



Jimma university
Institute of Health, Faculty of public health
Department of Health Policy and Management

**Readiness to use the Electronic Medical Record System and Associated
Factors among health professional at Jimma University Medical Center
in Jimma Town, Southwest Ethiopia, 2024**

By: Ermiyas Abraham Daka

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**Readiness to use the electronic medical record system and associated
factors among health professional at Jimma university medical center in
Jimma town, Southwest Ethiopia, 2024**

By: Ermiyas Abraham Daka

Advisors

Gelila Abraham (BSC, MPH in M&E, ass. professor, PHD candidate)

Temesgen Kabeta (BSC, MPH in Health Economics, PHD candidate)

Jimma, Ethiopia

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Abstract

Background: - Globally, electronic information and communication technology has been applied and much expanded in the healthcare industry. However, in developing countries including Ethiopia, Electronic Medical Record (EMR) system adoption and utilization for medical practice are still inconsistent and healthcare institutions that started utilization currently face different problems to sustain. A readiness of healthcare workers to use is mandatory to expand digital health service delivery.

Objective: - To assess readiness to use the electronic medical record system and associated factors among health professional at Jimma university medical center in Jimma town, Southwest Ethiopia, 2024.

Methods: - An institution-based cross-sectional study was conducted from May 10 up to Jun 12, 2024 on 302 health professionals working in Jimma university medical center (JUMC) sampled and selected by using a simple random sampling technique. Data was collected by using Open Data Kit (ODK) collect software and exported to SPSS version 27 for further analysis. Descriptive statistics was computed to describe study variables and presented using tables. Bi-variable and multivariable binary logistic regression models was fitted to identify the associated factors.

Result: Of study participants, 291 participated in the study with a 96.03% response rate. This study shows that we are 95% confident that the true proportion of health professionals who are ready to use EMRs lies between 52.2% and 63.8%. This means that more than half of the respondents are ready

In this study Female health professionals are 55.7% less likely to be ready to use the EMR system than males, AOR = 0.443, 95% CI [0.232, 0.847], Those health professionals competent in computers and IT Skills are 1,042.6% more likely to be ready for EMRs AOR = 11.426, 95% CI [4.796, 27.220]. Having Working Experience of 11 to 15 years are 86.1% less likely to be ready to use EMRs compared to those with less than 2 years AOR = 0.139, 95% CI [0.020, 0.968]. Having favorable attitude are 176.1% more likely to be ready to use EMRs compared to those with favorable attitude AOR = 2.761, 95% CI (1.383, 5.513).

Conclusion: - The findings of this study show that sex, computer skill and attitude toward EMR systems are the significant factors influencing readiness to use EMR system. Majority of the health professional have overall readiness to use EMR system.

Keywords: Electronic Medical Record system.

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Abbreviation

CBHI	Community based health insurance
EMRs	Electronic Medical Record system
EMR	Electronic Medical Record
FMOH	Federal Ministry of health
HIS	health information systems
HR	Human resource
ICT	Information and Communications Technology
JU	Jimma University
JUMC	Jimma University Medical Center
MOH	Ministry of Health
USA	United states of America
WHO	World Health Organization

Chapter One: Introduction

1.1. Background

The Electronic Medical Record (EMR) is a clinical data application that aids in decision-making, ordering, pharmacy requests, X-ray and laboratory findings recording, ambulance management and documenting clinical activities (1-3). They are increasingly used globally to improve patient care and healthcare efficiency. Advantages of EMRs include instant access, extensive clinical databases, and decision-support techniques. Most countries in Europe and the USA use EHRs to enhance healthcare quality(4, 5)

Paper-based and electronic patient records generally are used in parallel to support routine medical care. In low and middle-income countries (LMICs), inconsistencies between electronic and paper-based medical records can indeed present significant challenges for healthcare professionals in their daily practice leading to the risk of duplication or inconsistent entry of information. (6)

The absence of integrity and security of patient data and inaccurate or incomplete information in patient records can impede clinical decision-making, mismatch medication lists or incorrect dosages, miscommunication among health professional and raise legal and ethical issues, especially in cases where patient care is compromised due to errors or omissions. Inaccurate documentation could also affect liability in malpractice claims calling for the adoption of EMR and integrating with existing paper-based systems to minimize inconsistencies and improve the quality and efficiency of healthcare delivery.(7-9)

The adoption of electronic medical recordings (EMRs) in medical care is driven by the desire to enhance patient safety, improve clinical outcomes, streamline workflows, and optimize healthcare delivery. Authorized clinicians can access and manage patient medical data through EMR, enhancing efficiency in healthcare delivery and decision-making (10, 11). This digital format improves the quality, legibility and accessibility of progress notes, facilitating easy data analysis and reporting (12, 13).

