

Exploratory - Descriptive Study for Rehabilitation Services in PSAFH-Madinah, Saudi Arabia 2024

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Abstract: ***Background:** Standard medical rehabilitation services for inpatients and outpatients require adequate infrastructure, materials, and personnel. Multiple approaches exist to managing the planning of personnel requirements, including both the quantity and the specific roles needed. It is imperative to conduct routine assessments of staffing levels, especially considering implementing new care models like acute rehabilitation or in - reach rehabilitation. **Aims:** This study aims to investigate the number of outpatient and inpatient visits, follow - ups, referrals, no - shows, cancellations, dropouts, and prescribed medical devices in the physiotherapy department and calculate the staff - to - visits ratio. **Methodology:** This study utilized an Exploratory - Descriptive design; data was collected from January to March 2024. Data on outpatient and inpatient physiotherapy visits, referrals, newly admitted cases, no - shows, cancellations, dropouts, and prescribed medical devices were collected weekly. The study included all patients and staff, with no exclusion criteria. Data were recorded in Excel and analyzed using SPSS. **Results:** Outpatient services accounted for approximately 90.94% of total visits. Physiotherapy referrals predominantly originated from the Family Medicine department (52%) and the Orthopedic department (40%). The staff - to - visit ratio averaged 32 visits per staff member. The Third Next Available Appointment (TNAA) was 18.42 days (SD = 4.87; 95% CI, 16.96 - 19.89). A significant positive relationship was observed between TNAA and no - show rates in the outpatient department, with a p - value of 0.034 (95% CI, 0.844-0.054). **Conclusion:** Our findings underscore the importance of adequate staffing levels in healthcare settings to improve patient outcomes and enhance staff well - being. Addressing work - related stress and optimizing appointment scheduling can improve healthcare delivery and staff satisfaction. Moreover, ensuring adequate medical services supply is crucial to meet patient needs effectively*

Keywords: Rehabilitation, physiotherapy, Quality, Staff to visit ratio, Saudi Arabia

1. Introduction

Rehabilitation is defined by the World Health Organization (WHO) as “a set of interventions designed to optimize functioning and reduce disability in individuals with health conditions in interaction with their environment and the background of individual’s life and living.” It is essential to health services, enabling individuals to achieve their full functional potential in their living and working environments. Rehabilitation is also a crucial component of universal health coverage and an essential strategy for achieving Sustainable Development Goal 3: "Ensure healthy lives and promote well - being for all at all ages" (United Nations).

The Oxford Dictionary defines disability as “a physical or mental condition that limits a person's movements, senses, or activities. Approximately 1.3 billion people, or 16% of the world's population, currently live with significant disabilities. This number is rising, partly due to an aging population and a growing prevalence of non - communicable diseases (WHO, 2011).

Evidence from Wade (2020) demonstrates that rehabilitation benefits individuals with long - term disabilities, regardless of the cause, stage of illness, age, or setting. This broad applicability underscores the necessity of expanding rehabilitation services globally, particularly in low - and middle - income countries, to enhance accessibility and affordability. Effective rehabilitation depends on a skilled multidisciplinary team operating within the biopsychosocial model of illness, which emphasizes the interplay between biological, psychological, and social factors. Wade (2020) also highlights the importance of collaborative goal - setting within these teams. Further supporting this, Tyson et al. (2015) found that the effectiveness of stroke rehabilitation teams improved with the quality of team meetings, particularly in communication, coordination, equal member contribution, mutual support, commitment to team goals, and overall cohesion.

The literature consistently emphasizes the role of multidisciplinary teams in rehabilitation. Stroke rehabilitation reviews by Langhorne and Pollock (2002) and the Stroke Unit

Trialists' Collaboration (2013) elaborate on the critical aspects of such teamwork. Strasser (2005) notes that healthcare teamwork generally correlates with better outcomes, identifying key features like a task - oriented approach, high levels of organization, and effective use of quality information as crucial for success.

Momsen et al. (2012) and others have detailed the characteristics of rehabilitation and the potential impacts of multidisciplinary team care interventions. These include individually tailored interventions involving all relevant components, frequent contact among parties, high professional standards, and a focus on the individual in need. Whether trans - disciplinary or inter - disciplinary, multidisciplinary team care interventions involve comprehensive documentation of goals and guidelines, regular follow - ups, and continuous, transparent communication; additionally, regular joint conferences and ongoing education and training for professionals are crucial (Johansson et al., 2010; Burckhardt et al., 2006; Karjalainen et al., 2003; Coldwell et al., 2007; Norlund et al., 2009).

The global prevalence of disability is estimated at 16%, but it varies significantly between countries, ranging from less than 1% to as high as 30% in some nations (WHO). The Saudi General Authority for Statistics stated that disability rates among Saudis also vary across age groups, with the highest rate recorded among those aged 20 - 65 years at 55.86%. For the age group 65+, the rate is 31.14%, mainly due to health conditions that cause multiple difficulties in movement, vision, and hearing, as well as chronic diseases prevalent among the elderly (such as diabetes, hypertension, heart diseases, etc.). The survey results showed that the most common difficulty is movement (walking or climbing stairs), affecting 29.13% of the total Saudi population with disabilities, which significantly impacts their performance and participation in society.

