Proceedings of the Fourth Australian International Conference on Industrial Engineering and Operations Management, Melbourne, Australia, November 25-27, 2025

Proceedings of the International Conference on Industrial Engineering and Operations Management

Publisher: IEOM Society International, USA DOI: 10.46254/AU04.20250070
Published: November 25, 2025

Application of the WISN Method to Develop a Pharmacist Staffing Framework in a Private Hospital in Myanmar

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Abstract

Workforce planning has been a huge concern especially in healthcare industry settings where the large and inefficient workforce will result in significant costs while a shortage of professionals would increase the workforce efforts and may have consequential impact on service quality. The simpler and rational approach for planning workforce based on workload is the workload indicators of staffing need (WISN) approach developed by World Health Organization. The purpose of this study was to find the number of pharmacists needed using the WISN approach and develop the framework for identifying number of pharmacists needed under the context of a private hospital in Myanmar. The study applied cross-sectional research design conducted through interviews, direct observation of time it took to dispense number of medication items per prescriptions and reviewing hospital documents. There were 3 pharmacists of the case study hospital were selected to determine workload components such as the health service activities, support activities and individual additional activities. 56 observations were done using time study with standard operating procedures of 8 steps for exploring standard unit time. The results showed that total workload standards of 56481.5 items dispensed prescriptions per year. The final results of current 25-bedded hospital pharmacy needed 1.466 pharmacists with a WISN ratio of 0.672. The results of this study showed that the case study hospital pharmacy was well understaffed with high workloads to be performed, requiring efficient human resource policies to handle the workforce management if the hospital has a plan to extend 50-bedded with critical care services.

Keywords
Workforce Planning, Pharmacist, WISN, Workload Components, Unit Time

1. Introduction

Myanmar's healthcare system continues to struggle with consistent human resource challenges, encompassing shortages, uneven distribution as well as gaps among healthcare professionals. Amidst these, pharmacists both in private and public sector face particularly acute pressures as pharmacist density was 0.73 per 10,000 population which is seven times lower than international benchmark suffering from a critical shortage of pharmaceutical personnel. In public sector, 15% of pharmacist are in service while 85% of pharmacists are in private sector, concentrated in mostly urban centers like Yangon, Mandalay and Naypyitaw, creating a regional uneven distribution across Myanmar (Aye and Anantachoti 2020). Consequently, this imbalance creates the increased burnout, reduced job satisfaction, and high attrition rates, all of those threaten the sustainability of pharmaceutical services (Barakat and Sallam 2025). Globally,

studies have shown that workload stress as well as lack of professional development are the strong causes of pharmacist dissatisfaction (Alshahrani et al. 2025).

Internationally, planning workforce strategically has been noted as a foundation of resilient healthcare system allowing stakeholders to forecast demand, optimize skill sets and ensure continuity of care by targeting recruitment and retention strategies (Ramsey 2023). Insufficient workforce planning creates inefficiencies in resource allocation, uneven service distribution and increased burnout among frontline professionals, especially in rural and underserved areas (Abelsen et al. 2020 and Owolabi et al. 2024). Thus, Myanmar lacking a comprehensive, data-driven workforce planning approach complement to its demographic, geographic and institutional realities continued to allocating of inefficient resources that compromised service quality and failure to meet Universal Health Coverage (UHC) goals (World Health Professions Alliance 2025).

This gap highlights the essential necessity for the stakeholders in Myanmar to adopt evidence-based workforce planning approach for healthcare professionals – particularly pharmacists – that incorporate dynamic forecasting based on workload activities with systematic step-by-step analytics (Lee et al. 2024, World Health Organization 2023 and Gialama et al. 2019). By doing so, Myanmar can have a leverage over its healthcare systems as well as efficient utilization of professional resources regional-wise. Thus, the study aims to develop pharmacist staffing framework for the 25-bedded case study hospital using WISN method developed by WHO, a data-driven, systematic and simplified step-by-step framework that can complement current situations of Myanmar.

1.1 Objectives

The objective of this study is to find the number of pharmacists needed using the workload indicators of staffing need (WISN) approach and develop the framework for identifying number of pharmacists needed under the context of a private hospital in Myanmar.

