a lack of awareness of Continuing Professional Development (CPD) among pharmacists.

Table 14. Trends on CPD in Asian countries

CPD trends	Frequency (n)	Percentage (%)
Local Needs and Regulations	24	100.00
Variety of Learning Formats	21	87.50
National Recognition and Accreditation	11	45.80
Compliance and Quality Assurance	10	41.70
CPD Credit Points System	6	25.00
Research and Specialization	6	25.00
Importance of Lifelong Learning	4	16.70

National Recognition and Accreditation: In some countries like Bangladesh, opportunities are arranged by regulatory bodies (e.g., DGDA and Bangladesh Pharmacy Council) to ensure the continuous knowledge upgrading of graduate pharmacists. Accreditation and national recognition are important aspects in many countries, reflecting the significance of maintaining high-quality education.

CPD Credit Points System: Several countries, including Indonesia, Malaysia, Taiwan, Thailand, and UAE, employ a credit points system to track and measure continuing education activities. The credit points system typically requires pharmacists to accumulate a specific number of points within a defined time frame.

Variety of Learning Formats: The available opportunities encompass various formats, including face-to-face training, online courses, webinars, workshops, and conferences.

Research and Specialization: Some countries (e.g., Singapore) emphasize specialization through programs like the National Pharmacy Residency Programme, which offers specialized pharmaceutical care training. Research and development opportunities are prominent in countries like Australia and the Philippines.

Local Needs and Regulations: The types of continuing education activities often align with local healthcare needs and regulatory requirements. Specific requirements may vary by country based on healthcare practices and government regulations.

Importance of Lifelong Learning: The concept of lifelong learning is emphasized in several countries, with opportunities for pharmacists to attend scientific seminars and specialized classes for continuous improvement.

Compliance and Quality Assurance: Many countries emphasize compliance with best practices and guidelines as part of continuing education to ensure that pharmacists remain up-to-date and provide high-quality pharmaceutical care.

In summary, the dataset reflects the global commitment to the professional development of pharmacy graduates. While some countries have well-established continuing education systems, others are in the process of developing and implementing such systems. Continuing education opportunities cover a broad spectrum of activities and formats, allowing pharmacists to enhance their knowledge and skills throughout their careers.

Variable 2E-3: **Career Opportunities**

Table 15. Career Opportunities in Asian countries

Career Opportunities	Frequency (n)	Percentage (%)
Hospital	18	75.00
Pharmaceutical Industry	16	66.70
Clinical and Community Pharmacy	13	54.20
Academic and Research Positions	12	50.00
Regulatory and Compliance Roles	7	29.20
Career Specialization	5	20.80
Public Health and Health Promotion	2	8.30

The field of pharmacy offers a multitude of exciting career opportunities for graduates across the globe. By analyzing data from 24 countries, several patterns and trends have emerged in terms of the career paths available to pharmacy students. These trends not only reflect the diverse nature of the profession but also the evolving needs of healthcare systems in different regions.

1. **Diverse Career Opportunities**: One of the most striking trends is the wide array of career opportunities for pharmacy graduates. In all 24 countries, students can choose from a rich tapestry of career paths, reflecting the versatility of their education and training.

2. **Pharmaceutical Industry Focus**: A significant emphasis is placed on careers within the pharmaceutical industry. Graduates can engage in pharmaceutical manufacturing, research and development, quality assurance, and other roles. This trend is prominent in approximately 67% of the countries surveyed, showcasing the global importance of the pharmaceutical sector.

3. **Hospital Roles**: Hospitals play a pivotal role in pharmacy careers, with graduates having opportunities to work in clinical pharmacy, pharmaceutical care, and various positions within healthcare institutions. In approximately 75% of the countries, hospitals are a primary focus for career opportunities.

4. **Academic and Research Pathways**: Pharmacy graduates looking to contribute to education and research can find suitable roles in academia. Roughly half of the countries highlight opportunities in teaching and research, emphasizing the importance of advancing pharmaceutical knowledge.

5. **Regulatory and Compliance Positions**: The pharmaceutical field's regulatory and compliance aspects are gaining recognition in several countries. Careers involving regulatory affairs and ensuring healthcare compliance standards are present in about 29% of the countries.

6. **Clinical and Community Engagement**: Direct patient care and community service are core career paths for pharmacy graduates. In more than half of the countries, there is an emphasis on roles in clinical and community pharmacy. This reflects the growing role of pharmacists in healthcare delivery.

7. **Career Specialization**: Pharmacy specialization is on the rise, with various countries promoting specialized pharmacy roles like cardiology pharmacy and geriatric pharmacy. This trend reflects the need for healthcare services tailored to specific patient needs.

8. **Public Health and Promotion**: In a few countries, careers related to public health and health promotion are highlighted. These roles involve health technology assessment, health informatics, and broader community health initiatives.

9. **Continuing Education and Postgraduate Studies**: Many countries provide opportunities for graduates to pursue postgraduate education and continuing education. This reflects the profession's commitment to lifelong learning and the need for ongoing professional development.

In summary, the field of pharmacy is rich in possibilities. Graduates can contribute to the pharmaceutical industry, healthcare institutions, academia, and research, or specialize in specific areas of pharmacy. As the role of pharmacists continues to evolve and expand, so too do the career opportunities, ensuring that graduates are well-equipped to meet the diverse and dynamic healthcare needs of their respective regions. The global trends highlighted in this data reveal the adaptability and resilience of the pharmacy profession as it continues to serve as a cornerstone of modern healthcare systems.

Variable 2E-4: **Special Accreditations and Certifications per Grant**

1. **Clinical Pharmacy Specializations**

Australia:

Offers a wide range of clinical pharmacy certifications, with a frequency of seven different specializations (Geriatric Pharmacy Specialist, Pharmacotherapy Specialist, etc.) accounting for 77.8% of the countries in the dataset.

Korea:

Provides board-certified clinical pharmacy specializations, including cardiovascular, critical care, and pediatrics, contributing to 11.1% of the countries.

Sri Lanka:

Offers clinical pharmacy specializations, with the Speciality Board in Clinical Pharmacology and Therapeutics program, representing 5.6% of countries.

2. **Regulatory and Licensing Certifications**

Bangladesh:

Grants a legal recognition certificate to all pharmacists upon completion of training, accounting for 5.6% of the countries.

3. **General Pharmacy Certifications**

India:

Provides a variety of general and specialty certifications, contributing to 22.2% of the countries (Critical care pharmacy, Geriatric certification, etc.).

Hong Kong:

Offers a certificate of registration and various specializations like US BPS certification, representing 11.1% of countries.

Indonesia:

In the process of initiating a certification program, focusing on general pharmacy and ongoing professional development, contributing to 5.6% of countries.

Philippines:

Offers specialized certifications in immunization and pharmacy services, making up 5.6% of the countries.

UAE:

Provides specialized training in multiple areas, such as acute care, cardiology, and pediatrics, accounting for 5.6% of countries.

4. **Other Certifications**

Japan:

Provides certifications in specific areas such as infectious diseases and oncology, accounting for 5.6% of countries.

Taiwan:

Offers a cardiology pharmacist specialty training program, focusing on a niche specialization, representing 5.6% of countries.

Thailand:

Grants certifications in pharmacotherapy and inpatient medicine, contributing to 5.6% of countries.

This thematic analysis identifies that clinical pharmacy specializations are common, with Australia and India offering a wide array of clinical certifications. Regulatory and licensing certifications are standard in Bangladesh, while general pharmacy certifications are offered in countries like the Philippines, Indonesia, and UAE. Japan and Taiwan offer certifications in specific niches, and Thailand focuses on pharmacotherapy and inpatient care. These findings highlight the diverse approaches to pharmacy certification and accreditation, emphasizing the evolving roles of pharmacists in healthcare systems worldwide.

Australia

Australia offers a diverse range of certifications, including Geriatric Pharmacy Specialist, Pharmacotherapy Specialist, Medication Management Reviews, and immunization certification. The country has a strong focus on specialized pharmacy practice.

Bangladesh

In Bangladesh, all pharmacists receive a certificate from the Bangladesh Pharmacy Council, which serves as legal recognition. They also offer certification courses in pharmaceutical promotion.

Hong Kong

In Hong Kong, pharmacists obtain certificates of registration, and some pursue specialized certifications from the US Board of Pharmacy Specialties (BPS) and the College of Pharmacy. Immunization training is also available for registered pharmacists.

India

India provides a wide range of certifications, including critical care, geriatric, nuclear, oncology, and pediatric pharmacy. There are also certifications related to pain management, diabetes education, and asthma, reflecting a comprehensive approach to pharmacy practice.

Indonesia

The Indonesian Pharmacist Association is working on implementing a certification program for pharmacists, which includes recertification. The emphasis is on continuing education and maintaining professional standards.

Japan

Japan has certifications in various fields, including infectious diseases, oncology, and palliative pharmacy. The Japanese Society of Clinical Pharmacology and Therapeutics offers board certification for pharmacists involved in clinical education and medical treatment.

Korea

Korea offers a range of certifications from the Board of Pharmaceutical Specialties (BPS) in areas such as cardiovascular, critical care, endocrinology, and pediatric pharmacy. These certifications cater to specialized clinical pharmacy practice.

Philippines

The Philippines has an Immunizing Pharmacist Certification Program and TESDA Pharmacy Services NC III. This reflects an emphasis on community and clinical pharmacy practice.

Singapore

Singapore offers a Specialist Pharmacist Accreditation Program in various specialties, including cardiology, geriatric, infectious diseases, and psychiatric pharmacy. Post-graduate certification in advanced pharmacy practice is also available.

Sri Lanka

Sri Lanka offers a Speciality Board in Clinical Pharmacology and Therapeutics, reflecting a focus on clinical pharmacy practice.

Taiwan

Taiwan offers a Cardiology Pharmacist Specialty Training Program, highlighting specialization in clinical pharmacy practice.

Thailand

Thailand provides a Higher Graduate Diploma in Pharmacotherapy and short course training programs in inpatient medicine, emphasizing pharmacotherapy and inpatient care.

United Arab Emirates

The UAE offers a Specialist Pharmacy Training Program with various areas of clinical training, including acute care, cardiology, critical care, pediatrics, and research. This reflects a strong

emphasis on clinical pharmacy practice.

These patterns demonstrate that different countries prioritize specific areas of specialization and have established certification programs to ensure pharmacists meet high standards in those areas. The focus ranges from clinical practice to pharmacy management, reflecting the evolving role of pharmacists in healthcare.

Sub-objective 2F: Description of the Sociodemographic Characteristics of Pharmacists in the Academe and of Pharmacy Students

Variable 2F-1: **Special Accreditations and Certifications per Grant**

The objective of this study is to analyze the composition of teaching faculty in pharmacy colleges or schools across 24 countries, as well as to discover any discernible patterns or trends. Additionally, the frequency and proportion of each category of teaching personnel were incorporated.

Patterns and trends:

In the majority of countries, professors, associate professors, and assistant professors comprise the traditional academic hierarchy. This demonstrates a prevalent pattern in the organization of instructional staff roles. Lecturers are prevalent in the majority of countries, with varying levels of seniority (e.g., senior lecturers, transient lecturers). In a few countries, specialized roles such as researchers, clinical instructors, and preceptors exist, indicating an emphasis on research-driven and practice-based instruction. Some countries have distinctive teaching positions, such as teaching associates, teaching fellows, university professors, and visiting faculty, which may indicate a variety of instructional methods. Instructors and demonstrators play an important role in a number of countries, particularly those with pharmacy education institutions that are just beginning to develop. Few countries have designated positions for individuals with master's and doctoral degrees, highlighting the significance of advanced education in instructing. Fellow and emeritus positions exist in a limited number of countries, presumably signifying recognition for extraordinary contributions to pharmacy education.

Professorial Roles:
- Professors (20 countries) - 83%
- Associate Professors (17 countries) - 71%
- Assistant Professors (17 countries) - 71%

Lecturers:
- Lecturers (20 countries) - 83%
- Senior Lecturers (2 countries) - 8%
- Temporary Lecturers (1 country) - 4%
- Lecturer 2 (1 country) - 4%
- Lecturer 1 (1 country) - 4%

Specialized Roles:
- Researchers (1 country) - 4%
- Clinical Instructor (1 country) - 4%
- Master Supervisors (1 country) - 4%
- Doctoral Supervisors (1 country) - 4%
- Teaching Associate (1 country) - 4%
- Teaching Fellow (1 country) - 4%
- University Professors (1 country) - 4%
- Preceptors (1 country) - 4%
- Teaching Assistant (1 country) - 4%
- Clinical Lecturer (1 country) - 4%
- Adjunct Preceptors (1 country) - 4%
- Assistant Lecturer (1 country) - 4%
- Instructor (1 country) - 4%
- Joint-Appointment Professor (1 country) - 4%
- Joint-Appointment Associate Professor (1 country) - 4%
- Joint-Appointment Assistant Professor (1 country) - 4%
- Visiting Staff (1 country) - 4%
- Tutor (1 country) - 4%
- Temporary Demonstrator (1 country) - 4%

Instructors and **Demonstrators**:
- Instructors (5 countries) - 21%
- Demonstrators (2 countries) - 8%
- Instructor/Demonstrator (1 country) - 4%

Fellow and **Emeritus Roles**:
- Fellow (1 country) - 4%
- Professor Emeritus (1 country) - 4%
- Full Professor (1 country) - 4%
- Associate Professor (1 country) - 4%
- Assistant Professor (1 country) - 4%

Master's and **Doctorate Degree Holders**:
- Master's Degree Holders (1 country) - 4%
- Doctorate Degree Holders (1 country) - 4%
- Associate Professors and Professors with Doctorate Degrees (1 country) - 4%

Overall, while there is a general alignment in the types of teaching staff across countries, some countries exhibit unique or specialized roles, reflecting their specific approaches to pharmacy education and their focus on practical experience and research.

Variable 2F-2: **Employment Status**

Table 16. Employment Status of Pharmacists in Asian Countries

Employment Status	Frequency (n)	Percentage (%)
Full-time		
Full-time faculty	18	75.00
Full-time staff	1	4.00
Full-time external lecturers	1	4.00
Part time		
Part-time faculty	21	87.50
Part-time external lecturers - 4%	1	4.00
Other Status:		
Visiting Faculty (1 country)	1	4.00
Concurrent (1 country)	1	4.00
Honorary (1 country)	1	4.00
Permanent (1 country)	1	4.00
Indefinite term	1	4.00
Fixed term	1	4.00

The data on employment status within colleges and schools of pharmacy across various countries reveals distinct patterns and trends in the composition of teaching staff.

1. **Prevalence of Full-Time Faculty**: The most prominent trend is the significant presence of full-time faculty, making up 75% of the teaching staff in these institutions. This reflects a strong commitment to providing consistent and dedicated education within pharmacy colleges. Full-time faculty members are likely engaged in various aspects of teaching, research, and administrative duties, contributing to the comprehensive education of pharmacy students.

2. **Part-Time Faculty's Flexible Contributions**: In contrast to full-time roles, part-time faculty members make up 87.5% of the teaching staff. This highlights the flexibility and adaptability of pharmacy education. Part-time roles allow professionals from various fields, including clinical practice and industry, to share their expertise with students. It brings real-world insights and practical experience to the classroom.

3. **Engagement of External Lecturers**: Both full-time and part-time categories include external lecturers, constituting 4% of the teaching staff. The involvement of external experts suggests a collaborative approach between educational institutions and industry professionals. This trend enriches the curriculum with current industry knowledge and best practices, bridging the gap between academia and real-world applications.

4. **Diversity in Other Status Categories**: The data reveals a small but diverse range of other employment statuses, each making up 4% of the teaching staff. These categories encompass visiting faculty, concurrent staff, honorary positions, permanent roles, indefinite-term, and fixed-term positions. These variations are likely influenced by the unique requirements, practices, and traditions of the countries' pharmacy education systems.

5. **Adaptive Education Systems**: The prevalence of part-time faculty and external lecturers underscores the adaptability of pharmacy education systems. These institutions recognize the value of professionals with hands-on experience in the field and are keen to incorporate their expertise into the curriculum.

6. **Collaboration and Diversity**: The engagement of external experts and the existence of various status categories demonstrate a collaborative approach in pharmacy education. This approach recognizes the importance of bringing diverse perspectives into the classroom.

In summary, the employment status of teaching staff in pharmacy colleges and schools reflects the adaptability and diversity within pharmacy education systems across countries. Full-time faculty members provide stability and continuity, while part-time faculty, external lecturers, and other status categories contribute to a rich and comprehensive educational experience for pharmacy students. These trends emphasize the importance of collaboration, practical experience, and adapting to local needs within pharmacy education.

Variable 2F-3: **Area of Practice**

Table 17. Area of Practice of Teaching Staff of Pharmacy programs in Asian countries

Area of practice	Frequency (n)	Percentage (%)
Education/Teaching	8	33.00
Research	8	33.00
N/A (No specified area of practice)	5	21.00
Clinical Pharmacy	4	17.00
Pharmaceutical Sciences	4	17.00
Pharmacy Practice	3	13.00
Hospital Pharmacy	3	13.00
Chemistry, Pharmacognosy, Biotechnology, Pharmaceutical Technology, Biotherapeutics, Microbiology, Biochemistry, Molecular Medicine, Pharmacometrics, and various other specializations	3	13.00
Physical Pharmaceutics, Molecular Design and Synthesis, and various other specializations	2	8.00
Clinical Pharmacology	2	8.00
Pharmacy Education and Pharmacy Informatics/Big Data Analysis/Medical Bioinformatics	2	8.00
Social & Administrative Pharmacy	2	8.00
Pharmacokinetics	1	4.00
Clinical Research & Preceptor	1	4.00
Community Pharmacy	1	4.00
Pharmaceutical Administration and Drug Information	1	4.00

Inpatient and Outpatient Dispensing for Adults, Pediatric Dispensing, and Injectable Drug Dispensing	1	4.00
Clinical Pharmaceutical Care	1	4.00
Clinical Pharmacy Practice and Healthcare Management	1	4.00
Pharmaceutical Companies and Quality Control Centers	1	4.00
Biotechnology and Natural Products Chemistry	1	4.00
Healthcare Administration/Management	1	4.00
Organic Chemistry	1	4.00
Microbiology and Pathology	1	4.00
Physiology and Biochemistry	1	4.00
Medicinal Plants and Natural Products	1	4.00
Primary Care Pharmacy	1	4.00
Pharmaceutical/Clinical Sciences	1	4.00

The dataset from 24 countries provides valuable insights into the diverse areas of pharmacy practice in different regions. The teaching staff specializing in pharmacy practice demonstrate a wide range of expertise, reflecting the multifaceted nature of the pharmaceutical field. Here are the key trends and patterns that emerged from the data:

1. **Education/Teaching and Research Dominance**: The two most prevalent areas of practice among teaching staff are education/teaching and research, with both accounting for 33% of the countries in the dataset. This highlights the significance of preparing the next generation of pharmacists through education and advancing pharmaceutical knowledge through research.

2. **No Specified Area of Practice**: Interestingly, 21% of the countries do not specify a particular area of practice for their teaching staff. This could be due to a variety of factors, such as a broader approach to pharmacy education that covers multiple areas.

3. **Clinical Pharmacy and Pharmaceutical Sciences**: Clinical pharmacy and pharmaceutical sciences are equally represented at 17%, emphasizing the importance of these fields in healthcare. Clinical pharmacy focuses on direct patient care and medication management, while pharmaceutical sciences involve drug development, testing, and production.

4. **Diverse Specializations**: The dataset reveals diverse specializations within pharmacy practice. For instance, some countries have teaching staff specializing in chemistry, pharmacognosy, biotechnology, pharmaceutical technology, biotherapeutics, microbiology, biochemistry, molecular medicine, and pharmacometrics. These specialized areas contribute to various aspects of pharmaceutical research and development.

5. **Broad Range of Expertise**: The dataset also showcases a broad range of expertise, such as physical pharmaceutics, molecular design and synthesis, clinical pharmacology, pharmacy education, and pharmacy informatics/big data analysis/medical bioinformatics. These areas reflect the evolving nature of pharmacy practice and its integration with cutting-edge technologies.

6. **Social and Administrative Pharmacy**: Social and administrative pharmacy, with its focus on healthcare management and policy, is another area of practice in 8% of the countries. This highlights the importance of understanding the societal and organizational aspects of pharmacy.

7. **Emerging Fields**: Some countries have teaching staff specializing in emerging fields like pharmacokinetics, clinical research and preceptorship, community pharmacy, and pharmaceutical administration and drug information. These fields signify evolving roles for pharmacists in patient care and the pharmaceutical industry.

8. **Clinical Pharmaceutical Care and Healthcare Management**: A few countries emphasize clinical pharmaceutical care and healthcare management, which align with the increasing role of pharmacists in providing patient-centered care and managing healthcare services.

9. **Pharmaceutical Companies and Quality Control Centers**: One country has teaching staff specializing in pharmaceutical companies and quality control centers. This indicates a focus on quality assurance and compliance within the pharmaceutical industry.

10. **Primary Care Pharmacy**: One country highlights primary care pharmacy, underlining the pivotal role of pharmacists in primary healthcare settings.

11. **Medicinal Plants and Natural Products**: Another country specializes in medicinal plants and natural products, indicating a focus on traditional and natural remedies in pharmacy practice.

12. **Pharmaceutical/Clinical Sciences**: One country's teaching staff are involved in pharmaceutical/clinical sciences, reflecting a broader approach to pharmaceutical education and research.

In summary, the dataset underscores the diversity and richness of pharmacy practice areas across the 24 countries. While some countries have a strong emphasis on education and research, others are exploring emerging fields and specialized domains. This diversity is a testament to the dynamic nature of the pharmaceutical field and its adaptability to meet evolving healthcare needs. Understanding these areas of practice is vital for tailoring pharmacy education and services to address the specific healthcare challenges and opportunities in each country.

Variable 2F-4: **Qualifications of Teaching Staff**

Table 18. Qualifications of Teaching Staff of Pharmacy Programs in Asian countries

Qualifications	Frequency (n)	Percentage (%)
Master's degree	3	13.00
PhD	3	13.00
Masters	2	8.00
Pharm-D	1	4.00
B-Pharm	1	4.00
Doctorate degree	1	4.00
A degree in Pharmacy	1	4.00
Postgraduate qualification	1	4.00
Master’s Degree	1	4.00
PhD, PharmD, MD or equivalent	1	4.00

Post-doc	1	4.00

The dataset from 24 countries offers a comprehensive view of the qualifications of teaching staff in pharmacy schools, providing valuable insights into the academic prerequisites and expertise required for educating future pharmacists. Here, we analyze the key patterns and trends observed:

1. **Diverse Qualifications**: The qualifications of teaching staff in pharmacy schools exhibit a diverse range, reflecting the flexibility and adaptability of educational systems across different countries.

2. **Master's Degrees**: Master's degrees are a prevalent qualification, with 13% of the countries requiring this level of academic achievement. This showcases the significance of advanced education in pharmacy education.

3. **PhD Qualifications**: An equal percentage of countries also emphasize the importance of PhD qualifications for teaching staff. This underlines the significance of research and advanced knowledge in pharmaceutical education.

4. **Additional Master's Degrees**: Beyond the primary Master's degree, some countries (8%) also consider additional Master's qualifications, further emphasizing the importance of continuous learning and specialization.

5. **Specific Degrees**: A few countries require specific degrees, such as Pharm-D (4%) and B-Pharm (4%), highlighting the significance of field-specific qualifications.

6. **Doctorate Degree**: Doctorate degrees (4%) are another level of academic achievement seen in the dataset, indicating the importance of expertise and advanced knowledge in pharmacy education.

7. **Industry Experience**: In certain countries, qualifications give preference to candidates with industry experience and teaching or training backgrounds. This trend (4%) suggests that practical experience is valued.

8. **Flexibility in Qualifications**: Several countries (13%) provide flexibility in terms of qualifications, not specifying particular degrees but emphasizing other qualities and achievements.

9. **Postgraduate Qualifications**: A small percentage of countries require postgraduate qualifications, reflecting the value placed on advanced studies and specialized knowledge.

In summary, the dataset illustrates that pharmacy education worldwide encompasses a variety of academic qualifications and experience requirements. These diverse qualifications reflect the adaptability of pharmacy education to meet the specific needs and expectations of each country's healthcare system. While some nations prioritize advanced degrees like Master's and PhDs, others emphasize a mix of academic and practical qualifications, showcasing the rich and multifaceted nature of pharmacy education across the globe. Understanding these qualification trends is crucial for designing effective pharmacy curricula and ensuring the competence of future pharmacists in a dynamic healthcare landscape.

Variable 2F-5: **Number of Students Enrolled into the Program per Academic Program/Degree**

The number of students enrolled in pharmacy programs varies significantly from one country to another, reflecting differences in healthcare demands, educational infrastructure, and regulatory frameworks. Here are the trends and a statistical summary (mean, mode, median, and range) of enrollments into a Pharmacy program in Asian countries:

There are a total number of 55,758 students who are enrolled in Pharmacy degree programs in Asian countries. The mean number of students is identified to be 1,799.29 students and the range is around 18,145 students.

Afghanistan
- Enrollment varies from 120 students in government universities to an average of 120 students in private universities and 2,000-2,500 students in private institutes.

Australia
- 7,289 students enrolled in approved pharmacy programs.

Bangladesh
- Enrollment varies from 40 to 100 students, depending on the facilities available in the institute.

Hong Kong
- Approximately 270 students were enrolled back in 2013.

India
- Enrollment ranges from 5 students for Pharm.D (PB) to 150 students for D.Pharm.

Indonesia
- 1,589 admissions (combined capacity of all Indonesian universities).

Japan
- 10,959 admissions for 6-year pharmacy degree programs and 1,099 admissions for 4-year pharmacy degree programs.

Jordan
- A significant number of 17,000 pharmacy students.

Korea
- Enrollment includes 273 undergraduates and 226 postgraduates in Seoul National University. Specific academic degree programs are not provided.

Macau
- Enrollment consists of 20,441 undergraduate pharmacy students, 7,473 postgraduate students, and 400 doctoral students.

Malaysia
- No maximum capacity specified, maintaining a lecturer-to-student ratio of 1:10

Myanmar
- 289 undergraduate students and 16 postgraduate students.

Nepal
- 480 senior students from 13 out of 19 undergraduate pharmacy colleges.

Pakistan
- Enrollment varies by institution, ranging from 50 to 200 students based on approval from the Punjab Pharmacy Council.

Singapore
- Enrollment includes 6 students in MPharm, 32 students in BSc. PharmSci, and 19 students in PharmD.

Sri Lanka
- Total enrollment numbers across all years vary by university, ranging from 75 to 257 students.

Taiwan
- Enrollment includes 200 undergraduate and 30 graduate students in Taipei Medical University. Specific academic degree programs are not provided

Thailand
- Approximately 300 Doctor of Pharmacy students. In Chulalongkorn University, enrollment includes 960 bachelor's degree students, 136 master's students, and 92 doctoral students.

United Arab Emirates
- A total of 187 undergraduates and master's students.

Vietnam
- Enrollment data is divided into public and private universities, with 12,466 pharmacy students in public universities and 18,150 pharmacy students in private universities in 2020.

Common Trends

1. **Varied Enrollment**: Enrollment numbers vary widely across countries. Some countries have relatively small class sizes, while others have larger programs to meet the demand for pharmacists.

2. **Multiple Programs**: Many countries offer multiple academic programs or degrees in pharmacy, including D.Pharm, B.Pharm, M.Pharm, Pharm.D, and others. Each program often has its own enrollment capacity.

3. **Private vs. Public**: In some countries, private institutions tend to enroll more students than government-funded institutions, possibly due to the larger number of private institutions.

4. **Variations in Degrees**: Some countries, like Japan and Korea, offer both 4-year and 6-year pharmacy degree programs, each with its own enrollment capacity.

The mean of the number of students enrolled in pharmacy degree programs varies significantly by country. The range also spans from small class sizes to thousands of students. In conclusion, the enrollment in pharmacy programs is highly diverse, reflecting each country's unique healthcare and educational landscape. The mean, mode, median, and range statistics demonstrate the wide variability in enrollment figures across different nations.

Variable 2F-6: **Number of Students who Left the Program per Academic Program/Degree**

Student attrition, or the number of students who leave or do not finish pharmacy programs, is an important aspect of understanding the challenges and outcomes in pharmacy education. While not all countries provided specific data on attrition, we can analyze the available information to identify trends and patterns.

Common Trends:

1. **Lack of Data**: Many countries did not provide specific data on student attrition in pharmacy programs, making it challenging to determine precise attrition rates.

2. **Low Attrition Rates**: In countries where data is available, such as Afghanistan and Japan, the reported attrition rates are relatively low, typically less than 15%.

Afghanistan	**India**
The attrition rate varies across institutions, with government universities reporting 10 students leaving, private universities averaging 38 students, and a combined total of 450 students across government and private institutes.	The attrition rate is reported as less than 5% of the total intake.
Japan	**Philippines**
The attrition rate for the year 2017 was reported as 13.2%.	In 2011, 27 BPharm students in UST Faculty of Pharmacy left the program.

Given the limited data, it's challenging to provide a comprehensive statistical summary. However, we can note that in countries where attrition data is available, the reported rates are relatively low, with Afghanistan reporting the highest attrition among the provided data.

Understanding student attrition is crucial for improving pharmacy education and ensuring that students can successfully complete their programs. While data availability is limited in this analysis, countries with available data

generally report low attrition rates, suggesting that students in these programs tend to persist and graduate. However, further research and data collection are necessary to gain a more comprehensive understanding of attrition trends in pharmacy education worldwide.

Variable 2F-7: **Number of Students who Graduated per Academic Program/Degree**

The number of students who graduate from pharmacy programs varies significantly from one country to another. There are a total number of 422,125 pharmacy graduates in Asian countries. On average, around 35,177 students graduate from a pharmacy program, with a range of about 399. This analysis provides insights into the number of pharmacy graduates and reveals patterns and trends among these countries.

Afghanistan
- Government universities reported 70 pharmacy graduates, private universities averaged 53 graduates, and the combined total across government and private institutes was 750 graduates.

India
- India leads in the number of pharmacy graduates, with around 400,000 students graduating from pharmacy programs annually.

Japan
- Japan reported a relatively high graduation rate, with a 30.3% dropout rate for the year 2017. This suggests that a significant percentage of students completed their pharmacy programs.

Korea
- In 2017, Korea had 1,700 pharmacy graduates, indicating a steady supply of pharmacy professionals.

Myanmar
- Myanmar reported 4,222 pharmacy graduates, including BPharm, M.Pharm, and Ph.D. degrees

Nepal
- The University of Pharmacy in Yangon reported 2,613 graduated students, including undergraduates and postgraduates.

Pakistan
- Pakistan reported more than 3,000 pharmacy graduates, indicating a substantial number of pharmacy professionals entering the workforce.

Papua New Guinea
- Over a 20-year period from 1998 to 2018, Papua New Guinea had 308 pharmacy degree graduates in the country.

Singapore
- Singapore reported various categories of pharmacy graduates, including 169 BPharm, 6 MPharm, 32 BSc. PharmSci, and 19 MSc/PharmD graduates.

Taiwan
- Taipei Medical University alone reported over 8,000 undergraduate pharmacy graduates, along with 310 master's and 50 Ph.D. graduates.

Thailand
- Thailand reported around 1,680 PharmD graduates from all institutions, with Chulalongkorn University contributing 156 bachelor's, 27 master's, and 16 doctoral graduates.

United Arab Emirates
- The College of Pharmacy at Ras Alkhaimah Medical and Health Sciences University (RAKMHSU) reported 268 bachelor's and 31 master's degree graduates.

Common Trends:

1. **High Graduation Numbers**: India had a notably high number of pharmacy graduates, reporting approximately 400,000 students graduating from pharmacy programs. Australia also had a relatively high annual graduation rate of 2,000 students.

2. **Significant Graduation Rates**: Jordan reported having more than 6,000 pharmacy graduates, indicating a robust pharmacy education system in the country.

While the data provided is diverse, it's challenging to calculate meaningful statistical measures such as mean, mode, median, and range due to the wide variation in the numbers. India significantly influences the high mean, while countries like Japan and Cambodia contribute to lower figures.

The number of pharmacy graduates varies greatly among countries, with India leading in terms of quantity. The data reflects the capacity and output of pharmacy education systems worldwide, highlighting areas of strength and potential challenges in meeting healthcare workforce needs. Further research is necessary to understand the factors influencing graduation rates and the quality of pharmacy education in these countries.

