



Original Article

Nurses' Perception Regarding Barriers to use of Health Information System in the Teaching Hospital of Abbottabad

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ABSTRACT

The Health Management Information System (HMIS) was designed to provide information on the status of ongoing health-related events. It has been designed to enhance data management in health care facilities. The effectiveness of this system depends on the appropriate collection, analysis, interpretation, and utilization of data. **Objective:** This study intended to generate knowledge to bridge this knowledge gap to overcome barriers to using and implementing integrated HIS. **Methods:** Descriptive cross-sectional design was used in this study. The data were collected in a Teaching hospital in Abbottabad from July 27, to Aug 3, 2022. Five item Likert scale was used to collect data from 206 nurses. Those who have one-year of experience with HMIS were included in this study. **Result:** More than half 51.9% (n=107) of the study participants were female. Almost half 49.5% (n=102) of the participants responded with little and very few barriers in the use of health information systems, followed by much and very much by one-fourth of the participants 25.7% (n=53) and moderate 24.8% (n=51). technical (2.98±1.17) had the highest total mean scores followed by legal (2.95±1.19), organizational (2.91±1.15), and personal (2.90±1.16). **Conclusions:** The study concluded technical barrier as the top most and comprises computer shortage, internet breakdown and improper health information network. The nurses also reported workload due to documentation and access of an unauthorized person to information.

INTRODUCTION

One of the six components of a health system is health information systems, the other five being important to any health system (health professionals, healthcare services, Financial, management and governance, health products, and vaccinations). The health information system provides useful information for other components' efficient decision-making [1]. WHO has consistently emphasized the need of health information for the efficient management of health care organization [2]. Health information system is defined as software designed specifically for integrated health information management tasks that collect, verifies, analyses, and displays aggregate statistical data [3]. HMIS may lower expenses

while enhancing the standard of treatment [4]. Organization, people, and information systems are three factors that are crucial in the application of information technology in healthcare [5]. The Health Management Information System (HMIS) was designed to provide information on the status of ongoing health-related events to aid in effective management and evidence-based decision-making at all levels of health-care systems [6]. This system is important because they handle all patient data and information, including vital personal information and other in-depth medical data [7]. HMIS is broadly applied in developing and low-income countries and has been designed to enhance standard data management in health

care settings [8]. It is anticipated that HMIS will measure the prevalence of disease-related morbidity and mortality in populations, monitor trends over time, and spot any odd tendencies to enable prompt response [9]. The effectiveness of a health information system depends on the appropriate collection, analysis, interpretation, and utilization of data at all levels. In most cases, incapacitated systems have a negative impact on system performance and efficiency [10]. Health IT has the potential to improve patient safety, but its use and implementation have been accompanied by unforeseen consequences and significant safety concerns [11-12]. For improving patient safety in healthcare systems that incorporate health IT, developing trustworthy, doable ways to quantify safety concerns at the intersection of health IT and patient safety is a significant problem [13]. User self-efficacy, usefulness, and simplicity of use are significantly impacted by management support, agreement, and high-quality information; these important elements increase system acceptability and allow managers to take into account the crucial variables for decision-making, system development, and improvement [14]. The development of an evidence-based information system requires educational activities to improve the attention and abilities of healthcare professionals [15]. To maintain safety and quality of care, collaboration, good managerial and organizational planning, effective technology, well-structured systems, and effective communication are all needed [16]. Health management information is essential for the continuous improvement of the health care system. It has been started in Pakistan in 2007 but the contemporary system in Pakistan is worse and of poor quality because it has never been accomplished. After the installation of MTI ACT 2015, KP Government started HMIS in teaching hospitals. but there are major challenges in the implementation and the use of health information systems. very limited studies have been done in Pakistan especially in KPK so it's a significant issue that needs to be investigated. This study intended to generate knowledge to bridge this knowledge gap to overcome barriers to using and implementing integrated HIS.

METHODS

A descriptive cross-sectional design was used in this study to understand nurse's perceptions regarding barriers to using Health information system in a teaching hospital of Abbottabad. Data were collected from July 27 to Aug 3, 2022, through a random sampling technique. The study population included nurses who worked in a teaching hospital where health information system has been installed. Nurses who had one-year of experience with HIS were included in this study. Nurses who were on long leaves during data collection and has less than one-year

experience with HIS were excluded from the study. Sample size was 206 and the data collection tool was five item likert-scale from very little=1 to very much=5 and included 25 questions. The questionnaire included five sections. The first section on demographic characteristics: gender, age group, level of education and years of experience. The remaining four sections were classified as category barriers. The second section was about organizational barriers and consists of nine questions regarding organizational barriers to the implementation and use of health information system. The third section was about Technical barriers and consists of nine questions regarding organizational barriers for implementation and use of health information system. The fourth section was about personal barriers and consists of four questions regarding organizational barriers for implementation and use of health information system. The fifth section was about the Legal and Ethical barriers and consists of three questions regarding organizational barriers to the implementation and use of health information system. Barriers: a fence or other obstacle that prevents movement or access. It has been divided into three categories; little (1 - 2.339) scores indicate very little and few barriers to health information system. **Barriers:** a fence or other obstacle that prevents movement or access. It has been divided into three categories; little (1 - 2.339) scores indicate very little and few barriers to health information system, moderate (2.34 - 3.669) score indicates moderate barriers in the health information system and much (3.67 - 5) score indicates much barriers in the health information system. The content validity of the study instrumental tool was verified by health information department experts [5]. Reliability analyses were run for the HIS barrier tool and it was found that the internal consistency of the scale was found to be excellent (Cronbach's Alpha=0.904)