As of the latest statistics, the population of Saudi Arabia exceeds 34 million, with 1, 076, 000 individuals in the 65+ age group. The population of Madinah is 2, 137, 983 according to the General Authority for Statistics in 2022, with a disability rate of 2.7%, which increases by 53% in the 65+ age group. Madinah has the highest prevalence of chronic diseases in the Kingdom at 21%. Medical record statistics show that retirees, the elderly, and individuals with chronic diseases constitute a significant portion of the patients. Additionally, many citizens prefer to live and settle in Madinah after retirement (General Authority for Statistics, 2024).

According to McHugh and Swain (2014), the health sector employs many skilled and unskilled workers. Determining the appropriate number of staff required for each category is challenging due to various underlying factors, such as the workload each category of staff must manage within a healthcare facility. Caruth et al. (2009) define staffing as "the process of determining human resource needs in an organization and securing sufficient quantities of qualified people to fill those needs." DeWit and Putman (2005) reported that only 33% of patients deemed suitable for therapy by hospital therapists received at least 45 minutes of physiotherapy per weekday. They suggested that therapists

might underestimate patients' tolerance for treatment, though this claim was not backed by evidence. The study also recommended reviewing therapy practices, noting that UK therapists are often overburdened with administrative tasks, reducing their direct patient contact time.

Standard medical rehabilitation services for inpatients and outpatients require adequate infrastructure, materials, and personnel. These services are provided by highly skilled professionals, including physiatrists, physiotherapists, occupational therapists, and orthotics and prosthetics therapists.

Multiple approaches exist to managing the planning of personnel requirements, including both the quantity and the specific roles needed. Additional personnel may be hired as necessary, or staffing ratios can be utilized when the types and quantities of health conditions to be treated can be accurately expected (Beauvais, B., et al., 2024)

Different services or activities are offered in a rehabilitation department. However, they are not well suited to developing a staffing formula or have not yet been subjected to one. Staffing ratios are implemented in certain services based on the service's scale and level of task specification. Staffing ratios and the range of health conditions can be utilized for benchmarking against other programs or as potential benchmarks to guide the establishment of a new service (Affeldt, J., & Downey, C., 1961).

However, the standards for planning the numbers and types of personnel needed do not attempt to be established in the rehabilitation department. This exploratory - descriptive study aims to establish a baseline assessment and roadmap for the rehabilitation department at Prince Sultan Armed Forces Hospital (PSAFH) in Madinah, Saudi Arabia. To improve the quality and efficacy of rehabilitation health care services.

Patients referred to the rehabilitation medicine service will be administered an optimal combination of therapy to facilitate a successful rehabilitation process within a suitable duration. The extent to which this occurs will depend on various patient - specific factors, including the type of impairment experienced, the duration since its initiation, the existence of other illnesses, the patient's tolerance for therapy, cognitive abilities, and motivation to engage in rehabilitation (Krug, E., & Cieza, A., 2017).

An increasing body of literature supports the concept that increased therapy intensity enhances functional outcomes and improves the rehabilitation process (Teasell, R et al., 2005). A sufficient number of professional and support personnel comprise the staff establishment of a rehabilitation medicine service, enabling it to deliver evidence - based rehabilitation management that is update, safe, effective, and efficient (Larsen, M. J., & Ainsworth, C. L., 2001). It is imperative to conduct routine assessments of staffing levels, especially considering implementing new care models like acute rehabilitation or in - reach rehabilitation.

McHugh and Swain (2014) further highlighted the inadequacy of current staffing levels in providing optimal rehabilitation for stroke patients. Only 42% of the units

studied met the Department of Health staffing recommendations for physiotherapy, and fewer than 16% met the speech and language therapy recommendations. Although 84% of the units met the staffing recommendations for occupational therapy, this discrepancy suggests issues with the Department of Health guidelines. To provide the recommended 45 minutes of therapy per day for each patient, the estimated staffing levels are 1.7 physiotherapists, 2.1 occupational therapists, and 2.0 speech and language therapists per 10 beds., considering their respective direct contact times of 46%, 33%, and 25%. Consequently, fewer physiotherapists are required per 10 beds due to their higher direct patient contact, resulting in a staffing configuration that differs from clinical practice but is logically consistent, as physiotherapists have more direct contact time with patients than occupational and speech and language therapists. As for orthotics and prosthetics therapists, the Macro Staffing Analysis report in 2015 indicated a ratio of 0.125 and 0.228 therapists per 10 beds (Keating, 2015).

Staffing ratios have been successfully applied in nursing, particularly acute care settings. The review aimed to determine if similar workforce ratios exist for allied health professionals and if these could be used for planning allied health services (Romito, 2006; Shannon et al., 2007). However, the review by Cartmill et al. (2012) found few examples of staffing ratios for allied health professionals, and only one of these ratios was linked to clinical outcomes. The evidence suggests that staffing ratios might be applicable in specialized areas such as rehabilitation and Medical Assessment and Planning Units for allied health workforce planning. However, the available evidence is insufficient to use workforce ratios for planning allied health requirements in more general settings, such as general hospitals or community settings.