2. Literature review

Developed by the World Health Organization (WHO) in the late 1990s, the WISN method is a facility-based instrument designed to determine staffing requirements based on actual workload instead of population ratios or institution size especially in particular resource-limited settings (World Health Organization 2023). WISN is capable of calculating indigenous epidemiology and specialized service sets – especially in hospital setting across the developing countries in East Asia Mabunda et al. (2025) and South Africa Kunjumen et al. (2022) – ensuring that the results are accurate and beneficial for policy development and implementation (Wahdayuni et al. 2021).

A study carried out in Vietnam using WISN to provide nursing workforce planning in 10 departments and successfully able to provide effective workforce planning for four hospitals (Nguyen et al. 2022). Further, Oman's ministry of health applied WISN ratios to assess workload pressure percentages and able to make data-driven decisions on staffing norms and training needs to distribute support nursing staff into primary and tertiary care settings (Mohamed and Al-Lawati 2022). In addition, several studies also applied systematic WISN approach, mainly in public health sector, to determine various nursing staff requirement in sophisticated settings like, developing standard time for efficient nursing care in Saudi Arabia Al-Moteri et al. (2023), assessing nurses requirements for educational and non-educational hospitals in Iran Vafaee-Najar et al. (2018), and determining staffing needs for registered nurses and licensed practical nurses in primary care units in Brazil (Bonfim et al. 2022).

Another popular health cadre to be determined regarding the requirement of staff using WISN method was medical doctors and physicians, especially in Bangladesh (Nuruzzaman et al. 2022). Several studies pertained WISN approach manually or computerized generated WISN results to determine required physicians for public sector and found that WISN method can be useful in estimating physicians' requirements – shortage or overstaffed – thus, providing evidence-based infusions for workforce planning, replacing and retention management along with recommendations for better planning based on workload activities (Al-Dabbagh et al. 2022, Joarder et al. 2020, Machado et al. 2022 and Aytona et al. 2022).

Furthermore, Manalu et al. (2021) applies WISN to analyze pharmacist staffing in a hospital pharmacy installation and found a WISN ratio of 0.7, highlighting a significant shortage of pharmaceutical personnel. Similarly, A study conducted in Surabaya determined required pharmacist applying WISN in a public hospital setting and found that 17% of shortage in pharmacist staffing (Subhan et al. 2021). However, WISN has been adaptably applied in

determining nurses, doctors and other health care professional cadre in the developing countries, while pharmacist cadre type was the less commonly studies providing significant research gap (Aytona et al. 2022, Nuruzzaman et al. 2022 and Nair et al. 2022).

Moreover, implementing WISN can be data-intensive, calling for detail and large service statistics that might be unavailable or unreliable for certain facilities (Mabunda et al. 2025). The implementation of the WISN method can be hindered by inconsistent activity standard because of lack of digitized workload tracking and limited stakeholder engagement especially in regions that heavily relied on traditional and conservative process (Asres and Gessesse 2024). Finally, WISN method cannot capture qualitative dimensions like stress, burnout or interpersonal relationships which are critical to workforce performance (World Health Organization 2023). Moreover, most of the reviewed literatures for the study concentrate on using WISN method to determining the required health care professionals, focused on public hospital sectors while application gap in private sector setting was overlooked (Aytona et al. 2022 and Nuruzzaman et al. 2022).

Regardless, WISN method has proven relatively simple compared to previous workforce analysis and thus has been used extensively across the globe (Namaganda et al. 2022). Utilizing WISN to determine the pharmacist needs for the case study hospital in Yangon is both feasible and strategic like the study carried out in countries face challenges like understaffing, long patient queues and inefficient coordination (Manalu et al. 2021). Further, the study contributes to health workforce planning literature by framing WISN within Myanmar's unique healthcare landscape as well as offering practical contributions by offering a replicable analysis framework for determining required pharmacists staffing in private setting by providing actional data for related stakeholders to optimize workforce planning and allocations.

3. Method

This study conducted a descriptive cross-sectional design with a quantitative approach to find the number of pharmacists for a 25-bedded private hospital in Yangon, Myanmar. The study mainly employed the Workload Indicators of Staffing Need (WISN) methodology developed by WHO (2023), which is a guided eight-step process for determining the required number of staff for current specific and defined workload for the cast study hospital. The eight-step process carried out in this study are in Figure 1.