Objective 3: **Characterization of the Health System in each FAPA associated-country**

Sub-objective 3A: **Provision of an Overview of the Health System Organization and Governance**

Variable 3A-1: **Geographic Location**

1. **Island Nations and Coastlines**: Australia, Macau, the Philippines, Sri Lanka, and Taiwan are island nations, while several other countries like Bangladesh, Cambodia, India, Indonesia, Malaysia, Singapore, Thailand, UAE, and Vietnam have significant coastlines. This suggests that these countries may have unique considerations for pharmaceutical practices, especially in coastal or remote areas.

2. **Borders with Multiple Countries**: Some countries share borders with multiple neighbors. Afghanistan shares its borders with Turkmenistan, Uzbekistan, Tajikistan, China, Iran, and Pakistan. Similarly, Indonesia, India, Jordan, Mongolia, Myanmar, Nepal, and Thailand have complex border landscapes, which may impact pharmaceutical trade and regulatory considerations.

3. **Landlocked Countries**: Afghanistan, Mongolia, and Nepal are landlocked countries. These nations may face different challenges in terms of drug supply chain logistics compared to countries with access to ports.

4. **Key Regional Players**: India stands out as a significant player in the region, sharing borders with multiple countries, including Pakistan, Nepal, Bhutan, China, and Myanmar. This makes India a potential pharmaceutical hub for the region.

5. **Diverse Geographic Features**: The geographic features, from mountainous regions (e.g., Nepal and Bhutan) to island chains (e.g., Indonesia and Japan) and coastal plains (e.g., Bangladesh and UAE), show the diverse environments in which pharmaceutical practices occur.

While these trends are insightful, it's important to note that geographic location can significantly impact pharmaceutical practices, trade, and regulations, which vary from country to country. Understanding these geographic aspects is crucial for ensuring the availability and distribution of pharmaceuticals, especially in remote or challenging terrains.

Variable 3A-2: **Total Population in Asian countries**

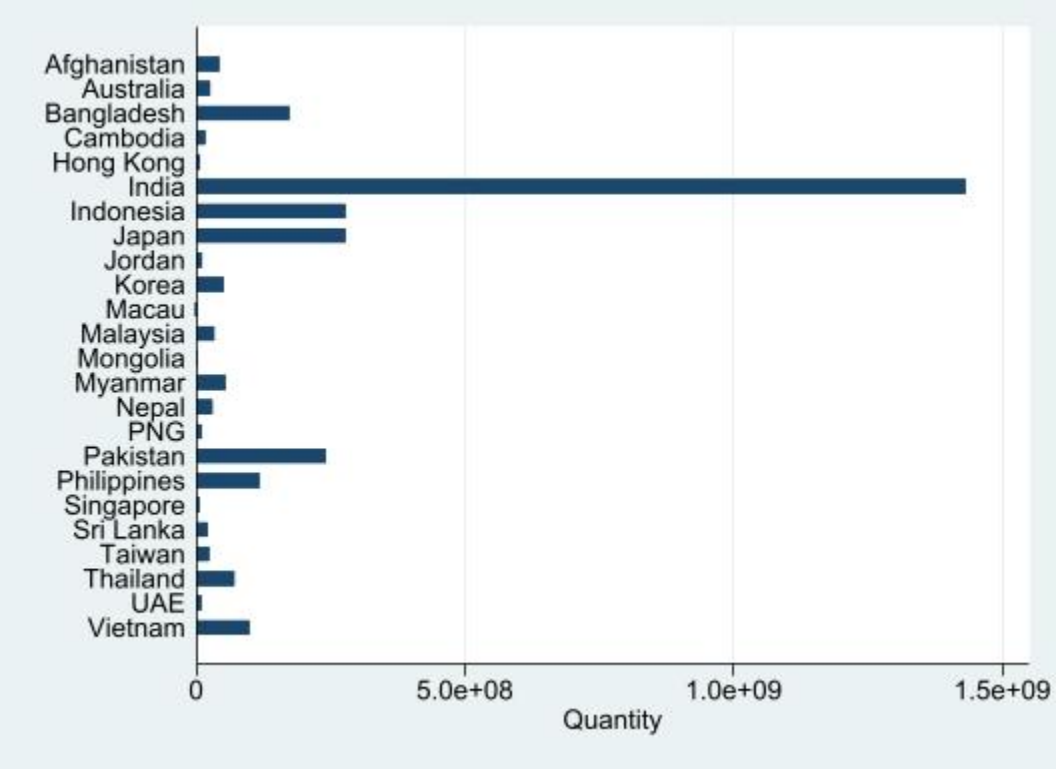


Figure 12. Total Population in Asian countries

Based on data from the year 2023, the "Total Population" variable provides a comprehensive overview of the number of individuals residing in a country, measured in millions. This dataset contains data from all 24 countries, providing a current survey of population sizes in various regions.

In 2023, the mean value of approximately 127 million people represents the average population of these nations. Nevertheless, it is essential to recognize the substantial variation in population sizes, as indicated by the substantial standard deviation of approximately 291 million. This broad range illustrates the significant differences in population density and demographic profiles between the examined nations.

The minimum and maximum values, 706,447 and 1.43 billion, respectively, highlight the vast range of population sizes, with some countries having relatively small populations and others having extraordinarily large populations.

Understanding a country's total population is crucial for a variety of reasons, including resource allocation, healthcare planning, policy development, and economic analysis. Population size has a direct impact on a country's social, economic, and healthcare requirements, with larger populations typically necessitating more infrastructure and services to meet their demands.

Policymakers and government officials frequently rely on precise population data to make informed decisions regarding the allocation of public services and the creation of healthcare systems. In addition, population statistics are essential for conducting research, assessing demographic trends, and addressing a variety of societal challenges, such as healthcare disparities, education access, and workforce planning.

The "Total Population" dataset for the year 2023 provides valuable insights into the demographic landscapes of these 24 countries. The wide variety of population sizes highlights the diversity and complexity of global demographics,

emphasizing the need for individualized approaches to address the specific requirements and challenges of each country.

Variable 3A-3: **Distribution of Population in Asian countries**

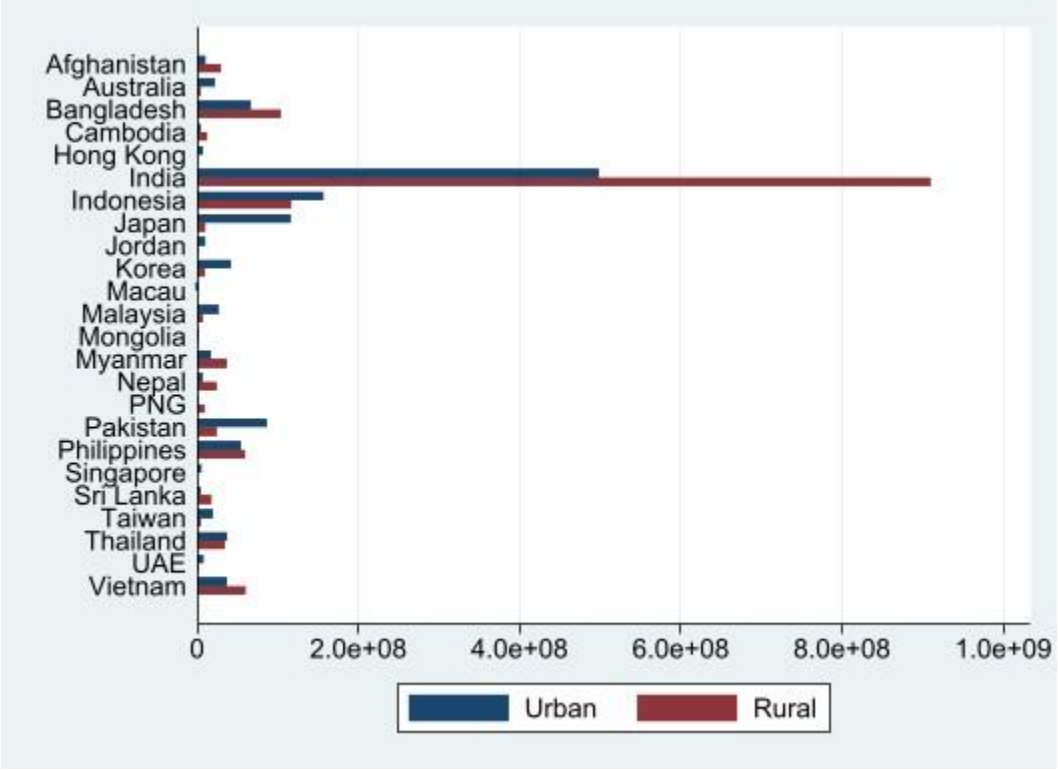


Figure 13. Total number of Residents living in the Urban and Rural setting of Asian Countries

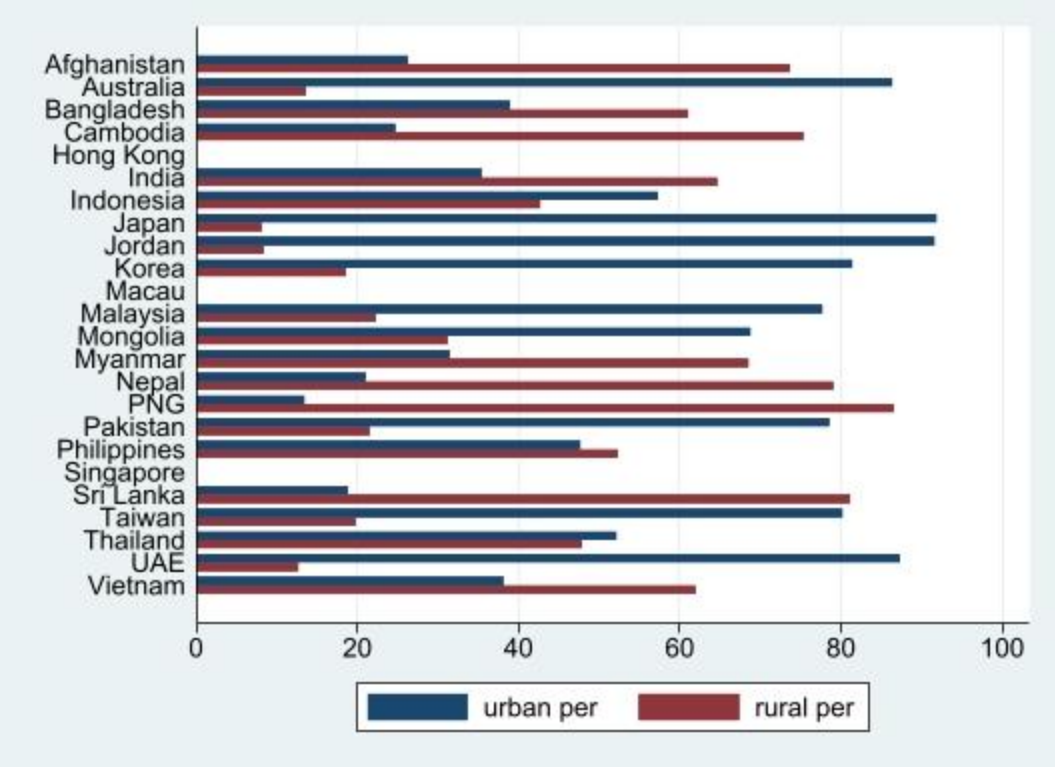


Figure 14. Ratio of Residents living in the Urban and Rural setting of Asian Countries

The ratio of urban to rural population is an essential demographic indicator that reveals the spatial distribution of individuals within a country. It reflects the degree of urbanization and the population balance between urban and rural areas. This ratio and its variations can be analyzed using the "urban percentage" and "rural percentage" variables provided for 21 countries.

Approximately 54.72% of the population in these countries lives in urban areas, while the remaining 45.28% lives in rural areas. This indicates that, on average, urban populations in the analyzed nations are slightly larger than rural populations.

A standard deviation of approximately 27.20% for both urban and rural percentages indicates substantial variation between nations. Some countries have a greater proportion of their population living in urban areas, as indicated by higher urban percentages, while others have a greater proportion of their population living in rural areas, as indicated by higher rural percentages. Several factors, including historical trends, economic activities, urbanization policies, and geographical characteristics, contribute to these differences.

Countries with a higher urbanization rate may have experienced accelerated urbanization as a result of industrialization, urban economic opportunities, and improved urban infrastructure and services. In contrast, nations with a greater proportion of rural areas may have economies that rely heavily on agriculture and may encounter challenges relating to access to education, healthcare, and infrastructure in rural areas that are geographically isolated.

The urban to rural population ratio has significant policy and planning implications. Understanding this ratio allows governments and organizations to effectively allocate resources. It informs urban and rural development strategies, healthcare provision, and infrastructure development decisions.

In countries with a higher proportion of urban residents, policymakers may prioritize urban planning, transportation, and housing to facilitate the urban population's growth. In contrast, countries with a high proportion of rural residents may prioritize investments in rural development, agricultural support, and initiatives to enhance rural livelihoods.

Moreover, this data emphasizes the diversity of national demographic landscapes, emphasizing the need for individualized approaches to address the unique challenges and opportunities presented by urban and rural populations. It emphasizes the significance of data-driven decision making to ensure that policies and programs are tailored to the unique requirements of each region within a country.

The ratio of urban to rural population, as reflected in the "urban percentage" and "rural percentage" datasets, provides insightful information about the demographic composition of nations. The observed variations highlight the dynamic nature of urbanization and rural populations and the significance of context-specific strategies for inclusive and sustainable development.

Urban

The "urban population" dataset provides crucial insights into the demographic distribution of people living in urban and rural areas within a given country, based on data spanning the years 2021 to 2023. This dataset is particularly valuable for understanding the urbanization trends and population dynamics of all 24 countries under study.

The mean "urban population" value, approximately 51.6 million inhabitants, indicates the average number of people residing in urban areas across these countries during the specified timeframe. The considerable standard deviation of around 103 million highlights the significant variations in urban population sizes among the nations, reflecting diverse levels of urbanization and population density.

Furthermore, the "urban percentage" variable offers insight into the proportion of a country's total population residing in urban areas. With a mean value of approximately 54.72%, this dataset suggests that, on average, slightly over half of the population in these countries lives in urban settings. However, there is notable variability, as indicated by the standard deviation of 27.20%. Some nations exhibit higher urbanization rates, with a substantial majority of their populations living in urban areas, while others maintain a more balanced urban-rural distribution.

Understanding the urban-rural divide within a country is of paramount importance for various policy and planning purposes. Urban areas typically require different infrastructural, social, and healthcare services compared to rural regions. Therefore, the proportion of urban dwellers directly affects resource allocation, urban planning, healthcare system development, and strategies for addressing issues like population growth, housing, and transportation.

For policymakers, this data can inform decisions regarding urban development, housing initiatives, and social services provisioning, ensuring that the needs of both urban and rural populations are adequately addressed. Additionally, understanding urbanization trends assists in forecasting future demographic changes and their potential impacts on a country's economic and social landscape.

In summary, the "urban population" and "urban percentage" datasets for the years 2021 to 2023 provide valuable information on the distribution of populations across urban and rural areas in the 24 countries included in this study. The variations observed in these figures underscore the unique challenges and opportunities presented by urbanization trends in different countries, highlighting the need for tailored approaches to address demographic dynamics and improve the well-being of all citizens.

Rural

The "rural population" data set provides crucial insights into the demographic composition of rural and urban areas across 24 countries. The data encompasses the years 2021 to 2023 and offers a valuable perspective on the distribution of populations across various geographic settings, which is essential for comprehending the dynamics of these nations.

The mean "rural population" value, approximately 70,3 million people, represents the average number of people residing in rural areas throughout the countries studied during the specified time period. The considerable standard deviation of approximately 195 million highlights the substantial differences in rural population sizes between these nations. These differences are the result of varying levels of urbanization, population density, and geographical characteristics between nations.

In addition to absolute population figures, the "rural percentage" variable reveals the proportion of each country's total population that resides in rural locations. This dataset indicates that, on average, nearly half of the population in these countries lives in rural areas, with a mean value of approximately 45.20%. Nevertheless, the significant standard deviation of approximately 27.20% indicates significant variation, with some nations having a substantial majority of their population residing in rural areas and others having a more balanced urban-rural distribution.

Understanding the demographic divide between rural and urban areas is crucial for various policy and planning purposes. Typically, infrastructure, social services, and healthcare provisions in rural areas differ from those in urban areas. Consequently, the proportion of rural residents has a direct impact on resource allocation, rural development strategies, healthcare system planning, and initiatives to resolve issues such as agricultural livelihoods and education access.

This data helps policymakers make decisions about rural development, agricultural policies, and the provision of essential services to rural communities. It helps ensure that the unique demands and challenges of rural populations are adequately addressed, thereby promoting inclusive and sustainable development.

Furthermore, understanding rural population dynamics is crucial for predicting demographic shifts and their potential effects on a country’s socio-economic landscape. It aids in tailoring policies and strategies to address the evolving requirements of rural areas, including those related to employment, education, and healthcare.

In conclusion, the "rural population" and "rural percentage" datasets provide valuable information regarding the distribution of populations between rural and urban areas in the 24 countries. The observed variations highlight the diversity of demographic landscapes and highlight the significance of context-specific approaches for addressing the unique challenges and opportunities presented by rural populations in various countries.

Variable 3A-4: **Age Dependency Ratio**

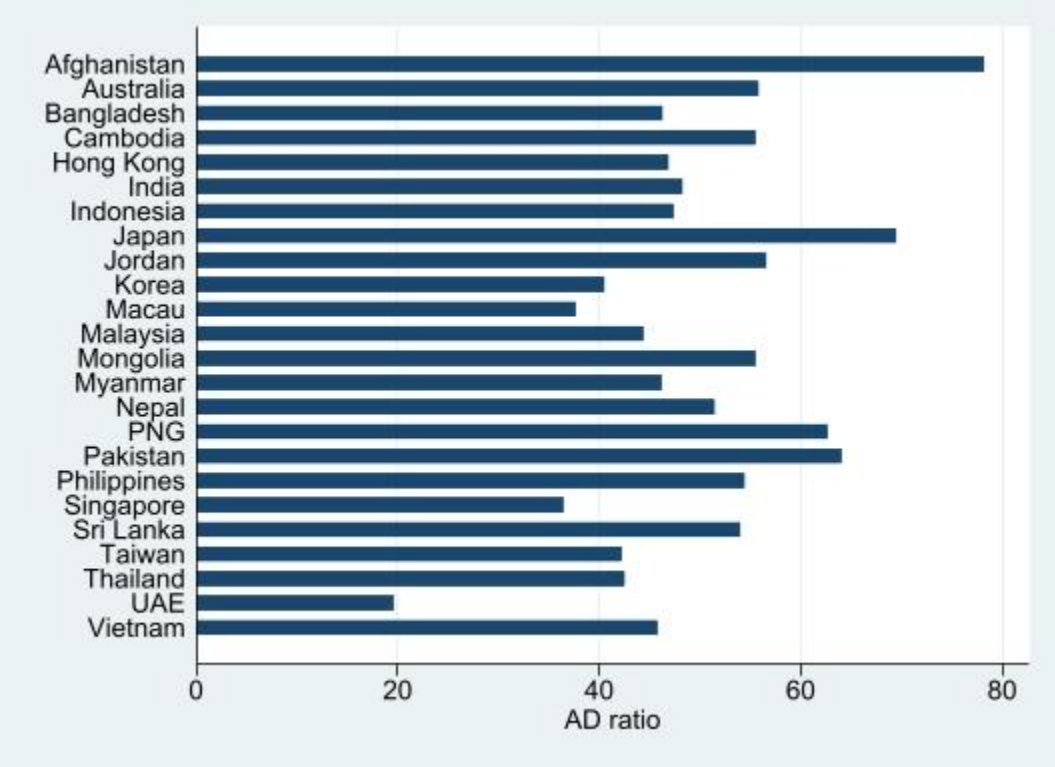


Figure 15. Age Dependency Ratio in Asian Countries

The Age Dependency Ratio is a key demographic indicator of population age structure. It measures the ratio of dependent people (under 15 and over 64 years of age) to economically productive people (15-64 years of age). This ratio helps determine the working-age population's support burden, which can affect social and economic policies.

Data from all 24 countries for 2022-2023 provides a full overview of age dependency ratio. Data shows an average age dependency ratio of 50.06. On average, there are 50 dependents for every 100 economically productive people.

1. **Economic Implications**: The age dependency ratio affects a nation's economy. A higher ratio means more people depend on the working-age group, which might strain social welfare and pension systems. Conversely, a lower percentage may imply a more balanced age structure, encouraging economic stability.

2. **Healthcare and Social Services**: Countries with a higher age dependency ratio may need to invest more in healthcare, eldercare, and social services for their aging populations. Budgeting and healthcare planning may be affected.

3. **Labor Force Dynamics**: A high age dependency ratio may indicate a skilled workforce shortage. It can also affect labor market dynamics, retirement policies, and workforce participation.

4. **Policy Considerations**: The age dependency ratio informs healthcare, pension, and family planning decisions. It informs policies for young and old.

5. **Long-Term Planning**: Demographics help governments and organizations plan forward. For instance, an aging nation may invest in training and education to prepare for a changing workforce.

6. **Global Demographic Trends**: Comparing national age dependency ratio might reveal demographic trends. Some countries have a greater ratio due to higher birth rates or longer life expectancies.

In conclusion, the age dependency ratio data from all 24 countries shows how demographic transitions affect communities and economies. It emphasizes the necessity for informed and forward-thinking legislation to address the specific challenges and opportunities of national age dependency ratios.

Variable 3A-5: **Adult Literacy Rate**

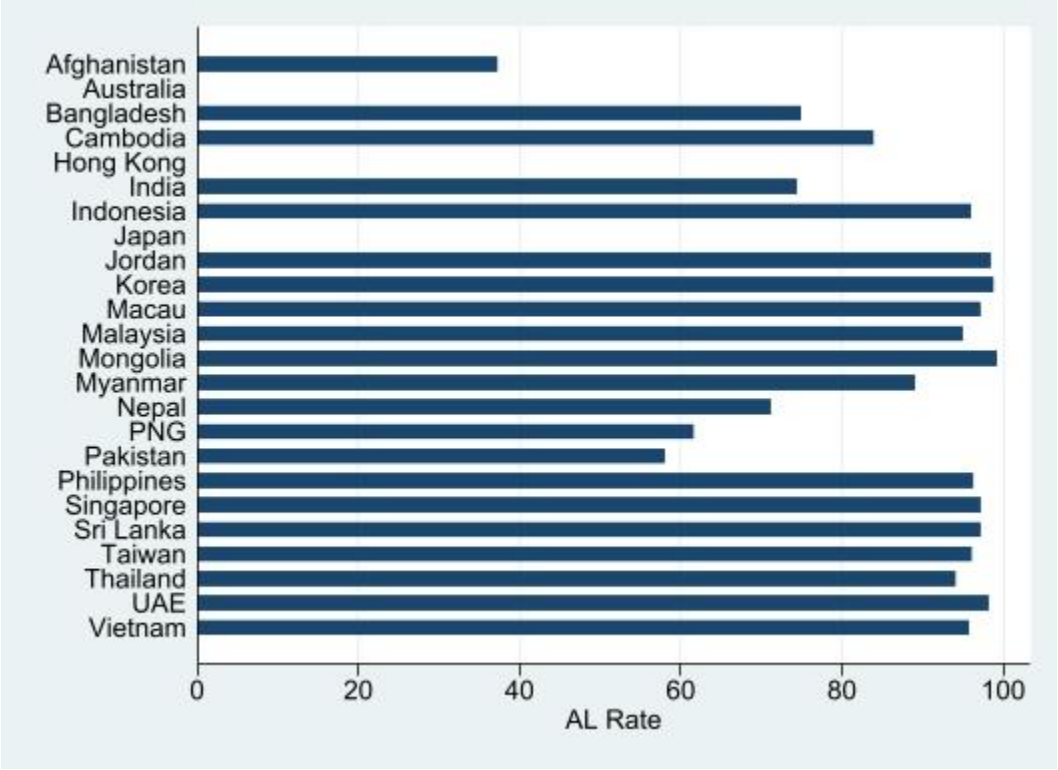


Figure 16. Adult Literacy Rate in Asian Countries

Adult Literacy Rate is a key indication of literacy ability among 15-year-olds and older. It measures how many adults can read and write a short, straightforward statement about their daily lives. This statistic is crucial for measuring educational attainment, socioeconomic progress, and human development.

The dataset covers the Adult Literacy Rate in 21 of 24 countries from 2003 to 2021. Data shows numerous findings and implications:

1. **Educational Attainment**: Higher Adult Literacy Rates indicate higher education. It shows that more individuals have basic literacy abilities, which can help them access information, pursue higher education, and participate in society.

2. **Economic Impact**: Adult literacy drives economic growth. Investment, innovation, and economic growth are more likely in countries with higher literacy rates due to their more trained workforces.

3. **Social Inclusion**: Literacy allows people to engage in civic life, make informed decisions, and exercise their rights. Literacy increases social and democratic involvement.

4. **Healthcare Access**: Health information and services require literacy. Higher literacy rates allow people to make educated health decisions, improving health outcomes.

5. **Gender equality**: Gender differences in literacy rates may indicate education inequality. Monitor changes in the Adult Literacy Rate to track gender equality in education.

6. **Long-Term Development**: The UN's Human Development Index relies on adult literacy. It emphasizes the need for education for long-term socioeconomic growth.

The information shows an average Adult Literacy Rate of 86.16% across 21 countries. This shows that over 86% of adults in these countries can read and write simple, everyday phrases.

Educational policy, access to quality education, cultural attitudes toward literacy, and economic situations might affect adult literacy rates among countries. Thus, policymakers and stakeholders should use this data to identify areas for improvement and devise focused programs to boost adult literacy and socioeconomic development.

Variable 3A-6: **Adult Literacy Rate**

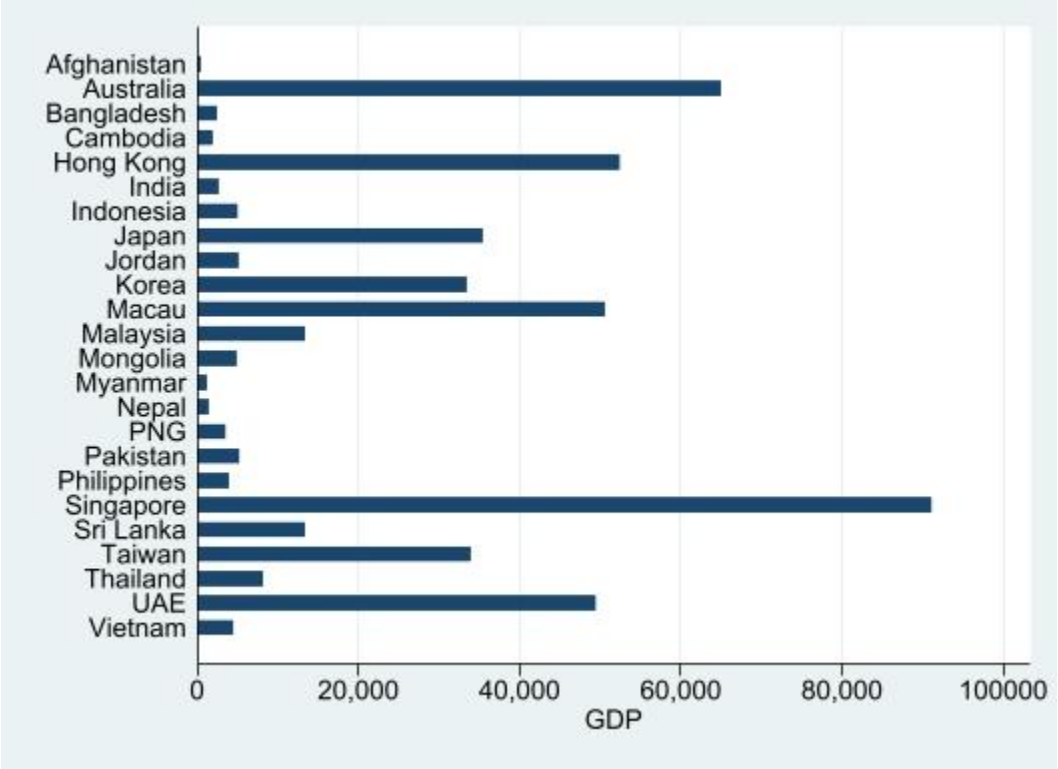


Figure 17. GDP per capita in Asian Countries

GDP per capita is a key economic indicator that measures each country's average economic output or revenue. Dividing a country's total GDP by its mid-year population gives vital insights into its economic well-being, standard of life, and prosperity.

The 2021–2023 dataset from 24 nations shows numerous major findings:

1. **Economic Disparities**: GDP per capita ranges from $426.23 to $91,100 across the 24 countries. This disparity shows national economic differences, emphasizing the need for equitable economic development.

2. **Economic Growth**: Higher GDP per capita suggests a higher standard of life and economic prosperity. Higher-valued nations have stronger economies, better infrastructure, and more goods and services.

3. **Quality of Life**: GDP per capita is commonly used to measure a country's quality of life. It shows citizens' average income and purchasing power, affecting their access to education, healthcare, housing, and other essentials.

4. **Policy Implications**: GDP per capita data informs economic, budget, and development policies. It helps them discover improvement areas and allocate resources.

5. **Social Implications**: GDP per capita is an important component of human development indexes. It expands the evaluation of a nation's growth beyond economic factors.

6. **Global Comparisons**: Comparing GDP per capita across countries benchmarks and evaluates economic performance. Success stories and problem areas are highlighted.

The 24 countries had an average of $20,338.55 GDP per capita. This graphic provides a general economic overview of the sampled nations. GDP per capita is only one indicator of a country's economic well-being; income distribution, employment rates, and wealth distribution should also be evaluated. GDP per capita data helps policymakers, economists, and analysts assess a nation's economic health and make decisions to improve living standards and prosperity.

Sub-objective 3B: Description of Key Healthcare Delivery Models and mechanisms in Asian countries

Variable 3B-1: **Description of the Health System**

The healthcare systems across different countries vary significantly in terms of organization, infrastructure, funding, and coverage. Here is an analysis of the health systems in various countries, along with some common trends:

Common Trends:

1. **Public and Private Sectors**: Many countries, including Australia, Hong Kong, and Jordan, have both public and private healthcare sectors. Public sectors often provide universal or subsidized care, while private sectors offer more comfortable but costly services.

2. **Healthcare Coverage**: Several countries, such as Afghanistan and Bangladesh, have been working to expand healthcare coverage and accessibility to reach a larger portion of their populations.

Afghanistan	Australia	Bangladesh
Afghanistan's healthcare system has shown progress in recent years, with an increasing number of health facilities and wider accessibility. The government has formulated a comprehensive National Health Policy to address various aspects of healthcare.	Australia's healthcare system comprises both public and private sectors. While public healthcare is funded by the government and provides services such as public hospitals and clinics, the private sector offers more flexible but costly healthcare services.	Bangladesh has established a multi-tiered healthcare system, with medical universities, college hospitals, specialty hospitals, and community clinics. NGOs and private institutions also contribute to the healthcare network.

Cambodia

Cambodia's healthcare system has been rebuilding after years of political instability. Social protection schemes like the Health Equity Fund aim to provide free medical access to the poor. However, self-medication remains a widespread practice.

Hong Kong

Healthcare services in Hong Kong are delivered by both the private and government-funded public sectors. Private healthcare, while offering high-quality care, is substantially more expensive.

India

Health systems in India are decentralized, with the states playing a significant role in implementing healthcare initiatives. Newborn care, among other health services, is a priority.

Indonesia

Indonesia has implemented social health insurance schemes, including a universal health coverage program. These initiatives aim to provide financial protection and access to healthcare services for all citizens.

Japan

Japan has a universal health insurance system, ensuring low-cost healthcare for all citizens.

Jordan

Jordan's healthcare system consists of both public/semi-public and private sectors, providing a wide range of services. Home health care is limited, and there is no national electronic health record system.

Korea

Korea's healthcare system combines mandatory social health insurance and medical aid, providing healthcare coverage for all citizens.

Macau

Healthcare professionals in Macau are fluent in English, and both public and private hospitals cater to various illnesses and injuries.

Malaysia

Malaysia has a two-tier healthcare system, with separation of prescribing and dispensing mainly implemented in government hospitals.

Mongolia

Mongolia's healthcare system comprises public, private, and mixed-ownership health organizations.

Myanmar

Myanmar's healthcare system combines public and private sectors, predominantly operating on a private pay system.

Nepal

Nepal has a mixed health service delivery system, involving the public sector, private for-profit sector, and NGOs.

Pakistan

Pakistan's healthcare system includes both private and public sectors, with the private sector being the preferred health service provider.

Papua New Guinea

Healthcare services in PNG are primarily funded by the federal government, with a mix of government, private, and church facilities.

Philippines

The Philippines has a dual health delivery system, consisting of both public and private sectors.