Electronic medical records systems record and retrieve patient information, including demographics, medical history, medications and drug allergies. (14, 15). They aid health professional in clinical decision support, patient education, order entry, health reporting, security, e-prescribing, alerts, financial management, quality assurance, chronic disease management and public health data collection (7,8).

The global demand for reliable healthcare delivery systems, including electronic Health (eHealth) and Electronic Medical Record systems (EMRs), is increasing (16). EMRs aim to reduce costs, improve health information interchange, and enhance healthcare access. Despite challenges, their potential benefits include cost reduction, service quality improvement and reduced medical errors(17). Global majority of medical errors are due to weak EMR programs and a lack of health experts' willingness to use them, with North Carolina showing that 44% of these errors could be prevented (2).

EMR offers the advantage of making information about patient care available in a secure way to multiple certified users. It provides integrated information from multiple sources and provides a more comprehensive view of patient care. Besides, it increases access to tools like clinical decision support reminders that help clinicians and teams in providing care on the best evidence (18)

In Ethiopia, efforts to implement EMR began in 2008 reflecting commitment to transform the traditional paper-based medical record system into a digital format. Initially, it was piloted in Dilla Chora Hospital, Dire Dawa, with intention to implement it at the national level (19).

The Ethiopian eHealth policy aims to improve the country's health information system by developing ICT solutions, particularly EMRs, to provide equitable, high-quality and prompt health services (20). Furthermore, the Ethiopian health sector transformation plan aims to enhance health service quality and equity by strengthening the health management information system and incorporating computerized priority policy plans (21).

In JUMC there is plan to implement EMRS at deferent time ant until know they cannot implement EMRs. Before eight years they try to implement EMRs which is adopted from Belgium and the software was called “Open clinic” but it failed on the pallet stage because incompatibility of the systems with our health service system and the application cannot be casualized with our system. At department level there is interest to use EMRs and initiation to use computer to register data.

1.2. Statement of the problem

Globally, less than half of the world countries has adopted a national EMR system according to a 2016 WHO report, although there have been improvements over the past decade (22) Research in US hospitals showed that the adoption of the EMR system can decrease patient length of stay, mortality rate and re-hospitalization. The United States

Institute of Medicine reports that 44,000 to 98,000 people die in hospitals each year due to medical errors, costing \$17 billion to \$29 billion per year (23, 24).

Most hospitals use paper-based records, which can decrease productivity, make it difficult to retrieve patient information and may not be readable. Additionally, paper-based records can negatively impact the quality of care provided to patients, as physicians may have to deal with duplicated or contradictory information in registries (2, 15, 25).

All over the world, the absence of EMRs in health facilities can be a factor in the problems that health facilities are currently facing. Healthcare professionals depend on paper-based records, which can result in inefficient information retrieval, delays in patient care and increased administrative burden. The lack of centralized electronic records can also delay communication and coordination among health professional , leading to fragmented care(26).

In public health care, long waiting times for service utilization are the main cause of dissatisfaction related to quality of care, which can be alleviated by implementing EMRs. In Ethiopia, the waiting time for patients before getting service ranges from 41 to 185 minutes (27) Handwriting note incomplete documentations are prone to errors, have 18.5% reading errors, which compromise patient safety and contribute to diagnostic and treatment mistakes (26).

However, some medical practitioners and health professionals may be resistant to the shift from manual to electronic documentation. Health administrators and information managers understand that changing health practitioner behavior and attitudes may take time, which affects the implementation of EMR in health facilities (28).

The adoption of EMRs depends on various factors, including individual, organizational, and environmental characteristics. Many EMR installations fail due to users' willingness and unreadiness to accept the transition from paper-based to electronic systems.(2, 29-31).

A cost-benefit analysis conducted to estimate the net benefit and cost of implementing EMR in paper-based medical records found that the net benefit of the EMR system was \$86,400 per provider. It shows that the net benefit of using EMR is positive and decreases net health care expenditures per beneficiary to decrease chart pulls, drug expenditure and increasing utilization of radiologic tests. Its benefit increases as more features are added and the time duration of using EMR increases (32)

EMR also has a significant effect on the quality of documentation. In a study conducted to compare the quality of documentation in paper-based documentation and electronic documentation in nursing-based care centers, a better quality of documentation was obtained from EMR systems than previous paper-based systems. (33). Medical record completeness was also increased from 6.5% to 45.7% after the intervention of the program. (34).