4. Data collection

Primary data was collected by visiting the pharmacy department of a case study hospital for observation between 1st May 2025 and 7th May 2025 (only from 07:00 am to 11:00 pm). Time-based sampling method was used to observe and record the number of items dispensed per prescription, while two observers recorded the work activities of selected staff using a stopwatch technique. The selected 3-full time pharmacists represent the entire eligible cadre in the case study hospital and similarly in other middle sized private hospitals in Myanmar, reflecting contextual constraints in Myanmar's private healthcare industry. The 56 time-study observations were derived from prescriptions that contained 1-5 prescribed items, which represent over 80% of annual prescription counts. This sampling approach is in line with WHO's WISN methodology and ensure the representativeness of the workload. Moreover, the derivation of the sample size was consulted with experts from Myanmar Pharmaceutical Association and reviews from previous literatures Ambaye et al. (2025), Magee et al. (2023) and Al-Moteri et al. (2023) to certain the robustness of the sample size. In the absence of national standard time, the study provides the evidenced derived unit time contributing both practical and contextual relevance. This study also interviews them all via online application (zoom meeting) due to the political instability, in order to get the data needed for WISN calculation and the information remained confidential for ethical purposes.

The secondary data, working days, hours, allowance time and total items of prescriptions (which will be total annual workload for the study) was obtained from the hospital's administrative department between the period from May 2024 to April 2025. Secondary data collected were also consulted with experts from Myanmar Pharmaceutical Association for data validity.

4.1 Data Analysis and Calculations

The calculation of pharmacists required is carried out by entering primary data, as well as, secondary data into the Workload Indicators of Staffing Need (WISN) formula constructed in Microsoft Excel and developed an effective and practical analysis framework for contextual setting and presented in Figure 1.