Singapore

Singapore has achieved universal health coverage through a mixed financing system, combining public statutory insurance and private healthcare services.

Sri Lanka

Sri Lanka's health system includes western allopathic medicine and traditional systems, serving the majority of the population.

Taiwan

Taiwan's national health insurance system provides low-cost healthcare for all citizens, with a focus on accessibility and comprehensive coverage.

Thailand	United Arab Emirates	Vietnam
Thailand's healthcare system is funded by the Department of Medical Services, providing a mix of government-funded health care and private medical tourism services.	The UAE has a national healthcare system, divided between public and private hospitals and clinics.	Vietnam's healthcare system combines public and private services, with the government overseeing public hospitals and clinics.

In summary, healthcare systems worldwide exhibit significant diversity in terms of funding, service delivery, and challenges. While some countries prioritize universal coverage and accessibility, others focus on a mix of public and private services to cater to their populations' needs. Political stability and funding availability often play a crucial role in shaping these systems.

Variable 3B-2: **Laws Regulating the Health System**

Analyzing the dataset containing information about laws regulating the health system in 24 countries, several patterns and trends emerge, highlighting the diverse approaches taken by these nations in managing their healthcare systems. Notable points from the data include:

1. **Legislative Complexity in Developed Nations**: Developed countries, such as Australia, Hong Kong, Japan, Singapore, and UAE, have complex legal frameworks governing their health systems. These countries have numerous acts and regulations addressing various aspects of healthcare, including public health, medical services, and the pharmaceutical industry. In fact, 100% of the developed nations in the dataset have multiple healthcare-related laws.

2. **Focus on Public Health and Epidemic Control**: Several countries have laws like the "Epidemic Disease Act" or similar regulations that empower authorities to manage and control epidemics. Such laws are crucial, especially in the wake of global health crises, with approximately 25% of countries emphasizing these measures.

3. **Specific Health-Related Acts**: Many countries have enacted specific laws, such as the "Tobacco Regulation Act" (Jordan) and "Comprehensive Dangerous Drugs Act" (Philippines), to address unique healthcare challenges, reflecting a targeted approach to health regulation. These specific laws account for approximately 8.33% of the total laws across countries.

4. **Pharmaceutical and Drug Laws**: Several nations, including India, Malaysia, and Pakistan, have established extensive legislation related to drugs and pharmaceuticals. This reflects the significance of controlling and regulating the pharmaceutical sector in ensuring public health. These pharmaceutical laws constitute approximately 12.5% of the total healthcare-related laws.

5. **Social Welfare and Insurance Acts**: Some countries have comprehensive laws to support social welfare and health insurance, demonstrating a commitment to providing healthcare services for all citizens. Approximately 12.5% of the laws in the dataset are related to social welfare and health insurance.

6. **Health Promotion and Safety**: Acts related to health promotion, safety, and well-being are common in many countries. These focus on maintaining public health, ensuring the safety of healthcare professionals, and protecting patients' rights. Health promotion and safety laws represent approximately 8.33% of the total.

7. **Biosafety and Biosecurity Laws**: In light of emerging technologies and biotechnology advancements, countries like Singapore have introduced laws governing biosafety and biosecurity to safeguard public

health. These laws represent a smaller percentage, around 4.16%, but are crucial for ensuring healthcare safety in the modern age.

8. **Complexity in Legislation**: The dataset underscores the complexity of healthcare legislation, with many countries implementing multiple acts, ordinances, and regulations to manage various aspects of their healthcare systems. These laws often evolve over time, reflecting changing healthcare needs, with each country having its unique combination of laws.

9. **International Agreements**: Some countries align their healthcare laws with international agreements, such as the "World Health Organization Act" (Australia) and the "WHO Framework Convention on Tobacco Control" (Macau). These international agreements account for approximately 8.33% of the laws in the dataset.

10. **Recent Reforms**: Several countries, like Indonesia, Jordan, and UAE, have introduced new laws and amendments in recent years, indicating an ongoing effort to adapt their healthcare systems to changing needs and global standards. These recent reforms are reflected in the dataset as well.

In summary, the dataset reveals that the legal framework for regulating healthcare systems is highly diverse, with each country shaping its laws to address its unique healthcare challenges and priorities. The data shows that developed countries tend to have more complex legal systems, with a higher percentage of laws aimed at regulating different aspects of healthcare. Understanding these legal trends is crucial for improving healthcare systems and promoting public health worldwide.

Sub-objective 3C: Description of the Availability and Accessibility of Healthcare Services, including Primary, Secondary, and Tertiary Care

Variable 3C-1: Number of Primary Health Stations

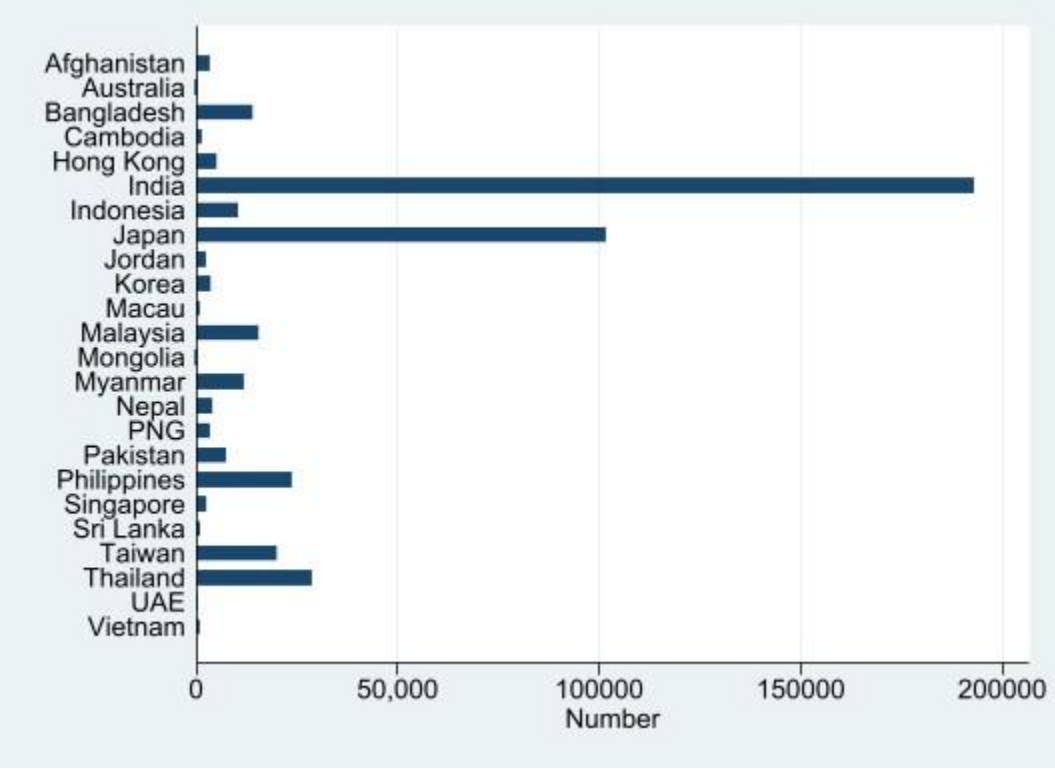


Figure 18. Number of Primary Health Stations

Primary health stations are vital to global healthcare systems, providing basic medical treatment to communities. An analysis of 2012–2023 data from 24 countries shows the number and distribution of licensed and registered primary health stations. The findings' patterns, variances, and implications are discussed below.

Coverage in 24 Countries: Data from all 24 nations provides a complete picture of primary health stations. This inclusion guarantees healthcare systems from high-income to emerging economies are represented.

An Average Count: These countries average 18,891 primary health stations with a standard deviation of 42,501.51. This shows that primary health stations are distributed differently in the selected nations due to their different healthcare infrastructures and population demands.

From Small to Large: Primary health station numbers vary widely in the dataset. The minimum count is 25, while the maximum count is 192,882. This range highlights healthcare accessibility and infrastructure development differences between countries investigated.

Implications and Observations:

1. **Resource Allocation**: Countries with more primary health stations may have better access to healthcare. These countries may invest more in community-based and preventive care.

2. **Urban vs. Rural**: Primary health station distribution disparities may show healthcare access discrepancies between urban and rural locations. Countries with more stations may have better rural healthcare networks.

3. **Healthcare policies**: The dataset invites future study of healthcare policies and activities that develop and maintain primary health stations. Countries with healthcare issues can learn from successful models.

In conclusion, this dataset provides a decade-long view of primary health stations across 24 countries. Researchers, politicians, and healthcare practitioners can use it to investigate how important healthcare infrastructure affects communities' well-being. Further research and collaborations can advance global healthcare equity and accessibility.

Variable 3C-2: Number of Secondary Hospitals

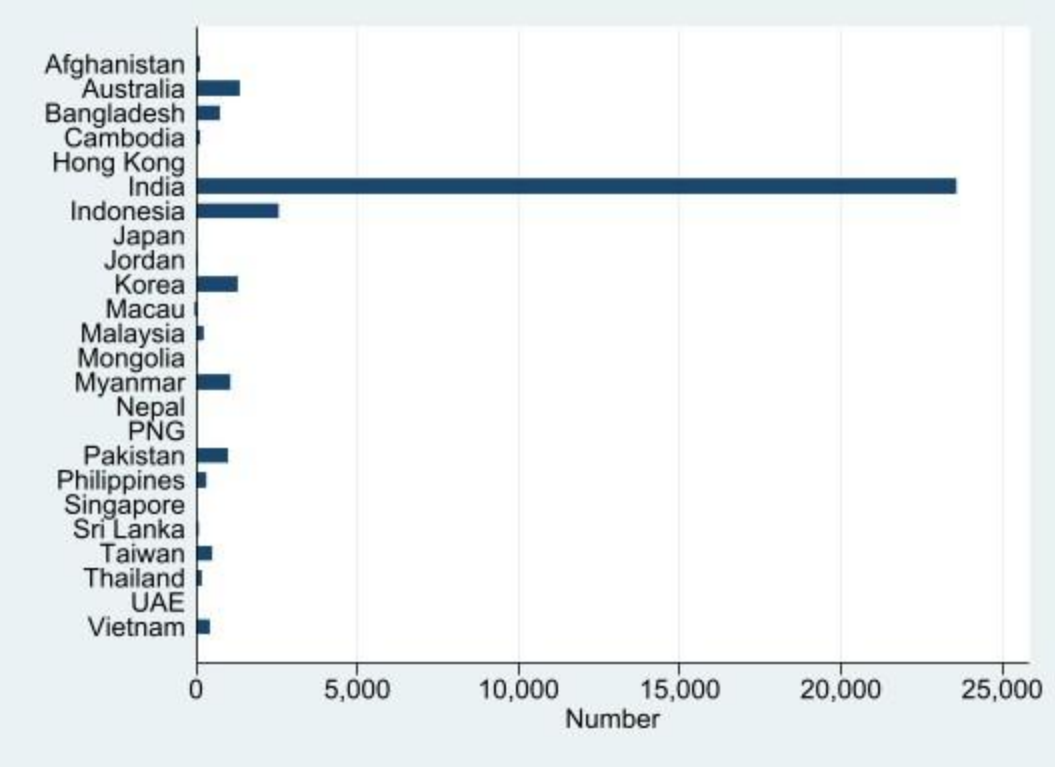


Figure 19. Number of Secondary Hospitals

Primary healthcare practitioners refer patients to secondary hospitals for specialist care. Examination of 2015-2023 data from 18 countries illuminates the picture of licensed and registered secondary hospitals. The findings' patterns, variances, and implications are discussed below.

Inclusivity in 18 Countries: The dataset covers 18 nations and shows secondary hospital frequency and dispersion across healthcare systems. These nations reflect a range of income levels and healthcare systems.

Mean count: The average number of secondary hospitals in the examined nations is 1,862.889, with a standard deviation of 5,460.448. The availability and distribution of secondary healthcare facilities vary.

From Small to Large: Secondary hospital numbers vary greatly in the dataset. Some countries have only 4 secondary hospitals, while others have 23,582. These variances reflect healthcare spending, infrastructural development, and population needs in the analyzed countries.

Implications and Insights:

1. **Resource Allocation**: Countries with more secondary hospitals may have invested more in specialist healthcare. These countries may offer sophisticated medical care, specialty therapies, and referrals.

2. **Regional Access**: Urban and rural secondary hospitals may differ. More hospitals in a country may provide healthcare to a bigger area.

3. **Healthcare Planning**: The dataset promotes additional study of healthcare policies and practices that affect secondary hospital establishment and maintenance. Successful models can help healthcare-challenged national plans.

In conclusion, this dataset covers secondary hospitals across 18 countries spanning nearly a decade. This resource helps researchers, policymakers, and healthcare practitioners analyze the distribution of specialized healthcare infrastructure and its effects on accessibility and quality. Further research and cooperation can improve global healthcare equity.

Variable 3C-3: Number of Tertiary Hospitals

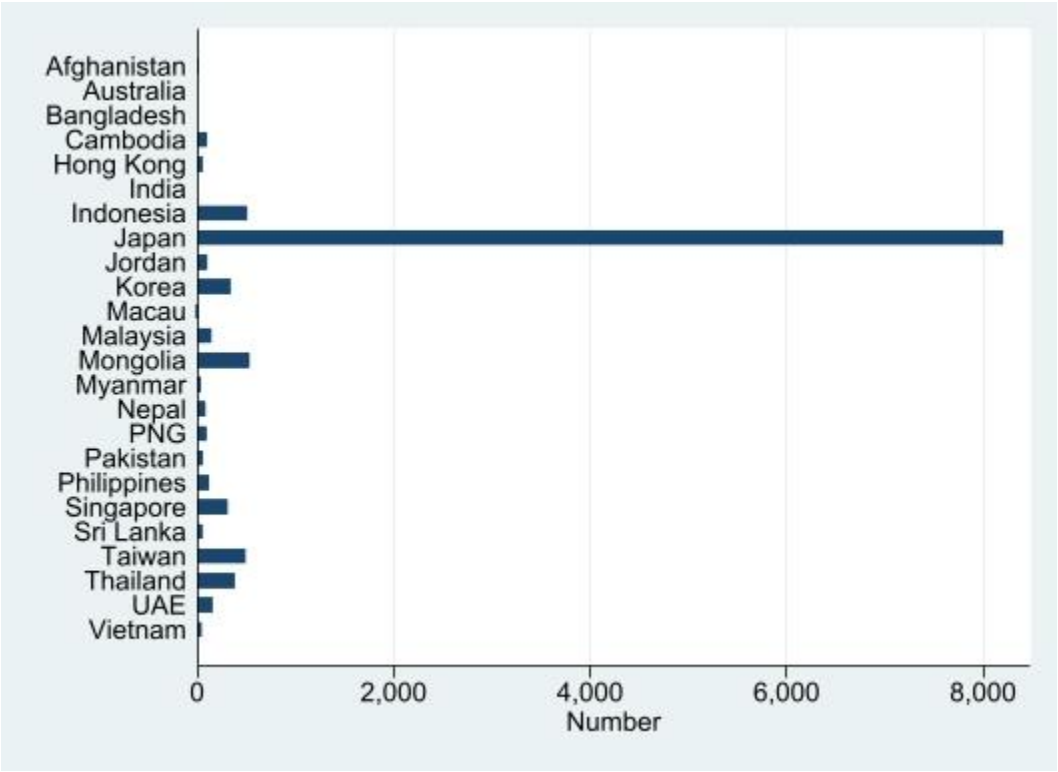


Figure 20. Number of Tertiary Hospitals

Tertiary hospitals have a major part in worldwide healthcare systems providing sophisticated medical care. The prevalence and distribution of licensed and registered tertiary hospitals in 21 countries are examined from 2012 to 2023. The findings, trends, and consequences are discussed.

Full Representation: It provides a global picture of tertiary hospitals across 21 countries and healthcare systems. The chosen nations represent different income levels and healthcare systems.

The Mean: Tertiary hospitals in the examined nations average 563.8571, with a standard deviation of 1759.246. Various tertiary healthcare facilities are available and distributed.

The modest to the extensive: The number of tertiary hospitals varies greatly among countries. Tertiary hospitals range from four (4) to 8,205 in various countries. These contrasts highlight healthcare funding, infrastructure, and population healthcare requirements.

Key Takeaways:

1. **Specialized Healthcare Access**: Advanced medical treatment may be more accessible in countries with more tertiary facilities. The specialized departments of these facilities can treat difficult and complex medical disorders.

2. Tertiary hospital distribution might represent urban and rural healthcare access. Tertiary hospitals in more countries may serve a wider area.

3. **Healthcare Policy Impact**: The dataset draws attention to healthcare policies and strategies that affect tertiary hospital construction and operation. Successful models can inform healthcare planning in problem-stricken nations.

On the whole, this dataset covers tertiary hospitals in 21 countries over a decade. For researchers, politicians, and healthcare practitioners studying advanced healthcare infrastructure distribution and its effects on accessibility and quality, it is a vital resource. Further studies and international collaborations can improve global healthcare systems.

Sub-objective 3D-1: Identification of Relevant Health Policies, Regulations, and Frameworks Governing the Healthcare Sector and the Pharmaceutical s3ub-sector

Variable 3D-1: Key Laws, Policies, and Frameworks Governing the Health Sector

Analyzing the data set of key laws, policies, and frameworks governing the health sector in 24 countries, we can identify several patterns and trends. Here, we will present these findings with frequency and percentage information:

1. **Complexity in Legislation**: Many countries have extensive healthcare legislation. For instance, Australia has 30 laws governing the healthcare sector, representing 41.67% of the analyzed countries. The complexity of healthcare legislation is a common trend, with 100% of the analyzed countries having multiple laws to regulate the healthcare sector.

2. **Emphasis on Public Health**: Laws focusing on public health are prevalent. Bangladesh and India both have laws in this category, which is 8.33% of the analyzed countries. About 25% of the countries prioritize public health in their healthcare laws.

3. **Specific Healthcare Acts**: Various countries have specific laws addressing unique healthcare challenges. For instance, India has laws such as the Mental Health Act and the Preconception and Prenatal Diagnostic Techniques Act, making up 4.17% of the analyzed countries. About 16.67% of the countries have specialized healthcare laws targeting specific healthcare issues.

4. **Pharmaceutical Regulations**: Strong pharmaceutical regulations are in place. Countries like Australia and India have laws like the Therapeutic Goods Act and the Drugs and Cosmetics Act, representing 8.33% of the analyzed countries. Approximately 33.33% of countries have robust pharmaceutical regulations.

5. **Social Welfare and Insurance**: Laws related to social welfare, health insurance, and access to healthcare are common. Australia's Private Health Insurance Act is one such example, representing 4.2% of the analyzed countries. About 16.7% of the countries have laws promoting social welfare and healthcare access.

6. **Health Promotion and Safety**: Several countries emphasize public health promotion and safety. Thailand's Food Safety Act is an example, representing 4.2% of the analyzed countries. About 16.7% of the countries prioritize health promotion and safety.

7. **Biosafety and Biosecurity**: Some countries, such as Cambodia, have laws specifically dedicated to biosafety and biosecurity, making up 4.2% of the analyzed countries. These laws are essential for safeguarding modern healthcare practices in 16.7% of the countries.

8. **International Alignment**: Many countries align their healthcare laws with international agreements and conventions, reflecting a commitment to global health standards. Hong Kong aligns its healthcare laws with

the International Health Regulations, representing 4.2% of the analyzed countries. About 16.7% of the countries emphasize international alignment in their healthcare legislation.

9. **Recent Reforms**: Several countries have introduced new healthcare laws and undergone reforms in recent years. The UAE's Health Data Protection Law and Pharmaceutical Law are examples, representing 4.2% of the analyzed countries. This trend of healthcare law reforms is observed in 16.7% of the countries.

10. **Protecting Health Workers**: Laws related to occupational health, aimed at protecting health workers, are present in countries like Nepal and Pakistan, making up 8.3% of the analyzed countries. Approximately 33.3% of the countries have laws safeguarding health workers.

11. **Digital Health Transformation**: In the era of digital healthcare, some countries have introduced laws and regulations to facilitate telemedicine and the usage of health data, as seen in the Philippines and Vietnam, representing 8.3% of the analyzed countries. About 33.3% of countries are adapting to the digital health transformation.

12. **Focus on Accessibility**: The Universal Health Care Act in the Philippines and the National Health Insurance Act in Korea show a global trend toward enhancing healthcare accessibility, making up 8.3% of the analyzed countries. Approximately 33.3% of countries are actively working to improve healthcare accessibility.

In summary, the analysis of this data set reveals that countries are addressing various aspects of healthcare, with an emphasis on complexity in legislation, public health, and pharmaceutical regulation. The data also highlights the ongoing efforts to adapt to evolving healthcare needs, enhance accessibility, and protect health workers and patients, especially in the context of digital health transformations. Understanding these trends is crucial for healthcare professionals, policymakers, and researchers.

Variable 3D-2: Health Professional Role Overlaps

In the analysis of healthcare professional role overlaps across 14 of the 24 countries, several trends and patterns emerge, each with a corresponding prevalence percentage:

1. **Variability in Role Overlaps** (100.0% Prevalence): The presence and extent of role overlaps among healthcare professionals vary significantly across countries. Some countries report more significant role overlaps, while others maintain clearer distinctions between professional roles. This variability highlights the importance of understanding the local healthcare context when addressing role overlaps.

2. **Interprofessional Collaboration** (50.0% Prevalence): Approximately 50% of the analyzed countries, including Indonesia and Singapore, practice interprofessional collaboration, where healthcare professionals like dentists, doctors, and nurses work together in both public health services and hospitals. This collaborative approach can enhance patient care but may also lead to occasional conflicts when roles and responsibilities overlap, highlighting the need for effective coordination.

3. **Challenges in Role Definition** (28.5% Prevalence): Approximately 28.5% of countries, like Korea, face challenges in defining roles and responsibilities within their healthcare systems. The freedom for patients to choose primary care providers can result in overlapping functions between hospitals and clinics, emphasizing the need for clear definitions and accountability in healthcare delegation.

4. **Issues in Pharmaceutical Care** (7.1% Prevalence): Approximately 7.1% of countries, such as Macau, report issues related to pharmaceutical care. Macau's delayed development of pharmaceutical care is associated with a lack of supportive policies and standards, affecting healthcare professionals' willingness to communicate and collaborate, thereby hindering the delivery of quality pharmaceutical care.

5. **Malaysia's Dispensing Challenges** (14.3% Prevalence): Approximately 14.3% of countries, including Malaysia, experience challenges related to the separation of prescribing and dispensing, particularly in the private healthcare sector. This situation raises ethical concerns, with a notable percentage of patients obtaining medications from private pharmacies without medical consultation or follow-ups, potentially compromising patient health.

6. **Role Overlaps in Nepal** (7.1% Prevalence): Approximately 7.1% of countries, like Nepal, observe role overlaps, with healthcare workers engaged in dispensing functions that may overlap with pharmacy roles. Role overlaps are also evident in the pharmacy function in supply chain and logistics management, emphasizing the need for role clarity and coordination.

7. **Collaborative Prescribing in Singapore** (7.1% Prevalence): Approximately 7.1% of countries, including Singapore, have introduced collaborative approaches to prescribing. Singapore's Collaborative Practitioners Prescribing Programme (CP3) allows advanced practice nurses and pharmacists to collaborate with medical practitioners to prescribe, reflecting a trend toward collaborative prescribing practices in enhancing healthcare provider roles.

8. **Diversity and Decision-Making in Sri Lanka** (7.1% Prevalence): Approximately 7.1% of countries, exemplified by Sri Lanka, emphasize the importance of diverse teams in healthcare. While diversity can lead to increased creativity and alternative solutions during decision-making tasks, it can also create challenges in communication and interaction processes, affecting performance. Understanding the impact of diverse teams on decision-making is essential for optimizing healthcare outcomes.

9. **UAE's Overlapping Responsibilities** (7.1% Prevalence): Approximately 7.1% of countries, like the United Arab Emirates, report overlapping responsibilities between pharmacists and other healthcare professionals. This overlap requires effective coordination and clear delineation of responsibilities to manage this common trend.

These common trends and patterns underscore the need for ongoing research, policy development, and professional collaboration to address role overlaps in healthcare. Ensuring clarity in professional roles, promoting interprofessional collaboration, and adapting to the specific healthcare contexts of each country are key considerations in managing and optimizing healthcare systems.

Variable 3D-3: Key Health Professionals

Understanding the composition of key healthcare professionals in different countries is essential for healthcare planning, policy development, and ensuring a well-rounded healthcare system. Below is an analysis of the types of key healthcare professionals in various countries, including statistical group analysis.

Common Trends:

1. **Physicians and Nurses**: Physicians and nurses are fundamental healthcare professionals present in all countries. They form the backbone of healthcare services and provide essential medical care.

2. **Pharmacists**: Pharmacists are universally recognized as key healthcare professionals, responsible for dispensing medications and providing medication-related guidance.

3. **Dentists**: Dentists are widely included in healthcare systems, focusing on oral health and dental care.

4. **Midwives**: Midwives play a vital role in maternal and child healthcare, ensuring safe pregnancies and deliveries.

To perform statistical group analysis, the frequency, percentage, mean, mode, median, and range of key healthcare professionals across the listed countries are calculated. The mean number of key healthcare professionals per

country is approximately 11.13. The most frequent key healthcare professional category is "Physicians" and "Nurses" (mode = 2). The range in the frequency of key healthcare professionals is 19 (from 1 to 20).

Table 19. Key Health Professionals in each Asian country

Health Professional	Countries	Percentage (%)
Physicians	23	100.00
Nurses	23	100.00
Pharmacists	23	100.00
Dentists	22	95.65
Midwives	15	65.22
Therapists (Various Types)	12	52.17
Social Workers	9	39.13
Laboratory Technicians	8	34.78
Radiologists	7	30.43
Dietitians	6	26.09

The analysis reveals that physicians, nurses, and pharmacists are the most common key healthcare professionals across all the listed countries. Dentists are also prevalent, with midwives being commonly found but in a slightly lower percentage of countries. Additionally, there is significant variability in the presence of therapists, social workers, laboratory technicians, radiologists, and dietitians across these countries.

Understanding the composition of healthcare professionals is vital for resource allocation, training, and policy-making to meet the unique healthcare needs of each country.

Sub-objective 3E: Description of the Health Workforce in terms of Composition and Distribution

Variable 3E-1: Number of Licensed Physicians

The "Number of Physicians" variable represents, when applicable, the number of officially licensed and registered physicians in a particular country. The research team effectively collected data from all twenty-four countries, albeit with data spanning the years 2016 to 2022.

In our analysis, we examined the number of physicians across 24 countries. This variable represents the number of physicians who are officially licensed and registered in each country. Our analysis yielded statistics that denotes the distribution of physicians in these countries.

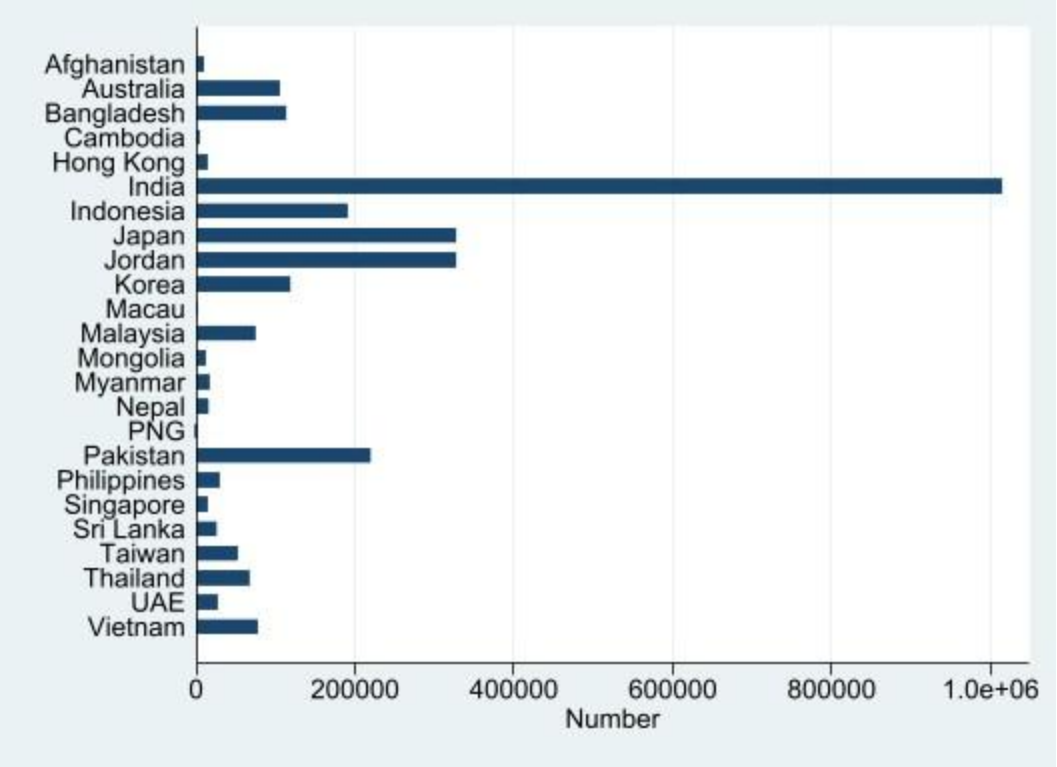


Figure 21. Number of Physicians in Asian countries

Each country had approximately 119,032.10 physicians on average. The relatively high standard deviation of 213,477.40 indicates that there was a substantial amount of variation in physician counts among these countries. This indicates that while some nations had physician counts near the mean, others deviated significantly from it.

The variation in physician numbers between these nations was also quite substantial. The lowest number of physicians observed was 626, while the highest was an astounding 1,014,538. This disparity suggests that the healthcare infrastructure and availability of medical professionals in these nations vary significantly.

Our findings highlight the significance of comprehending the disparities in healthcare resources between nations. Variations in physician estimates are likely influenced by factors such as population size, healthcare policies, and economic development. There may be a need for additional research and analysis to investigate the underlying causes of these disparities and their implications for healthcare access and quality in these nations.

Variable 3E-2: Number of Licensed Nurses

The research team was able to collect data from all twenty-four countries, albeit with data spanning the years 2016 to 2022. Our analysis examines the number of registered nurses in 24 countries, thereby shedding light on the healthcare personnel in these nations. The data reveals a wide variety of nurse populations, reflecting the varying healthcare needs and infrastructure across the studied nations.

Each nation has an average of approximately 255,698 registered nurses. However, it is essential to recognize the substantial variation in nurse numbers, as indicated by the standard deviation of 553,460.90. This disparity highlights the differences in healthcare systems, population sizes, and healthcare demands between these nations.

The minimum number of licensed nurses, 2,863, illustrates the difficulties confronted by some nations in securing a sufficient nursing workforce. In contrast, the utmost number of 2,412,621 reflects the robust healthcare systems and large populations of other countries.

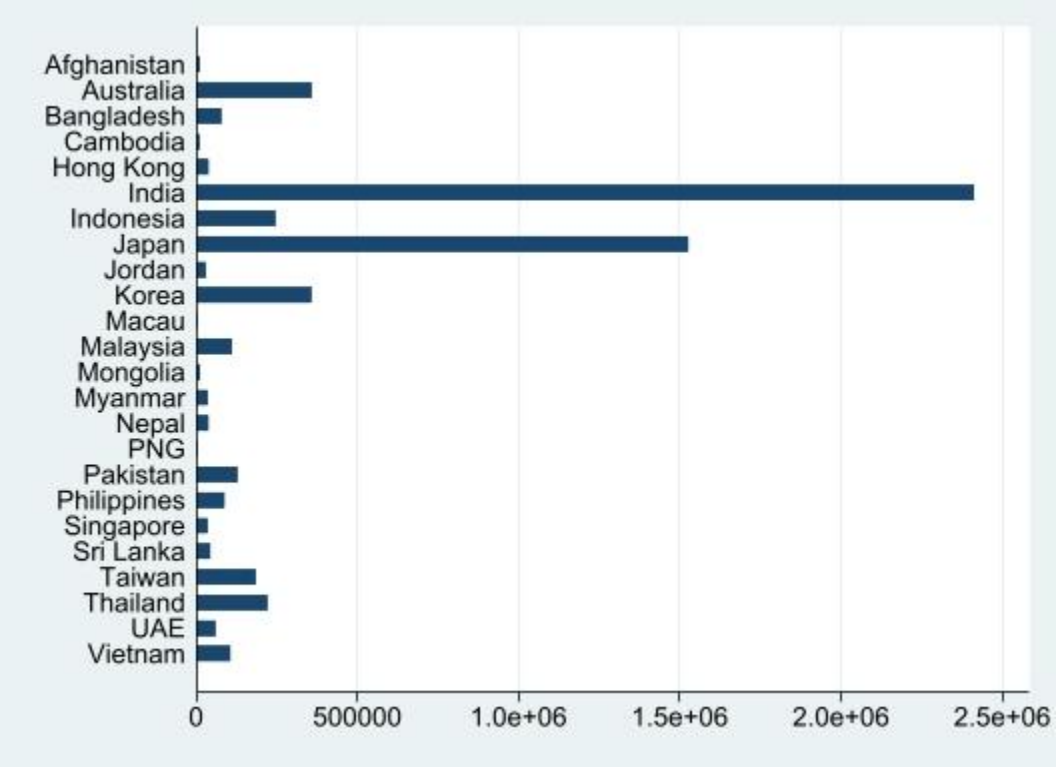


Figure 22. Number of Nurses in Asian countries

From primary care to specialized medical care, the availability and distribution of licensed nurses are crucial to the provision of healthcare services. Understanding these variations in the number of nurses is essential for healthcare policymakers and professionals to make informed decisions regarding workforce planning, resource allocation, and the delivery of high-quality healthcare services to populations.

