Data And Statistics Of Hospital Beds And Staffs To Manage Health Information To Formulate Policies To Increase The Number Of Beds And Staffs In Thailand

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Abstract

The purpose of this research was to use research data and statistics on hospital beds and staff to manage health information and develop strategies to improve the number of hospital beds and staff in Thailand. Collect critical information about the existing condition, compile reports, and establish policies to expand the number of hospital beds and medical personnel in Thailand. This was a mixed-methods study that included data collection and focus group sessions, as well as descriptive statistics and content analysis. The research results showed that Thailand has 153,927 hospital beds, with an overall occupancy rate of 102.20. There are 50,573 doctors, accounting for one out of every 1,292 people. There are 158,317 nurses, accounting for one in every 419 people. The study's key finding is that Thailand will have half as many hospital beds as Japan, or 4.0 beds per 1,000 people. With an annual budget of 57 billion-baht, 114,000 hospital beds must be built in order to accommodate 267,000 patients. Nurses and public health specialists are expected to become "physician representatives," with one for every three beds, bringing the total from 38,000 to 9,500 annually. Training lasts 12 months, with an annual cost of 950 million baht. Thailand has insufficient hospital beds, a high bed occupancy rate, and a shortage of medical professionals, making it unable to deliver services throughout the country. It is critical to evaluate the amount and ratio of nurses in order to deliver adequate services. National planning aims to address limits in hospital bed management systems and staff development by synthesizing primary data to increase hospital beds and accommodate more people. On the other hand, Thailand has an insufficient quantity of beds and a high occupancy rate. The usage of hospital beds also limits mobility and cannot accommodate hospitalized patients. Thailand's inadequate medical and health manpower is insufficient to improve the breadth and adequacy of medical and health services in hospitals across the country. Reviewing, controlling, and planning at the national level in terms of bed capacity and personnel numbers. It will enable bed management operations and the country's limited medical personnel to create a service system to help patients access medical and public health services in Thailand.

Key words: *Hospital Bed Capacity, Medical Staffs, Health information management, Hospital Bed Capacity Policy, Medical Staffs Policy.*

Introduction

The global medical workforce shortage is becoming an increasingly significant issue and it is important that this problem should be solved immediately to respond to the need of patients (Channuwong et al., 2022; Vries et al., 2023). Many countries face a shortage of

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primary care doctors and specialists. The ratio of medical staff to nursing needs of patients is growing as the population grows (Khan, 2023). This condition results in limited access to basic health care services, an increasing number of patients in hospital wards or emergency departments, and a growing demand for medical personnel (Do et al., 2023). Furthermore, the complete implementation of the medical insurance system has increased, and the rise in noncommunicable diseases (NCDs) is the primary cause of the growing need for medical and health care staff (Do et al., 2023).

In addition to the paucity of medical personnel, another important issue that hospitals face while providing services to patients is a lack of hospital beds. Although hospital forecast accuracy has improved in relation to the number of patients admitted to the hospital, the number of hospitals in different countries is restricted, and the algorithm or approach utilized may be useful to some extent (Fabian et al., 2023). However, the limited number of beds has resulted in the issue of insufficient beds. In many nations, inpatient care is inadequate. The ratio of bed occupancy rate (BOR) to bed turnover rate (BTR) is increasing, and some hospitals are attempting to introduce bed management schemes to address this issue (Khalid et al., 2023). Hospital bed management is an important task, and various methods for calculating effective work allocation are proposed, taking into account patients' condition, treatment needs, and wishes; however, the majority of these methods rely on static and non-adjustable treatment duration estimation, which ignores the uncertainty of patients' recovery. Furthermore, the impact of the number of hospital beds on hospital bed management, including computer-aided hospital bed management, and the combination of flexible hospitalization duration estimation and shared resource management (total bed capacity), has not been adequately investigated (Schmidt et al., 2023). It is clear that a growth in hospitalization time necessitates the proper management of limited inpatient beds, particularly in the face of significant volatility, unpredictability of patient arrival, and hospitalization time (Schäfer et al., 2019). A shortage or insufficient number of beds is a serious issue while delivering services to inpatients.

Furthermore, several new issues have exacerbated the problem. For example, the emergence of patients occupying beds for too long has resulted in a lack of beds that can accommodate patients, while the number of new patients has increased (Kaewprapran et al., 2019). Based on statistics and information from Thailand's hospitals Data collection from actual work for the resource database, which serves as a reference database. Lack of precision in bed information and incomplete medical information at work (Wongsin, 2020). As a result, it is critical to study, collect data, and analyze the primary health resources to determine whether the number of beds and staff serving patients in Thailand is sufficient, in order to promote actions to increase the number of beds equipped with appropriate personnel in accordance with appropriate guidelines and policies, and to continue this work.