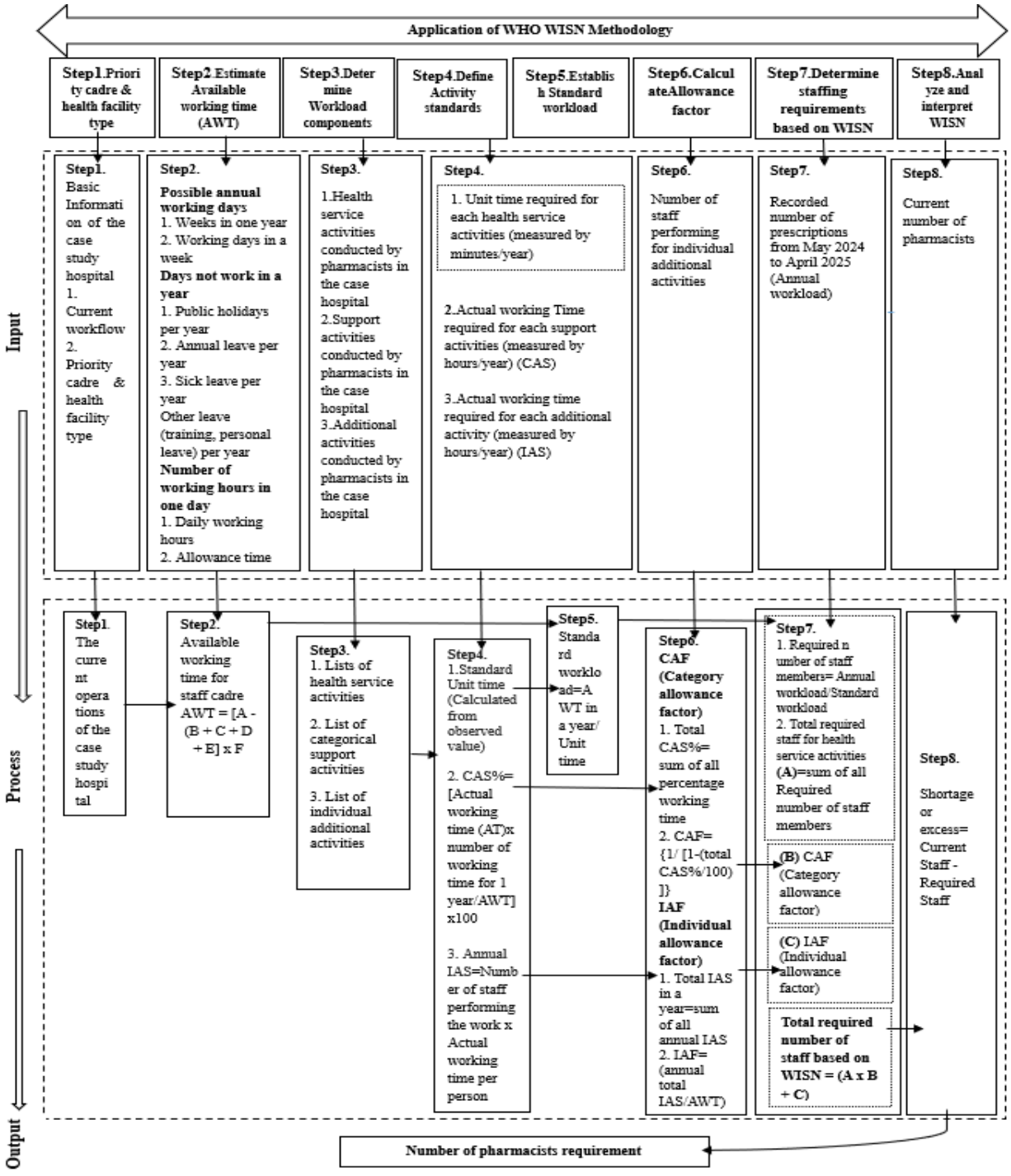

Figure 1. Analysis framework for the number of pharmacists needed in a private hospital pharmacy in Myanmar

5. Results and Discussion

In order to identify the required number of pharmacists for the case study hospital, several steps were performed in order according to WISN method. The first step is estimating the available working time (AWT) and presented in Table 1. The available working time for a full-time pharmacist within a year is 3507.5 hours or 210,450 minutes with little or no leave throughout the year. Actual number of working hours in a day is 11.5 hours, a schedule significantly exceeding the normal 8 hours per working day. A study from Indonesia reported 1608 hours per year for pharmacists Rantemarampa et al. (2025), while Manalu et al. (2021) confirmed the AWT for the pharmacists is 283 or 135,840 minutes per year. Compared to previous literature, the study AWT of 3507.5 hours per year as AWT can be seen as almost understaffed for pharmacists in the contextual nature of pharmacist-appropriate AWT of (1600 to 1900 hours per year).

The study results of 11.5 hours per day reflect prolonged working hours and consequently lead to cognitive fatigue and attention lapse, emotional exhaustion and depersonalization and finally high turnover intent and absenteeism (Dee et al. 2023). This operation routine with 11.5 hours shifts is inconsistent with conserving high reliability in medication systems would increase the case study hospital's risk of medication errors and decrease efficiency for safety-oriented pharmacy functions.

Table 1. Calculating Available Working Time (AWT)

WISN Calculation for a Pharmacist				
Administrative Working Area: Case study hospital pharmacy				
1.Calculating possible annual working days				
Staff category	Weeks in1 year	Working days in 1 week	Possible working days in 1 year	Coding
Pharmacists	52	6	312	A
2. Calculating days not worked in a year				
Reason for absence	Pharmacist			
Public Holidays	5			B
Annual Leave	0			C
Sick leave	2			D
Other leaves (training, personal leave, etc.)	0			E
Total Annual Days Absent	7			
3. Calculating working hours in a year of a pharmacist				
Number of working hours in a day	12			F
break time (hours in a day)	0.5			
Actual Number of working hours in a day	11.5			
AWT of a pharmacist				
Description	Calculation	Pharmacist AWT Calculation		
Total Annual days absent	B+C+D+E	7		
Total working days in a year	A-(B+C+D+E)	305		
AWT (Hours per year)	(A-(B+C+D+E)) *F	3507.5		
AWT (Minutes per year)	((A-(B+C+D+E)) *F) *60	210450		

The standard unit time was not compromised in the context of Myanmar; thus, the study derived the standard unit time from observations and calculation carried out in the analysis section and found the 3.726 minutes to dispensed an item using full standard operating procedures (SOPs). A study from Ethiopia found that dispensing time took 20-190 seconds with an average of 102 seconds per prescription, if counselling time (34.6 seconds) with the patients was involved, the average time per prescriptions with varying prescribed items will take 136.6 seconds per patients (Ambaye et al. 2025). Dispensing time between 30-120 seconds (up to 4 minutes) were recorded in high-volume dispensing settings (Magee et al. 2023). The total annual workload of items dispensed was 98,671 while the standard workload was 56,481. Furthermore, the pharmacists from the case study hospital perform eight standard operating

procedures while performing dispensing medication to the patients which are in align with the study carried out by (Manalu et al. 2021) as presented in Table 2.