Reliability Statistics	
Cronbach's Alpha	N of Items
.904	25

Table 1: Reliability analysis

RESULTS

More than half 51.9 % (n=107) of the study participants were female and 48.1% (n=99) were male. Age groups were categorized into three groups. Less than 30 years and 31 to 45 years 44.2% each (n=91) merely 11.7 % (n=24) were above 45 years. Almost two-fifth 38.8 % (n=80) of the participants were Generic BSN in Qualification. Followed by a diploma in nursing 34 % (n=70) and Post RN BSN at 26.2 % (n=54). Merely two participants were MSN in qualification. 42.2% (n=87) of the participants had less than five years of experience, followed by 6 to 10 years 29.6 % (n=61) and 16 to 20 years were 16.5 % (n=34). 11 to 15 years and above 20 years 4.9 and 6.8 % respectively as shown in Table 2.

Demographic details		Total (n=206 %)
Age (In years)		
<30		91(44.2%)
31 to 45		91(44.2%)
Above 45		24(11.7%)
Gender		
Male		99(48.1%)
Female		107(51.9%)
Education Level		
Diploma		70(34%)
Generic BSN		80(38.8%)
Post RN BSN		54(26.2%)
MSN		2(1.0%)
Experience		
<5 years		87(42.2%)
6 to 10		61(29.6%)
11 to 15		10(4.9%)
16 to 20		34(16.5%)
Above 20		14(6.8%)

Table 2: Demographic Information**HIS Barriers**

Barrier total scores were divided into three categories and the percentile scores, Little and very little (1 - 2.339) indicate less than 47 percentile score. Moderate (2.34 - 3.669) indicates 47 to 73 percentile score. Much and very much (3.67 - 5) indicates more than 73 percentile score. Almost half 49.5% (n=102) of the participants responded with little and very few barriers in the use of health information system, followed by much and very much by one-fourth of the participants 25.7% (n=53) and moderate 24.8% (n=51).

	Frequency (%)	Valid Percent	Cumulative Percent
little and very little	102(49.5%)	49.5	49.5
moderate	51(24.8%)	24.8	74.3
much and very much	53(25.7%)	25.7	100.0
Total	206(100.0%)	100.0	

Table 3: Frequency and percentage of variables

Health information system barriers were categorized into organizational, technical, personnel, and legal barriers. T-test was run to measure the mean differences between barriers categories. Results showed a mean difference, technical (2.98±1.17) had the highest total mean scores followed by legal (2.95±1.19), organizational (2.91±1.15), and personal (2.90±1.16) as shown in Table 4.

Barrier category	Mean±SD
Technical	2.98±1.17
Legal	2.95±1.19
Organizational	2.91±1.15
Personnel	2.90±1.16

Table 4: Mean and standard deviation of Barrier category**Organizational barriers**

Participation in new courses, shortage of IT experts, improper planning, inadequate maintenance, support, and

performance reduction during the use of HIS was the top barriers among organizations. More than One-third 37 % of the participants showed little concerns on learning new skills and conducting updated courses, followed by 32 % much and moderate 30 %, because The system has continuously changed with integrated information for the improvement of the health care system. Almost two-fifth 37.4 % of the nurses reported shortage of IT personnel as a little barrier followed by much and moderate 31 % respectively. Shortage of information technology personnel had a great concern in the use of HIS. They are responsible for the maintenance and support of HIS user. Two-third of the study participants expressed concern over inappropriate planning. It is the most important step in the use of health information system and enables all health care workers especially Nurses to make a schedule and organize their task accordingly. More than three-fifth of the nurses reported that inadequate maintenance of HIS, inappropriate support in the operational activities are the factors which affect the performance of this system. Senior managers are responsible for the training and evaluation of nurses' performance in the use of HIS but inadequate support from them leads to poor monitoring and evaluation. Despite the benefits of HIS, three-quartile of Nurses reported when they are attached to the system during patient data documentation they remain detached from patients which leads decrease productivity in their work and ultimately compromises patient care.

Technical Barriers

Lack of a national health information network, poor internet, shortage of computers and no proper standards for data exchange are the main barriers identified in the technical category. Three-quartile of the study participants reported that health information network has not established appropriately. In Pakistan, health information has connected intra-province. District health information system has been started but due to improper maintenance became worsen. After the installation of the Medical Teaching Institution Act 2015, a health information system has been started in teaching hospitals of Khyber Pakhtunkhwa but still not connected. Internet facility and enough equipment's are essential components in HIS. But majority of the participants reported that due to weak internet connectivity and a shortage of computers, the productivity and performance of HIS have declined.