Overall, the evidence suggests that successful rehabilitation relies heavily on the involvement of a multidisciplinary team, which enhances the quality of rehabilitation services through effective collaboration and communication. Proper staffing ratios are crucial in this context, as they ensure that each professional can dedicate adequate time to direct patient care. Staffing ratios account for the specific direct contact times each type of therapist has with patients, optimizing the rehabilitation process and improving patient outcomes.

Rational

The quality of rehabilitation services ensures that individuals with long - term disabilities can achieve their full functional potential. Central to delivering high - quality rehabilitation is the involvement of multidisciplinary teams, which bring together experts from various fields to address the complex interplay of biological, psychological, and social factors affecting patients. Working within the biopsychosocial model, these teams collaboratively set and pursue shared goals, fostering a holistic and patient - centered approach to care. Evidence indicates that effective communication, coordination, and mutual support within these teams lead to significantly better patient outcomes. Moreover, as global health trends necessitate expanding rehabilitation services (Tyson et al., 2015), particularly in low - and middle - income countries, the role of skilled multidisciplinary teams becomes even more critical. By enhancing service delivery and

ensuring comprehensive care, multidisciplinary teams improve the quality of rehabilitation services and contribute to the broader objectives of universal health coverage and sustainable development (Momsen et al., 2012). Therefore, prioritizing developing and supporting multidisciplinary rehabilitation teams is essential for advancing the quality and effectiveness of rehabilitation services worldwide.

This underscores the need for extended care and rehabilitation services, especially in Madinah, which lacks sufficient rehabilitation and extended care services and specialized fields in rehabilitation. There is a pressing need to establish a specialized rehabilitation center for musculoskeletal injuries, chronic inflammations, stroke and neurological disorders, spinal cord and brain injuries, amputations, and pediatric cases.

Goal of the Study

This study aims to investigate the number of outpatient and inpatient visits, follow - ups, referrals, no - shows, cancellations, dropouts, and prescribed medical devices in the physiotherapy department and calculate the staff - to - visits ratio. The purpose is to establish a baseline assessment and develop a roadmap for the rehabilitation department at PSAFH - Madinah.

Research Question

What is the status of outpatient and inpatient visits, follow - ups, referrals, no - shows, cancellations, dropouts, and prescribed medical devices in the physiotherapy department at PSAFH - Madinah, and how can this data be used to establish a baseline assessment and develop a roadmap for the rehabilitation department?

2. Methodology

A descriptive quantitative approach was adopted in this study to investigate Rehabilitation Services in PSAFH - Madinah.

Variables

The collected data includes the number of outpatient visits for physiotherapy and follow - up visits for various conditions such as stroke, traumatic brain injury, spinal cord injury, amputations, fractures, total knee, shoulder, and hip replacements, post - spinal surgery, musculoskeletal disorders, and pediatrics. It also covers the number of physiotherapy visits by inpatients, inpatient referrals to physiotherapy from departments such as orthopedics, family medicine, neurology, pediatrics, and others, as well as the number of newly admitted cases of stroke, spinal cord damage, traumatic brain injury, and upper or lower limb amputation. Additionally, it includes instances where patients fail to show up for their physiotherapy appointments, cancel their appointments, or drop out of treatment, the number of patients referred from various departments for outpatient care, the number of strokes, amputees, spinal cord injuries, and traumatic brain injury patients admitted to the hospital, and the number of medical devices prescribed for patients.

Study Design

This study utilized an Exploratory - Descriptive design from January to March 2024. Data collection was managed by the hospital's data department and recorded in Excel

spreadsheets. Following data retrieval, analysis was performed using SPSS software. The dataset included variables aggregated weekly, which means that detailed patient information, as well as specific visit dates and times, were not available. Only weekly totals were used in the analysis.

Population and Sample

All patients and staff in the department will be included in the study from January to March 2024.

Inclusion and Exclusion Criteria

All patients, visits, and staff during the study period were included in the analysis. There are no exclusion criteria.

Measures (tools)

The data is downloaded daily in Excel files to determine the average number of visits, referrals, cancellations, no - shows, and dropouts for physiotherapy. Total count of medical devices prescribed for patients. To ensure accurate data collection, the primary researchers have access to the OSIS program, which provides numbers of hospital admissions using the ICD 10 code. Additionally, the researchers reviewed the admission office records and logbook of surgical cases.

Data Analysis

The quantitative data will be analyzed using the Excel spreadsheet and IBM SPSS Statistics 22.0 program. The number of visits, referrals, requested equipment, and rates of cancellation, no - show, and patient drop - out will be analyzed using mean and standard deviation for continuous variables, median and interquartile range for ordinal variables, and percentages for categorical categories.

3. Results

Table Error! No text of specified style in document.- 1: Visits Count

Visits count	Jan	Feb	Mar	Total	%
Total no. of visits	1457	1232	1088	3777	
Outpatient visits	1320	1109	1006	3435	90.94%
inpatient visits	137	123	82	342	9.05%

Table 5 - 1 presents the distribution of total physiotherapy visits, highlighting the predominance of outpatient services (90.94%) compared to inpatient services (9.05%) over the year's first quarter.