In our country, Cross-sectional research done in Addis Ababa, Ethiopia in 2015 showed that EMR system /smart care/ software implementation was started in 2007/2008 but the adoption and utilization rate are still low(21, 35). Even the health institutions that started to use EMR systems also failed to sustain EMRS. As indicated by the previous studies, health professionals' resistance and dissatisfaction with using new technology were major barriers to the use of EMR(21, 36).

Paper-based record-keeping in healthcare facilities can lead to increased workloads and reduced efficiency, as it requires more administrative effort. EMRs provide data analytics capabilities to improve healthcare delivery and provide insights for research, quality improvement and population health management.(2, 37).

Therefore, it is important to change the old way of patient medical records, which lacks appropriate information and is time and space consuming into the modern one, electronic medical record (4). However, there are unknowns and difficulties with EMR deployment at Jimma University Medical Center in Southwest Ethiopia. Paper-based systems in health organizations affect healthcare delivery efficiency, confidentiality, and overall healthcare system availability Therefore, it is important to identify the level of readiness and associated factors that affect the implementation of EMR in JUMC.

1.3. Significance of the study

For JUMC: - The finding of the study is crucial to modernizing the healthcare system and improving service delivery in JUMC. Because EMRs are not yet implemented, they are facing many challenges in providing quality services and patient satisfaction. Particularly, there is a long wait time for patients to receive a service, a high surgical backlog and at times, patients are lost from the hospital. This condition puts the hospital in a crisis and they are facing challenges in the CBHI reimbursement system due to poor data handling. Therefore, implementation of EMRs solve all issues raised above.

For zonal health office and catchment health facilities: - The study provided valuable information on readiness to implement EMRs and associated factors those barriers to

the implementation of EMRs among health care providers. It will serve as an evidence-based decision-making tool by making health and health-related data easily available after the problems are identified and addressed accordingly. Besides, it will have a significant impact on the selection of an appropriate implementation strategy in respective health facilities.

For researchers: - Since JUMC is the only territory referral hospital in the south western of Ethiopia which has more than 30 (primary and general hospital) catchment health facility, this research finding help as base line and as researchers explore further research on problems related to EMR system and its implementation.

Chapter two: Literature review

2.1. Readiness to use EMRs among health professionals

The adoption of Electronic Medical Record (EMR) systems has been a global trend in modern healthcare systems. Studies conducted in various countries have shown a positive correlation between the implementation of EMRs and improved patient care, streamlined workflows and enhanced healthcare outcomes(38, 39).

Different authors define EMR in different ways, some define the Electronic Medical Record (EMR) is a clinical data application that aids in decision-making, ordering, pharmacy requests, X-ray and laboratory findings recording, ambulance management and documenting clinical activities(1, 2, 40, 41).

EMR first appeared in academic medical centers in the 1960s and 1970s. The Institute of Medicine (IOM) initially referred to computer-based patient recorder systems, which contain computerized medical records, longitudinal patient records and electronic charts, which are just a few of the numerous titles included in the EMRs. The IOM selected the term "Electronic Health Records" in 2003. Following the IOM's recognition of the necessity for a thorough examination of paper-based records, there were increased efforts made to employ EMR in the 1980s. IOM conducted research, reported on implementation challenges, and suggested a strategy for converting paper-based records to electronic records (14).

2.1.1. Readiness to use the EMR system

The study assessed the readiness of health professionals in two hospitals in Ghana that assessment indicated an overall readiness level of 54.9%(42) A cross-sectional study on Information and communication technology skill, knowledge and readiness for electronic medical record system adoption among health professionals in a tertiary hospital, Myanmar 54.2% health professionals were overall readiness.(43).

Also, in the study conducted in Nigeria about Doctors' Attitudes and Willingness to Use Electronic Medical Records at the Lagos University Teaching Hospital, from a sample of 202 participants in the study, almost all of them (96.54%) were willing to use EMR (30).

Another study done in Kenya on the Comparative Analysis of Hospital Information Management Systems Among Healthcare Workers in Two Selected Hospitals shows that 89% of respondents in the private hospital strongly agreed the system provided

more functionality for accessing services, this shows in the private hospital the system is well integrated and most services can be accessed via the system, so the health professionals in a private hospital are more willing to use EMR system(44).