Personnel barriers

Workload due to documentation and inadequate participation in HIS activities are personnel barriers reported by two-third of the study participants. Nurses. Documenting every event of a patient increases nurse's workload and decreases patient-nurse interaction. Participation in HIS-related activities needed to get the

new and updated skill. Untrained staff faced more difficulties in the use of HIS compared to skilled staff.

Legal barriers

More than three-fifth of the study participants stated that Access of unauthorized persons to information and data confidentiality were the main legal barriers. Nurses showed great concern about the access of an unauthorized person to patient information which may violate the patient rights to confidentiality and privacy.

Association between Demographic variables and total Barrier categories score

Chi-square test was run to check the association between demographic and total barriers categories score. Gender ($p < 0.05$) Age group ($p = 0.005$) showed a significant association with barriers and there is no association found between the level of education and total barrier categories score ($p > 0.05$). Nurses' opinions by experience group and level of education showed no association with barrier categories. Gender showed an association with the organizational barrier ($p = 0.003$) and Personal barrier ($p = 0.002$). The association found age group with a personal barrier ($p = 0.002$) and legal ($p = 0.003$).

Barriers	Very much and much	moderate	Very little and Little	Mean±SD
Getting new skills and participation in new courses	(32.) 67	(30.) 63	(36.9) 76	3.07±1.21
Shortage of human resources specialized in health information technology	(31.6) 65	(31.1) 4	(37.4) 77	3.08±1.22
Lack of efficient planning for HIS	(32) 66	(34.5) 72	(33.5) 69	3.02±1.12
Inadequate maintenance, support and updating services systems	(35) 72	(31.1) 64	(34) 70	2.93±1.19
Reduction of performance when Implementing HIS	(38.3) 79	(37.4) 77	(24.3) 40	2.82±1.09
Lack of national health information networks	(43.2) 89	(32) 66	(24.8) 51	2.75±1.13
Lack of fast and easy internet access	(30.6) 63	(26.7) 55	(42.2) 88	3.16±1.30
Lack of equipment and hardware for access to HIS	(37.4) 77	(25.7) 53	(36.9) 76	2.96±1.20
Lack of national standards for data exchange	(33.5) 69	(31.6) 65	(35) 72	3.03±1.21
Increasing providers' workloads for documentation	(33) 68	(35) 72	(32) 66	3.00±1.17
Inadequate participation of providers in the process of designing and implementing HIS	(33.5) 69	(33.5) 69	(33) 68	3.01±1.12
Concerns about the access of unauthorized persons to information	(34) 77	(31.1) 64	(35) 72	3.02±1.18
Concerns about the security and confidentiality	(33.5) 69	(28.6) 59	(37.9) 78	3.10±1.18

Table 5: Mean and Standard Deviation

DISCUSSION

The finding of this study revealed that technical (2.98±1.17) had the highest total mean scores followed by legal (2.95±1.19), organizational (2.91±1.15), and personal (2.90±1.16). The same tool was used in another study from physician's perspective conducted by S. Malekzadeh et al., [17]. showed as technical (3.4±0.89), personal (3.1±0.98), organizational (3.06±0.88), and legal (3.04±1.2). Lack of a national health information network, poor internet, shortage of computers and no proper standards for data exchange are the main barriers identified in the technical

category. Another study finding showed that Hardware and software-related problems were the main technical challenges in the implementation of health information system. The challenges in another study include cost, time, and benefit evaluations, lack of internet access, a qualified worker's shortfall, poor infrastructure, social and cultural norms, national policies, and a lack of motivation among health professionals [18]. The finding of this study indicated Workload due to documentation and inadequate participation in HIS activities are personnel barriers reported by Nurses. The participants of another study identified Health care professional beliefs, time shortage, and nature of work as Human challenges [7]. Cost challenges, privacy and security issues, time limitations, technical issues, and workload were among the more significant barriers reported in this study [15]. Human factors including general computer literacy, usability, and learning curve have a significant impact on the acceptance and successful implementation of information systems in hospitals [19]. According to our study findings Participation in new courses, shortage of IT experts, improper planning, inadequate maintenance, support, and performance reduction during the use of HIS was the top barriers among organizations. However, another study finding showed Cost, time and benefit analysis, unavailability of internet, shortage of trained workforce, inadequate infrastructure, social and cultural, countrywide policies and motivation of health care professionals are the barriers for which developing countries are struggling [20]. The findings of another study revealed shortcomings in the planning and management process and a lack of coordination in health care setting [21]. The result of this study showed that Access of unauthorized persons to information and data confidentiality was the main legal barriers. while a Study conducted in Iran by Ahmadian et al., (2014) showed that errors in information access, lack of enough information networks, technical difficulties in the system design, and inadequate organizational training [22].

CONCLUSIONS

The study concluded technical barrier as the top most and comprises computer shortage, internet breakdown and improper health information network. Inefficient planning, poor support and maintenance, attending new courses and decreased productivity are the organizational barriers identified in this study. The nurses also reported workload due to documentation and access of an unauthorized person to information.

Conflicts of Interest

The authors declare no conflict of interest.

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