Table Error! No text of specified style in document.- 2: Outpatient Visits Distribution

Visits count	Valid	Mean	Upper CI	Lower CI	SD	Min	Max
Total No. Of Outpatient & Inpatient Visits	56	58.946	62.871	55.022	14.655	9.000	82.000
New Visits in Clinics	56	20.607	22.186	19.028	5.895	3.000	33.000
Follow Up Visits in Clinics	56	32.929	35.446	30.411	9.400	0.000	49.000
Total No. Of Visits in Clinics	56	53.482	57.186	49.778	13.830	3.000	75.000

SD, Standard deviation; Min, Minimum; Max, Maximum.

Table 5.2 shows inpatient statistics for physiotherapy visits, showing that the total number of outpatient and inpatient visits has a mean of approximately 59 (SD = 14.7), with a confidence interval of 55 to 63, indicating considerable variability. New visits have a mean of around 21 (SD = 5.9), with the actual mean likely between 19 and 22. Follow - up visits average 33 (SD = 9.4), with a confidence interval of 30 to 35, showing moderate variability. Total visits to physiotherapy clinics average 53 (SD = 13.8), with a confidence interval of 50 to 57, reflecting some fluctuation in visit numbers. Overall, the data reveal consistency in visit numbers and significant variability across different categories.

Table Error! No text of specified style in document.- 3: No Show – Cancellation – Drop Out in Outpatient Visits

Visits count	Jan	Feb	Mar	Total	%
Total booked outpatient appointments*	1926	1679	1602	5207	
no - show	419	497	466	1382	22%
cancellation	187	73	130	390	10%
dropout	112	117	194	423	6%

* Total booked outpatient appointments = cancelled + no show + completed appointments

Table 5 - 3 illustrates the rates of no - shows, cancellations, and drop - outs among outpatient visits. The no - show rate is notably high, particularly in February (30%), indicating potential areas for improving patient adherence to scheduled appointments.

Table Error! No text of specified style in document.- 4: No Show – Cancellation – Drop Out in Inpatient Department

Visits count	Jan	Feb	Mar	Total	%
inpatient visits	137	123	82	342	
cancellation	9	4	7	20	5.8%
drop out	0	0	0	0	

Table 5 - 4 shows the low rates of cancellations and the absence of dropouts in inpatient physiotherapy visits, suggesting a higher adherence among inpatients compared to outpatients.