Research Methodology

Study design and procedure
This research is a mixed-methods study that includes both qualitative and quantitative research.

1) Quantitative Research methodology is used to collect secondary and primary data, check for medical personnel, beds, and other relevant information from a variety of sources, such as National Bureau of Statistics reports and hospital departments.

2) Qualitative research methodology is used to collect data by interviewing ten key informants of experts from the fields of public health, collecting medical statistics and group focus.

Study participants and sampling

The population and sample contain:

1) The population and quantitative study samples include public and private hospitals from across the country. By employing population research to save secondary and primary data, as well as data recording.

2) Population and qualitative research samples include professionals in medicine, public health, statistics, and medical statistics. Medical Informatics in Thailand provides crucial information based on the following factors for selecting 10 suitable professionals and experts.

    2.1) Two doctors with experience in hospital or department management.

    2.2) Become a nationally known physician or healthcare professional, such as a member of the House of Representatives, the Senate, or a political party administrator. Or 2 heads of domestic or international private organizations

    2.3) Three professors of statistics, statistics, or information medicine

    2.4) Three professors or experts in public policy

Study instruments
The research tools contain three tools:
1) Collect information from hospitals around the country and make information requests to hospitals where information is not available. To keep information in specific records.
2) Interview form, which is used to gather interview data from key information sources, experts, and experts.
3) A group meeting form is used to record information from expert and expert meetings.

Data analysis
Data analysis and research were carried out individually in accordance with the format of this study.
1) quantitative research
Descriptive statistics were used to analyze the number of ward staff and the number of hospital beds in health and medical facilities in Thailand.
2) Qualitative education
    2.1) Typology and taxonomy for data from interviews and key information provider group meetings.
    2.2) Content analysis of data from interviews and key information provider group meetings.

Ethical aspects
The Mahidol University, Social Sciences Institutional Review Board (approval No.2023/063.2004 and MU-SSIRB No.2023/062(B1)) granted approval for this study, which adhered to the international guidelines for protecting human research participants. Following the committee's authorization, informed consent was obtained from the participants, including detailed information about the risks involved, the confidentiality of their information, and their agreement to sign as evidence. Data collection in the sample organization commenced only after obtaining consent from the samples, key informants, and authorized individuals, ensuring compliance with ethical standards. The collected data was subsequently analyzed for this study.

Results
The findings of the study involved the analysis of service personnel data in medical and health institutions in Thailand. The outcomes of the analysis are presented below:

Table 1 The data of service personnel in medical and health institutions in Thailand

Health manpower	Number	Proportion to population	Number of educational institutions producing	Quantity produced per year
Physician	50,573	1,292	21	3,121
Nurse	158,317	419	86	11,000
dentist	11,575	5,643	13	826
Dental Nurse	6,818	9,581	7	400
pharmacist	26,187	2,494	19	2,000
medical technician	15,200	4,298	12	911
physical therapist	10,065	6,490	16	875
Public Health Technical Officer	27,035	2,416	69	12,593
Thai traditional Doctor	30,371	2,151	27	1,080

Per capita bed ratio in Thailand

1) Thailand has a total of 152,993 hospital beds, which is approximately 153,000 beds. The ratio of beds to population stands at 2.29 beds per thousand people.

2) The number of beds providing public services equally in all regions is equal to 15 beds per 1,000 people.

   2.1) Considering that in order to provide a sufficient number of hospital beds in different parts of the world, there should be 10 beds per 1,000 people in all regions.

   2.2) In comparison between Thailand and foreign countries, such as Japan, the ratio is 7.9 beds per 1,000 people, while South Korea has 6.4 beds per 1,000 people.

Number of hospital beds and occupancy rate of hospital beds in Thailand

1) The number of beds under the Ministry of Health is 98,781.

2) The number of beds in private hospitals is 40,718, including 10,921 ordinary beds and 23,780 special beds, and the total number of actually available beds is 34,692, excluding the number of other beds, that is, 6,017 operating beds, symptom observation beds and severe beds.

3) The hospital affiliated with the Ministry of National Defense provides 6,274 beds.

4) The hospital affiliated with the National Police offers 680 beds.

5) University-affiliated hospitals in Thailand have a combined total of 13,500 beds.