The overall Electronic Medical Record (EMR) readiness in sub-Saharan Africa varies widely across countries due to disparities in infrastructure, digital skill, and healthcare system investments. EMR adoption rates in the region often range between 40-60%, depending on the specific country and healthcare setting. (45)

The study conducted in northwest Ethiopia on Organizational and health professional readiness for the implementation of electronic medical record system, an implication for the current EMR implementation findings showed that 42.1% of them had overall readiness for the implementation of an EMR system, while 56.0% and 196 47.7% had core readiness and engagement readiness, respectively (46).

A study conducted in the North Gondar Zone found that 54.1% of healthcare professionals were ready for EMR use, with 67.8% core readiness (awareness and attitude) and 60.9% engagement readiness (willingness and technical ability) (47).

The study conducted in Ethiopia on Willingness to Use Electronic Medical Record (EMR) System in Healthcare Facilities, with a cross-sectional survey of study from a general of 616 health professionals who participated in the study shows that the proportion of individuals who were willing to use the EMR system in healthcare facilities was 85.9% (95% CI: 82.3-89.5) (2).

A qualitative study conducted on the Knowledge and attitudes of nurses in community health centers about electronic medical records show that 78% of nurses possess good ethical knowledge, 84% had a positive attitude on readiness to record Data electronically(48). According to a cross-sectional survey conducted among physicians and staff nurses at private hospitals in India, 75% of participants felt comfortable using electronic medical records (EMRs), while just 25% felt happy working with paper records.(49).

In another study conducted in Dire Dawa and Harari hospitals, the utilization of EMR was 67.7%, with 54% using it daily. Besides, a higher proportion of health professionals 34% prefer paper-based recorded(50). In study conducted in Gamo woreda, 65.25% of participants had overall readiness for EMR, while 68.75% had engagement readiness for EMR and 69.75% had core readiness(51).

2.2. Associated factors that affect readiness to use EMRs

2.2.1. Management Commitment to support and Budget allocation

Successful implementation of EMR depends much on commitment and support from the top (leadership) and is one of the most dominant factors. Lack of support from clinical or administrative leadership may lead to dissatisfaction with the implementation of EMR systems. Without real commitment from the top can easily doom an EMR effort. The commitment of top management helps to ensure adequate resource allocation, supports redesign efforts and facilitates implementation steps(52)

The study in sub-Saharan Africa shows that the EMR adoption rates in the region often depending on the specific country and healthcare setting. This magnitude is influenced by factors such as limited access to electricity, inadequate internet coverage, and the cost of implementing health informatics systems(45)

Some health care providers argued that the initial capital investment in applying EMR in the organization is very high and implementing an EMR system can have costs involved in maintenance, training of health care professionals and upgrading the system (53, 54). EMR technology is still unaffordable for most hospitals, group practices and solo practitioners (55).

Several factors have been identified as influencing healthcare professionals' readiness to adopt EMR systems. Organizational factors, such as leadership support, resource availability and training programs, play a crucial role in shaping attitudes toward EMRs (56).

Study conducted in southwestern Ethiopia show that computer skill computer access at health facilities, attitude towards EHRs, awareness about EHRs, perceived benefit about EHRs and perceived technology self-efficacy were significantly associated with overall health care providers readiness for the adoption of EHR(57) also, EMR system implementation can be affected by factors like financial, technical factors, behavioral factors, Individual factors, legal barriers and the sociodemographic character of the individuals significantly associated with overall readiness (17, 58, 59).

Thus, the implementation of the EMR system will require frequent communication between management and employees. This direct interaction will help to create positive perceptions about EMR. Therefore, management should pay careful attention not only

to crafting fair procedures and policies but also to communicating with the employees(60).

A cross-sectional study done in Ayder Referral Hospital, Mekelle, northern Ethiopia, in 2015 showed that 39.7% of the respondents mentioned the presence of management support and 16.6% a budget allocation (61).

2.2.2. Socio-demographic

A cross-sectional study done in Nigeria, in 2018 indicated that there was no significant association between age with willingness to use an EMR system (30). A cross-sectional study conducted in public hospitals in Malawi, in 2017 indicated that 58.6% of healthcare workers within the 21-30-year age group used EMR system more than paper-based records. Within this study participants aged 61 to 70 years used paper records more than electronic records (62). A cross-sectional study done in Addis Ababa, Ethiopia, in 2015 indicated that health professionals aged ≤ 30 years use 2.57 times computers to manage patients as compared to those aged >30 years (63).