Figure 2 present the time allocation of each pharmacist toward workload activities, 27% allocated to health service activities, 55.55% of allocation toward categorical support activities and 18% went to individual additional activities. The pharmacists from this study were performing the standard operating procedures yet the most time-consuming workloads are especially in categorical supporting activities. Time spent for pharmacist in the clinical health service activities, categorical support activities and individual additional activities were 65% to 70%, 15% to 24% and 6% to 20% respectively for the study carried out by Mohamed and Al-Lawati (2022), while Nguyen et al. (2022) highlighted in their study that administrative duties preoccupied up to 40% of nurses' time highlighting the need for standard operating procedures that balance clinical time with non-core task burdens. Similarly, some of the healthcare professional especially physicians and doctors spent between around 70% in the health service activities, average of 25% on categorical support activities and up to 3.05% on additional activities while district hospital nurses spent 29% of their time on health service activities with 68% of their time on categorical support activities with 2.86% on individual additional activities (Nuruzzaman et al. 2022).

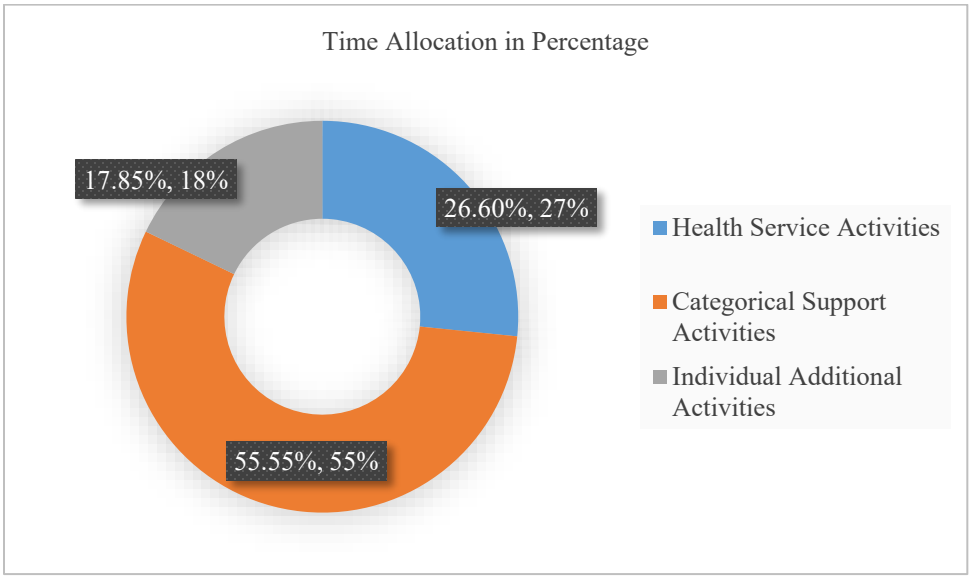

Figure 2. Pharmacist Time Allocation in Percentage

Sungkonoputri and Dhamanti (2023) pointed out that role ambiguity in which optical reactionists were occupied with nursing duties could result to inefficiencies and workload stress. Moreover, the study results are contrasting with previous study carried out by Manalu et al. (2021), in which, the most time extensive activity was dispensing medicine. However, this result aligns with the previous study in which support activities account for more than the health service activities encouraging efficient resource reallocation and optimization of process (Thum et al. 2024) .

The result of the study showed that the current recruited pharmacist in the case study is much under-staffed than the calculation provided by WISN method by 1.466 with a WISN ratio of 0.672 in Table 3. Consequently, the current recruited pharmacist of the case study hospital is 3 thus the shortage in the pharmacists employed is 1.466 full-time pharmacists. The staffing level below workload-based framework in this case a shortage of 1.466 full time pharmacists directly impacts the efficiency of pharmacists to fulfill their technical and clinical responsibilities. Previous researches have discussed that pharmacist shortage reduce patient counseling time, medication review and monitoring which in turn could increase the risk of medication errors and poor accountable outcomes (Tariq et al. 2024). Reduced pharmacist staff also hinders standard dispensing procedures leading to medication delays, longer patient waiting times and reduced patient satisfaction (Yulia et al. 2025). Additionally, shortage in pharmacist negatively impact service efficiency and increased error risk factoring into pharmacist burnout and wellbeing (Dee et al. 2023).