Table 2 Bed occupancy rates of hospitals at various levels in Thailand

Type of hospital	Total number of inpatients	Bed occupancy rate
Regional or large hospitals	1,041,409	109.32
Provincial level hospital or medium sized hospital	1,169,899	99.68
District level hospital or small hospital	1,947,286	102.16

All types of hospitals	4,158,594	102.20

The findings of the research conducted on listening to key informants regarding the database, data analysis, and statistics pertaining to the personnel and beds of medical and public health services in Thailand are outlined as follows:

1) Determine the number of beds per capita;

1.1) To achieve successful results, Thailand's implementation tactics should be compared to those of other countries on the continent. Examining other countries' ways can provide significant insights that can be applied to policy implementation in Thailand.

1.2) A potential way to improve comparison is to cut charges whenever possible. Adjusting the rates allows for more accurate and meaningful comparisons between countries. This will help us understand the effectiveness of policies and their effects on healthcare systems.

1.3) In order to develop practical and feasible policies in Thailand, it is important to consider appropriate rates. While it is not necessary to compare the same number of countries, it is crucial to maintain proportional representation. This will ensure that the policies implemented in Thailand are suitable for the country's healthcare capacity.

1.4) When considering the increase in the number of beds, it is essential to take into account a reasonable price. This involves not only constructing additional beds but also building new wards or facilities. By considering the cost implications of expanding healthcare infrastructure, a more comprehensive approach can be taken to calculate the number of additional beds required.

2) Consider the number of medical service personnel.

2.1) In order to address this issue, it is necessary to have other personnel who can supplement the knowledge or provide system support. These individuals will be able to assist doctors in their work and contribute to the expansion of the healthcare system by increasing the number of available beds.

2.2) The personnel representing doctors should possess adequate medical knowledge and can come from nursing or public health backgrounds. This ensures that they are equipped to effectively support doctors in their roles.

2.3) Additionally, it is important to consider increasing the number of replacement doctors. This will help to alleviate the burden on existing doctors and ensure that there is sufficient coverage for medical services.

2.4) Instead of solely focusing on producing new doctors, training can be considered as an alternative. This is because personnel already possess valuable knowledge and experience, which can be further developed to effectively represent the work of doctors.

2.5) However, it is crucial that training is conducted with ample support from the government budget. Sufficient funding is necessary to ensure that the training programs are comprehensive and effective in preparing personnel to fulfill the role of representing doctors.

2.6) Personnel who are capable of increasing their knowledge to effectively represent the work of doctors can be given appropriate additional titles, such as personnel representing doctors. This recognition highlights their importance and contribution to the healthcare system.

Discussion

Based on this research, it has been determined that there is a shortage of hospital beds and a high occupancy rate. Consequently, the utilization of hospital beds lacks flexibility, making it difficult to accommodate patients across different hospitals. This finding aligns

with previous studies that have examined the occupancy of unoccupied beds by inpatients. Specifically, it has been observed that patients who have been hospitalized for an extended period of time exhibit a significantly high bed occupancy rate (Kaewprapran et al., 2018). A similar study conducted in Saudi Arabia also supports this notion, revealing that hospitalized patients are more likely to be admitted to wards for further treatment due to the increasing number of hospitalized individuals, consequently impacting the occupancy rate of hospital beds (Khalid et al., 2023). In the northwest region of England, a medium-sized hospital affiliated with the NBS of Pennsylvania Emergency Hospital faces the challenge of managing bed resources within the NHS Hospital due to the limited number of beds (Wongsin, 2020). This finding is consistent with research on hospital bed allocation, which has become a routine task for hospitals. Recently, it has garnered increased attention due to the growing level of hospitalization, necessitating effective management of the adequacy of limited hospital beds. Particularly in large hospitals in Germany, the fluctuation and uncertainty surrounding patients' arrival and hospitalization duration pose significant challenges (Fabian et al., 2023).

The availability of medical and public health professionals in Thailand is limited. Merely enhancing medical and public health services in hospitals throughout the country is insufficient. This is also in accordance with the constraints of foreign education in effectively managing the sufficiency of doctors and nurses. A deficit in medical personnel has been identified, which is a growing global concern (Vries et al., 2023). In Sindh, Pakistan, there is a scarcity of primary healthcare physicians and specialists. This has had an impact on patient services in the Sindh region of Pakistan (Khan, 2023). Similarly, there is a shortage of doctors in Nevada. Consequently, measures have been taken to explore avenues that incentivize doctors to remain and practice in the area, including providing financial support and other benefits (Do et al., 2023). Furthermore, Israel is facing a shortage of doctors due to retirement issues and an inadequate production of doctors and medical students. The per capita number of doctors in Israel is lower than that of the OECD, standing at 3.1 doctors per 1000 individuals (Treister & Peleg, 2023).