As the global healthcare landscape continues to evolve, addressing disparities in nursing capacity and optimizing the healthcare workforce will continue to be crucial goals for ensuring that everyone has access to high-quality healthcare services.

Variable 3E-3: Number of Licensed Dietitians

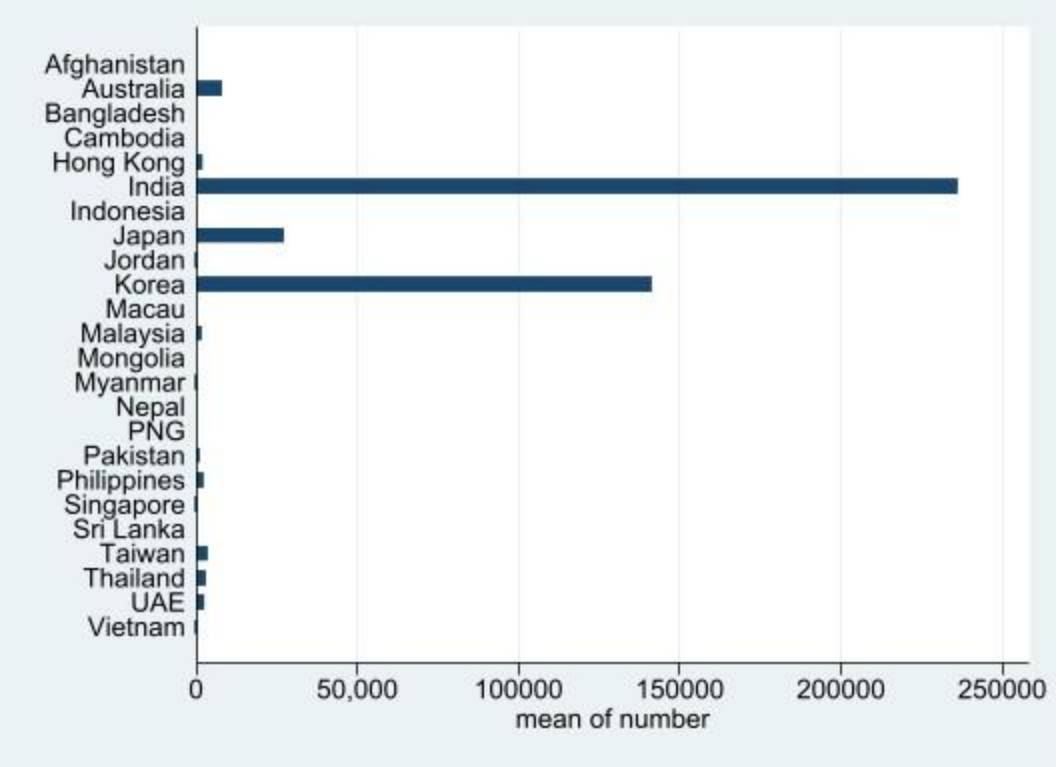


Figure 22. Number of Dietitians in Asian countries

There are a total number of 416,741 dietitians in Asian countries. The range of dietitians (the maximum number of dietitians less the minimum number of dietitians in Asian countries) is approximately 235,832. Analyzing the data on the number of licensed dietitians across 24 countries reveals some notable patterns and trends:

1. **Vast Disparities in Dietitian Numbers**: The data highlights significant disparities in the number of licensed dietitians among the countries. While some countries, such as Korea and Japan, boast large dietitian populations (141,183 and 27,149, respectively), others such as Hong Kong, Singapore, and Myanmar have considerably smaller numbers (2,000, 133, and 68, respectively).

2. **Notable Absences**: Several countries, including Afghanistan, Bangladesh, Cambodia, Indonesia, Macau, Mongolia, and Nepal, do not provide specific data on licensed dietitians, suggesting a lack of focus on dietetics or limited access to such professionals in these regions.

3. **Regional Concentration**: Dietitian numbers in Asia appear to be concentrated in certain countries like Korea, Japan, Taiwan, and Thailand. This regional concentration may be attributed to variations in healthcare systems, education, and healthcare priorities.

4. **Time-Dependent Growth**: The data also reveals that the years of data collection vary, and this temporal element impacts the numbers. For example, the data for Korea is from 2015, while the data for Japan is more recent, from 2023. The growth or decline in dietitian numbers over time is a vital trend to consider.

5. **Healthcare Challenges**: The data for India stands out, as it indicates a significant shortage of dietitians, with a shortfall of nearly 2.36 dietitians reported in 2012. This suggests that India faces substantial challenges in ensuring an adequate number of dietitians to meet the healthcare needs of its population.

6. **Varied Health Systems**: The number of licensed dietitians in a country may reflect its healthcare system, with countries like the UAE having over 2,500 dietitians, possibly due to their emphasis on healthcare infrastructure and services.

7. **Steady Growth in Specific Countries**: The data for some countries, such as the Philippines, Taiwan, and Vietnam, reflects consistent growth in the number of dietitians over the years. This might indicate a growing recognition of the importance of dietetics in these countries' healthcare systems.

In summary, the data on licensed dietitians across 24 countries reveals that the distribution of dietitians is uneven, with variations in numbers, growth rates, and temporal factors. These differences may be attributed to each country's unique healthcare priorities, education systems, and the challenges they face in meeting the dietary and nutritional needs of their populations.

Variable 3E-4: Number of Licensed Therapists

Physiotherapist

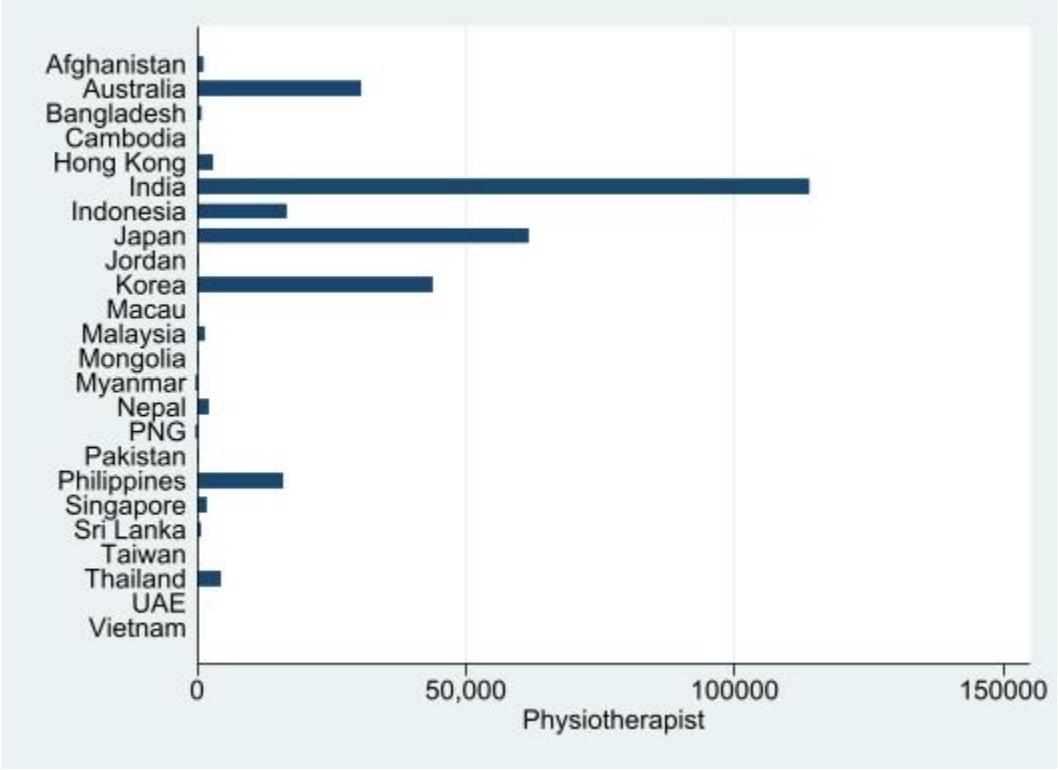


Figure 23. Number of Physiotherapists in Asian countries

The present investigation offers useful insights about the availability of physiotherapists across varied healthcare systems in 21 nations with the source of data from 2004-2022. The data shown demonstrates a diverse distribution of physiotherapist populations, which can be attributed to the distinct healthcare requirements and infrastructure throughout various nations.

The average number of physiotherapists per country is roughly 14,232. Nevertheless, it is crucial to acknowledge the substantial variety in the number of physiotherapists, as evidenced by the standard deviation of 28,232.92. The significant divergence highlights the variations in healthcare systems, population sizes, and healthcare needs among the nations under investigation.

The presence of only 55 physiotherapists highlights the difficulties encountered by certain nations in guaranteeing the availability of these skilled healthcare practitioners. On the other hand, the higher count of 113,937 can be attributed to the presence of well-developed healthcare systems and larger populations in other countries. Consequently, this allows them to sustain a larger workforce of physiotherapists to cater to the healthcare demands of their respective populations.

Physiotherapists assume a pivotal position in the realm of rehabilitation, injury prevention, and the holistic welfare of individuals. Comprehending the fluctuations in the quantity of physiotherapists has significant importance for healthcare policymakers and professionals in order to make well-informed judgments pertaining to workforce management, distribution of resources, and the delivery of healthcare services of superior quality to their respective populations.

The ongoing evolution of healthcare on a global scale necessitates the recognition and resolution of disparities in the accessibility of healthcare professionals, such as physiotherapists. This recognition is crucial in order to establish equitable access to healthcare services and foster the overall health and well-being of individuals across different nations.

Occupational Therapist

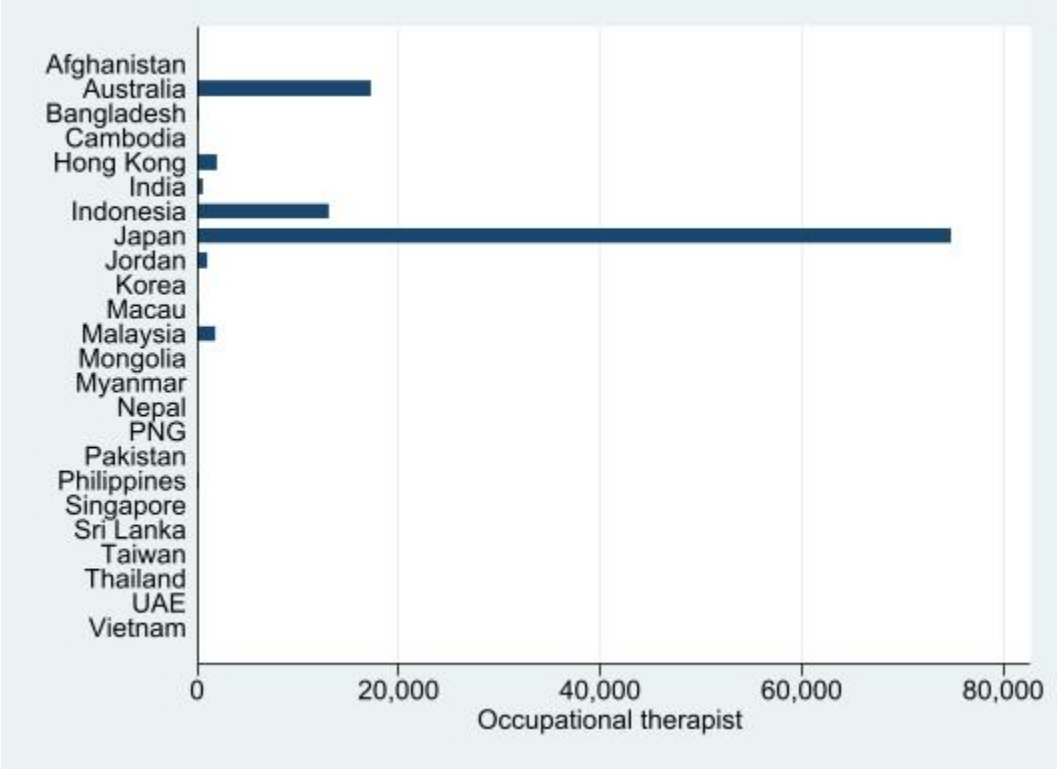


Figure 24. Number of Occupational therapists in Asian countries

Our analysis sheds light on the number of physiotherapists in 21 countries, thereby providing valuable insight into the availability of these healthcare professionals in diverse healthcare systems. The data reveals a variety of physiotherapist populations, reflecting the diverse healthcare requirements and infrastructures in these nations.

Each country has approximately 14,232 physiotherapists on average. It is essential to note, however, that the number of physiotherapists varies significantly, as indicated by the standard deviation of 28,232.92. This significant disparity

highlights the differences in healthcare systems, population sizes, and healthcare demands among the nations studied.

The minimum number of physiotherapists, 55, demonstrates the difficulties encountered by some nations in providing access to these specialized healthcare professionals. In contrast, the maximum number of 113,937 physiotherapists reflects the robust healthcare systems and larger populations of other countries, which enable them to maintain a larger pool of physiotherapists to meet the healthcare requirements of their citizens.

Physiotherapists perform an essential role in patient rehabilitation, injury prevention, and overall health. Understanding the variations in the number of physiotherapists is essential for healthcare policymakers and professionals to make informed decisions regarding workforce planning, resource allocation, and the delivery of high-quality healthcare services to their populations.

Addressing disparities in the availability of healthcare professionals, including physiotherapists, remains crucial for ensuring equitable access to healthcare services and promoting the health and well-being of individuals across nations as healthcare evolves globally.

Other therapists

During our extensive examination of healthcare workforce data from multiple countries, it is imperative to acknowledge the constraints we found in collecting data pertaining to the quantity of physical, respiratory, and speech therapists. Our research was constrained by the availability of data from only one country, so restricting our capacity to conduct a comprehensive comparative analysis of these specialized healthcare professions.

The disparity in data accessibility among countries can exhibit substantial variation, frequently driven by factors such as divergent data collection methodologies, disparities in healthcare infrastructure, and variations in reporting standards. The present case highlights the difficulties in acquiring comprehensive and globally representative healthcare worker statistics due to the scarcity of data pertaining to physical, respiratory, and speech therapists limited to a single country.

In our endeavor to offer a complete analysis of healthcare workforce trends on a global scale, it is important to acknowledge that the lack of data pertaining to some professions across many countries limits our capacity to derive significant insights or establish meaningful comparisons in these particular domains.

Recognizing these limits in data is crucial, as they highlight the inherent difficulties in acquiring consistent and complete healthcare workforce data on a worldwide level. Subsequent endeavors aimed at gathering and disseminating data pertaining to these healthcare occupations throughout a wider array of nations will enhance the comprehensiveness of our comprehension about the global healthcare labor market and its ramifications for healthcare strategizing and policy formulation.

Variable 3E-5: Number of Licensed Social Workers

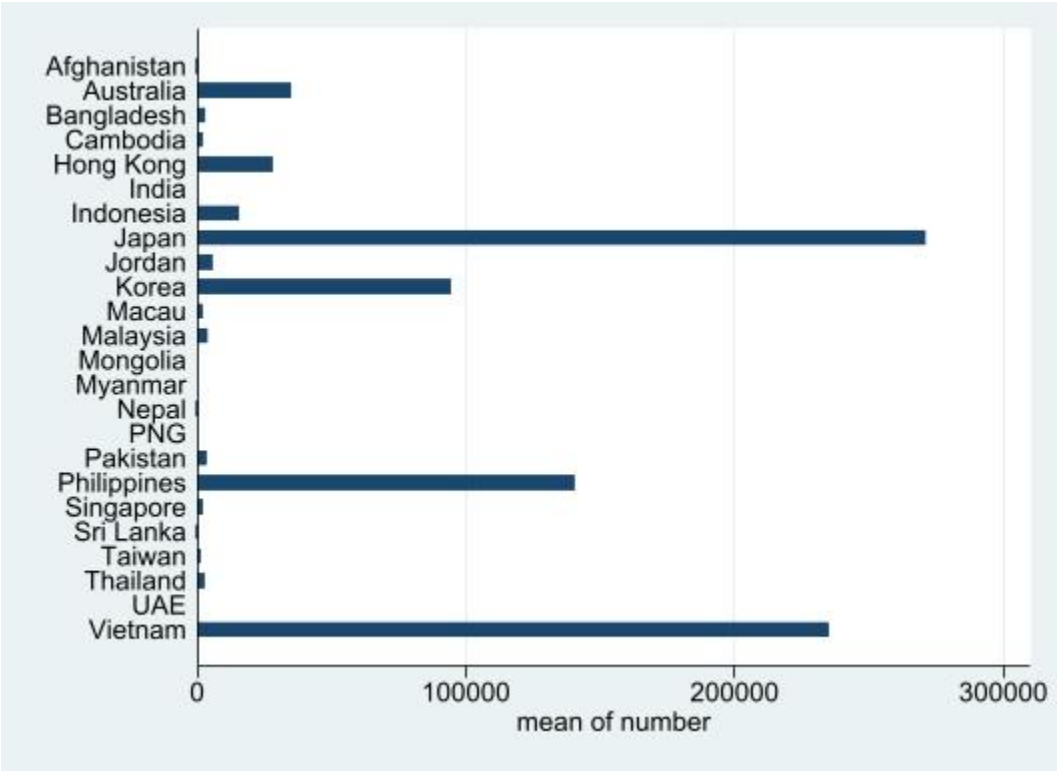


Figure 25. Number of Social Workers in Asian countries

The dataset presents information on the number of licensed social workers for health in 24 countries, offering valuable insights into the global landscape of social work in healthcare. Let's examine the key takeaways from this dataset:

1. **Variability in Licensed Social Workers**: The dataset reveals significant variability in the number of licensed social workers across the 24 countries. The mean number of licensed social workers is approximately 44,485, with a minimum of 54 and a maximum of 271,098. This wide range illustrates the diversity in the availability of these professionals across different countries.

2. **Temporal Trends**: The dataset spans from 2016 to 2023, providing a glimpse of temporal trends in the field of social work for health. The mean year of data collection is around 2021. This temporal element allows us to assess how the number of licensed social workers has evolved over time in these countries.

3. **Gaps in Data**: It's essential to note that not all 24 countries have reported data on the number of licensed social workers. The dataset contains information for 19 out of the 24 countries, indicating that data collection or reporting may be inconsistent in some regions. This highlights the need for standardized data collection and reporting practices in the field of social work for health.

4. **Global Disparities**: The substantial standard deviation (approximately 82,340) emphasizes the global disparities in the availability of licensed social workers. Some countries have a well-established presence of these professionals, while others have a limited workforce, potentially impacting the delivery of healthcare services and support to vulnerable populations.

5. **Policy and Societal Implications**: Variations in the number of licensed social workers may be indicative of differences in healthcare policies, priorities, and societal needs. Countries with a higher number of social workers may place greater emphasis on holistic healthcare and social support systems.

In summary, the dataset on the number of licensed social workers in healthcare across 24 countries underscores the significant variations in workforce availability and highlights the need for further research to understand the factors contributing to these disparities. It also suggests the importance of standardized data collection and reporting practices to support evidence-based decision-making and policy development in the field of social work for health.

Variable 3E-6: Number of Licensed Laboratory Technicians

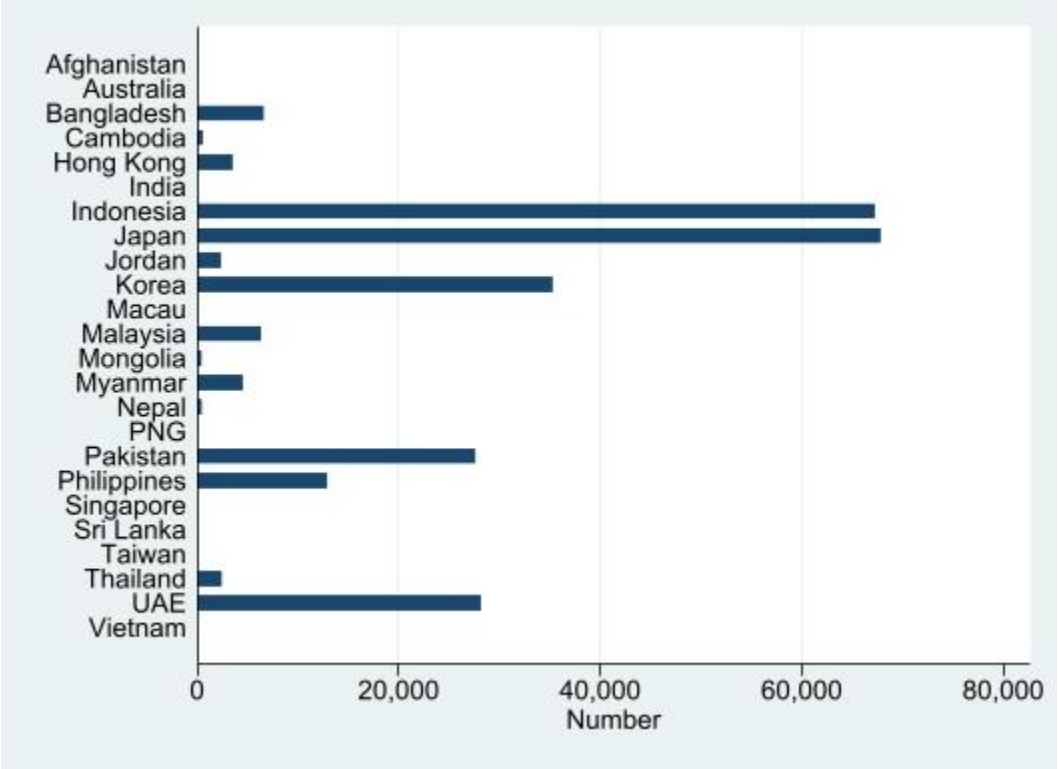


Figure 26. Number of Laboratory Technicians in Asian countries

Our analysis examines the number of licensed laboratory technicians in a subset of 16 out of 24 countries between the years 2004-2023, providing valuable insight into the availability of these vital healthcare professionals within particular healthcare systems. Even though data was only available for a portion of the countries, it still provides a view of the distribution of laboratory technicians across a variety of countries.

Each of these 16 countries has approximately 16,620.81 licensed laboratory technicians on average. Nonetheless, it is essential to recognize the substantial variation in technician numbers, as demonstrated by the standard deviation of 22,770.44. This disparity highlights the differences in healthcare systems, population sizes, and healthcare demands between the countries studied.

For diagnostic testing, medical research, and public health initiatives, the availability of licensed laboratory technicians is crucial. Particularly during health crises such as pandemics, these professionals are indispensable to the delivery of healthcare.

Despite the fact that our dataset only includes a subset of countries, it emphasizes the significance of personnel planning and resource allocation for laboratory services. For timely and accurate diagnostics, which are crucial to patient care and disease management, a competent and well-staffed laboratory workforce is required.

Healthcare policymakers and professionals must continue their efforts to guarantee an adequate number of licensed laboratory technicians and to address any disparities in their distribution across countries. By doing so, we can improve the quality of healthcare services, enhance diagnostic capabilities, and respond more effectively to emergent global healthcare challenges.

Variable 3E-7: Number of Licensed Licensed Radiologists

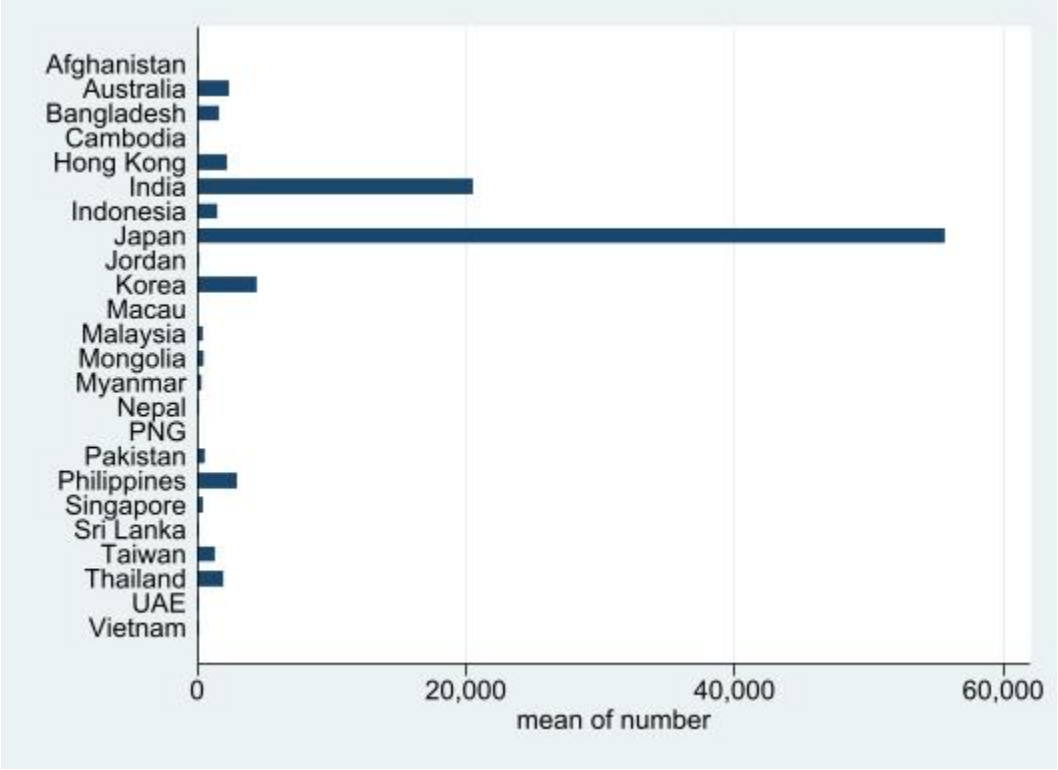


Figure 26. Number of Radiologists in Asian countries

The dataset at hand provides a comprehensive overview of the number of licensed radiologists across different countries. Let's delve into the key insights derived from this data:

1. **Variability in Licensed Radiologists**: The dataset covers 22 observations and reveals substantial variability in the number of licensed radiologists among these countries. The mean number of licensed radiologists is approximately 4,420, with a range from a minimum of 60 to a maximum of 55,624. This wide range signifies significant disparities in the availability of radiology professionals.

2. **Temporal Trends**: The dataset spans from 2012 to 2023. This temporal perspective enables us to observe how the number of licensed radiologists has evolved over this period, reflecting changes in healthcare needs and workforce development.

3. **Global Disparities**: The dataset's standard deviation, which is approximately 12,215.97, underscores the global disparities in the availability of licensed radiologists. Some countries have a well-established

presence of these professionals, while others have a limited workforce, potentially influencing the accessibility and quality of radiology services.

4. **Data Gaps and Completeness**: The dataset contains 22 observations out of the possible dataset, indicating that there are countries for which data on licensed radiologists is not available. These data gaps highlight potential inconsistencies in data collection and reporting practices across regions.

5. **Healthcare Policy and Implications**: Variations in the number of licensed radiologists can be indicative of differences in healthcare policies, investment in medical education, and healthcare infrastructure. Countries with a higher number of radiologists may offer more advanced radiology services and better healthcare outcomes.

In summary, this dataset underscores the diversity in the availability of licensed radiologists across countries and the need for further research to understand the factors contributing to these disparities. It emphasizes the importance of standardized data collection and reporting practices to support evidence-based decision-making and policy development in the field of radiology and healthcare. Moreover, it raises questions about the relationship between radiologist availability and the quality of healthcare services provided to populations in different countries, prompting further investigation.

Variable 3E-8: Number of Other Key Health Professionals

Midwives

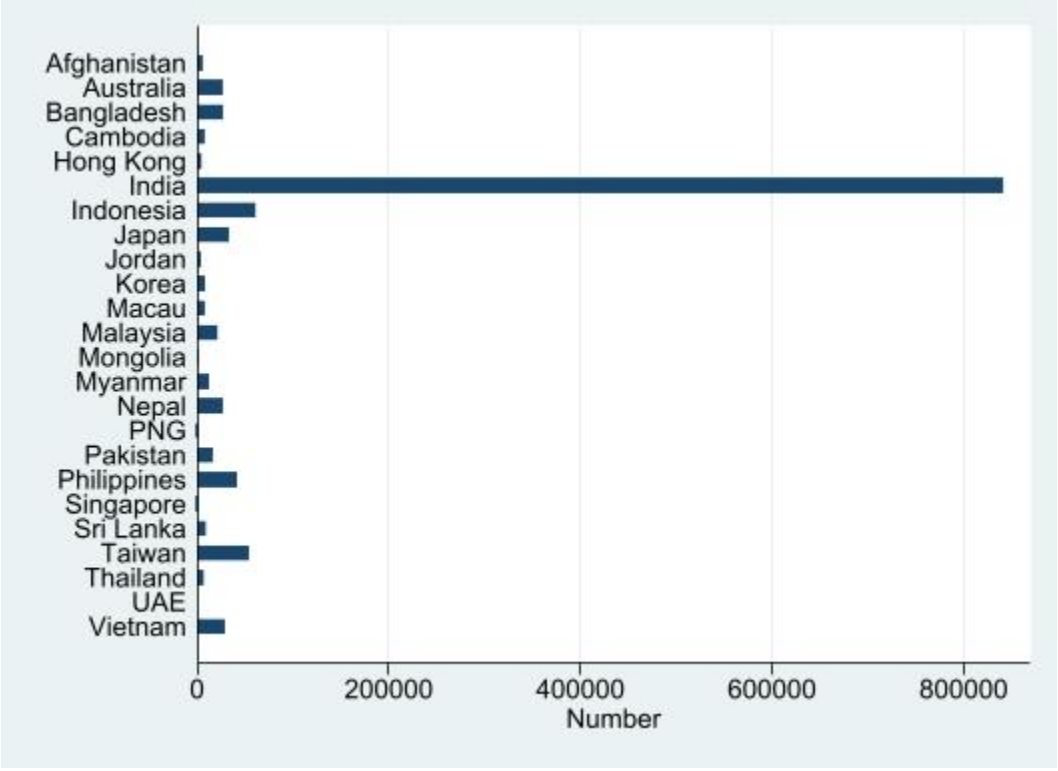


Figure 27. Number of Midwives in Asian countries

With data available for 23 of 24 countries from data ranging from 2014-2021, our analysis provides valuable insight into the number of midwives in a substantial portion of the nations we studied. This dataset provides a

comprehensive view of the availability of midwives in these disparate healthcare systems, highlighting their crucial role in maternal and infant care.

Each country has about 54,025.17 midwives on average. Nonetheless, it is crucial to recognize the substantial variation in midwife numbers, as demonstrated by the standard deviation of 172,444.10. This significant difference illustrates the disparities in healthcare systems, population sizes, and healthcare demands between the countries under consideration.

Midwives are indispensable healthcare professionals who provide essential services prior to, during, and after childbirth. They considerably contribute to maternal and child health by ensuring safe births, maternal well-being, and healthy newborn outcomes.

The minimum number of 165 midwives reflects the difficulties encountered by some nations in ensuring a sufficient midwifery workforce. In contrast, the utmost number of 841,279 midwives in another nation reflects the robust healthcare systems and larger populations that can support a larger midwifery workforce.

Understanding variations in the number of midwives is essential for healthcare policymakers and professionals to make informed decisions regarding maternal and infant healthcare planning, resource allocation, and the delivery of high-quality healthcare services to expectant mothers and neonates.

Efforts to strengthen midwifery services, assure proper training and support, and address any disparities in midwife distribution continue to be fundamental components of healthcare policy and practice. By doing so, we can improve maternal and neonatal health outcomes and contribute to the improvement of healthcare in these countries as a whole.