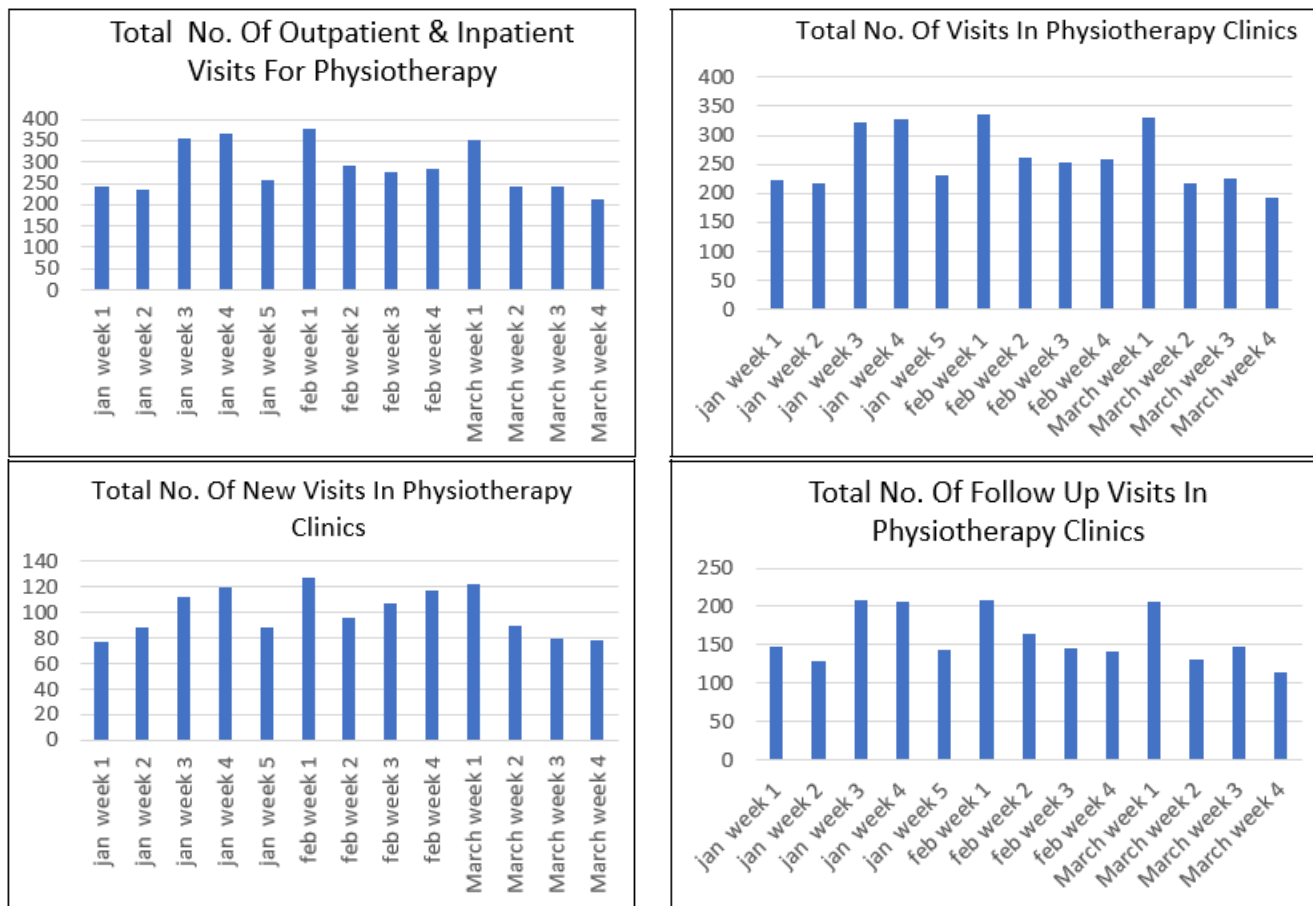


Figure Error! No text of specified style in document.-1: Bar charts showing the visits count and distribution each weak

Table Error! No text of specified style in document. - 5: Visits count of Stroke Cases

Visits count	Jan	Feb	Mar	Total
Total no of stroke cases	20	19	3	42
Number of new visits	5	2	0	7
Number of follow - up visits	15	17	3	35

Table 5 - 5 summarizes stroke - related visits, indicating that most follow - up visits were compared to new visits, reflecting ongoing patient management and care.

Table Error! No text of specified style in document.- 6: Adult Neuro - Rehabilitation Visits count

Visits count	Jan	Feb	Mar	Total
Total of visits	34	19	17	70
new visits	5	3	6	14
follow - up visits	29	16	11	56

Table 5 - 6 details adult neuro - rehabilitation visits, with follow - up visits comprising a significant portion, indicating ongoing rehabilitation processes.

Table Error! No text of specified style in document.- 7: Post - surgery and Other Rehabilitation Visits

Visits count	Jan	Feb	Mar	Total
Post - fracture	29	12	7	48
Post hip/knee/shoulder replacement	9	5	6	20
Post spinal surgery	3	1	1	5
Other rehabilitation services	574	539	472	1585

Tables 5 - 7 highlight the variety of rehabilitation cases, with many visits for general rehabilitation needs compared to specific post - surgery rehabilitation.

Table Error! No text of specified style in document.- 8: Pediatric Rehabilitation Visits

Visits count	Jan	Feb	Mar	Total
new visits	10	3	1	14
follow up visits	13	21	17	51
Total	23	24	18	65

Table 5 - 8 shows pediatric rehabilitation visits, with follow - up visits substantially outnumbering new visits, suggesting continuity in pediatric care.

Table Error! No text of specified style in document.- 9: Physiotherapy Referrals from different medical departments

Referral source	Jan	%	Feb	%	Mar	%	total	%
orthopedic	145	30%	180	37%	157	33%	482	40%
physical and rehabilitation	0	0%	0	0%	0	0%	0	0%
family medicine	239	38%	210	33%	187	29%	636	52%
neurology	11	46%	5	21%	8	33%	24	2%
Neuro - & spinal surgery	0	0%	0	0%	0	0%	0	0%
Internal Medicine	0	0%	0	0%	0	0%	0	0%
surgical departments	0	0%	0	0%	2	100%	2	0.2%
pediatric	0	0%	5	45%	6	55%	11	1%

other departments	43	67%	8	13%	13	20%	64	5%
Total referrals	435	36%	408	34%	373	31%	1216	100%

Table 5 - 9 provides a detailed breakdown of physiotherapy referrals by department for January, February, and March. The Family Medicine department emerges as the largest source of referrals, contributing 636 referrals and accounting for 52% of the annual total, though it shows a gradual decline from 38% in January to 29% in March. Similarly, the Orthopedic department is a significant contributor with 482 referrals, or 40% of the total, maintaining a more consistent monthly contribution. In contrast, departments such as Physical Medicine & Rehabilitation, Neurosurgery & Spinal Surgery, and Adult Medical Departments did not contribute any referrals. The table also highlights small but notable contributions from other departments, such as Neurology and Pediatrics, indicating specific, though limited, needs for physiotherapy services from these areas. The overall referral pattern suggests a heavy reliance on Family Medicine and Orthopedics for physiotherapy services, with significant room for engagement from other departments.

Table Error! No text of specified style in document.- 10:
Total staff count, and distribution based on level

	Staff PT	Senior PT	Consultant	Total
Count	8	1	1	10

Table 5 - 10 shows the total number of staff members in the PT unit, with most staff being Staff PT. Knowing that the only consultant is the head of the department and will not be included in the staff - to - patient ratio analysis in this research.