Research findings have demonstrated the significance of assessing the quantity and proportion of doctors and nurses in order to ensure adequate medical services for the Thai population. The study in question conducted a comprehensive analysis of the number of nurses and doctors in European nations, while also examining key factors involved in formulating strategies and managing the workforce of medical professionals in hospitals across Europe and other regions (Channuwong & Ruksat, 2022; Vries et al., 2023). In India, there are several factors contributing to the shortage of doctors and specialists, which have been exacerbated by significant changes in recent years. These challenges encompass inadequate infrastructure, a scarcity of medical professionals, disparities between urban and rural areas, limited medical insurance coverage, insufficient funding for healthcare, and a fragmented healthcare system. The Indian government is actively striving to address the mounting burden of non-communicable diseases (NCDs), which pose a substantial challenge to the healthcare system (Kumar, 2023).

In relation to the management and planning at the national level, it has been discovered that this approach will assist in addressing the challenges faced by the limited bed management and medical staff in the country. This will enable the development of service systems aimed at facilitating the access of Thai patients to medical and public health care services. The research conducted on the health policy of the Ministry of Public Health, which serves the ASEAN Community, reveals that the reform of the functional system of the Ministry of Public Health is categorized into health service areas. This division is beneficial as it allows for comprehensive supervision of the service units within these areas. Furthermore, it facilitates the swift implementation of various policies and contributes to the diversification of service provision, thereby ensuring that citizens receive quality services in a

comprehensive manner. The Ministry of Public Health in Thailand faces challenges in terms of human resources and management, and it is imperative for them to prioritize access to public health services and public health care. This includes the development of manpower, allocation of budgetary resources, and availability of facilities (Kheawichai, 2018; Sirathanakul et al., 2023).

A research study conducted by Heinz Vajasdi and his colleagues highlights the significance of utilizing key data in order to enhance the provision of clinical services through the management of medical and health personnel, as well as the number of beds. The study suggests that the estimation of hospital bed requirements in China can be predicted by considering population demographics and bed usage data as crucial indicators (Vajasdi et al., 2020). Furthermore, the findings of this research align with previous studies, emphasizing the importance of effectively allocating inpatients to hospital beds to ensure patient satisfaction and manage the workload of nurses and doctors (Fabian, 2023). Consequently, the research underscores the critical role of task allocation planning when admitting patients to hospitals, as it directly impacts hospital strategy, operational management, and bed utilization (Schmidt et al., 2013).

Conclusions

According to a study conducted to promote health policies in Thailand, it is recommended to ensure an adequate number of beds for individuals based on the per capita ratio of beds. This study compared Thailand with other countries on the same continent that are effectively managing their healthcare systems. When formulating practical and feasible policies for bed comparison rates in Thailand, it is advisable to reduce the potential comparison rate. It is not necessary to compare the exact number of countries, but rather to consider appropriate proportions. The aim is to adopt a policy that ensures the provision of an appropriate number of beds in Thailand without exceeding the national capacity.

Considering the reasonable cost implications of increasing the number of hospital beds, it is important to prioritize the construction of buildings or wards rather than solely focusing on increasing the bed count. The recommended approach is to first construct the necessary infrastructure and then calculate the number of additional beds required.

The research findings on this topic can be summarized as follows:
1) To simplify the implementation of medical services in Thai hospitals, it is suggested to increase the number of beds to half of Japan's ratio. With a target ratio of 4.0 beds per 1,000 people, a total of 267,000 beds are needed. Therefore, an additional 114,000 beds need to be built.
2) The cost estimation for constructing the additional beds is as follows: Each bed requires a budget of 2 million baht. To accommodate the increased number of beds and the necessary infrastructure, a government-backed budget of 57 billion baht per year is required over a 4-year period.
3) It is recommended to establish a system for developing nurses and public health scholars as representatives of hospitals that have increased their bed capacity. This will involve increasing the number of personnel to accommodate the additional 114,000 beds and ensuring a ratio of 1 person per 3 beds. Therefore, an additional 38,000 personnel are needed.
4) A budget of 100,000 baht per person will be allocated for the training of these representatives, who will serve as "Doctor representatives" in the hospitals.

Author Contributions

The authors contributed equally to the discussion, literature exploration, writing, and editing.

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Conflicts of Interest
The authors declare no conflict of interest.

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