A cross-sectional study conducted in public hospitals in Malawi, in 2017 indicated that both sexes had equal utilization levels for EMR systems b/c both have equal exposure to technology (62). A cross-sectional study done in the North Gondor zone, in 2014 revealed that male health professionals were 1.87 times more likely to be ready to use EMR systems than female health professionals (64).

Cross-sectional research conducted in Benghazi, Libya, in 2007 indicated that doctors' educational level had a positive significance association with their computer use (65). As cross-sectional study done in a developing country in Ethiopia, in 2015 revealed that in educational level those with higher levels of education were 2.78 times more likely to use computers than those with lower levels of education (66).

A cross-sectional study done in Addis Ababa, Ethiopia, in 2015 indicated that degree and above holders were 3.17 times to use computers than diploma holder (63). A cross-sectional study done in the Harar region, Ethiopia, in 2015 indicated that medical laboratory technicians and pharmacists were more likely to use computers than nurses (66).

2.2.3. Appropriate Technology or Software Selection

Once the organization decides to move to an EMR, one of the most critical steps in the pre-implementation phase is choosing software carefully. Thus, to increase the chance

of success, management with technical advice and guidance must choose software that most closely fits its requirements, including hardware, databases and operating systems.(52, 60)

2.2.4. Computer utilization

In a study conducted in Ireland, very significant differences were found in using EMR among Irish health care providers. Vocational training was a requirement to use EMR. Other factors like lack of time and lack of computer skills were other barriers to using EMR. The author was generalizing that health professional who were more likely to use EMR were young, male and working in group practices and those who take vocational training (67).

Research conducted in Lebanon showed that 71.9% of nurses and 67.9% of other types of health professional use the computer daily but 42% of physicians never used the PHC center computer (66). Research conducted in Kenya showed that 44.6% of health professionals had sufficient computer skills in the use of EMR system (68) while a study done in Egypt, in 2013 showed that 17% of health professionals had lack of computer skills which caused barriers to using EMR system (69).

As a cross-sectional study done in Addis- Ababa, Ethiopia, 2018 showed, 76.1% of health professionals started using the system immediately after implementation. Among them, the major proportion of users were nurses (44.0%), followed by HMIS staff (20.7%), laboratory, pharmacy staff and physicians (18.4%). In this study, the main reasons for not using the EMR system were that 75.7% of physicians had no time to use it, 60.6% and 69.7% of nurses reported that the computer was not working and power fluctuation respectively while 48% of laboratory and pharmacy reported that the other departments are not using the system(63).

As a cross-sectional Study done in Adama Hospital, Oromia, Ethiopia 2015 indicated, health professional computer skills for Specialist physicians was 100%, degree 71.8% and diploma 49.2% (22) while a cross-sectional study done in the North Gondor zone, 2014 revealed that 10.2% of health professionals had no computer-related skill (64).

2.2.5. Attitude towards EMR system

A cross-sectional study done in Jeddah, Saudi Arabia, in 2018 showed around 81.2% of health professional perceived EMR was easier than the previous routine medical records to review patients' problems, 68.6% of health professional were satisfied with the

system information and terminology, 72.9% by system capabilities, 41.7%, technical support, 50.7% with the service and 72.7% ease of use. In this study, 63.4% agreed that templates were well suited to their specialty and 69.7% agreed that the system increased their ability to add important content (70).

The study conducted in the North Gondor zone, in 2014 revealed, that 54.6% of health professionals had a good attitude toward the EMR system. In the later study, health professionals who had a good attitude toward the EMR system were about 1.56 times more likely to get ready to use the EMR system as compared to those health professionals with a poor attitude (64).

2.2.6. Knowledge of EMR system

A cross-sectional study conducted in Iran, in 2016 showed that 66.3% of health professionals had knowledge about computer and man factors for the use of EMR (71). Cross-sectional research conducted in Benghazi, Libya, in 2007 indicated that around 53% of doctors had good knowledge about the advantages of the EMR system (65).

Key factors associated with readiness include knowledge of EMR systems, attitude toward their implementation and computer skill. For example, health professionals with good knowledge were over two times more likely to be ready for EMR implementation compared to those with poor knowledge(47).

A cross-sectional study done in the North Gondor zone, in 2014 indicated that 71.3% of health professionals had good knowledge of EMR systems. This study found that health professionals who had good knowledge of EMR systems were about 2.12 times more likely to get ready to use EMR systems as compared to those health professionals with poor knowledge (64).