Table Error! No text of specified style in document.- 11:
Staff - To - visit Ratio SVR

Patients visit type	Total Visits	Staff	SVR Ratio	SPTV Ratio
Total no. Of outpatient & inpatient	3777	9	420	472.125
outpatient	3435	9	382	429.375
inpatient	342	9	38	42.75

SVR, Staff - to - visit Ratio; Staff - P. T. - to - visit Ratio

Table 11 presents the staff - to - visit ratios for various categories of physiotherapy visits. The staff - to - visit ratio across all physiotherapy visits is 1: 420, indicating a substantial patient load per staff member. For visits specifically to physiotherapy clinics, the ratio is somewhat lower at 1: 382, suggesting a slightly better distribution of staff for these sessions. In contrast, the ratio for inpatient

Table Error! No text of specified style in document.- 14: Third Next Available Appointment TNAA

	Valid	Missing	Mean	CI Up	CI Low	SD	Min	Max
TNAA (days)	45	20	18.422	19.886	16.958	4.873	6	30

Table 5 - 13 provides descriptive statistics for the "Third Next Available Appointment" for new cases measured in days. With 45 valid data points and 20 missing entries, the mean waiting time is approximately 18.4 days (SD = 4.87). The 95% confidence interval ranges from 16.96 to 19.89 days, indicating that the true mean likely falls within this interval. The waiting times vary from a minimum of 6 to 30 days, reflecting moderate variability in appointment availability.

physiotherapy visits is markedly lower at 1: 38, reflecting a more favorable staff - to - visit distribution in this setting. These ratios underscore the significant differences in staff allocation between outpatient and inpatient care, highlighting areas where staffing may need to be adjusted to meet patient needs better.

Table Error! No text of specified style in document. - 12:
Staff - To - visit Ratio SVR by Week

Week	Total No of visits	SVR	Staff - To - visits
Jan Week 1	243	27	30.375
Jan Week 2	236	26	29.5
Jan Week 3	356	40	44.5
Jan Week 4	365	41	45.625
Jan Week 5	257	29	32.125
Feb Week 1	379	42	47.375
Feb Week 2	292	32	36.5
Feb Week 3	278	31	34.75
Feb Week 4	283	31	35.375
Mar Week 1	350	39	43.75
Mar Week 2	242	27	30.25
Mar Week 3	244	27	30.5
Mar Week 4	213	24	26.625
Mar Week 5	42	5	5.25
Total All	3780	420	472.5

SVR, Staff - to - visit Ratio; Staff - P. T. - to - visit Ratio

Table 5 - 12 presents the weekly staff - to - visit ratios. The ratios vary significantly across the weeks, with the highest patient load in the first week of February (379 patients) and the lowest in the fifth week of March (42 patients). These fluctuations highlight the varying demand for physiotherapy services and the corresponding allocation of staff resources. The overall all - staff - to - visit ratio for the quarter is 1: 378, while the staff - to - patient ratio is 1: 472.5, underscoring the high patient load handled by the physiotherapy department.

Table Error! No text of specified style in document.- 13:
Average SVR over the study period

	Average	Min	Max
SVR	32	24	42

Table 5 - 13 shows the average SVR for all staff in the department, with an average of 32 visits per staff member. The hospital operates five days a week, which equates to approximately 8 visits per day for each staff member.

Table Error! No text of specified style in document.- 15:
Medical Devices prescribed and delivered

Equipment status	Jan	Feb	Mar	Total
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Total Number of Medical Devices Prescribed for Patients	101	96	45	242
Total Number of Medical Devices Delivered for Patients	0	26	12	38
Percentage of delivered to prescribed devices's	0%	27%	27%	16%

Table 5 - 14 shows the total amount of prescribed equipment in the departments and the number of equipment delivered, with an average of 16% delivered.

Table Error! No text of specified style in document.- 16: Forecasted visits over the next three months

Date	Week of	Forecasted Visits	Visit - to - Staff Ratio
April 7, 2024	Week 1 of April	298	33.11
April 14, 2024	Week 2 of April	275	30.56
April 21, 2024	Week 3 of April	251	27.89
April 28, 2024	Week 4 of April	220	24.44
May 5, 2024	Week 1 of May	244	27.11
May 12, 2024	Week 2 of May	279	31
May 19, 2024	Week 3 of May	256	28.44
May 26, 2024	Week 4 of May	232	25.78
June 2, 2024	Week 1 of June	201	22.33
June 9, 2024	Week 2 of June	226	25.11
June 16, 2024	Week 3 of June	260	28.89
June 23, 2024	Week 4 of June	238	26.44

Table 5 - 15 shows the forecasted visits three months after the study period. These forecasts suggest a cyclic pattern with fluctuations in visit numbers, reflecting seasonal variations or other periodic factors affecting patient visits. Forecasted