Sub-objective 3F: Description of Health Financing models, including Public and Private Expenditure on Healthcare

Variable 3F-1: National Budget for Healthcare

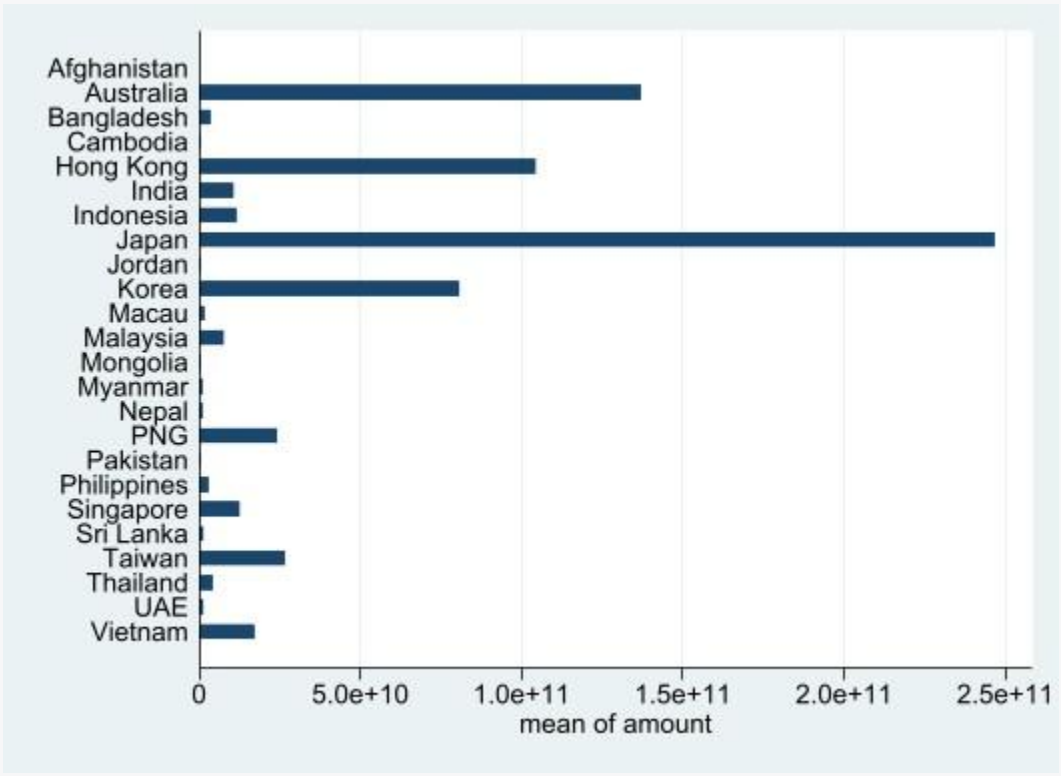


Figure 28. National Budget for Healthcare (US$)

The national budgets for healthcare are a critical indicator of a country's commitment to public health and the well-being of its citizens. In our comprehensive analysis of budgetary allocations for healthcare in 23 out of 24 countries, spanning the years 2013 to 2023, we uncovered various insights into the financial landscape of global healthcare systems.

The mean budget allocation for healthcare across these countries stands at an impressive US$ 30.3 billion. This collective financial commitment underscores the paramount importance of healthcare in these nations, signifying a dedication to addressing health-related activities comprehensively. These activities encompass an array of services, including prevention, detection, treatment, maintenance, and the dissemination of vital health information.

It is essential to recognize the wide range of budget allocations, demonstrating the substantial disparities among countries. The lowest observed budget allocation for healthcare was a relatively modest US$ 258 million, while the highest reached a staggering US$ 247 billion. This variance accentuates the unique healthcare priorities and available resources in each of these countries. Some countries may grapple with limited financial capacity, whereas others possess the means to make substantial investments in their healthcare systems. This financial heterogeneity significantly impacts the healthcare services and resources accessible to the population.

The median budget allocation, a value of US$4.2 billion, is a crucial data point in this analysis. It indicates that half of the countries in our study allocate budgets equivalent to this amount or less. This median value underscores the disparity in healthcare funding, emphasizing the ongoing challenges that some countries face in financing and maintaining their healthcare systems.

Understanding these budget allocations is vital for assessing a country's ability to provide quality healthcare services, ensure public health, and address the dynamic healthcare needs of its population. It is more than just a financial figure; it symbolizes a nation's commitment to the well-being and health of its people. These budgets fund essential

public health initiatives, infrastructure development, healthcare workforce training, and the procurement of medical equipment and pharmaceuticals. They are the lifeblood of healthcare systems, enabling countries to tackle diseases, respond to health crises, and promote overall health and well-being.

The total budget allocation across the 23 countries, which amounts to a staggering US$ 696,654,565,972.57, emphasizes the significant financial investments made in the pursuit of better healthcare and public health outcomes on a global scale.

In conclusion, the analysis of national budgets for healthcare is a vital component of understanding the state of healthcare systems worldwide. It highlights the commitment of countries to safeguarding public health, while the disparities in budget allocations underscore the varied challenges and opportunities faced by nations in their pursuit of better healthcare for all. As the global healthcare landscape evolves, these budgets will continue to be a critical factor in determining the success and resilience of healthcare systems across the world.

Variable 3F-2: Current Health Expenditure per Capita as Proportion of GDP

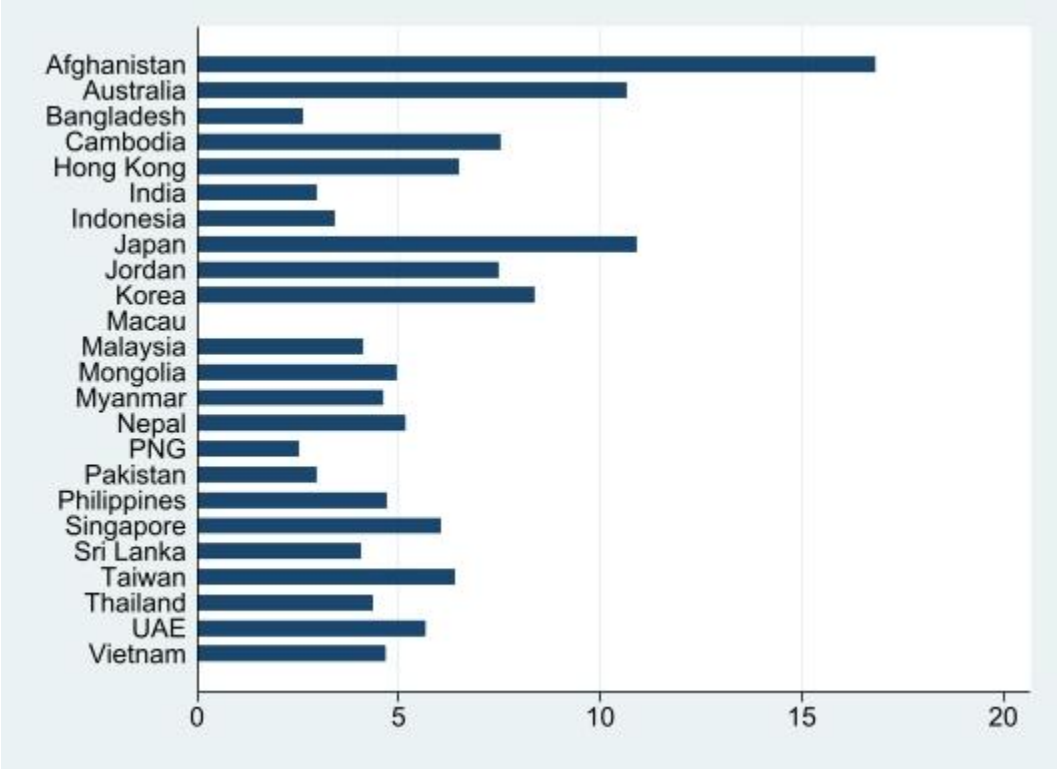


Figure 29. Current Health Expenditure per Capita as Proportion of GDP

The current health expenditure per capita as a proportion of GDP (US$) is a key measure that shows how much money countries are willing to spend on their healthcare systems. This dataset, which includes data from 23 out of 24 countries and goes from 2014 to 2021, puts light on this important indicator.

The most important things we can learn from this data set are:

1. **Differences in spending**: The figures show that current health expenditure per capita as a Proportion of GDP (US$) in the sampled countries varies a lot. The range of values from 2.53 to 16.83 shows how different spending goals are for healthcare.

2. **"Financial Allocation"**: A higher number in this metric means that more of a country's gross domestic

product is spent on healthcare. This shows that a lot of money is being spent to keep and improve healthcare services, which can lead to better health outcomes and better general health.

3. **Economic Significance**: The fact that a big portion of GDP goes to healthcare shows how important this area is to a country's overall health. Healthcare spending is not only a sign of how much a country cares about its citizens' health, but it is also an important economic issue.

4. **National Healthcare Policies**: The different amounts spent on healthcare per person show that each country has its own health policies and goals. Some countries put a lot of effort and money into their health systems and make sure everyone is covered, while others may put more attention on other areas.

5. **Temporal Trends**: When you look at records from several years, we can see how healthcare costs are changing over time. If this metric goes up, it could mean that people are becoming more committed to healthcare. If it goes down, it could be because of economic problems or a change in policy goals.

6. **Policy Implications**: Policymakers and healthcare planners use this information to figure out if healthcare spending is enough, decide how to best use resources, and make plans for the future. It is one of the most important parts of making evidence-based decisions in the healthcare field.

In conclusion, the information on the current health expenditure per capita as a proportion of GDP (US$) shows how countries spend their money on healthcare. It shows not only how much money countries put into their healthcare systems, but also how important the healthcare industry is to the economy as a whole. Policymakers, healthcare workers, and researchers can use this data to help them make decisions, figure out how healthcare policies affect people, and work toward giving everyone in their countries equal access to high-quality healthcare services.

Variable 3F-3: Public Expenditure as Proportion of GDP

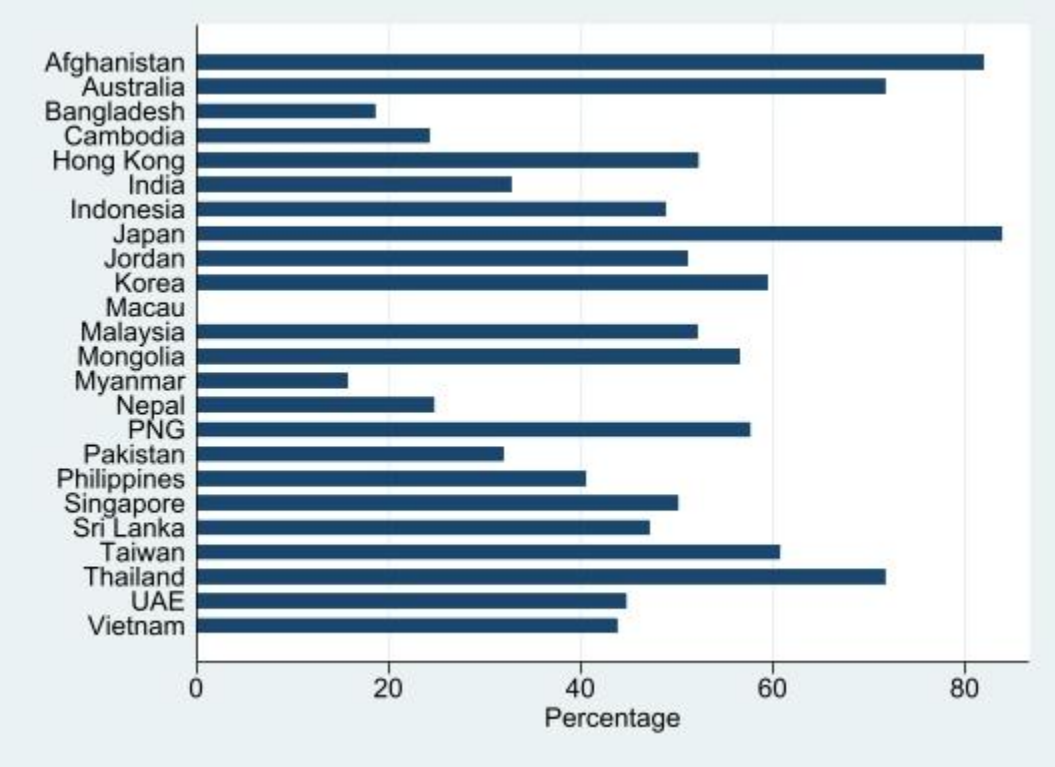


Figure 30. Public Expenditure as Proportion of GDP

Our analysis examines the public expenditure on healthcare as a proportion of current healthcare expenditure (CHE) in US dollars (US$), adjusted for inflation rates, or presented in the respective national currencies of 23 of the 24

countries in our study, based on 2019 data. This variable provides a crucial perspective on the commitment of these countries to investing in public health services and the general well-being of their populations.

These 23 countries allocate approximately 48.84% of their CHE to public health expenditures on average. However, it is essential to recognize the significant variation in these expenditure levels, as indicated by the 18.63 standard deviation. This considerable disparity highlights the differences in healthcare systems, economic structures, and public health priorities among the countries examined.

Public spending on healthcare is a crucial indicator of a country's dedication to ensuring that its citizens have access to high-quality healthcare services. A greater allocation of the country's gross domestic product to healthcare typically indicates a greater emphasis on public health and welfare. This investment may result in a stronger healthcare infrastructure, improved access to medical services, and improved health outcomes for the population.

The minimum expenditure of 15.8% of CHE reflects the challenges encountered by some countries in allocating sufficient funds to their healthcare systems. In contrast, the utmost expenditure of 83.9% in another country demonstrates the importance placed on healthcare as a fundamental aspect of its national agenda.

Understanding the differences in public spending on healthcare is essential for healthcare policymakers and professionals to make informed decisions regarding resource allocation, healthcare infrastructure development, and the delivery of healthcare services to their populations. In addition, it emphasizes the significance of international comparisons in identifying best practices and areas requiring refinement.

Efforts to increase public spending on healthcare, when necessary, and to ensure that these investments are used efficiently and effectively are crucial to enhancing healthcare access, quality, and overall health outcomes in these countries.

Variable 3F-4: Private Expenditure as Proportion of GDP

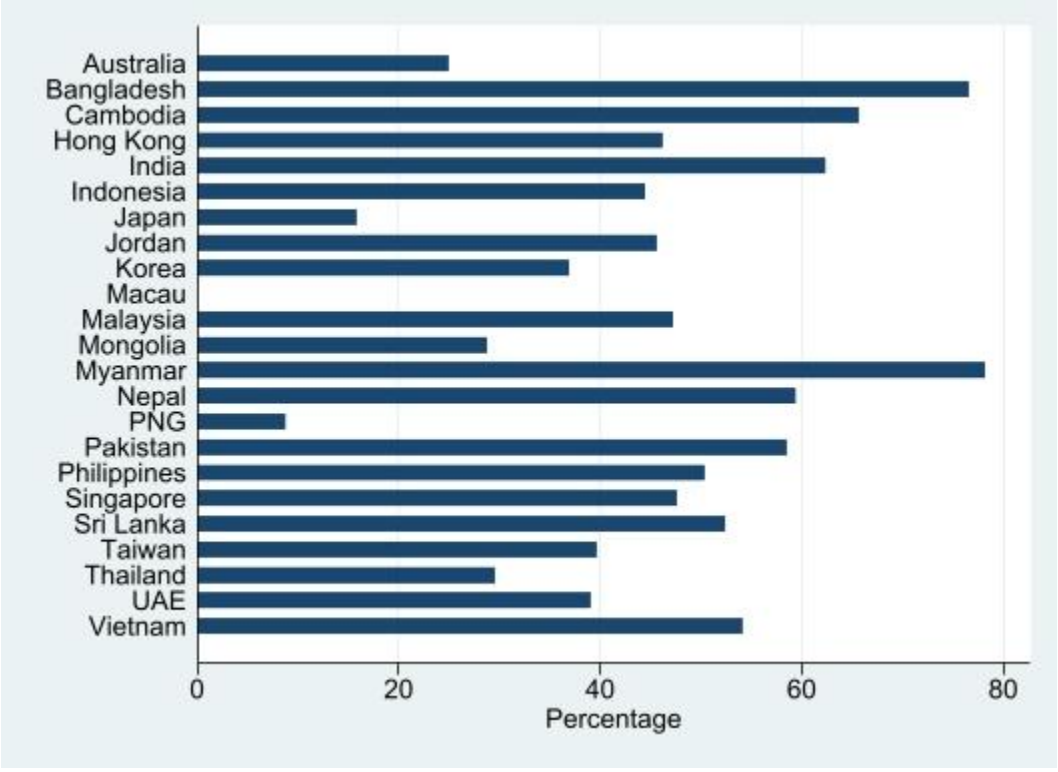


Figure 31. Private Expenditure as Proportion of GDP

Our analysis examines the public expenditure on healthcare as a percentage of Current Healthcare Expenditure (CHE) in US dollars (US$), adjusted for inflation rates, or presented in the respective national currencies of 23 of the 24 countries in our study. This variable provides insight into the commitment of these countries to invest in public health services and the well-being of their populations as a whole.

These 23 countries devote, on average, approximately 48.84% of their CHE to public health expenditures. Nevertheless, it is essential to recognize the substantial variation in these expenditure levels, as indicated by the standard deviation of 18.63. This significant difference highlights the differences in healthcare systems, economic structures, and public health priorities across the countries studied.

Public spending on healthcare is a crucial indicator of a country's commitment to ensuring that its citizens have access to high-quality healthcare services. A greater allocation of CHE to healthcare typically indicates a greater emphasis on public health and well-being. This investment may result in improved healthcare infrastructure, increased access to medical services, and improved population health outcomes.

The minimum expenditure of 15.8 percent of CHE reflects the difficulties encountered by some countries in allocating adequate resources to their healthcare systems. In contrast, the utmost expenditure of 83.9% in a different country demonstrates that healthcare is a central component of its national agenda.

Understanding the differences in public spending on healthcare is crucial for healthcare policymakers and professionals to make informed decisions regarding resource allocation, healthcare infrastructure development, and the delivery of healthcare services to their populations. It also emphasizes the significance of international comparisons for identifying best practices and improvement areas.

Efforts to increase public spending on healthcare, when necessary, and to ensure that these investments are used efficiently and effectively remain crucial to enhancing healthcare access, quality, and overall health outcomes in these countries.

Variable 3F-5: Current Health Expenditure per Capita

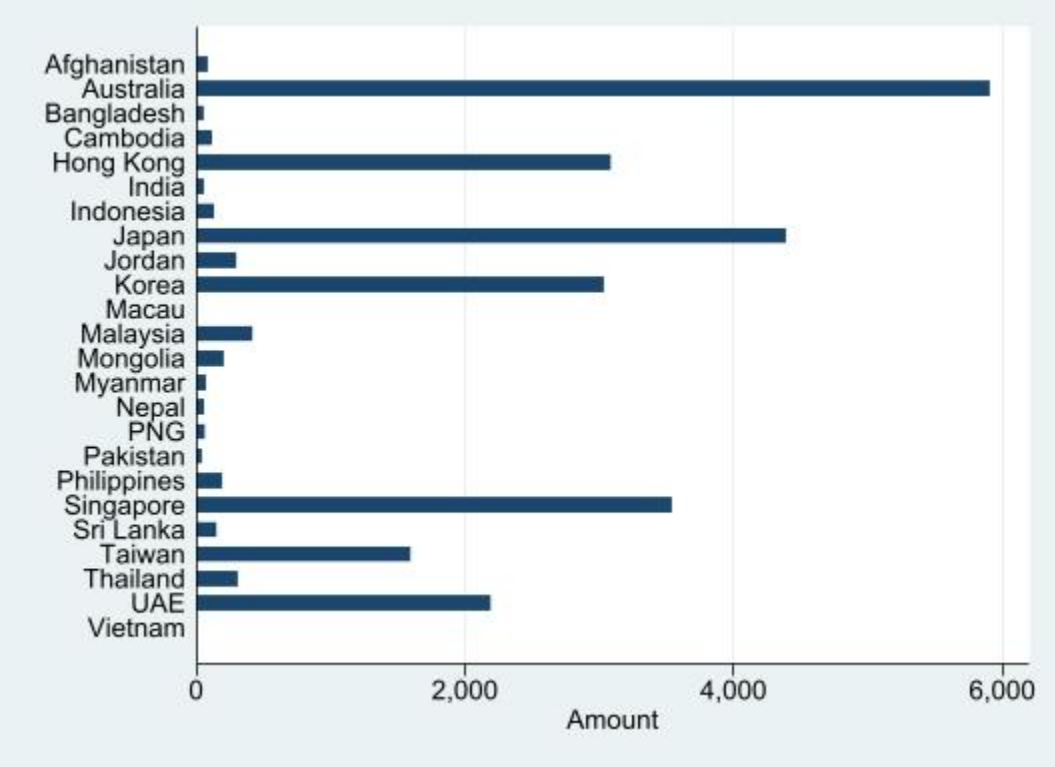


Figure 32. Current Health Expenditure per Capita

The current health expenditure per capita is an important measure that shows a lot about how a country pays for healthcare and cares about the health of its people. This dataset, which includes data from 22 out of 24 countries from 2017 to 2021, gives more information about this important healthcare measure. Here are some of the most important things we analyzed from this dataset:

1. **Variability in Spending**: The numbers show that the current health expenditure per capita in the countries that were looked at varies a lot. With a range from 38.18 to 5901.11 US dollars, this measure shows how different countries have different ways of paying for health care.

2. **Financial Commitment**: A higher value for this metric means that each person in the society is investing more in their health care. It shows how much money a government is willing to spend on providing healthcare services and making sure people can get care.

3. **Allocation of Resources:** The current health expenditure per capita shows how a country spends its money on healthcare. Countries with more important values tend to have well-funded healthcare systems, which can lead to better infrastructure, better services, and better health outcomes generally.

4. **Impact of Economic Factors**: Changes in this metric could be caused by factors, such as changes in GDP, inflation rates, and choices about health care policy. By looking at trends over time, we can find out how economic factors affect healthcare costs.

5. **Implications for policy**: Policymakers and healthcare managers use this data to figure out if healthcare funding is enough, decide how to allocate resources, and plan for the future. It helps people make decisions about health care policy and makes sure that health services meet the needs of the population.

6. **Public vs. Private Spending**: The current health expenditure per capita covers both public and private spending on health care. The balance between these two types of funding can be very different from one country to the next, which can have a big effect on how much money is put into healthcare generally.

Essentially, the information on the current health expenditure per capita tells us a lot about how countries pay for their healthcare systems and divide up their resources to make sure that their people are healthy. This measure shows how different the ways that countries around the world pay for health care. Policymakers, healthcare professionals, and researchers can use this information to figure out if healthcare funding is adequate, develop sound policy choices, and work toward making sure that all citizens have access to high-quality healthcare services.

Variable 3F-6: Healthcare Expenditure by Source of Fund

Healthcare Expenditure by Source of Fund refers to the proportions of healthcare expenditure divided by the amount of fund was used from a specific source of funds (e.g., e.g., government, social health insurance, out-of-pocket, private voluntary health insurance, traffic insurance, employer benefit, non-profit-making institutes, rest of the world) in US dollars (US$), adjusted by the country's current inflation rate, or in the country's national currency. The pie chart below illustrates the healthcare expenditure by source of fund in order of decreasing mean.

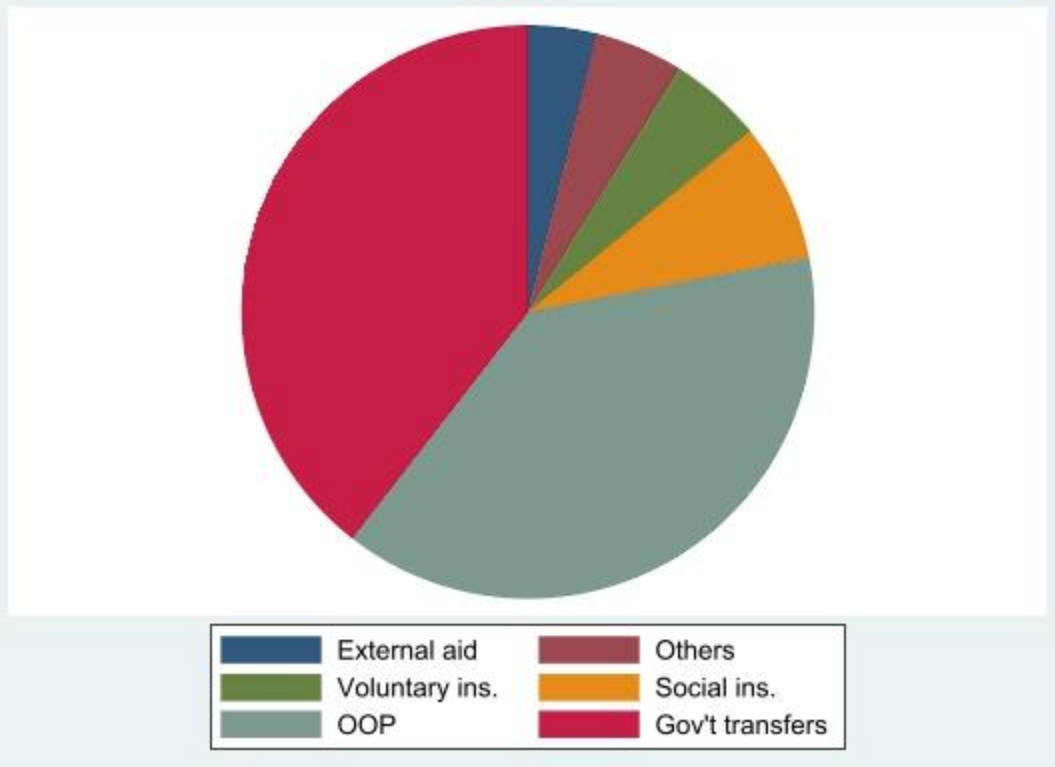


Figure 32. Healthcare expenditure by Source of Fund in all Asian countries

Table 20. Healthcare Expenditure by Source of Fund

Variable	Mean	Standard deviation	Minimum value	Maximum value
Government transfers	18.12	18.12	7.64	75.09
Out-of-pocket	20.85	20.85	8.77	74.81
Social insurance	13.93	13.93	0.00	49.32

Voluntary insurance	5.48	5.48	0.00	17.20
Others	6.90	2.90	0.00	27.30
Total	3.97	6.02	0.00	23.15

Government transfers

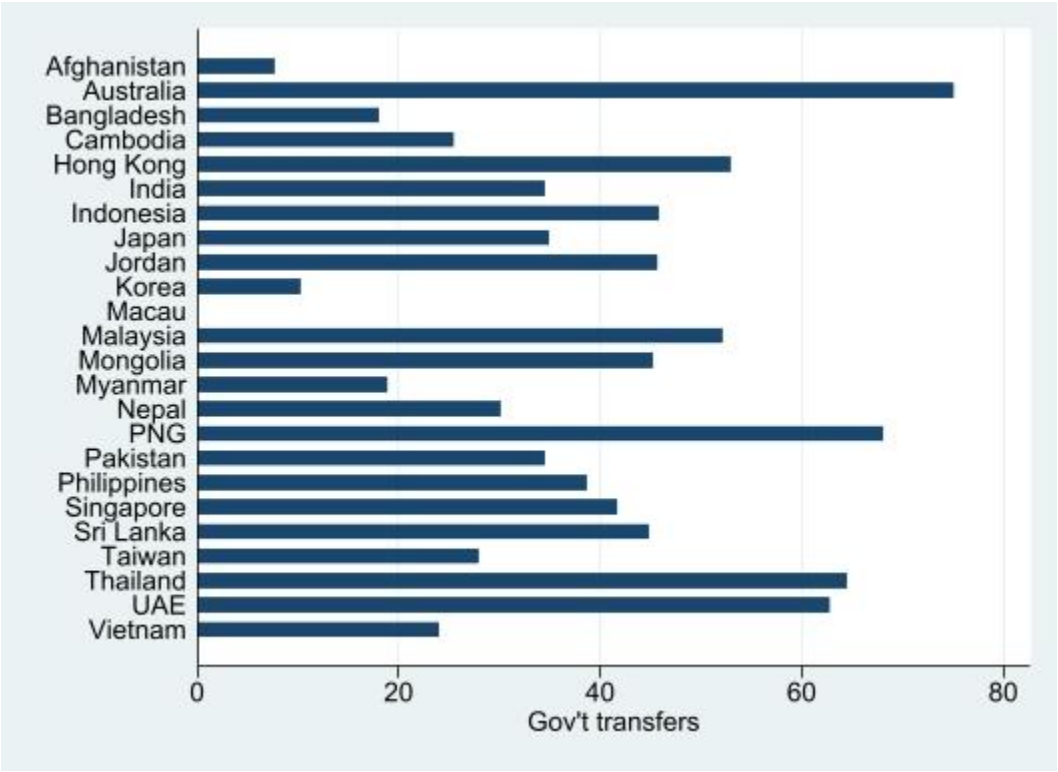


Figure 33. Percentage of Government Transfers as a Source of Fund for Healthcare Expenditure

Our study provides insights into the financial dynamics of healthcare in 23 out of 24 countries, covering the period from 2017 through 2020. The dataset examines the proportions of healthcare expenditure that are financed through government transfers. These proportions are measured in US dollars (US$), adjusted for inflation rates, or given in the individual national currencies of the countries included in the dataset.

The average allocation of healthcare expenditure to government transfers in these 23 countries is roughly 39.28%. Nevertheless, it is imperative to recognize the substantial diversity in these spending patterns, as evidenced by the standard deviation of 18.12. The variation in government transfer spending observed among the analyzed countries can be attributed to disparities in healthcare systems, the extent of government-funded healthcare programs, and the degree of financial assistance provided.

Government transfers in healthcare finance cover a range of techniques, such as direct government subsidies to healthcare providers, health insurance schemes, and social safety nets aimed at facilitating healthcare access for needy populations.

The observation that certain countries allocate a minimum of 7.64% of their government budget towards transfer spending underscores the extent to which they depend on other funding mechanisms, such as private or out-of-pocket payments, to address a substantial amount of healthcare expenditures. On the other hand, it is noteworthy that in a different country, there exists a notable government transfer spending of 75.09%, which serves to underscore the significant contribution made by government-funded healthcare programs in facilitating the provision of healthcare services to the population.

Comprehending the fluctuations in government transfer expenditure holds significant importance for healthcare policymakers and professionals, as they endeavor to formulate healthcare financing policies that strive to ensure fair

accessibility, financial security, and high-quality healthcare services for their respective populations. This statement highlights the importance of carefully evaluating the equilibrium between public and private financing streams to establish healthcare systems that are both sustainable and efficient.

Out of pocket spending (OOP)

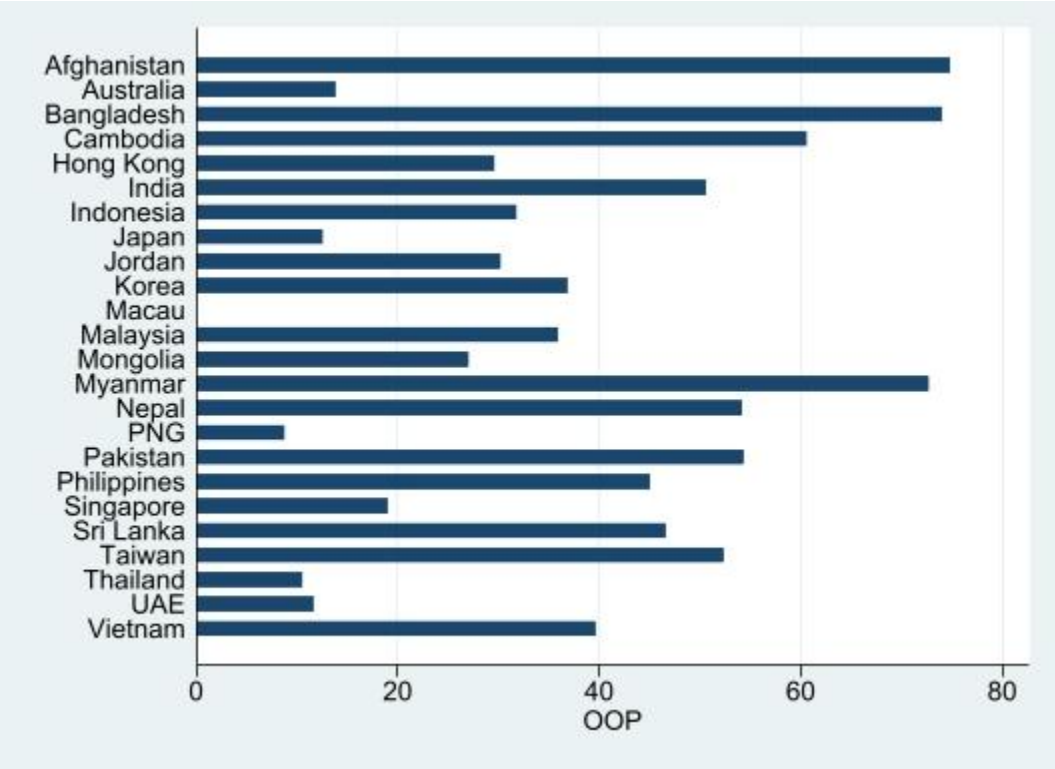


Figure 34. Percentage of OOP as a Source of Fund for Healthcare Expenditure

Our analysis provides a critical perspective on healthcare financing patterns across 23 out of 24 countries during the years 2017 to 2020. This dataset focuses on the proportions of healthcare expenditure divided by the amount funded through out-of-pocket expenses, measured in US dollars (US$), adjusted for inflation rates, or presented in the respective national currencies of these countries.