2.2.7. EMR training on EMRs

In a study conducted in Ireland, very significant differences were found in using EMR among Irish health care providers. Vocational training was a requirement to use EMR. Other factors like lack of time and lack of computer skills were other barriers to using EMR. The author was generalizing that health professional who were more likely to use EMR were young, male and working in group practices and those who take vocational training (67).

Research conducted at Zahedan University in Iran, in 2011 indicated that 68.5% of physicians had self-guided training in computer(72). As a cross-sectional study

conducted in public hospitals in Malawi, 2017 indicated, 72.4% of healthcare workers received training on EMR systems to use it (2).

In a study conducted in Mexico public hospitals, physicians who participated in this study indicated that the EMR systems are very complex and difficult to learn and this affects their attitude towards using the EMR systems. The participants also mentioned that it usually takes too much time to enter data in real-time (73).

A cross-sectional study conducted in South Africa in 2011 indicated that 93% of health professionals had received EMR training (74). Research conducted in a Saudi Arabia hospital, in 2017 indicated that 53.0% of respondents had formal EMR training. In this study, training had a significant association with acceptance of the use of EMR (75).

Another concern related to implementation of EMRs is the possibility that physicians will spend more time with computers than with their patients (54). In some cases, EMR software is becoming so complex that it is difficult to tell in advance what the system will do in each situation. Furthermore, clinicians are initially slower after EMR implementation (76).

As cross-sectional study done in Addis- Ababa, Ethiopia, 2018 showed, 64% of health professionals had EMR user training. Participants who had EMR software training were 3.04 times more likely to use EMR than those who did not have any kind of EMR software training (21).

Another study done in Bahir Dar, Ethiopia, in 2013 indicated that 33.3% of health professionals were computer trained and others were not for various reasons; 59.7% had no access to a computer system, 22.6% didn't have time to learn, 16.8% both time shortage and no access to the computer system and only 0.9% were not interested to learn it (77).

2.2.8. language barrier

A cross-sectional study done in Jeddah, Saudi Arabia, in 2018 indicated that 54.2% of Participants had not experienced language difficulties when using the system. In this study, English language proficiency levels had a significant positive relationship and were necessary for EMR system acceptance, preference and adoption (78).

Conceptual framework of the study

This Conceptual framework is adapted for the assessment of the readiness of health professionals to use EMRs and associated factors in JUMC, southwest Ethiopia (2)