Table 2. Determining Required Number of Staff Using WISN

Staff Category: Pharmacists of the case study hospital				
Standard Unit Time: 3.726 minutes per item				
Available Working Time per pharmacist: 3507.5 hours				
Health Service Activities for all pharmacists	Workload Component	Annual Workload	Standard Workload	Required Number of Pharmacists
	Main Component			
	Dispensing Medication	98671	56481	1.747
	Sub Component			
	1.Prescription receiving	98671	602599	0.164
	2.Prescription screening	98671	329466	0.299
	3.Data entry from prescriptions	98671	1191311	0.083
	4.Labeling medication	98671	344897	0.286
	5.Preparing medication	98671	330773	0.298
	6.Medication verification	98671	335038	0.295
	7.Calling names, consultation and dispensing	98671	447602	0.22
	8.Recording	98671	971762	0.102
Required pharmacists for Health Service Activities (A)				1.747
Support Activities for all pharmacists	Workload Component	CAS (Actual Working Time)		CAS% (Percentage Working Time)
	Receive and re-check drugs from warehouse	152.5		4%
	Monthly stock taking	576		16%
	Check drug stock	305		9%
	Prepare drug requests	152.5		4%
	Prepare medical supplies for operations	305		9%
	Prepare emergency medicines	305		9%
	Organize/separate medicine into shelves	152.5		4%
Total time spent on support activities (in hour)				1948.5
Total time consumption of category allowance standard (CAS%)				55%
Category allowance factor (CAF) (1/(1-(CAS/100)))				
Required pharmacists for Category Support Activities (B)				2.25
Additional Activities of certain pharmacists	Workload Component	Number of Staff	IAS (Actual Working Time per person)	Annual IAS (For all staff performing Activity)
	Coordinate/control non-existent drugs	1	3 hours / day	915
	Monthly reporting	1	4 hours / month	48
	Drug information services	2	1 hours / day	610
	Health education to patients	1	0.5 hours / day	153
	Discuss work problems	1	0.5 hours / day	153
Total time spent on individual allowance standard (IAS) in a year(hour)				1878
Individual allowance factor IAF(IAS/AWT)				
Required pharmacists for Individual Additional Activities (C)				0.535
Total Required Number of Staff Based on WISN A*B+C				4.466