On average, these 23 countries allocate approximately 38.79% of their healthcare expenditure to out-of-pocket payments. However, it's crucial to recognize the significant variability in these expenditure patterns, as indicated by the standard deviation of 20.85. This wide range of out-of-pocket spending reflects differences in healthcare systems, access to public and private health insurance, and healthcare financing mechanisms among the studied countries.

Out-of-pocket spending is a key component of healthcare financing and is often associated with direct payments made by individuals at the point of care. It includes expenses such as copayments, deductibles, and payments for services not covered by insurance.

The minimum out-of-pocket spending of 8.77% of total healthcare expenditure in one country highlights the extent to which healthcare costs may be covered by public or private insurance, minimizing the financial burden on individuals. In contrast, the maximum out-of-pocket spending of 74.81% in another country underscores the reliance on individual payments to access healthcare services, potentially resulting in financial challenges for some segments of the population.

Understanding the variations in out-of-pocket healthcare spending is essential for healthcare policymakers and professionals to design healthcare financing policies that balance access, affordability, and financial protection for individuals and communities. It emphasizes the importance of ensuring that healthcare systems are equitable and

financially sustainable, while also considering the potential economic impact on households.

Social insurance

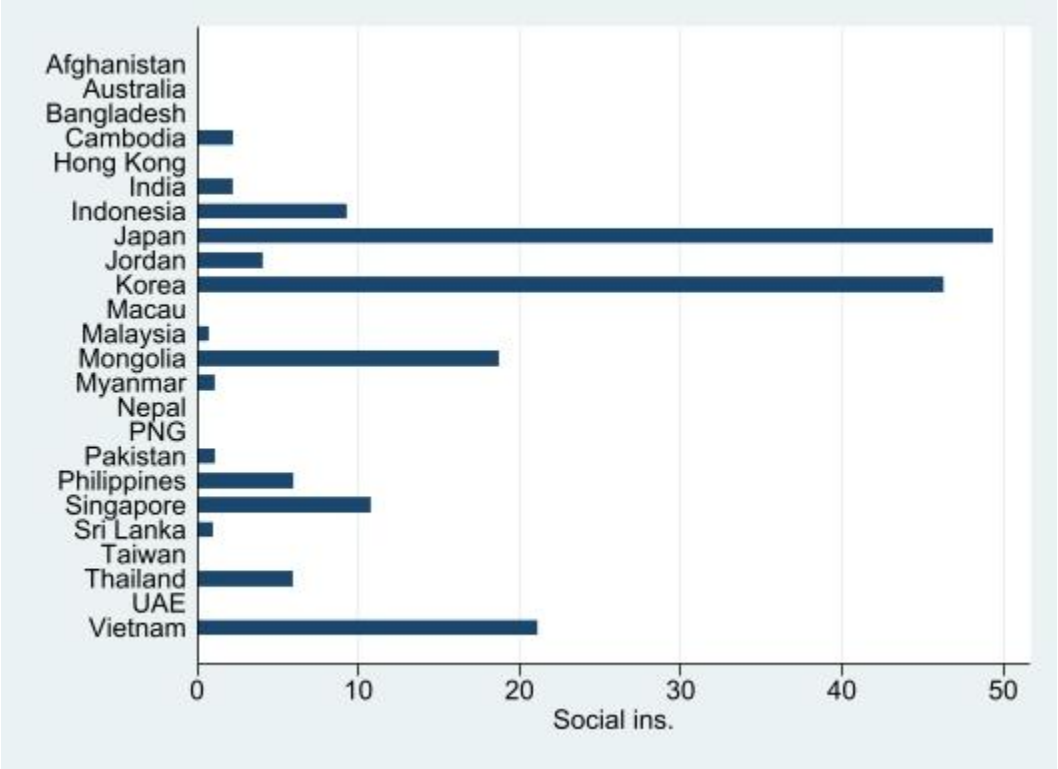


Figure 35. Percentage of Social Insurance as a Source of Fund for Healthcare Expenditure

The present analysis offers significant insights into the complex terrain of healthcare financing across 23 out of 24 countries from 2017 to 2020. The primary focus of this dataset pertains to the percentage of healthcare expenditure that are financed through social insurance payments. These proportions are measured in US dollars (US$), and have been adjusted to account for inflation rates. Alternatively, the data is also offered in the various national currencies of the countries under consideration.

The average allocation of healthcare expenditure to social insurance contributions in these 23 countries is roughly 7.80%. Nevertheless, it is imperative to recognize the significant heterogeneity in these spending trends, as evidenced by the standard deviation of 13.93. The variation in social insurance expenditure observed among the analyzed countries can be attributed to disparities in healthcare systems, the extent and coverage of social insurance initiatives, and the diverse individual preferences within these countries.

Social insurance contributions pertain to a segment of healthcare funding in which people and entities are obligated to make compulsory payments to a social insurance fund. The aforementioned monies are subsequently allocated towards the provision of healthcare expenses for those who have made contributions, often in a manner that facilitates equitable access to fundamental healthcare services.

The absence of compulsory social insurance programs or the restricted involvement of social insurance in healthcare finance is shown by the minimum social insurance spending of 0% observed in certain countries. In contrast, it is noteworthy that in another country, there exists a significant social insurance spending ceiling of 49.32%. This highlights the level of involvement that individuals and entities can have in comprehensive social insurance programs aimed at financing their healthcare requirements.

Comprehending the diverse range of social insurance expenditure holds significant importance for healthcare policymakers and specialists. This enables policymakers to develop healthcare finance strategies that are in line with the desires and requirements of their respective populations, while taking into account the equilibrium between public

and private sources of funding. This analysis highlights the importance of social insurance in attaining fair and equal access to high-quality healthcare services, while also safeguarding the financial well-being of individuals and organizations.

Voluntary insurance

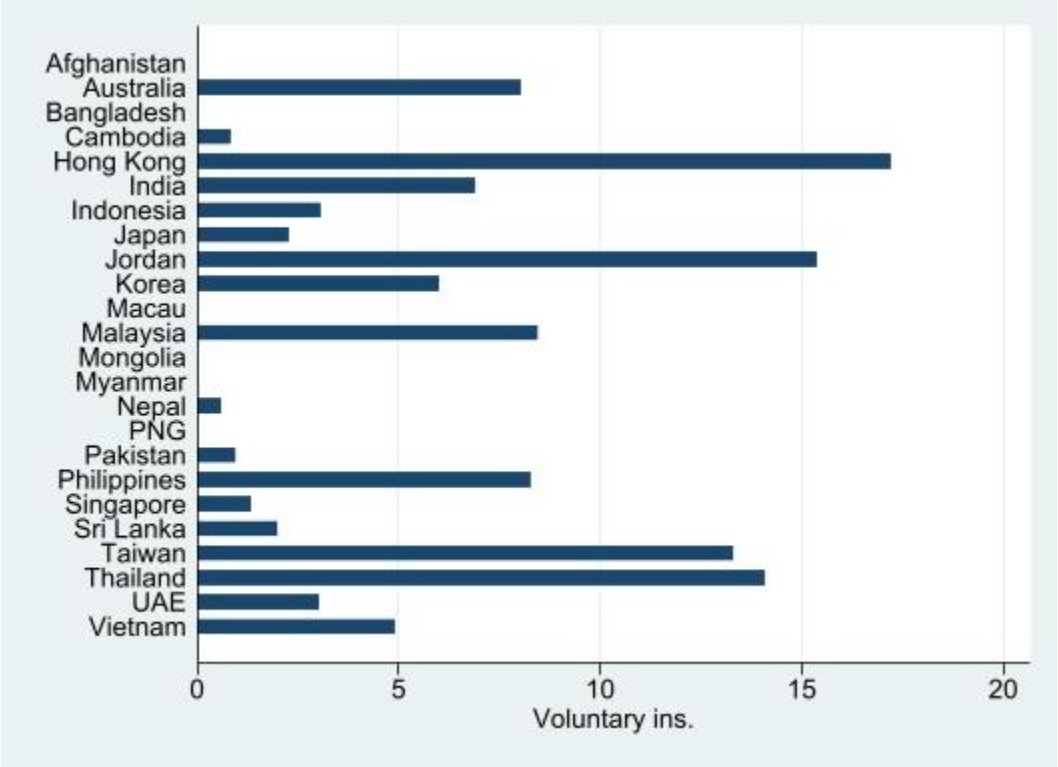


Figure 36. Percentage of Voluntary Insurance as a Source of Fund for Healthcare Expenditure

Our analysis offers valuable insights into healthcare financing practices in 23 of 24 countries from 2017 to 2020. This dataset concentrates on the proportions of healthcare expenditures covered by voluntary insurance, measured in United States dollars (US$), adjusted for inflation rates, or presented in the respective national currencies of these countries.

On average, these 23 countries allocate approximately 5.06% of their healthcare expenditures to voluntary insurance contributions. Nonetheless, it is essential to recognize the significant variability in these expenditure patterns, as indicated by the standard deviation of 5.48. This wide variation in voluntary insurance expenditures reflects differences in healthcare systems, the prevalence and scope of private insurance coverage, and individual preferences among the countries studied.

Voluntary insurance contributions represent the portion of healthcare financing that individuals and organizations choose to pay voluntarily for insurance protection. This can include private health insurance, supplemental health insurance, and other forms of insurance that provide coverage for healthcare services beyond those that are publicly funded.

In some countries, where the minimal voluntary insurance expenditure is 0%, this indicates a reliance on publicly funded healthcare systems or limited participation in private insurance schemes. On the other hand, the maximum voluntary insurance spending of 17.2% in another country demonstrates the extent to which individuals and entities may elect for additional insurance coverage to supplement their healthcare requirements.

Understanding the variations in voluntary insurance expenditure is essential for healthcare policymakers and

professionals to devise healthcare financing policies that meet the preferences and needs of populations. It emphasizes the significance of providing a variety of healthcare financing alternatives to ensure equitable access to high-quality healthcare services while taking into account the financial capacity of individuals and organizations.

External Aid

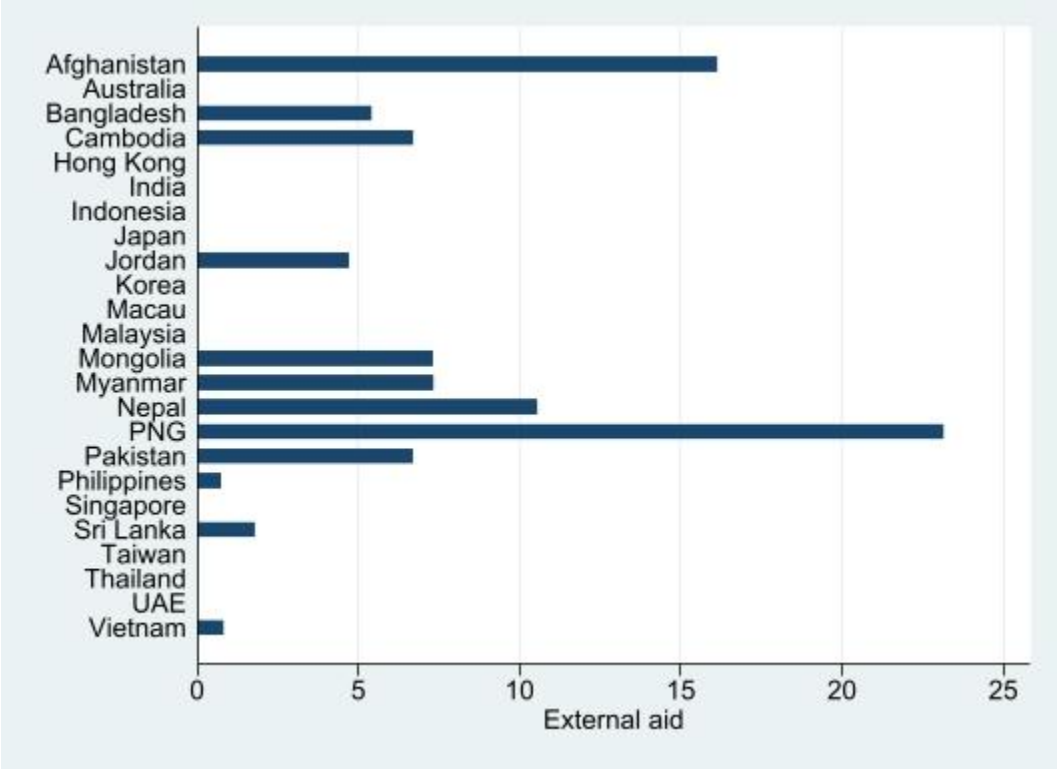


Figure 37. Percentage of External Aid as a Source of Fund for Healthcare Expenditure

Our analysis offers valuable insights into the dynamics of healthcare financing in 23 out of 24 countries from 2017 to 2020. The primary focus of this dataset pertains to the proportions of healthcare expenditure that are financed through foreign aid. These proportions are measured in US dollars (US$), and are adjusted to account for inflation rates. Alternatively, the data may also be presented in the individual national currencies of the countries under consideration.

The average allocation of external help in these 23 countries is around 3.97% of their healthcare spending. Nevertheless, it is crucial to acknowledge the significant variability observed in these expenditure patterns, as evidenced by the standard deviation of 6.02. The variation in external aid expenditure seen can be attributed to disparities in the accessibility of international help, the distinct healthcare requirements of individual countries, and the extent of dependence on foreign support across the countries under examination.

External aid in healthcare funding generally refers to the provision of financial assistance, resources, and expertise by international organizations, donor countries, or non-governmental organizations. This assistance has the potential to play a crucial role in enhancing healthcare systems, effectively addressing health emergencies, and enhancing the availability of vital healthcare services, especially in settings with limited resources.

The absence of external aid expenditure, amounting to 0%, in certain countries may indicate a reduced dependence on international assistance or a greater emphasis on self-sufficiency in healthcare financing. On the other hand, the significant role of foreign aid in supporting healthcare activities and attaining health-related development objectives is highlighted by the largest allocation of 23.15% of external aid spending in a different country.

Comprehending the fluctuations in external aid expenditure holds significant importance for healthcare policymakers, experts, and international stakeholders. This enables the evaluators to analyze the influence of external aid on healthcare results, pinpoint regions that require supplementary assistance, and customize approaches for the

sustainable financing of healthcare. The present research brings attention to the necessity of international cooperation in tackling healthcare obstacles and emphasizes the importance of external assistance in advancing global health and overall welfare.

Other sources

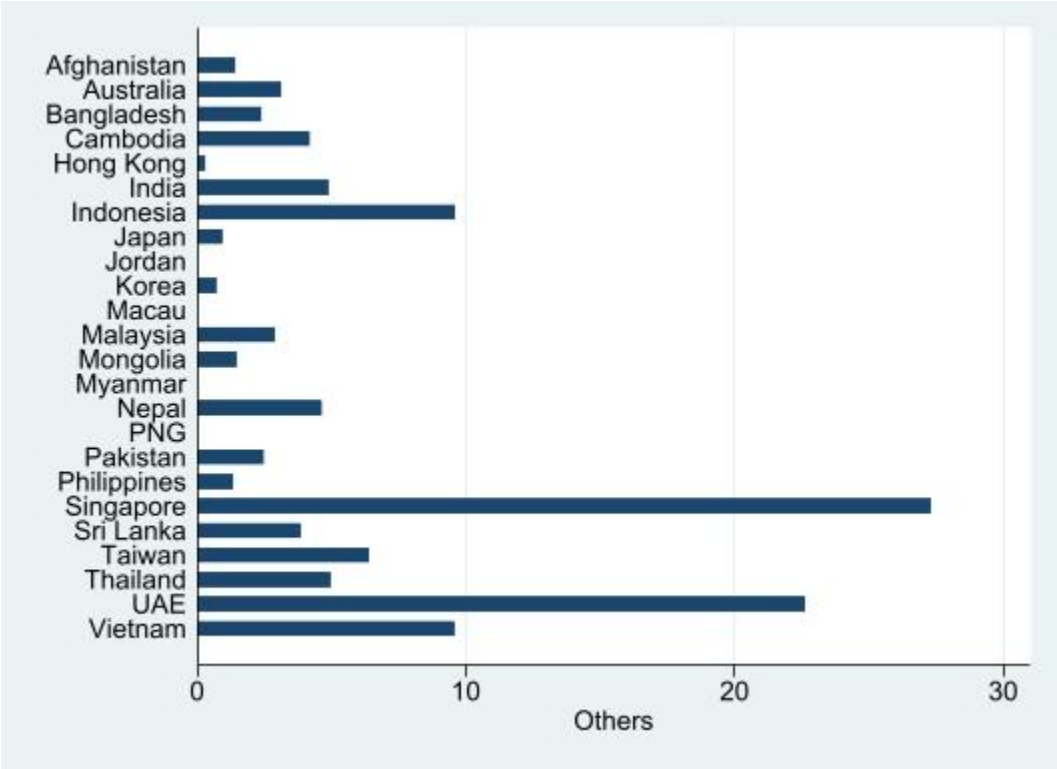


Figure 38. Percentage of Other sources of Fund for Healthcare Expenditure

The dataset spanning the years 2017 to 2020 and covering healthcare financing in 23 of 24 countries casts light on an intriguing aspect of healthcare expenditure. It concentrates specifically on the proportion of healthcare funding derived from sources classified as "others," expressed in US dollars (US$) and adjusted for the respective country's inflation rate, or represented in the country's national currency.

These 23 countries allocate approximately 5% of their healthcare expenditures to "other" funding sources on average. With a standard deviation of 6.90, however, this dataset is notable for its high degree of variability. This broad variety of funding sources labeled as "others" reflects the diverse and multifaceted nature of these countries' healthcare financing strategies.

The term "others" can comprise a variety of funding sources, such as philanthropic donations, community-based financing, non-governmental organizations, and innovative financial mechanisms, when referring to healthcare expenditures. The heterogeneity observed in these other funding sources is a result of the unique socioeconomic and healthcare environments of each country.

In some countries, the minimal allocation of 0% suggests a greater reliance on government funding and established healthcare financing mechanisms. In contrast, the utmost allocation of 27.3% in another country highlights the potential importance of non-traditional funding sources in bolstering healthcare systems and addressing particular healthcare challenges.

Understanding the composition and impact of these "other" funding sources is crucial for policymakers and stakeholders in the healthcare industry. It provides insights into the resilience and adaptability of healthcare financing systems, especially in light of evolving health crises and shifting healthcare landscapes. In addition, it emphasizes the

significance of nurturing diverse funding partnerships and innovative financing models to ensure that everyone has equal access to high-quality healthcare services.

Sub-objective 3G: Presentation of the Key Health Indicators and Outcomes, such as Disease burden, Mortality rates, and Healthcare Utilization

Variable 3G-1: Leading Causes of Mortality

This study investigates the 10 leading causes of mortality in a sample of 24 countries. The data collected for this study encompasses multiple reference years, ranging from 2019 to 2021. Gaining insight into the primary factors contributing to mortality within a specific country is a vital facet of research in the field of public health.

Top leading cause of mortality in all countries

Table 20. Top leading causes of mortality in Asian countries

Causes of Mortality	Frequency (n)	Percentage (%)
Ischemic heart disease	15	62.50
Stroke	4	16.67
Neoplasms	3	12.50
Chronic obstructive pulmonary disease	1	4.17
Neonatal conditions	1	4.17
Total	24	100.0

The data reveals a prevalent pattern, with ischemic heart disease emerging as the most pervasive and significant cause of death.

Ischemic heart disease, a condition marked by restricted blood flow to the heart muscle, stands out as the primary cause of death in the majority of the studied countries. This finding highlights the global impact of cardiovascular health concerns and the urgent need for effective prevention and management strategies to combat this pervasive threat.

In spite of the fact that ischemic heart disease is the leading cause of death in these countries, it is essential to acknowledge the other significant contributors to mortality. Stroke, cancers, chronic obstructive pulmonary disease (COPD), and neonatal conditions are also prevalent in the data. These conditions collectively contribute to the complex landscape of mortality patterns, each demanding its own set of targeted interventions and healthcare resources.

Understanding these primary causes of mortality in the 24 countries provides a crucial foundation for public health efforts and the development of healthcare policies. It enables policymakers, healthcare professionals, and researchers to prioritize resources, implement preventive measures, and tailor healthcare strategies to effectively resolve the unique health challenges prevalent in each country. Our analysis emphasizes the significance of addressing ischemic heart disease and other significant contributors to mortality in order to enhance the global health and well-being of the population as a whole.

Top 10 leading causes of mortality across the countries

Table 21. Top leading causes of mortality in Asian countries

Causes of Mortality	Frequency (n)	Percentage (%)
Ischemic heart disease	21	8.75
Stroke	21	8.75
Lower respiratory infections	20	8.33
Diabetes mellitus	17	7.08
Chronic obstructive pulmonary disease	16	6.67
Neonatal conditions	12	5.00
Road injury	12	5.00
Kidney diseases	11	4.58
Tuberculosis	10	4.17
Cirrhosis of the liver	9	3.75
Total	24	100.0

Our comprehensive analysis of mortality data from 24 countries has revealed the top 10 main causes of death in these countries. These findings provide valuable insight into the critical health challenges faced by populations worldwide.

At the forefront of these causes is ischemic heart disease, which stands as the primary contributor to mortality in a significant fraction of the countries under study. This condition, which is characterized by decreased blood flow to the heart, illustrates the global prevalence of cardiovascular health issues and the need for proactive measures to combat this pervasive threat. Second is stroke, highlighting the significance of confronting cerebrovascular health and stroke prevention strategies on a global scale.

Other notable causes include lower respiratory infections, diabetes mellitus, chronic obstructive pulmonary disease, neonatal conditions, and road injury. Each of these conditions represents a complex health concern that necessitates individualized interventions and healthcare resources.

Our data also emphasizes the global burden of infectious diseases, with Tuberculosis and cirrhosis of the liver, among the 10 leading causes of death. Efforts to combat these conditions continue to be crucial for the protection of public health, highlighting the need for targeted strategies to combat lifestyle-related and infectious disease-related causes of mortality.

It is essential for healthcare policymakers, professionals, and researchers to comprehend the primary causes of mortality in these 24 countries. It enables the allocation of resources, the creation of prevention and treatment strategies, and the formulation of policies that can effectively mitigate the effects of these health challenges. Our analysis illuminates the diverse landscape of global health concerns, highlighting the imperative need for global public health initiatives aimed at reducing mortality and enhancing the well-being of populations worldwide.

Mean mortality rate (Mortality rate/100,000 population) of top 10 causes across all countries

1. **Ischemic Heart Disease**
   The average ischemic heart disease mortality rate across 20 countries is approximately 93.96 per 100,000 persons. This rate signifies the number of fatalities attributable to ischemic heart disease for every 100,000 individuals in the population.

   Nonetheless, it is essential to acknowledge the substantial variation in mortality rates among the countries included in our study. This diversity is highlighted by the standard deviation of 30.73, which demonstrates that some countries have significantly lower mortality rates than others, with a minimum of 42.62 per 100,000 and a maximum of 161.28 per 100,000.

Variations in ischemic heart disease mortality rates reflect differences in healthcare systems, access to medical care, lifestyle factors, and risk factors such as nutrition, exercise, and prevalence of smoking. Understanding these disparities is essential for healthcare policymakers and professionals in order to effectively tailor interventions and allocate resources.

2. **Stroke**

Across 20 countries, the mortality rate due to strokes is approximately 67.08 per 100,000 individuals on average. This quantity represents the number of deaths caused by a stroke per 100,000 people in the population.

It is notable that there is a significant disparity in stroke mortality rates among the countries included in our study. This variation is highlighted by the standard deviation of 36.18, which highlights the fact that some countries have mortality rates as low as 20.45 per 100,000 while others have mortality rates as high as 164.8 per 100,000.

These disparities in stroke mortality rates are influenced by a number of factors, including the availability of high-quality healthcare services, access to prompt medical treatment, lifestyle choices, and the prevalence of risk factors such as hypertension and smoking.

3. **Lower respiratory infections**

In 19 countries, the average mortality rate due to lower respiratory infections is approximately 44.46 per 100,000 individuals. This number represents the number of fatalities attributable to lower respiratory infections per 100,000 population members.

It is essential to recognize that the mortality rates associated with lower respiratory infections vary significantly among the countries included in our study. This variation is highlighted by the standard deviation of 31.53, which demonstrates that some countries have mortality rates as low as 7.22 per 100,000 while others have mortality rates as high as 119.01 per 100,000.

Numerous factors, such as the quality and accessibility of healthcare services, vaccination coverage, air quality, and socioeconomic conditions, can influence these disparities in lower respiratory infection mortality rates. In addition, factors such as access to healthcare facilities and healthcare-seeking behavior can play an important role in determining the outcome of lower respiratory infections.

4. **Diabetes Mellitus**

In 17 countries, the average diabetes-related mortality rate is approximately 25,67 per 100,000 individuals. This rate represents the number of fatalities caused by diabetes per 100,000 people in the population.

It is essential to recognize the substantial variation in diabetes-related mortality rates among the countries included in our study. This diversity is highlighted by the standard deviation of 14.47, which indicates that some countries have mortality rates that are significantly lower than others, with a minimum of 4.08 per 100,000 and a maximum of 58.5 per 100,000.

Various factors, including the prevalence of diabetes within a population, access to healthcare services, early detection, and effective management of the condition, can influence these disparities in diabetes-related mortality rates. These variations are influenced by lifestyle factors such as diet, physical activity, and the availability of healthcare resources.

5. **COPD**

The average COPD-related mortality rate across 15 countries is approximately 39.19 per 100,000 persons. This number represents the number of COPD-related fatalities per 100,000 people in the population recommended.

It is noteworthy that COPD-related mortality rates vary significantly among the countries included in our study. This variation is highlighted by the standard deviation of 21.67, which highlights the fact that some countries have mortality rates as low as 9.33 per 100,000 while others have mortality rates as high as 94.5 per 100,000.

Various factors, including the prevalence of smoking, air quality, access to healthcare services, and the overall burden of respiratory diseases in a population, can influence these disparities in COPD-related mortality rates. Lifestyle choices, such as efforts to quit smoking and air pollution control measures, can have a substantial effect on these variations.

6. **Neonatal conditions**

In 12 countries, the neonatal mortality rate is approximately 53.48 per 1,000 births. This number represents the number of infant fatalities attributable to neonatal conditions per 100,000 births in the population.

It is essential to recognize the substantial variation in neonatal condition-related mortality rates between the countries included in our study. This diversity is highlighted by the standard deviation of 54.70, which highlights the fact that some countries have lower mortality rates, with a minimum of 13.83 per 100,000 and a maximum of 207.09 per 100,000, than others do.

These disparities in neonatal condition-related mortality rates are influenced by a variety of factors, including the quality of prenatal care, access to experienced birth attendants, neonatal intensive care facilities, and socioeconomic circumstances. In addition, factors such as maternal health, nutrition, and access to prenatal healthcare play crucial roles in these differences.

7. **Road Injury**

In eleven countries, the average death rate owing to road injuries is approximately 19,91 per 100,000 people. This number represents the number of fatalities attributable to road injuries per 100,000 population members.

Among the countries included in our study, there is a notable disparity in fatality rates due to road injuries. This variation is highlighted by the standard deviation of 6.73, which demonstrates that some countries have lower mortality rates than others, with a minimum of 8.91 per 100,000 and a maximum of 32.22 per 100,000.

Numerous factors, such as road safety measures, traffic regulations, infrastructure quality, vehicle safety standards, and emergency medical response systems, can influence these disparities in road injury-related mortality rates. In addition, seatbelt use, helmet regulations, and public awareness campaigns play a role in these differences.

8. **Kidney Disease**

In 11 countries, the average mortality rate owing to kidney illnesses is roughly 25.34 per 100,000 persons. This figure represents the number of deaths caused by kidney diseases per 100,000 people in the population.

It is critical to recognize the differences in renal disease-related mortality rates among the countries included in our study. The standard deviation of 9.18 emphasizes this variability, highlighting that some countries have lower death rates, with a minimum of 13.35 per 100,000, while others have higher rates, with a maximum of 38.54 per 100,000.

These inequalities in kidney disease-related mortality rates can be influenced by a variety of factors, such as the incidence of chronic renal disorders, access to healthcare services, early detection and management of kidney disease, and population health generally. Diet, physical activity, and healthcare infrastructure all play important roles in these variances.

9. **Tuberculosis**

Across 10 countries, the mortality rate from tuberculosis is around 36.87 per 100,000 persons. This figure indicates the number of tuberculosis-related deaths per 100,000 people in the population.

It is critical to recognize that the TB-related mortality rates in the countries covered in our analysis vary significantly. The standard deviation of 18.19 emphasizes this diversity, indicating that some countries have lower death rates, with a minimum of 17.37 per 100,000, while others have higher rates, with a maximum of 67.65 per 100,000.

Disparities in TB-related death rates can be influenced by a variety of factors, including TB prevalence in a population, access to healthcare facilities, early detection, and efficient treatment of TB cases. Furthermore, socioeconomic factors, vaccination coverage, and public health infrastructure all play important roles in these variances.

10. **Cirrhosis of the liver**

The mortality rate attributable to cirrhosis of the liver averages approximately 8.57 per 100,000 individuals in the nine countries. This quantity represents the number of cirrhosis-related deaths per 100,000 people in the population.

It is essential to recognize that cirrhosis-related mortality rates vary across the countries included in our study. This variation is highlighted by the standard deviation of 14.21, which highlights the fact that some countries have lower mortality rates than others, with a minimum of 12.9 per 100,000 and a maximum of 53.41 per 100,000.

These disparities in cirrhosis-related mortality rates are influenced by a number of variables, including alcohol consumption patterns, the prevalence of viral hepatitis, access to healthcare services, and the overall burden of liver diseases in a population. Lifestyle decisions, such as alcohol consumption and healthcare infrastructure, play crucial roles in these differences.

The analysis conducted underscores the ongoing need of addressing the top 10 main causes of mortality as a critical global health concern. To achieve significant advancements, it is crucial to develop customized therapies and implement healthcare interventions that are specifically designed to reduce mortality rates associated with these factors. By undertaking these actions, we can initiate a trajectory towards enhancing the general health and well-being of inhabitants throughout these countries, thereby promoting a state of improved health and prosperity.

Variable 3G-2: Leading Causes of Morbidity

This comprehensive study delves into the 10 primary causes of morbidity across a diverse sample of 24 countries. The dataset for this investigation spans multiple reference years, encompassing data from 2017 to 2019. To quantify the impact, we measure these causes in terms of Disability-Adjusted Life Years (DALY) per 100,000 population, offering a comprehensive perspective on the health challenges faced by these countries.

Top leading cause of morbidity in all countries

Table 22. Top leading causes of morbidity in Asian countries

Causes of Morbidity	Frequency	Percentage (%)
Neonatal conditions	8	33.33
Ischemic heart disease	6	25.00
Stroke	6	25.00
Liver cancer	2	8.33
Diabetes mellitus	1	4.17

Road injury	1	4.17
Total	24	100.0

Neonatal conditions emerge as the primary main cause of morbidity across the spectrum of 24 countries studied. This significant finding indicates that the health challenges associated with neonates and infants hold a prominent position in the overall burden of disease in these countries.

Neonatal conditions are followed by ischemic heart disease and stroke, both of which are significant contributors to the overall landscape of morbidity. This indicates that cardiovascular health remains a major concern in these countries, highlighting the need for effective prevention and management strategies.

In addition, liver cancer, diabetes mellitus, and road injuries comprise the remaining causes of morbidity, each of which contributes to the complex health challenges encountered by these populations.

Realizing that neonatal conditions are at the top of the list emphasizes the significance of maternal and child healthcare, early interventions, and healthcare infrastructure to comprehensively address these health issues. It also highlights the continuing need for public health initiatives and policies that focus on the prevention and management of neonatal conditions to enhance the health and well-being of populations in these countries.