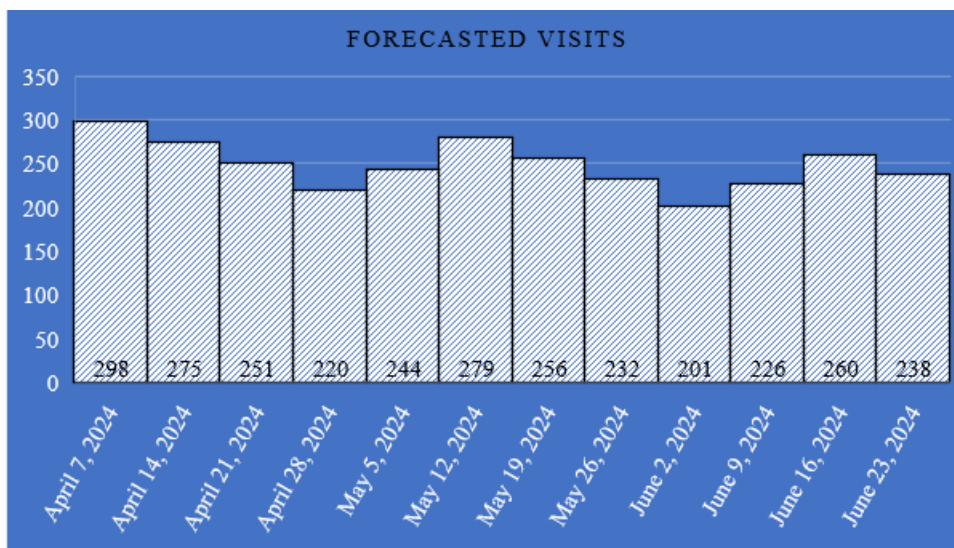


Figure Error! No text of specified style in document.-2: Histogram of Forecasted Visits Over the Next Three Months

Table Error! No text of specified style in document.- 17: Correlation test between TNA, dropout, cancellation and no - show rates

Variable		TNAA	dropout	cancellation	no show
TNAA	Spearman's rho	—			
	p - value	—			
	Upper 95% CI	—			
	Lower 95% CI	—			
Dropout	Spearman's rho	0.104	—		
	p - value	0.724	—		
	Upper 95% CI	0.601	—		
	Lower 95% CI	- 0.452	—		
Cancellation	Spearman's rho	- 0.033	0.058	—	
	p - value	0.91	0.843	—	
	Upper 95% CI	0.506	0.571	—	
	Lower 95% CI	- 0.554	- 0.487	—	
No show	Spearman's rho	0.568	0.61	- 0.222	—
	p - value	0.034	0.021	0.446	—
	Upper 95% CI	0.844	0.862	0.35	—
	Lower 95% CI	0.054	0.118	- 0.673	—

Table 5 - 17 shows a positive relationship between TNAA and the no - show rates in our data set, with p - value of 0.034 (95% CI 0.844 – 0.054).

4. Results Summary

The study offers comprehensive insights into patient visits, staff distribution, and referral patterns across various departments. Key findings include a heavy dominance of outpatient visits over inpatient visits, with outpatient services accounting for approximately 90.94% of total visits. The study further analyzes the distribution of outpatient visits, patient adherence issues such as no-shows and cancellations, and specific service areas such as stroke and neuro-rehabilitation visits. Additionally, physiotherapy referrals predominantly come from the Family Medicine and Orthopedic departments, highlighting specific departmental dependencies. The research also details the staff-to-visit ratios, indicating a substantial patient load, especially in outpatient services. Finally, there is a significant positive relationship between TNA and no-show rates in the outpatient department.

5. Discussion

Rehabilitation Services	Physical Therapy	Rehabilitation Medicine	Occupational Therapy	Speech and Language	Splints and Prosthetics	Behavior Modification	Home Rehabilitation
Musculoskeletal Injuries	√	√	√		√	√	√
Stroke Injuries	√	√	√	√	√	√	√
Spinal Cord Injuries	√	√	√		√	√	√
Brain Injuries	√	√	√	√	√	√	√
Amputations	√	√			√	√	
Pediatric Cases	√	√	√	√	√	√	√
Cardiac and Respiratory Cases	√	√				√	
Elderly Rehabilitation	√	√	√		√	√	√

Worldwide, the average international physiotherapy session is 30 to 60 minutes (Bouça - Machado R et al., 2019), so we assumed a mean of 45 minutes per session. On days with a full staff workload, this could mean that patients may not receive the full recommended session time due to the overload. Any staff absence further disrupts workflow and compromises patient care quality. Research consistently shows that increased staff counts are linked to reduced inpatient mortality rates and decreased lengths of hospital stays (Blegen & Vaughn, 1998; Lankshear et al., 2005).

Work-related stress notably mediated the relationships between workloads and job stresses and outcomes, emerging as the strongest predictors. Hämmig O. (2018) found that a work-life imbalance was the most significant predictor of burnout symptoms among health professionals, particularly among physicians. Additionally, an effort-reward imbalance was the strongest predictor of thoughts about leaving the profession ($\beta = .31 - .36$). Reducing workload and job stress, particularly addressing reward frustration and the challenges of balancing work and personal life, may help prevent burnout and reduce the likelihood of health professionals leaving the profession. This approach could also help decrease turnover, early retirement, career endings, and understaffing in healthcare settings.