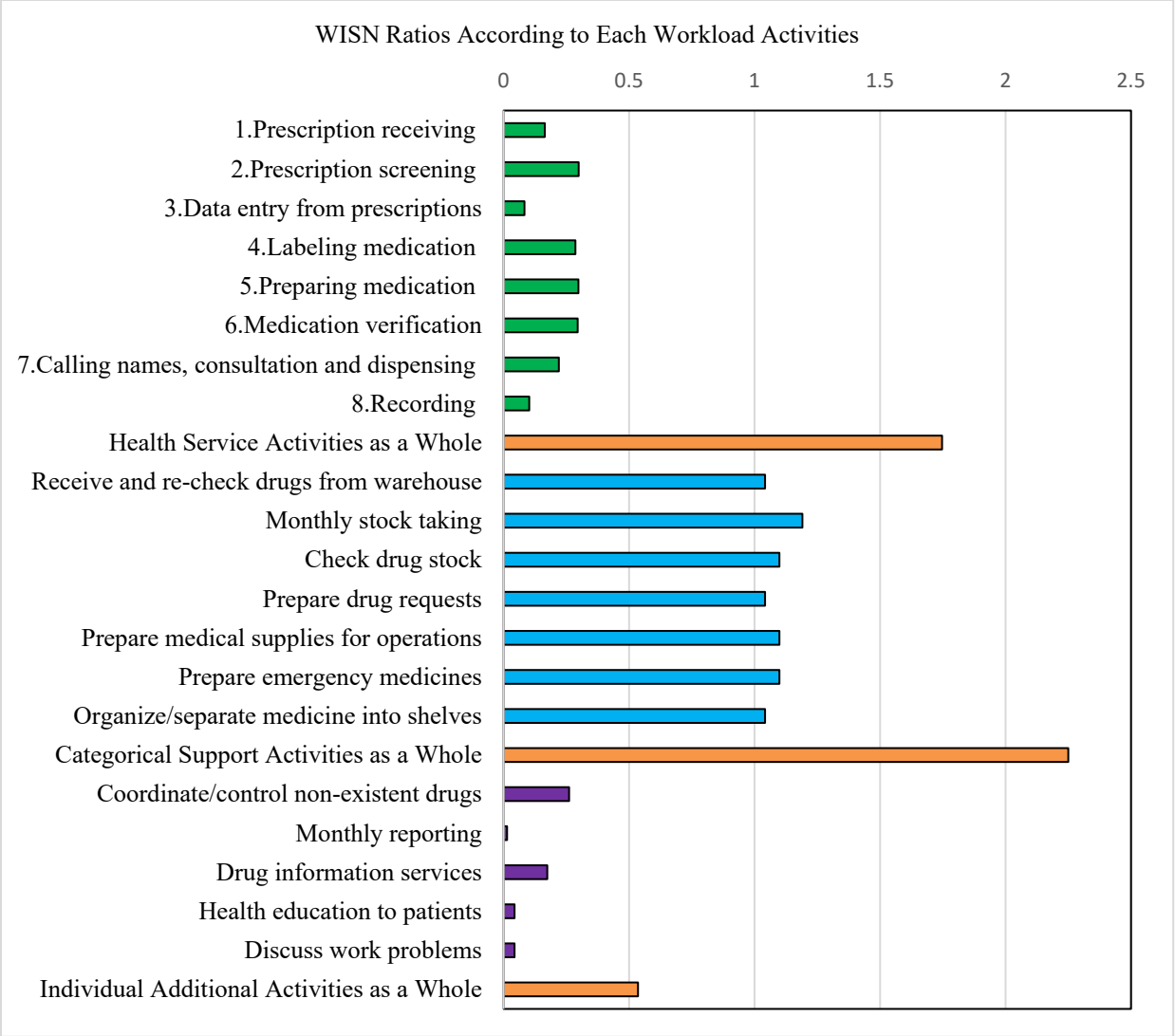

Figure 3. WISN Ratios According to Each Workload Activities

Table 3. Analysis and Interpreting WISN Results

Case study private hospital pharmacy	
Current Pharmacist Number	3
Required Number based on WISN	4.466
Shortage	1.466
Workforce Problem	Shortage
WISN Ratio	0.672
Workload	High

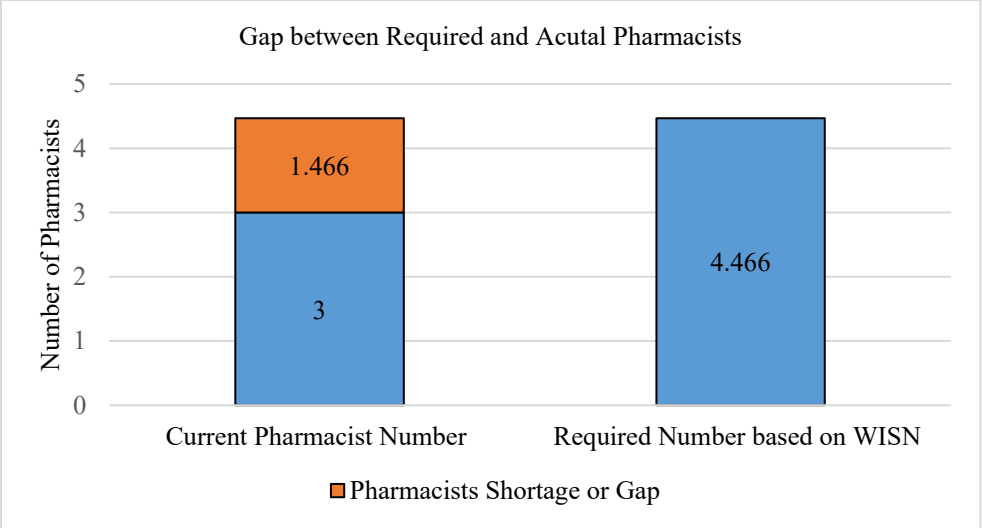

Figure 4. Gap between Required and Actual Pharmacists

WISN ratio of 0.672 also indicated that the shortage is evident for the case study hospital (Figure 3). In the WISN user's Manual WHO (2023), the most efficient WISN ratio would be one, explaining that the number of staffs are in-line with the workload demand, presenting the staff are recruited enough to perform the current workload. However, as the ratio become closer to zero, in this case 0.672 (Figure 4), the pharmacists are performing heavy workload as the existing workload is greater than the standard workload activities performed by a full-time pharmacist.