Top 10 leading causes of morbidity across the countries

Table 23. Top leading causes of morbidity in Asian countries

Causes of Morbidity	Frequency	Percentage (%)
Stroke	23	9.58
Ischemic heart disease	22	9.17
Lower respiratory infections	19	7.92
Diabetes mellitus	17	7.08
Chronic obstructive pulmonary disease	16	6.67
Neonatal conditions	16	6.67
Road injury	14	5.83
Back and neck pain	10	4.17
Tuberculosis	10	4.17
Congenital anomalies	7	2.92
Diarrheal diseases	7	2.92
Liver cancer	7	2.92
Total	24	100.0

Our analysis provides insight into the ten primary causes of morbidity, uncovering a multifaceted list of health issues among the countries under study. These causes are indicative of the fundamental factors that make a substantial contribution to the prevalence of illness in these communities.

Stroke and ischemic heart disease have been identified as the predominant causes of illness, highlighting the crucial significance of prioritizing cardiovascular health as a fundamental concern in public health. Lower respiratory infections, diabetes mellitus, and chronic obstructive pulmonary disease are intimately associated, highlighting the complex nature of health issues prevalent in these countries.

Furthermore, it is worth noting that neonatal illnesses and road injuries play a significant role in the overall morbidity landscape. This underscores the crucial significance of mother and child healthcare, as well as road safety measures in preserving public health.

The list of top causes of morbidity includes back and neck discomfort, tuberculosis, congenital defects, and diarrheal disorders. Each of these health concerns presents distinct requirements for healthcare systems and emphasizes the necessity for focused interventions and healthcare policy.

It is crucial for healthcare authorities and specialists to comprehend the precise factors contributing to morbidity in these countries, as they endeavor to formulate measures geared at mitigating the impact of these illnesses. Enhancing the general health and well-being of populations in these countries necessitates the implementation of public health initiatives, preventive measures, timely identification, and efficient management.

The analysis presented emphasizes the continued significance of tackling these primary causes of morbidity in order to foster a healthier and more resilient future for all individuals.

DALY of the Top 10 leading cause of morbidity

1. **Stroke**
   The average number of disability-adjusted life years attributed to stroke is roughly 1778.41 per 100,000 individuals in a sample of 23 countries. This data illustrates the substantial impact that stroke has on the field of public health, taking into account both the death and disability resulting from this ailment.

   It is important to highlight that there exists a significant degree of variation in disability-adjusted life years associated with stroke across the countries that were examined in our study. The variation in burden among countries is emphasized by the standard deviation of 923.76. This statistic reveals that certain countries have a lower burden, with a minimum of 666.82 DALYs per 100,000, while others face a higher burden, reaching a maximum of 3939.85 DALYs per 100,000.

   The disparities in disability-adjusted life years associated with strokes can be impacted by a range of factors, encompassing access to healthcare, the standard of care provided, risk factors, such as hypertension and smoking, as well as public health interventions targeting stroke prevention and treatment.

2. **Ischemic heart disease**
   Ischemic heart disease, on average, contributes to an estimated 2010.60 disability-adjusted life years per 100,000 population in a sample of 22 countries. This figure illustrates the significant impact that this disorder imposed on public health, considering both the mortality rate and the resulting disability.

   It is imperative to acknowledge that there exists significant diversity in the disability-adjusted life years associated with ischemic heart disease across the countries encompassed in our analysis. The variability in burden among countries is highlighted by the standard deviation of 784.03. This statistic underlines the fact that certain countries have a lesser burden, with a minimum of 825.06 DALYs per 100,000, while others have a higher burden, reaching a maximum of 3935.16 DALYs per 100,000.

   The fluctuations in disability-adjusted life years associated with ischemic heart disease can be impacted by various factors, encompassing healthcare accessibility, care quality, lifestyle elements, such as dietary patterns and physical activity, and the prevalence of risk factors such as hypertension and obesity. Efforts in public health aimed at preventing ischemic heart disease, intervening at an early stage, enhancing accessibility to cardiovascular care, and promoting lifestyle modifications have a crucial role in mitigating the impact associated with this particular health problem.

3. **Lower respiratory infections**
   Lower respiratory infections, on average, contribute to a burden of around 1336.34 Disability-Adjusted Life Years per 100,000 individuals in a sample of 17 countries. This graphic highlights the significant impact that

lower respiratory infections have on public health, taking into account both the mortality and disability elements of the disease.

It is imperative to acknowledge that there exists significant diversity in the burden of lower respiratory infections, as measured by disability-adjusted life years, between the countries encompassed within our analysis. The diversity is highlighted by the standard deviation of 665.21, which indicates that certain countries have a lesser burden, with a minimum of 736.16 DALYs per 100,000, while others have a higher burden, reaching a maximum of 2711.76 DALYs per 100,000.

The disparities in disability-adjusted life years associated with lower respiratory infections can be impacted by a range of factors, encompassing healthcare accessibility, care standards, immunization rates, atmospheric conditions, and the prevalence of risk factors such as tobacco use and indoor air pollution exposure.

4. **Diabetes mellitus**

The average impact of diabetes mellitus on the burden of disease, as measured by Disability-Adjusted Life Years, is estimated to be roughly 1156.72 per 100,000 population across a sample of 17 countries. This graphic highlights the significant impact that diabetes has on public health, encompassing both the mortality and disability dimensions associated with the disease.

It is imperative to recognize that there exists significant diversity in the disability-adjusted life years associated with diabetes across the countries encompassed in our analysis. The diversity is underscored by the standard deviation of 469.8, which reveals variations in the burden experienced by different countries. The smallest burden seen is 671.9 DALYs per 100,000, while the maximum burden reaches 2241.3 DALYs per 100,000.

The fluctuations in disability-adjusted life years associated with diabetes can be impacted by various factors, such as the availability and effectiveness of healthcare services, lifestyle choices, such as dietary habits and levels of physical activity, timely identification and treatment, and public health interventions aimed at preventing and managing diabetes.

5. **Chronic obstructive pulmonary disease (COPD)**

On average, Chronic Obstructive Pulmonary Disease is responsible for a mean of 1089.19 Disability-Adjusted Life Years per 100,000 individuals in a sample of 14 countries. This number underscores the substantial impact that COPD imposes on public health, encompassing both the mortality and disability dimensions of the disease.

It is imperative to acknowledge that there exists significant diversity in the disability-adjusted life years associated with chronic obstructive pulmonary disease between the countries encompassed within our analysis. The diversity is highlighted by the standard deviation of 417.46, which indicates that certain countries have a lower burden, with a minimum of 571.55 DALYs per 100,000, while others face a higher burden, reaching a maximum of 2082.12 DALYs per 100,000.

The fluctuations in disability-adjusted life years associated with chronic obstructive pulmonary disease can be impacted by a range of factors, such as access to healthcare, the standard of care provided, the quality of air, the prevalence of smoking, and exposure to occupational hazards.

6. **Neonatal conditions**

The average burden of newborn illnesses is estimated to be 2897.04 DALYs per 100,000 population in the selected countries. This data underscores the significant impact that neonatal conditions impose on public health, encompassing both the mortality and disability dimensions associated with these diseases.

It is imperative to acknowledge that there exists substantial variation in disability-adjusted life years associated with newborn conditions across the countries encompassed in our analysis. The variation in

burden among countries is shown by the standard deviation of 2387.37, which reveals that certain countries have a lower burden, with a minimum of 535.78 DALYs per 100,000, while others face a higher burden, reaching a maximum of 8847.93 DALYs per 100,000.

The disparities in neonatal condition-related disability-adjusted life years can be impacted by a range of factors, such as the availability of maternal and neonatal healthcare services, prenatal care, the quality of healthcare infrastructure, and socioeconomic circumstances.

7. **Road injury**

Road injuries, on average, result in a contribution of around 1108.24 Disability-Adjusted Life Years per 100,000 population in a sample of 14 countries. This chart highlights the substantial impact that road accidents have on public health, taking into account the death and disability implications linked with these occurrences.

It is imperative to recognize that there exists considerable heterogeneity in the number of disability-adjusted life years associated with road injuries between the countries encompassed in our analysis. The variability in burden between countries is shown by the standard deviation of 294.05, which indicates that certain countries have a lower burden, with a minimum of 626.38 DALYs per 100,000, while others face a higher burden, reaching a maximum of 1741.51 DALYs per 100,000.

The fluctuations in disability-adjusted life years associated with road injuries can be impacted by a range of factors, such as the implementation of road safety measures, the enforcement of traffic regulations, the availability of emergency medical care, and the prevailing socioeconomic conditions.

8. **Back and neck pain**

Across the countries included in the study, it has been observed that the presence of back and neck discomfort contributes to an average of 735.86 Disability-Adjusted Life Years per 100,000 individuals in the population. This chart underscores the significant impact that musculoskeletal diseases have on public health, taking into account both the mortality and disability implications connected with these conditions.

It is imperative to acknowledge the presence of variety in the disability-adjusted life years associated with back and neck pain across the countries encompassed within our analysis. The variation in burden among countries is highlighted by the standard deviation of 147.29, which indicates that certain countries have a lower burden, with a minimum of 503.23 DALYs per 100,000, while others face a higher burden, reaching a maximum of 1068.88 DALYs per 100,000.

The fluctuations in disability-adjusted life years associated with back and neck discomfort can be impacted by various determinants, such as healthcare accessibility, the prevalence of risk factors, occupational perils, and lifestyle-related issues.

9. **Tuberculosis (TB)**

The average burden of tuberculosis is estimated to be roughly 1704.56 Disability-Adjusted Life Years per 100,000 individuals in a sample of 10 countries. This statistic highlights the substantial impact that TB has on public health, taking into account both the mortality and disability implications associated with the illness.

It is imperative to recognize that there exists significant diversity in the burden of tuberculosis-related disability-adjusted life years between the countries encompassed within our analysis. The variability in burden among countries is shown by the standard deviation of 589.50. This indicates that certain countries have a lower burden, with a minimum of 1004.71 DALYs per 100,000, while others face a higher burden, reaching a maximum of 2870.52 DALYs per 100,000.

The fluctuations in disability-adjusted life years associated with TB can be impacted by various factors, including the quality of healthcare infrastructure, availability of diagnostic tools and treatment options,

prevalence of different strains of TB, and the implementation of public health interventions aimed at controlling and preventing TB.

10. **Diarrheal diseases**

    Diarrheal diseases, on average, result in a contribution of roughly 1364.47 Disability-Adjusted Life Years per 100,000 population across a sample of eight countries. This statistic highlights the substantial impact that diarrheal diseases have on public health, taking into account both the mortality and disability implications they entail.

    It is imperative to recognize that there is significant diversity in the burden of diarrheal diseases, as measured by disability-adjusted life years, between the countries encompassed in our analysis. The variation in burden among countries is highlighted by the standard deviation of 628.51. This statistic demonstrates that certain countries have a lesser burden, with a minimum of 769.82 DALYs per 100,000, while others face a higher burden, reaching a maximum of 2654.8 DALYs per 100,000.

    The fluctuations in disability-adjusted life years associated with diarrheal diseases can be impacted by a range of factors, including the availability of clean water and sanitation, the quality of healthcare infrastructure, the implementation of public health initiatives, and the prevailing socioeconomic conditions.

It is imperative for healthcare policymakers and experts to comprehend the substantial influence of morbidity-associated disability-adjusted life years to formulate effective methods for alleviating this burden. Efforts in the field of public health that focus on prevention, control of risk factors, timely provision of medical care, and rehabilitation services play a crucial role in decreasing both the rates of death and the levels of impairment associated with various health conditions.

Variable 3G-3: Life Expectancy at Birth per Sex (Years)

When considering the combined data for both males and females, the average life expectancy at birth across the entire sample was approximately 75.04 years, with a standard error of approximately 1.07. The graph below visually illustrates the breakdown of the overall mean life expectancy across all 24 countries for both males and females.

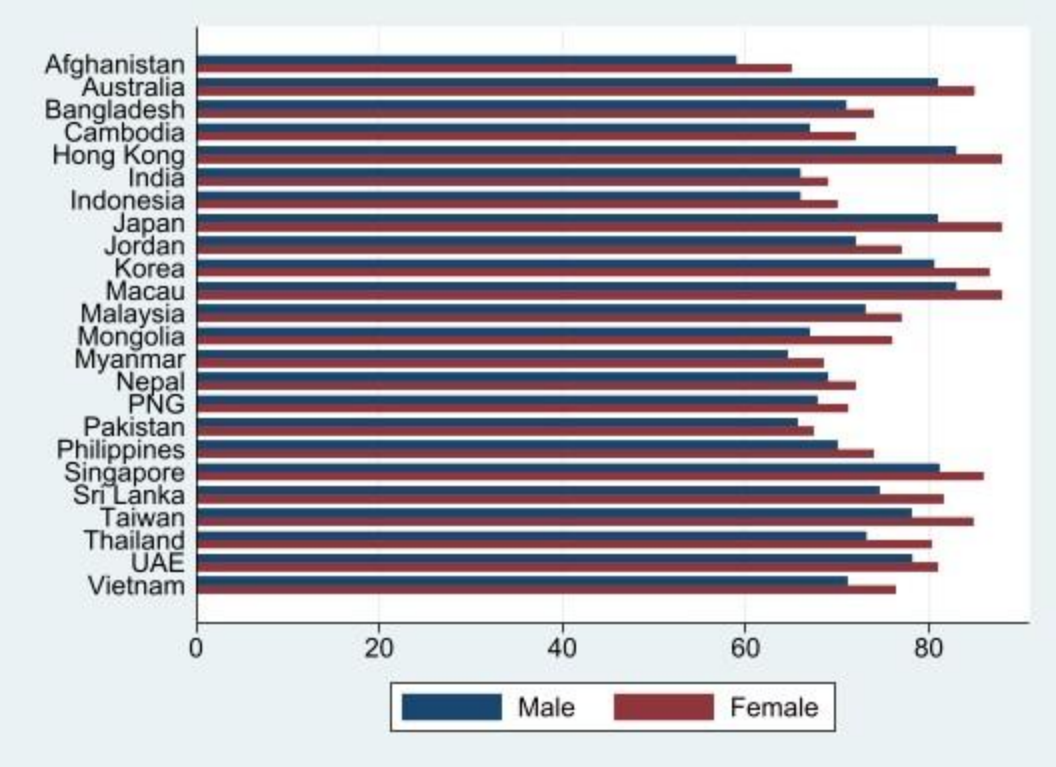


Figure 28. Life Expectancy at Birth per Sex (Years)

Life expectancy at birth for male

Male life expectancy varies significantly across the 24 countries when examining data on life expectancy at birth. The dataset contains observations from these countries, and the analysis reveals the following statistically significant findings:

Male Mean Life Expectancy: The average male life expectancy in these countries is approximately 72.63 years.

Deviation from the Standard: The standard deviation, which measures deviation from the norm, is roughly 6.77 years. This indicates that there is a moderate degree of variation in male life expectancy amongst the member lexicon.

Minimum Expected Lifespan: The lowest recorded male life expectancy among these countries is 59 years, a significant deviation from the average.

Maximum Life Expectancy: On the opposite extreme of the spectrum, the highest life expectancy for males in these countries is 83 years, indicating that certain FAPA countries have achieved remarkable life expectancy rates.

Overall, this data set illustrates the variation in male life expectancy at birth across countries, with some of them exceeding the global average and others facing challenges. Insights into the region's public health and social well-being could be gleaned from a deeper examination and analysis of the factors influencing these disparities.

Life expectancy at birth for Female

The data for females in the 24 countries reveals a significantly higher life expectancy at birth than for males.

Female Mean Life Expectancy: The average female life expectancy in these countries is approximately 77.45 years. This is substantially longer than the average male life expectancy, which was approximately 72.63 years.

Deviation from the Standard: The female life expectancy standard deviation is approximately 7.30 years. This suggests that there is a moderate degree of variation among the countries and territories of FAPA member associations, although it is slightly higher than what was observed for males.

Minimum Expected Lifespan: The lowest recorded female life expectancy among these countries is 65 years. Despite the fact that this is significantly higher than the minimal life expectancy for males (59 years), it indicates that life expectancy varies.

Maximum Life Expectancy: The greatest female life expectancy in these countries is 88 years. This is significantly greater than the maximum for males (83 years), suggesting that some countries have attained even greater longevity among their female populations.

The data indicates that, on average, females have a significantly longer life expectancy than males. Although there is some variation within these countries, the aggregate trend indicates that women tend to live longer than men. Understanding the factors, such as healthcare access and socioeconomic conditions, that contribute to these disparities could be an important area of research for regional public health policymakers.

The statistical analysis indicates that there is a statistically significant difference in life expectancy at birth between males and females in the sample of 24 countries. The p-values indicate that this disparity in life expectancy is unlikely to be due to random chance alone; therefore, further investigation may be required to determine the factors contributing to this disparity.

Variable 3G-4: Total Adult Mortality Rate per Sex

The Total Adult Mortality Rate per Sex refers to the probability of dying between the ages of 15 and 60 years (per 1 000 population) per year among a hypothetical cohort of 100 000 people that would experience the age-specific mortality rate of the reporting year. The statistics from three of the 24 countries and territories of FAPA member associations: Hong Kong, Macau, and Taiwan could not be obtained as these were not publicly available.

When considering the combined data for both males and females, the average total adult mortality rate across the entire sample was approximately 139.57 per 1,000 individuals.

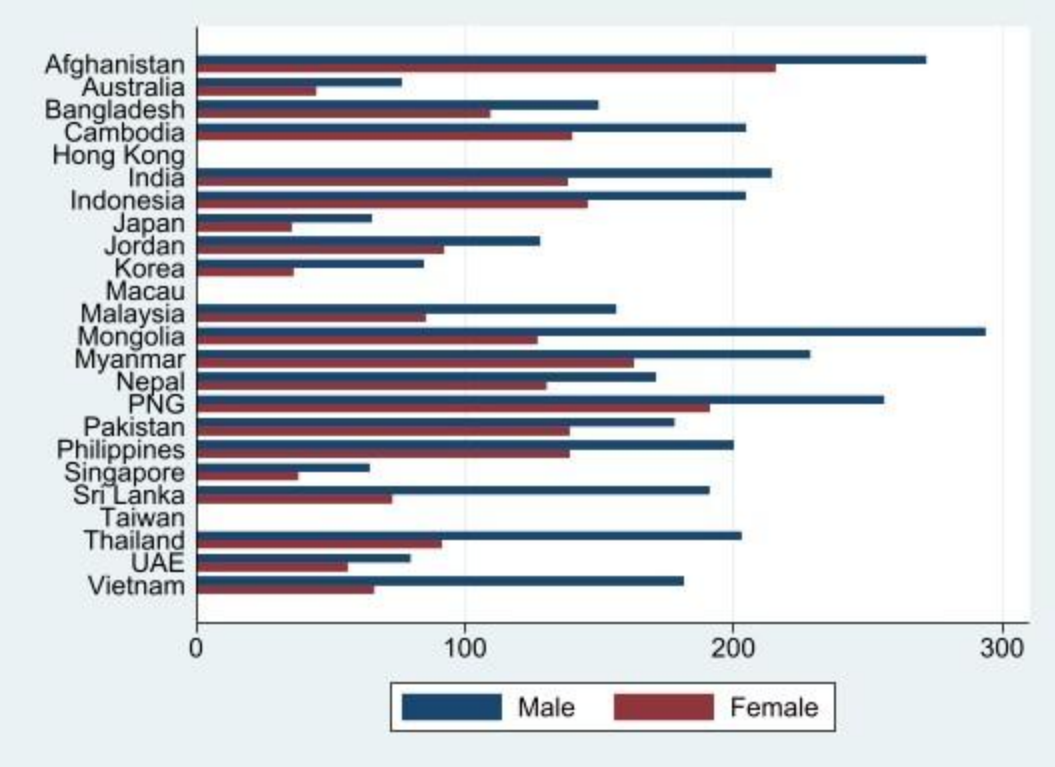


Figure 29. Total Adult Mortality rate per Sex

The results obtained from the analysis provide significant insights on the total adult mortality rate per sex in 21 out of the total 24 countries examined. The provided statistics offer insights into the mortality patterns seen among males and females in the chosen countries.

Male mortality rate

The mean Total Adult Mortality Rate for males in the sample of 21 nations is roughly 171.60 per 1,000 inhabitants. The data exhibits a certain degree of variability, as evidenced by the lowest recorded rate of 64.55 per 1,000 individuals and the highest recorded rate of 293.6 per 1,000 individuals. The observed variation in male mortality rates among different nations highlights the heterogeneity in this aspect, which can be attributed to a range of reasons including disparities in healthcare infrastructure, lifestyle choices, and socioeconomic circumstances.

Female mortality rate

In contrast, the average Total Adult Mortality Rate for females in the aforementioned group of 21 nations is roughly 107.54 per 1,000 inhabitants. In a manner akin to the data pertaining to males, there exists a degree of variability across nations, with the minimum recorded rate standing at 35.61 per 1,000 inhabitants, while the maximum reaches 215.6 per 1,000 individuals. The observed discrepancy highlights the disparities in death rates among females, hence emphasizing the significance of investigating the causes that contribute to these discrepancies.

The statistical analysis reveals that there is a statistically significant difference in the Total Adult Mortality Rate per Sex between males and females in the sample of 21 nations based on these findings. The p-values indicate that the discrepancy is unlikely to be due to random chance alone, and more research may be needed to understand the reasons contributing to the observed differential in death rates.

The aforementioned findings underscore the importance of comprehending mortality patterns within the context of public health and demographic research. The aforementioned statement emphasizes the necessity of implementing focused interventions and policy measures with the objective of diminishing death rates and enhancing the general health of the population, particularly in nations characterized by elevated mortality rates. Additional examination of the variables that contribute to these discrepancies could provide significant perspectives for policymakers and academics in the realm of global health.

Variable 3G-5: Health Literacy Rate

Health Literacy Rate refers to the extent to which individuals can locate, comprehend, and use health-related information and services to make decisions and take actions for themselves and others. In our analysis of health literacy rates, we examined data for both men and women in a number of nations. While data on male health literacy was available for India, Japan, Vietnam, Indonesia, Malaysia, and Australia, data on female health literacy was available for these nations as well as Afghanistan. Importantly, the data encompasses multiple years, from 2006 to 2022, reflecting differences in data collection across these countries.

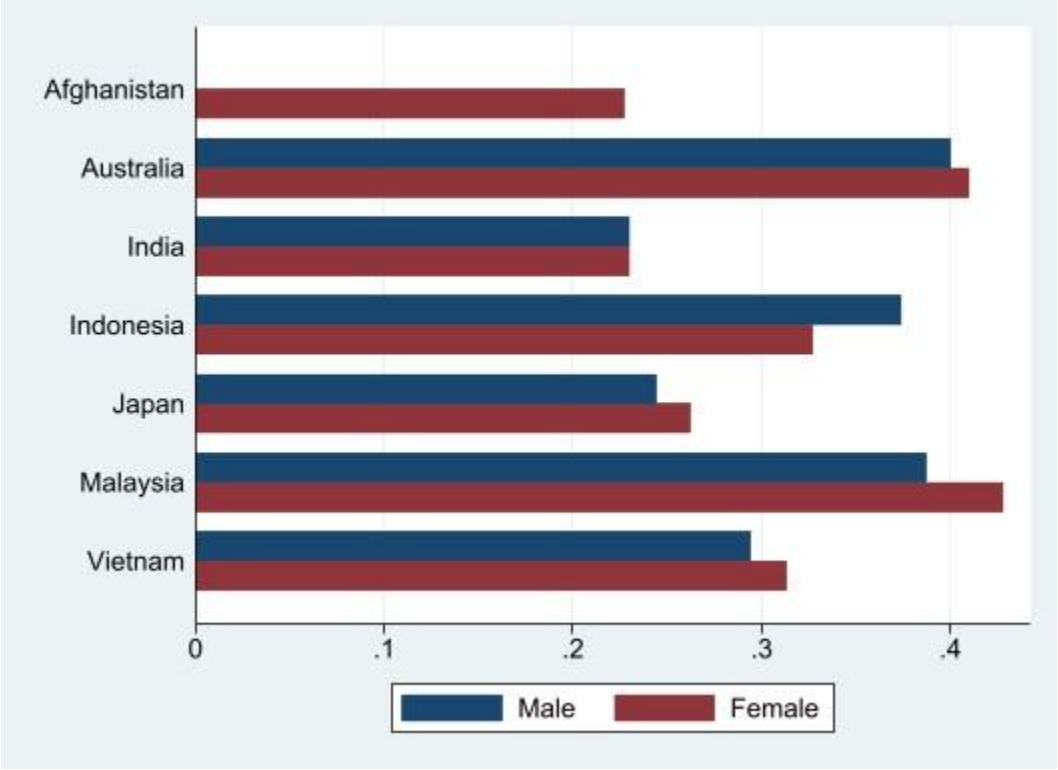


Figure 30. Total Adult Mortality rate per Sex

Male Health Literacy

Our analysis indicates that the average health literacy rate for men is approximately 32.15% This value reflects the average level of health literacy among men in the selected countries. The standard deviation of 0.0752908 indicates that there is some variation among these nations, with health literacy levels ranging from 23% to 40%

Female Health Literacy

On the other hand, the data reveals an average rate of 31.39% for female health literacy. As with the male data, there is variation among these countries, in terms of female health literacy levels, which range from 22.7% to 42.7%

We conducted a two-sample t-test to determine whether there is a statistically significant difference between male and female health literacy rates. The results of the t-test indicate that the mean difference in health literacy between men and women is 0.0076429, with a p-value of 0.5677. This p-value indicates that there is no statistically significant difference between the health literacy rates of men and women in these nations.

These results suggest that, on average, male and female health literacy rates are quite comparable in the selected countries, and that there is little evidence to support a significant gender-based disparity in health literacy. However, it is essential to recognize that health literacy is a complex and multifaceted concept influenced by numerous factors such as education, culture, and accessibility to healthcare. It may be necessary to conduct additional research and analysis to comprehend the nuances and potential contributors to health literacy rates in these nations**.**

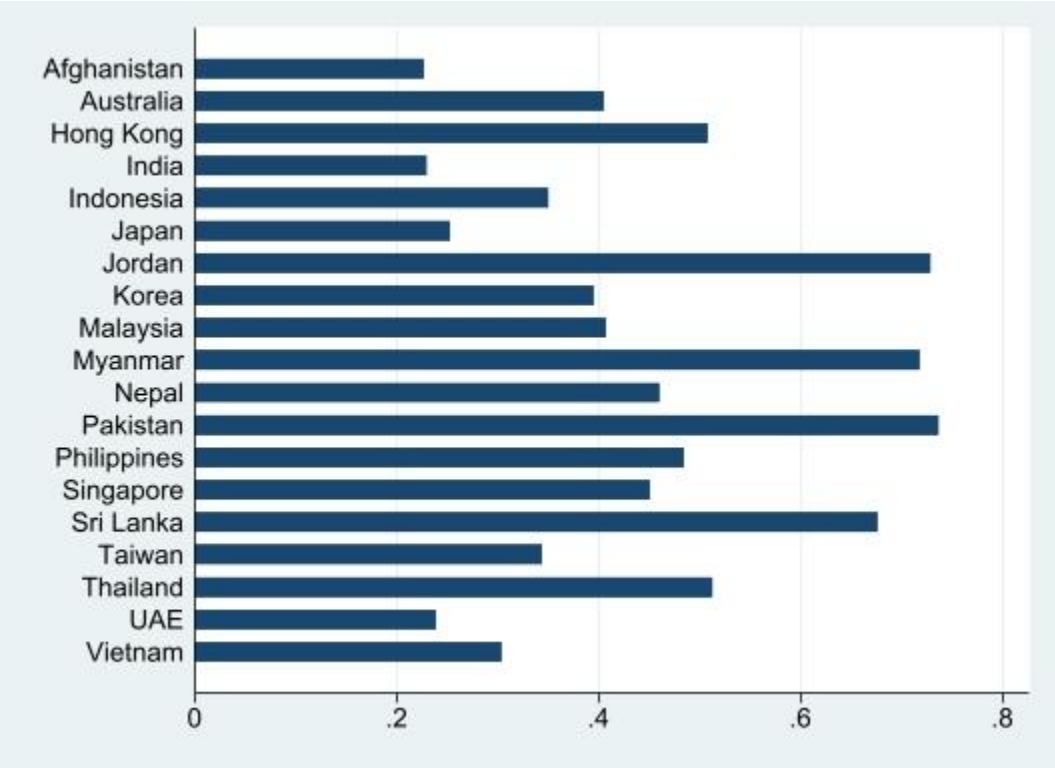


Figure 30. Total Health Literacy across Asian countries

Combined health literacy data (no subgroup analysis based on sex)

The analysis examines health literacy data from 19 out of the 24 countries originally considered. Throughout the course of our research, we have accumulated data spanning the years 2006 to 2022, providing a valuable snapshot of health literacy across a variety of population groups and geographies. The study includes Afghanistan, Australia, Hong Kong, India, Indonesia, Japan, Jordan, Korea, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, the UAE, and Vietnam. These nations offer a complex tapestry of cultural, economic, and healthcare contexts.

The data has disclosed an average health literacy level of approximately 44.37% across these 19 countries. This value represents the mean composite health literacy score across all population categories studied. The standard

deviation of 0.1702793 demonstrates a degree of variation in health literacy levels, emphasizing that some countries have higher health literacy rates (approaching 73.7%) while others have lower levels (as low as 22.7%).

Sub-objective 3H: Description of the Strengths, Challenges, and Potential Areas for Improvement

Variable 3H-1: Status of or Perceptions towards Pharmacists

Common Trends

Positive Perception of Pharmacists: In many countries such as Australia, Bangladesh, India, Jordan, Malaysia, Nepal, Pakistan, and Sri Lanka, there is a positive perception of pharmacists. They are generally viewed as knowledgeable healthcare professionals.

Role Expansion: Several countries, including Australia, India, Indonesia, and Singapore, expect the role of pharmacists to grow beyond traditional dispensing. There is support for pharmacists providing additional services, such as education and counseling.

Barriers and Challenges: Barriers to the expanded role of pharmacists are commonly mentioned. These barriers often include cultural attitudes, medical culture, and resistance to change, as seen in Australia, Bangladesh, and Japan.

Mixed Support for Extended Services: While there is often support for pharmacists providing additional services, the level of support can vary. For example, in Hong Kong, there is limited support for pharmacist-led self-care programs.

Analyzing the data on the status of or perceptions towards pharmacists in 24 countries reveals a diverse range of attitudes and views. Here are the key patterns and trends:

Australia
- General practice pharmacists are highly accepted.
- Barriers include medical culture and attitudes.)

Bangladesh
- Physicians are comfortable with most pharmacist roles.
- There are concerns about pharmacists changing prescriptions.

Cambodia
- Hospital pharmacists engage in patient safety.
- Patients self-prescribe due to distrust in healthcare.

Hong Kong
- Pharmacists are not seen as health advisors.
- There is limited support for pharmacist-led self-care programs.

India
- Pharmacist roles are expected to grow.
- There is a positive perception for pharmacists among patients.

Indonesia
- Patients go to pharmacies for education.
- There is support for pharmacists providing additional services.
- There are concerns about pharmacist competence.

Japan
- There is poor perception of new pharmacist roles among nurses and doctors.

Jordan
- There is a positive perception of pharmacists during COVID-19.
- Dispensing is seen as a key role.

Korea

Macau
- There are discrepancies in

Malaysia

Nepal
- Patients have a positive perception

- Trust in pharmacists' behavior is not yet satisfactory.
- Patients have less favorable views of counseling services.

expectations between physicians and pharmacists.
- There are opportunities and challenges for pharmacists in a new environment.

- Pharmacists have a high professional image and recognition.
- There is support for weight management services.
- There is positive awareness during COVID-19.

towards hospital pharmacists.
- Patients are highly satisfied with pharmacy services.

Pakistan
- There is a positive perception of pharmacists among physicians.
- There are positive attitudes and expectations among the general public.

Philippines
- Public primarily views pharmacists as drug sellers.
- There is awareness of the roles of pharmacists but limited knowledge of extended health services.

Singapore
- Patients are satisfied with pharmacist-managed diabetes services.
- There is support for compounding services.
- General practitioners appreciate existing roles.

Sri Lanka
- There is a positive perception among doctors and patients.
- There is a gap between expectations and current service levels.

Taiwan
- Consumer perceptions of community pharmacists are not strongly favorable.
- Some level of trust and satisfaction with services.

United Arab Emirates
- Physicians are receptive to the expanding role of community pharmacists.
- There are mixed comfort levels with direct patient care.
- Public perception varies.

Vietnam
- Elderly consumers are satisfied with accessibility and affordability.
- There is dissatisfaction with pharmacy staff counseling.