A greater composition of staff in rehabilitation inpatient services was linked to decreased 30-day mortality rates. Precisely, a 10% rise in the number of registered nurses (RNs) in the inpatient rehabilitation department corresponded to a

The main objective of this study was to investigate the number of outpatient and inpatient visits, including all types of visit patterns and dropout rates, and to calculate the staff-to-visits ratio. Our key findings reveal a heavy dominance of outpatient visits over inpatient visits, with outpatient services accounting for approximately 90.94% of total visits. The average staff-to-visits ratio (SVR) for all staff in the department is 32 visits per staff member, equating to approximately eight visits per day for each staff member over a five-day workweek. This calculation does not include the time required for paperwork.

In PSAFH, the only physical therapy specialty available is for musculoskeletal injuries, chronic pain, pediatrics, and neurological conditions such as stroke. However, it is essential to meet patients' needs by providing other rehabilitation specialties. This means that, besides physiotherapists, there is a need of multidisciplinary rehabilitation team that includes a rehabilitation physician, occupational therapist, and prosthetics and orthotics specialist, as shown in the table below.

0.5 percentage point reduction in mortality rates in a Canadian study covering conditions such as acute myocardial infarction, stroke, pneumonia, and septicemia (Tourangeau, Giovanetti, Tu, & Wood, 2002). Similarly, a study by Aiken LH et al. (2002) revealed that higher patient-to-staff ratios significantly impact patient outcomes and staff well-being. Each additional patient per staff increased the risk of 30-day mortality and failure-to-rescue by 7% and raised the odds of staff burnout by 23% and job dissatisfaction by 15%. These findings highlight the critical need for adequate staffing to enhance patient safety, reduce mortality rates, and improve nurse satisfaction, thereby mitigating turnover and ensuring higher quality care in healthcare settings.

Regarding the third next available appointment (TNA), our hospital during the study period had a TNA of 18.4 days (SD = 4.87; 95% CI, 16.96 - 19.89). Among our sample, the no-show rates were positively related to the TNA, indicating that longer waiting times increased the chances of no-show rates. This affects the workflow, staff schedules, and potentially patient healthcare outcomes. A study by Shah N et al. (2022) showed that the average TNA was 11 days, significantly inversely associated with patient satisfaction regarding wait times for regular appointments. Specifically, for each additional week of TNA, the proportion of patients rating their wait time as good or excellent dropped by 7.35%. However, this did not affect other factors such as continuity with their preferred physician, ease of after-hours access, same-day telephone response, or same-or-next-day access when ill. Because our department mainly covers outpatient

visits, we failed to study the inpatient outcome and relationship to the TNAA.

Our study forecasted a decrease in patient visit counts, which could be avoided if the staff count was increased to meet the department's needs. Additionally, we found that only 26% of the required medical devices were delivered at their best in February and March, meaning that only one - fourth of patients' medical device needs were met. Although the requested devices decreased over the two months after January, the delivered medical devices also decreased, not increasing the percentage of delivered medical devices. This necessitates an extensive search and root cause analysis to determine the reasons behind the lack of medical device delivery.

6. Suggestions for Improvement

Based on our findings, several measures can be taken to improve patient care and staff well - being in healthcare settings:

- **Increase Staffing Levels:** Hiring additional staff is crucial to address high patient - to - staff ratios and their negative impacts on patient outcomes and staff well - being. Adequate staffing levels can reduce failure - to - rescue incidents, and improve patient safety and satisfaction.
- **Optimize Appointment Scheduling:** Reducing the third next available appointment (TNAA) time can enhance patient satisfaction and reduce no - show rates. Implementing more efficient scheduling systems and increasing appointment availability can help achieve this goal.
- **Enhance Medical Devices Availability:** Conduct a thorough root - cause analysis to understand the reasons behind medical devices shortages. Ensuring that the necessary medical device is available and accessible to meet patient needs can significantly improve the quality of care.
- **Data - Driven Decisions:** Utilize data analytics to monitor patient flow, staff performance, and medical devices utilization to make informed decisions that enhance operational efficiency and patient care.

7. Limitations of the Research

While this study provides valuable insights, several limitations should be acknowledged:

- 1) **Sample Size and Generalizability:** The study was conducted in a single hospital, which may limit the findings' generalizability to other healthcare settings. A larger sample size and longer follow - up period across multiple institutions would provide more robust data.
- 2) **Cross - Sectional Design:** The study's cross - sectional design captures a snapshot in time, making it difficult to establish causality between variables. Longitudinal studies would be needed to confirm these relationships over time.
- 3) **Lack of Control for External Factors:** The study did not account for all potential external factors influencing patient visits and staff performance, such as seasonal variations, policy changes, or economic conditions.
- 4) **Medical Devices Utilization:** The study did not explore the specific reasons behind the low delivery rates of

medical devices, which could provide deeper insights into the department's operational challenges.

- 5) **Limited Scope:** The research focused primarily on patient visits and staff - to - visits ratios without delving into other critical aspects such as patient intervention outcomes, quality of care measures, and patient satisfaction in more detail.

8. Conclusion

Our findings underscore the importance of adequate staffing levels in healthcare settings to improve patient outcomes and enhance professionals' well - being. Addressing work - related stress and optimizing appointment scheduling can improve healthcare delivery and staff satisfaction. Moreover, ensuring adequate medical device supply is crucial to effectively meeting patient needs.

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