Various WISN ratios for respective healthcare professionals were 0.2 to 0.67 for physician-consultants Nuruzzaman et al. (2022), 0.2 to 7.0 WISN ratios for operation nurses for different public facilities Aytona et al. (2022), 0.81 WISN ratios for pharmacists of Haji Public Government Hospital Surabaya, Subhan et al. (2021), while a study in Vietnam confirmed that the clinical departments having nursing shortage of 1 to 2 nurses with WISN ratios between 0.88 and 0.95. Similarly, studies carried out in Duhok governorate lacked 145 physicians with WISN ratios of 0.33 across governorate healthcare centers Al-Dabbagh et al. (2022) while in Muscat governorate, 68 shortages of doctors accompanied by 0.8 WISN ratio and 26 shortages of nurses with WISN ratio of 0.9 (Mohamed and Al-Lawati 2022). These ratios from several studies provide insightful comparison as well as assisting in making evidence-based workforce planning decision in similar resource limited healthcare setting like Myanmar.

Additionally, it is to be noted that some of the activities, especially in category support activities and individual additional activities such as direct patient care of clinical activities in the case study hospital pharmacy has not been fully in coordinate with the activities those are on per with international private hospital. If those activities were performed by current pharmacists, the required number of pharmacists could be more than the study calculated and analyzed. If the workload is high, it will harm patients through poor service and negative impacts on nurses in the form of fatigue, work stress, and emotions, so job satisfaction is also low (Ross et al. 2019). Thus, the study WISN results can be used as the foundational tool to effectively manage pharmacist workforce as well as current and potential workload to better plan efficient workforce by using proposed WISN analysis framework.

6. Conclusion

By applying WISN method, workforce planning can be simplified and effectively manage the current workforce as well as served as the stepping stone for policy and decision makers to ensure the right number of healthcare professionals especially pharmacists in the study context. This study provides a solid foundational analysis framework based on previous literature while reflecting the current pharmacists employed was not responsive enough to serve actual needs for the case study hospital using WISN method. The result of the study can be used as an appliance for auditing and distribution of pharmacists if the expansion of 50 beds for the case study hospital after managing the shortage of pharmacy staff.

To address increasing hospital demands in both private and public health care of Myanmar, the WISN methodology should be integrated into hospital human resource planning and recruitment (Jing et al. 2022). In addition, a review of health care professional staffing norms would be essential in managing shortages of pharmacists as high workload will be inevitable. Further, careful and detailed analysis of workload activities and proper time allocation towards each activity will allow the stake-holding decision makers to better understand the current dynamics and context for any expansion plans. Based on the results, the study proposed the case study hospital to review the current workload activities along with job description, and offering attractive incentives especially paid holiday package with suitable working hours while creating effective and efficient recruiting management to handle the current shortage of pharmacists. Additionally, delegating consistent tasks such as recording and check drug stock in the system to assistants or streamlined technology enabled pharmacists to focus on clinical and patient-centered services. Finally, by strengthening supervision and resource management by providing training with supportive supervision can enable to lift the heavy workload environment.

As the study offers insightful contributions to WISN literatures and practical contextual setting, shortcomings are inevitable. Since the study carried out with time-constraints with limited resource available due to several political unrests, the study able to conduct statistically detectable sample size without the detailed consideration of seasonal fluctuations and lack of qualitative factors such as burnout and job satisfaction. Another limitation would be that the study focused only on pharmacy framework in a private hospital setting thus the generalization to other healthcare professional framework or settings may be confined. Furthermore, the study confined the AWT calculation based on real situation of no leave for the case study, thus, further study should consider using sensitivity analysis for calculating AWT using plausible leave scenarios to better predict the WISN results based on related setting. Moreover, application of the results should be with considerable caution as workload and time allocations might be differed from hospital to hospital or related contextual setting. While observation for this study was carried out, pharmacist assistants were presented in a heavy workload condition and thus, further study should consider cooperating of pharmacist with others in related working area. Moreover, the assessment of workload activities and calculation of the WISN approach demand great availability and accuracy of existing as well as primary data in the case of Myanmar context because of poor documentation at the institutional level thus, overestimation or underestimation of the data might be present. Thus, the study recommends further studies – especially Myanmar context – to conduct WISN approach in multi-hospital comparison or across cadre type. Combing qualitative aspects such as burnout, workplace stress, and job satisfaction with strong presentation of WISN method can help further studies to strengthen their framework setting.

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