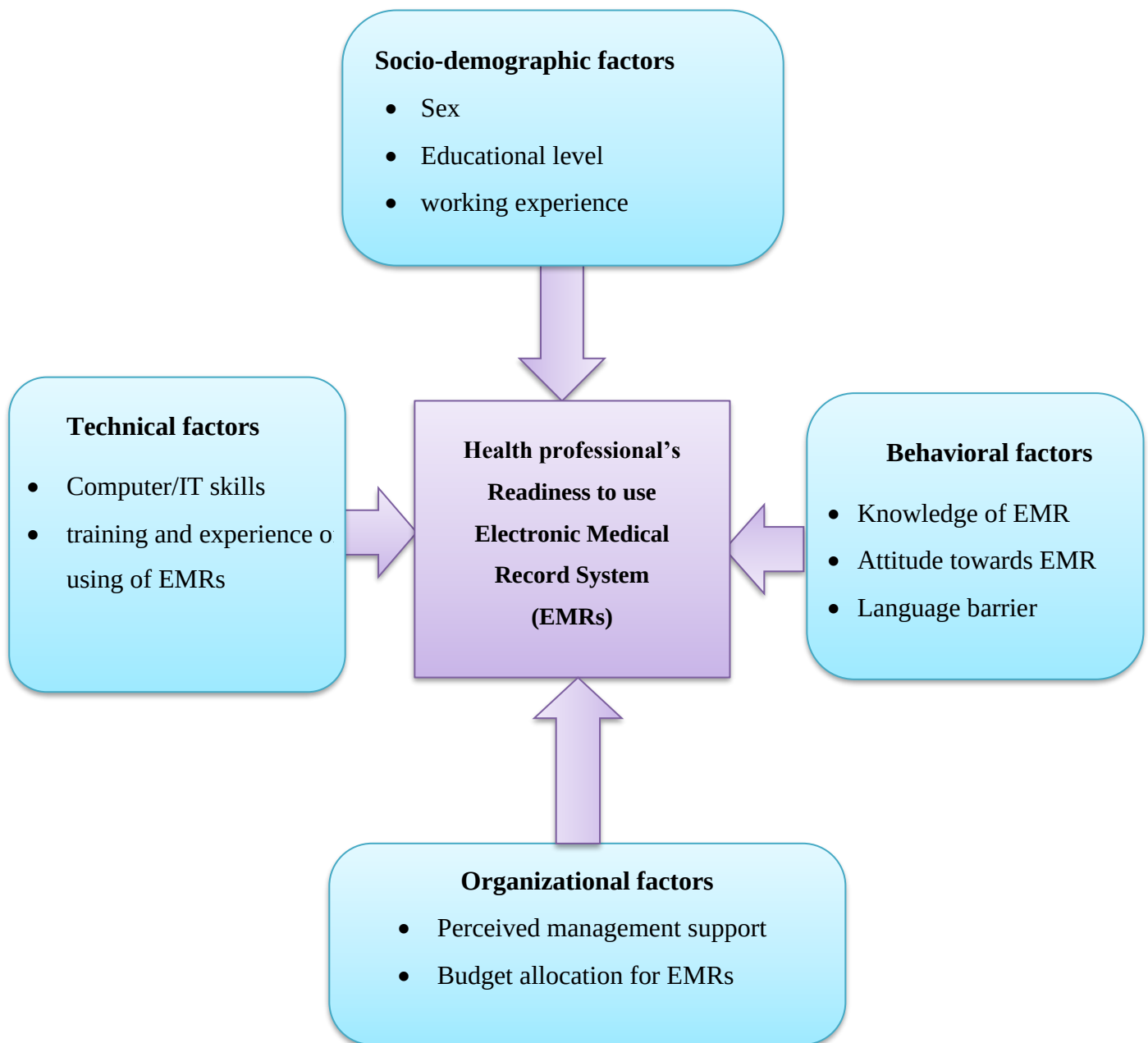


Figure 1 :- Conceptual framework for readiness of health professionals to use EMRs and associated factors in JUMC, southwest Ethiopia (2)

Chapter 3: Objectives

3.1. General Objective

Assessment of readiness to use the electronic medical record system and associated factors among health professional at Jimma University Medical Center in Jimma Town, Southwest Ethiopia, 2024.

3.2. Specific objectives

To determine the level of readiness to use EMRs among health professionals in JUMC, Jimma town, Southwest Ethiopia, 2024.

To identify the factors influencing the readiness to use EMRs in JUMC, Jimma town, Southwest Ethiopia, 2024.

Chapter 4: Methods and Materials

4.1. Study Setting and Period

4.1.1. Study setting

The study was conducted at Jimma University Medical Center (JUMC) which is in Jimma town, Jimma zone, Oromia region state, southwestern Ethiopia. JUMC is one of the oldest public hospitals in the country. It was established in 1938 by Italian invaders for the service of their soldiers. Geographically, it is in Jimma City 352 km southwest of Addis.