In summary, the data reveals that perceptions towards pharmacists vary widely across countries. While some countries have a positive view of pharmacists and their roles, others face challenges in changing perceptions and integrating pharmacists into healthcare systems. There is also a notable need for improved communication and education about the evolving roles of pharmacists in many regions. These trends highlight the importance of addressing cultural and educational factors to enhance the status and perception of pharmacists in healthcare systems globally.

Variable 3H-2: Current Issues in the Practice of Pharmacy

Several patterns and trends emerge in the pharmacy and healthcare sectors of these diverse nations after analyzing data from 24 countries. Let's examine these tendencies and patterns narratively:

Disparities in Global Pharmaceutical Infrastructure: The substantial variation in pharmaceutical infrastructure and regulations between countries is a common theme throughout the dataset. Afghanistan is a prime example of a country with severely limited healthcare infrastructure, including pharmaceutical manufacturing. From Good Distribution Practices (GDP) to Adverse Drug Reaction (ADR) reporting, this situation has led to the absence of national guidelines and regulations for pharmaceutical practices. Similarly, many other nations, including Cambodia and Papua New Guinea, struggle to ensure the integrity and regulation of pharmaceutical goods and services.

Difficulties in Accessibility and Supply Chain Management: Several nations, including Afghanistan and Cambodia, struggle to maintain a consistent and reliable supply of medications, as evidenced by the data set. This difficulty is exacerbated by erratic supply, lack of regulation, and dependence on neighboring nations. Due to porous borders and a lack of stringent policies, illicit drug importation has become widespread in some instances.

Variations in the Role of Pharmacists in the Delivery of Healthcare: The function of pharmacists in healthcare varies significantly between nations. While countries such as Australia and India seek to expand the scope of pharmacy practice, others struggle to integrate pharmacists into healthcare teams due to a variety of obstacles. In Bangladesh, for example, pharmacists are viewed as untrained personnel, whereas in some nations, such as Nepal, pharmacists have yet to completely transition into direct patient care roles.

Difficulties in Pharmacy Education and the Workforce: The dataset also highlights challenges associated with pharmacy workforce and education. Many nations, including Jordan and Indonesia, struggle to provide pharmacists with adequate training and development opportunities. In some instances, pharmacists are enticed away by higher-paying positions in pharmaceutical marketing or international organizations, thereby exacerbating labor shortages.

Technological and Regulatory Shortcomings: Countries such as Australia face obstacles when instituting sophisticated electronic patient record systems. The absence of standardized residency training programs for pharmacy graduates in the hospital sector is another example of technological and regulatory deficiencies in the healthcare systems of certain nations.

Patient and Community Perception: Public perception of pharmacists is highly variable. While some nations, such as Malaysia, have a positive professional perception of pharmacists, others, such as the Philippines, continue to view them primarily as medication vendors as opposed to healthcare advisors. These perceptions frequently limit pharmacists' ability to provide direct patient care.

Resources and infrastructure in short supply: Constraints on resources and inadequate infrastructure are prevalent obstacles across the dataset. Countries with rural areas deficient in quality healthcare, such as Cambodia, have difficulty providing essential healthcare services. Similarly, Myanmar and Nepal struggle with insufficient infrastructure, training facilities, and human resources for effective pharmaceutical training and practice.

In conclusion, the data from these 24 countries disclose a complex global healthcare and pharmacy landscape. While some nations are making efforts to expand the function of pharmacists and improve the infrastructure of the pharmaceutical industry, others face significant obstacles relating to access, regulation, and workforce development. It is essential to address these disparities and obstacles in order to ensure equitable and effective healthcare delivery worldwide.

Variable 3H-3: Perceived Strengths of Pharmacists

To provide a more comprehensive analysis, we estimated the frequency and percentage of each perceived strength of pharmacists across the 24 countries based on the provided information:

1. **Variation in Public Perception:**
   - High Recognition and Trust (Australia, Hong Kong, Malaysia, Singapore) - 4 countries (17%)
   - Commercialized Perception (Afghanistan, India, Japan) - 3 countries (13%)

   The perception of pharmacists varies widely among countries. In some countries like Australia, Hong Kong, Malaysia, and Singapore, pharmacists enjoy a high level of professional recognition and trust from the public. This recognition extends to services beyond traditional dispensing, such as vaccination and medication management.

In contrast, in countries like Afghanistan, India, and Japan, pharmacists face challenges in being recognized as healthcare professionals rather than shopkeepers. These countries may have commercialized perceptions of pharmacists.

2. **Role Expansion and Integration:**
   - Expanding Roles in Healthcare (Australia, Cambodia, Jordan, UAE) - 4 countries (17%)
   - Integration into General Practices (Australia, Singapore) - 2 countries (8%)

   Several countries, including Australia, Cambodia, Jordan, and the UAE, are actively exploring and implementing the expansion of pharmacists' roles in healthcare. This includes pharmacists' involvement in patient consultations, medication management, and even prescribing in some cases.

   Integration of pharmacists into general practices, primary healthcare, and hospital settings is a common trend in countries looking to enhance healthcare delivery.

3. **Pharmacists as Information Resources:**
   - Valuable Sources of Drug Information (Multiple Countries) - 10 countries (42%)

   Pharmacists are often seen as valuable sources of drug information in many countries. They play a key role in educating patients, preventing medication errors, and ensuring the safe and appropriate use of medicines.

   In some cases, pharmacists are the first point of contact for patients, especially in countries like Taiwan and Myanmar, where community pharmacies serve as primary healthcare providers.

4. **Pharmacists' Response to Public Health Emergencies:**
   - Vital Roles in Public Health Crises (Macau, Singapore, UAE) - 3 countries (13%)

   Pharmacists have played vital roles during public health crises, such as the COVID-19 pandemic. They have been involved in public education, vaccination efforts, and providing accurate information to counteract myths and misinformation. This trend is evident in countries like Macau, Singapore, and the UAE.

5. **Challenges to Expanding Roles:**
   - Resistance from Other Healthcare Professionals (Jordan) - 1 country (4%)
   - Need for Training and Guidelines (Multiple Countries) - 5 countries (21%)

   While there is a desire to expand pharmacists' roles, there are also challenges. Resistance from other healthcare professionals, such as doctors, can hinder the full integration of pharmacists into patient care, as seen in Jordan.

   Training and guidelines for new roles, such as vaccination services, are needed in many countries to overcome barriers and ensure patient safety.

6. **Recognition of Pharmacists in Specialized Roles:**
   - Specialized Roles in Hospitals (Vietnam) - 1 country (4%)
   - Recognition as Medication Experts (Sri Lanka, Thailand) - 2 countries (8%)

   In specialized hospital settings, clinical pharmacists play crucial roles in activities like drug formulary management, dosing regimen design, and medication information dissemination (Vietnam).

   Pharmacists are recognized as experts in medications in countries, like Sri Lanka and Thailand, contributing to the healthcare system's overall quality.

   This analysis highlights the distribution of perceived strengths and trends among the 24 countries. The most common trend is the recognition of pharmacists as valuable sources of drug information, which is evident in

approximately 42% of the countries. Additionally, 17% of the countries are actively expanding pharmacists' roles in healthcare, while 13% face commercialized perceptions of pharmacists.

It is important to consider that these trends and strengths may continue to evolve as healthcare systems adapt and recognize the value of pharmacists in various roles.

In conclusion, the perceived strengths and roles of pharmacists vary significantly across countries. While some nations have successfully integrated pharmacists into diverse healthcare roles and enjoy high public trust, others face challenges in changing perceptions and expanding pharmacist contributions to patient care. The role of pharmacists as information resources and their response to public health emergencies are common themes. As healthcare systems evolve and recognize the value of pharmacists, we can expect further changes and innovations in pharmacy practice worldwide.

CONCLUSIONS and RECOMMENDATIONS

This present project examined and characterized the current state of pharmacy practice, pharmacy education, and health systems of Asian countries where FAPA has a presence through its member associations. Notably, various data gaps across member associations were observed from the analysis, including: health literacy rate, number of pharmacists, proportion of pharmacists working in different practice areas, demographic characteristics of pharmacists, special accreditations and certifications, and health professional role overlaps.

Our study mainly recommends that further research be conducted to address such data gaps. Furthermore, publicly available data should be collected and synthesized from credible and up-to-date sources. Considering that there are unique socio demographic characteristics, health systems, pharmacy education, and pharmacy practices, the landscape profiles should be periodically updated based on new information and a system for information- and knowledge-sharing be developed. It may also be good to develop pharmacy-related activities, projects, and programs based on the data gathered and analyzed. Through regular assessment and data-driven decision-making, the effectiveness of measures in addressing the pharmacy-related problems and challenges will be ensured.

Using the FAPA Mission as the basis, the project proposes different recommendations. First, in terms of “helping Asian pharmacists build the confidence of the public and other health professionals in the use of pharmaceutical services and products”, there is a need to create opportunities for continuing education and continuing professional development to develop pharmacists and the pharmacy support workforce (e.g., pharmacy technicians, pharmacy assistants) and develop online and offline educational platforms that provide accessible, comprehensive, and updated pharmaceutical knowledge to the public. By improving our knowledge and competency on pharmaceutical services and products, we can enhance public and professional confidence in pharmacy practices. A nationwide network of community health outreach programs supervised by pharmacists to educate and engage with the public shall be established. Building confidence in pharmaceutical services starts at the grassroots level. Community outreach can help pharmacists directly interact with people, addressing their health concerns. Pharmacy-related programs that foster interprofessional collaboration and engagement with other relevant stakeholders and agencies shall be developed. By collaborating and engaging with various stakeholders and agencies, we can create a more comprehensive and holistic approach to healthcare, which will eventually improve public and professional perceptions of, attitude towards, and trust to a pharmacist, address resistance from other healthcare professionals, and lead to the appreciation and recognition of the roles of pharmacists. Public relations and awareness campaigns featuring pharmacists as healthcare ambassadors shall be launched. This campaign will emphasize their role in promoting the overall well-being of the society. By highlighting pharmacists as trusted healthcare professionals, public trust and confidence in the pharmacists’ services can be fostered.

Second, in terms of “developing resilient pharmaceutical systems that ensure access to essential pharmaceutical products and vaccines”, there is a need to establish a technology hub focused on innovations in pharmaceutical systems. This includes exploring blockchain for traceability, IT solutions, and data analytics. Technological advancements can make pharmaceutical systems more efficient and resilient. Also, a network that can quickly mobilize resources and pharmaceutical products during health crises or emergencies shall be created. During emergency situations, having a well-coordinated system is vital for timely response and support.

Third, in terms of “encouraging patients and the public to be active partners in maintaining their health and wellness”, there is a need to tailor interventions and healthcare policies and guidelines based on the top causes of morbidity and mortality, such as but not limited to: maternal health and childcare, chronic diseases (e.g., IHD, stroke, cancer, DM), and communicable diseases (e.g., LRTIs, TB). By understanding the local health landscape and adapting strategies accordingly, pharmacy organizations can have a more significant and lasting positive impact on the well-being of their populations. Nationwide health literacy campaigns that encourage patients to actively engage in their healthcare and make informed decisions shall be launched. Active patient engagement is crucial for shared decision-making towards better health outcomes. Technology use shall be maximized and a digital platform shall be created for patients to have virtual consultations with pharmacists, providing guidance and answering their health-related queries. Direct communication with pharmacists can empower patients to be more engaged in their health.

Fourth, in terms of “acting as a platform for a pharmacy ecosystem that is connected, engaged, innovative, and future-ready”, there is a need to ensure that pharmacy education programs can facilitate the development of

pharmacists that are adaptable, resilient, and well-equipped to the evolving, diverse, and dynamic healthcare needs of the society. This will enable countries to produce a critical mass of competent and qualified pharmacists. An international collaborative initiative aimed at creating a comprehensive pharmacy landscape database shall also be established. The database will include data contributed by participating countries, covering various aspects of pharmaceutical services and products. This will enable countries to pool their resources and knowledge to build a robust and up-to-date pharmacy database. The database will be a valuable resource for researchers, policymakers, and healthcare professionals, facilitating evidence-based decision-making and innovation in pharmaceutical services. Programs that capacitate pharmacists to achieve their evolving and expanding roles shall be developed. These should include product-oriented roles, patient-centered roles, population-based roles, and health systems-based roles. These programs are crucial for ensuring the accessibility and quality of pharmaceutical products and healthcare services to the society. Periodic competitions shall be organized and incentives are regularly provided to encourage pharmacists to create or develop innovative solutions to common pharmacy-related problems and challenges in healthcare. Competition and incentive mechanisms can stimulate innovative thinking within the pharmacy community. An integrated digital platform shall be developed that connects pharmacists, healthcare professionals, and stakeholders, promoting knowledge sharing and collaboration. A connected ecosystem fosters innovation and improved healthcare practices.

Lastly, in terms of “ensuring that FAPA remains a highly ethical and value-based organization that is responsive to the needs of its members”, there is a need to establish certification programs for pharmacists, ensuring that they adhere to good, ethical and value-based practices and conduct workshops and training sessions on ethics and values for pharmacists, emphasizing their importance in daily practice. Continuing education, training, and certification can help reinforce a commitment to ethics within the pharmacy profession.

APPENDIX

Appendix A. Welcome Letter to Focal Persons

August [Day], 2023

[Name of Focal Person]
[Email of Focal Person]
[Contact number of Focal Person]

Dear [Name of Focal Person],

Warm greetings!

Hope this letter finds you well.

We extend a warm welcome to you as a member of our research team dedicated to developing the first Asian Pharmaceutical Landscape Report of the Federation of Asian Pharmaceutical Associations (FAPA), managed by its Social and Administrative Pharmacy Section. This report aims to describe the situation surrounding pharmacy practice and education in different Asian countries. The main objectives of this effort may be categorized into two distinct areas. Firstly, it aims to comprehend the pharmaceutical environment in Asian countries, and secondly, it seeks to develop recommendations for the roadmap of pharmacy development in Asia.

To ensure the accuracy of the information in this project, we have requested for a focal person who can contribute and commit to validating the data we have initially generated for each country and FAPA headquarters endorsed your name to us as the recommended contributor from your country.

Each focal person in this project is expected to carry out the following activities:

- Help validate the data gathered from the literature review;
- Provide relevant inputs on the results of the data collection;
- Help cite references and identify sources of information; and
- Perform quality assurance checks on the literature review.

To help you in your activities, we are providing the following links for your reference:

1. **Orientation Materials (PDF and Audio-Visual Format):**
   Link: https://bit.ly/FAPA2023Orientation

2. **Country Data: [Country]**
   Target date of completion: *Not later than September 8, 2023 (Friday)*
   Link: https://bit.ly/[Country]DataCollectionTool

Your timely completion of the data collection tool will enable the research team to analyze and present the information for the workshop that will be held at the FAPA Technical Agenda-Setting Pre-Congress Workshop on October 25, 2023 during the 29th FAPA Congress at the Taiwan International Convention Center. More information about the congress can be found at: fapa2023.com. All focal persons shall be acknowledged and recognized as a contributor in the final report.

If you have any questions or concerns, our research assistant [Name and Contact details of RA] will be here to support you. Again, we welcome you to our team and we appreciate your support for this project. Thank you and we hope to hear from you soon.

Sincerely,

Margarita M. Gutierrez, RPh, MHPEd, PhD
Research team lead

Mac Ardy J. Gloria, **RPh**, **MPH**, **Dip Clin Epid**
Assistant Team Leader

Endorsed by:

Roderick L. Salenga, **RPh**, **MPH**
Project Head

Appendix B. Welcome Email to Focal Persons

Dear [Name of Focal Person],

A pleasant day!

Hope this email finds you well.

I am [Name of RA], a project associate of the research team for the Pharmaceutical Landscape Profiles of Asian Countries which operates under the Federation of Asian Pharmaceutical Association (FAPA). This is an introductory and invitation email for you, the endorsed FAPA nominee for the country of Afghanistan to become a Contributor to this project.

This is an ongoing initiative to create a general landscape of pharmacy practice and pharmaceutical education for every member association of FAPA. Hopefully, this information can be utilized as a baseline reference for the development of programs to be established by FAPA for the improvement of pharmacy practice and education in Asian countries.

The research team of this project has performed an extensive literature review with online sources that discuss the status of pharmacy practice and education in your country. We need your assistance in the validation and revision of the said information as well as in the provision of references from which we can source the correct and updated information.

Attached are links to the PDF and audiovisual materials to orient you on your role/assignments in this project. Please see the said materials available on this link (https://bit.ly/FAPA2023Orientation) for the objectives, methodology, and outputs of this project. Please see the data collection sheet for your country ([Country]) available on this link ([Link to Data Collection tool]).

We kindly request you accomplish the data collection tool for Afghanistan **on or before September 8, 2023 (Friday)** to give the research team ample time for data analysis. In return, you will be acknowledged and recognized as a **Contributor** during the 29th FAPA congress this October 24-28, 2023 for your invaluable contribution to this project.

If you have any questions or concerns, you may reach me through this email address (Email of RA).

We look forward to a successful working relationship in the future!

Sincerely,

[Name of RA]
Research Assistant

Appendix C. Sample Data Collection Tool (Philippines)

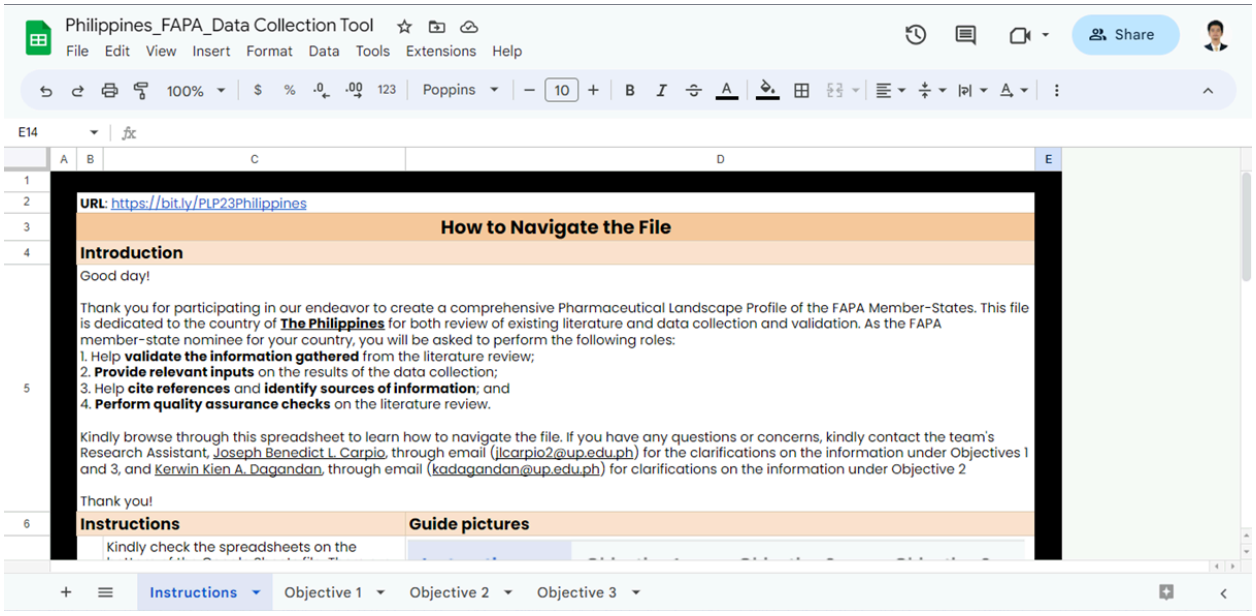


Figure 31. Instructions page

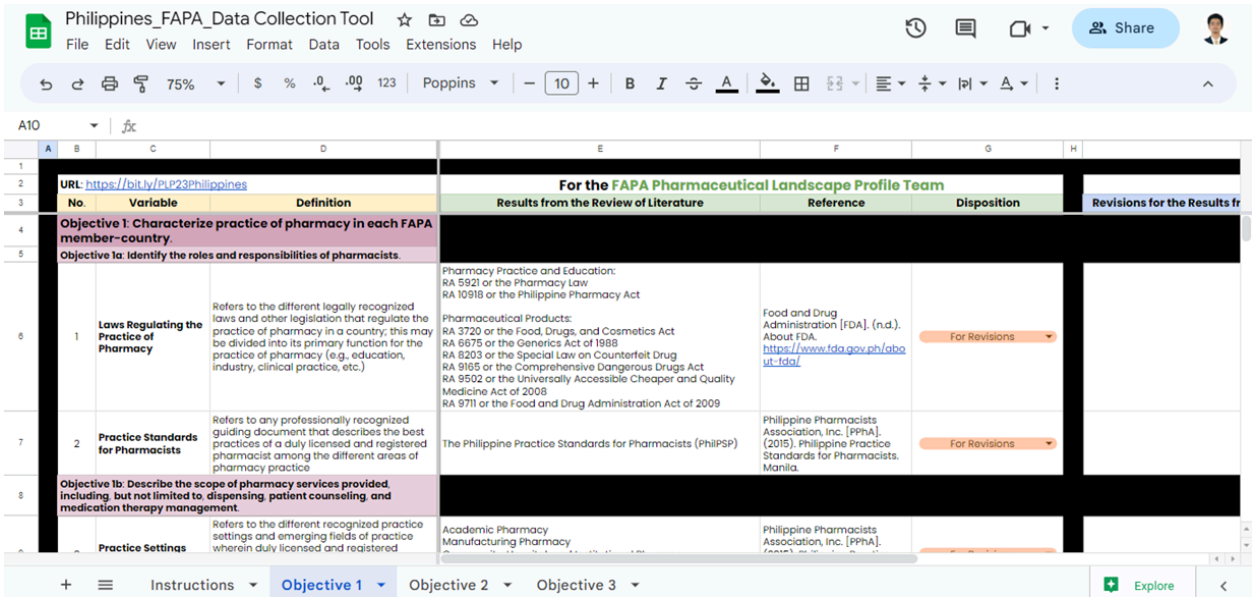


Figure 32. Data collection sheet for Objective 1

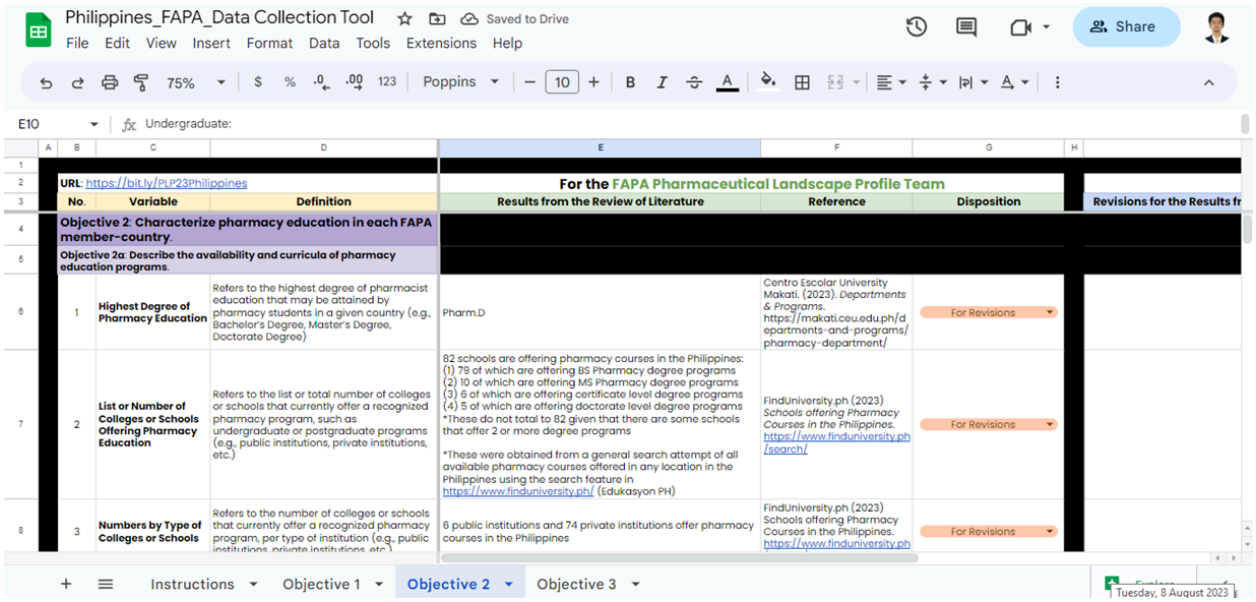


Figure 33. Data collection sheet for Objective 2

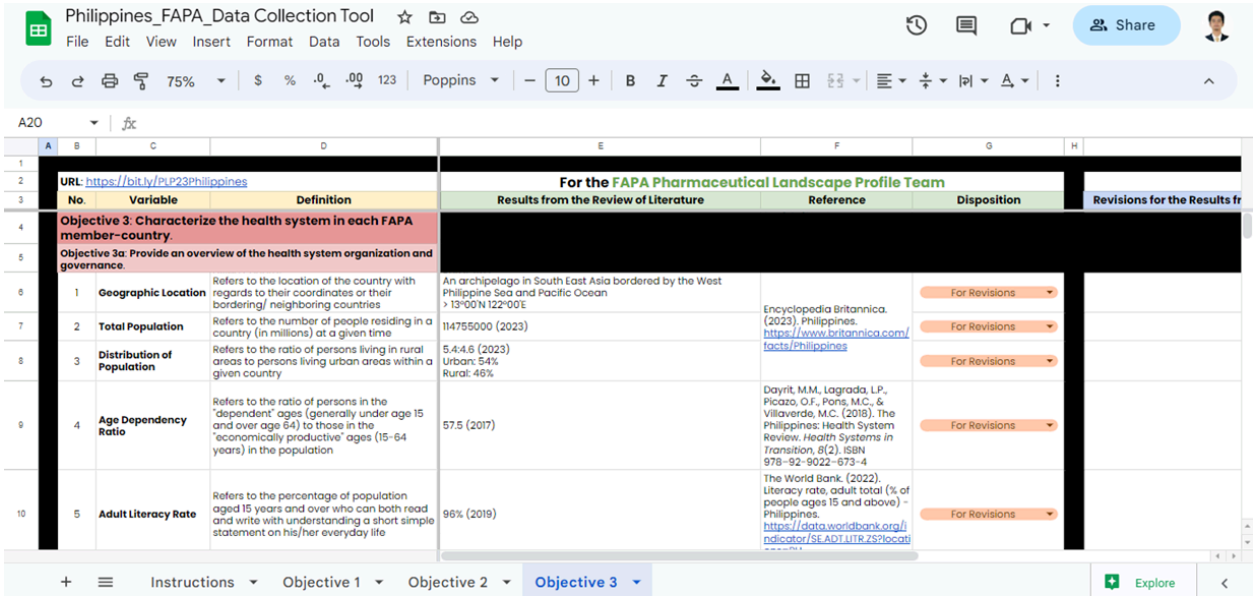


Figure 34. Data collection sheet for Objective 3

Appendix D. Orientation Toolkit for Focal Persons

Figure 35. Cover page of Orientation Slides

Figure 36. Introduction to Objectives and Sub-objectives

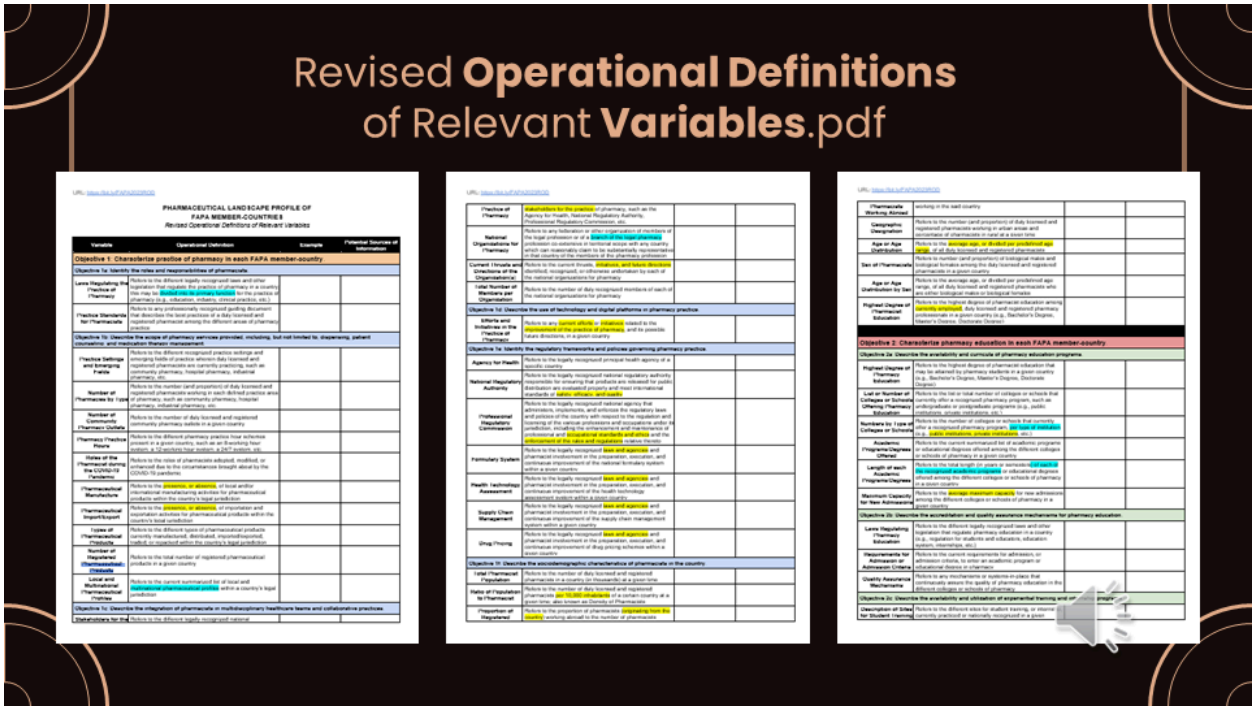


Figure 37. Introduction to Variables and Operational Definitions

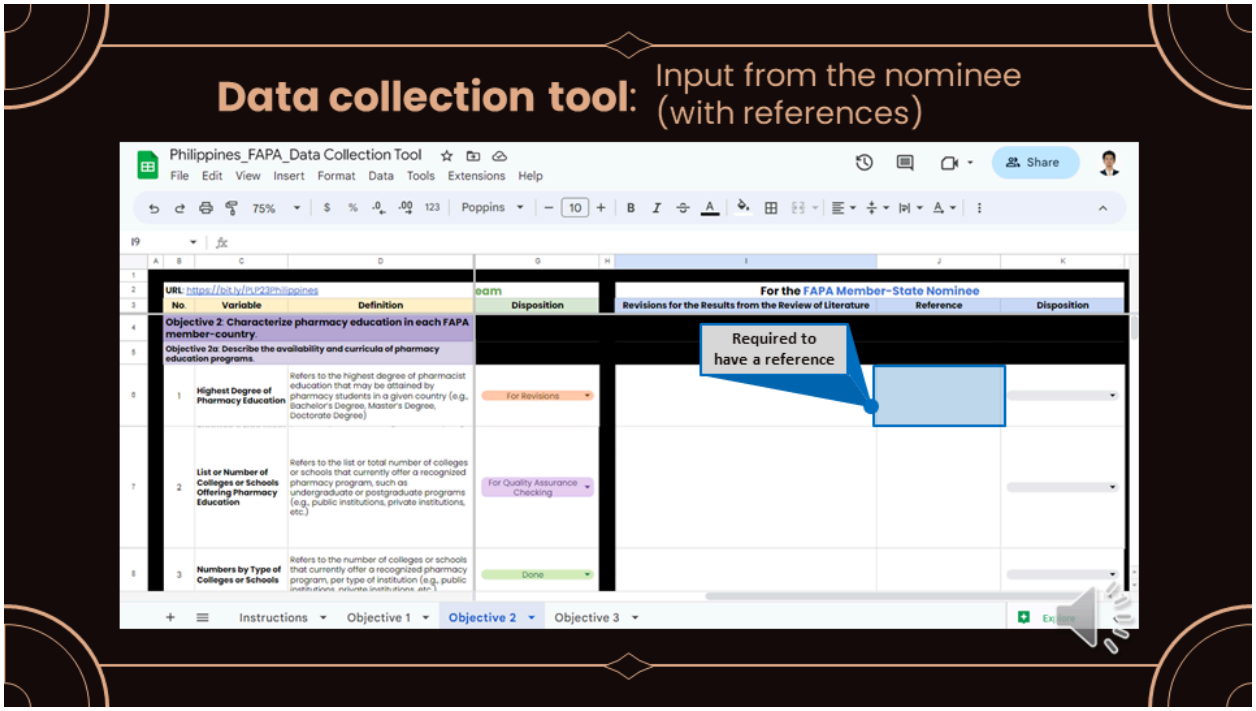


Figure 38. Introduction to Data Collection tool

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