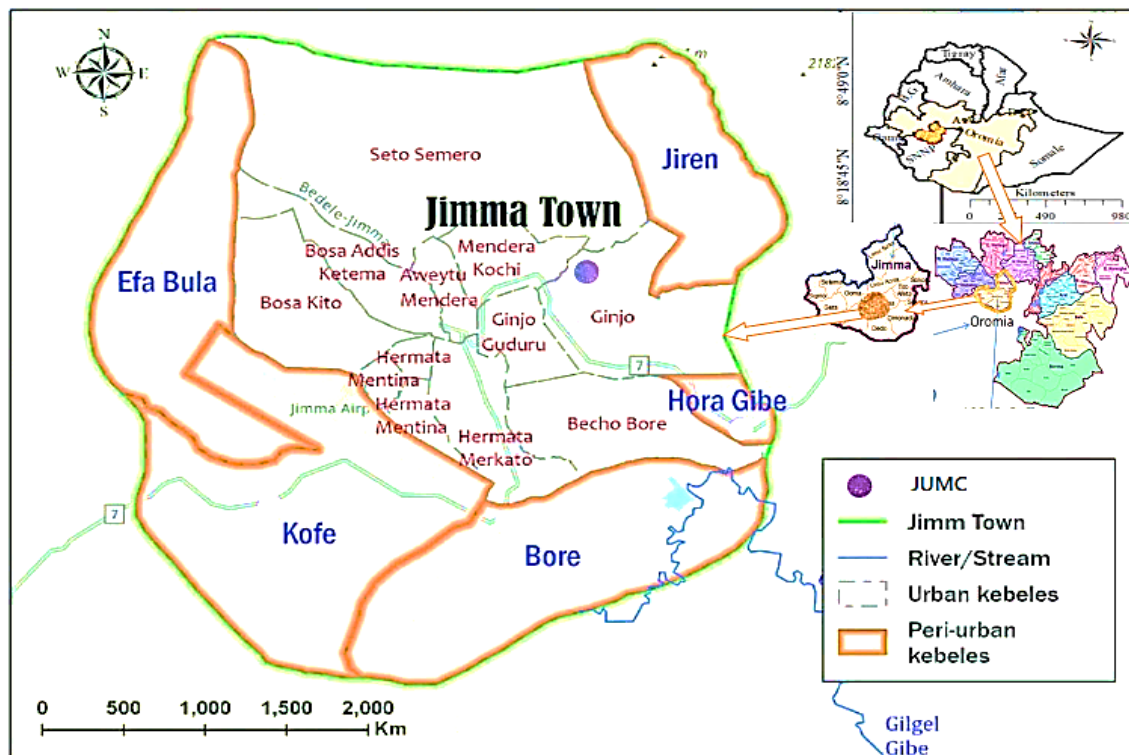


Figure 2 :- Map of the study area (Jimma University Medical Center in Jimma Town, Southwest Ethiopia)

Currently, it is one of the teaching and referral hospitals in the southwestern part of the country, providing services for approximately 15,000 in-patient, 160,000 outpatient attendants, 11,000 emergency cases and 4500 deliveries in a year coming to the hospital from the catchment population of about more than 20 million people. It has a total of 1072 who are actively working in JUMC and 587 supportive staffs. From the health professionals 182 physicians, 559 nurses, 70 pharmacists, 73 laboratory technologist, 13 psychiatry, 12 Anesthesia, 23 radio graphics and 55 others (HMIS, MRU, Administrators)(79).

4.1.2. Study period

The study was conducted from May 10, 2024 up to Jun 12 2024

4.2. Study design

A facility-based quantitative cross-sectional study design was employed.

4.3. Population

4.3.1. Source population

The whole Health professional who are working at JUMC during the study periods.

4.3.2. Study population

All sampled health professionals who are working in JUMC during the study periods and fulfill the inclusion criteria.

4.4. Inclusion and exclusion criteria

4.4.1. Inclusion criteria

All health professionals who have at least six months of work experience in that hospital are included in the study because they have been exposed to the environment and received their letter for permanent employment. Those who were available during the data collection period were included in the study.

4.4.1. Inclusion criteria

Health professionals who are not actively on work like staffs on education at different institution, annual leave, sick leave, maternal leave was excluded from the study.

4.5. Sample size determination and sampling techniques

4.5.1. Sample size determinations

The sample size of this study was determined using a single population proportion formula. The sample size was calculated using data from a study carried out in North Gondar Zone, Ethiopia, which showed that 54.1% of health professionals had overall readiness to use EHR system is used. (64)

To calculate the sample size the percentage of readiness to use EMR (P) is 54.1%, with a 5% margin of error and 95% CI, since the source population is ($< 10,000$), a correction formula was used,

To calculate the sample size a single population formula used

$$n = \frac{(Z_{\alpha/2})^2 * p * (1 - p)}{d^2}$$

Where:

- ✚ n = is the minimum possible sample size ($Z_{\alpha/2}$)
- ✚ $Z_{\alpha/2}$ = is standard error which is=1.96 for 95% CI
- ✚ P= population proportion which is assumed to be 0.541
- ✚ d= margin of error (5%)

$$n = \frac{(1.96)^2 * 0.5185 * (1 - 0.5185)}{(0.05)^2}$$

$$n = \underline{\underline{382}}$$

Since our population is <10,000 we use the correction formula to calculate the final sample size; -

$$n = \frac{n}{1 + \frac{n}{N}} = \frac{383}{1 + \frac{383}{987}} = 275.9 \approx \underline{\underline{276}}$$

By adding 10 % of the non-respondent rate which is equal to **27**. Therefore, the final sample size was 276+27= **303**

4.5.2. Sampling techniques

Initially the lists of all health professionals were obtained from HR which is 987, with their profession category. The required sample size 303 was calculated, the health professionals were classified according to their professions, based on their number sample size was calculated proportionally for each profession. Finally, the study participant was selected by simple random sampling methods from each category lists by using a random generator machine.

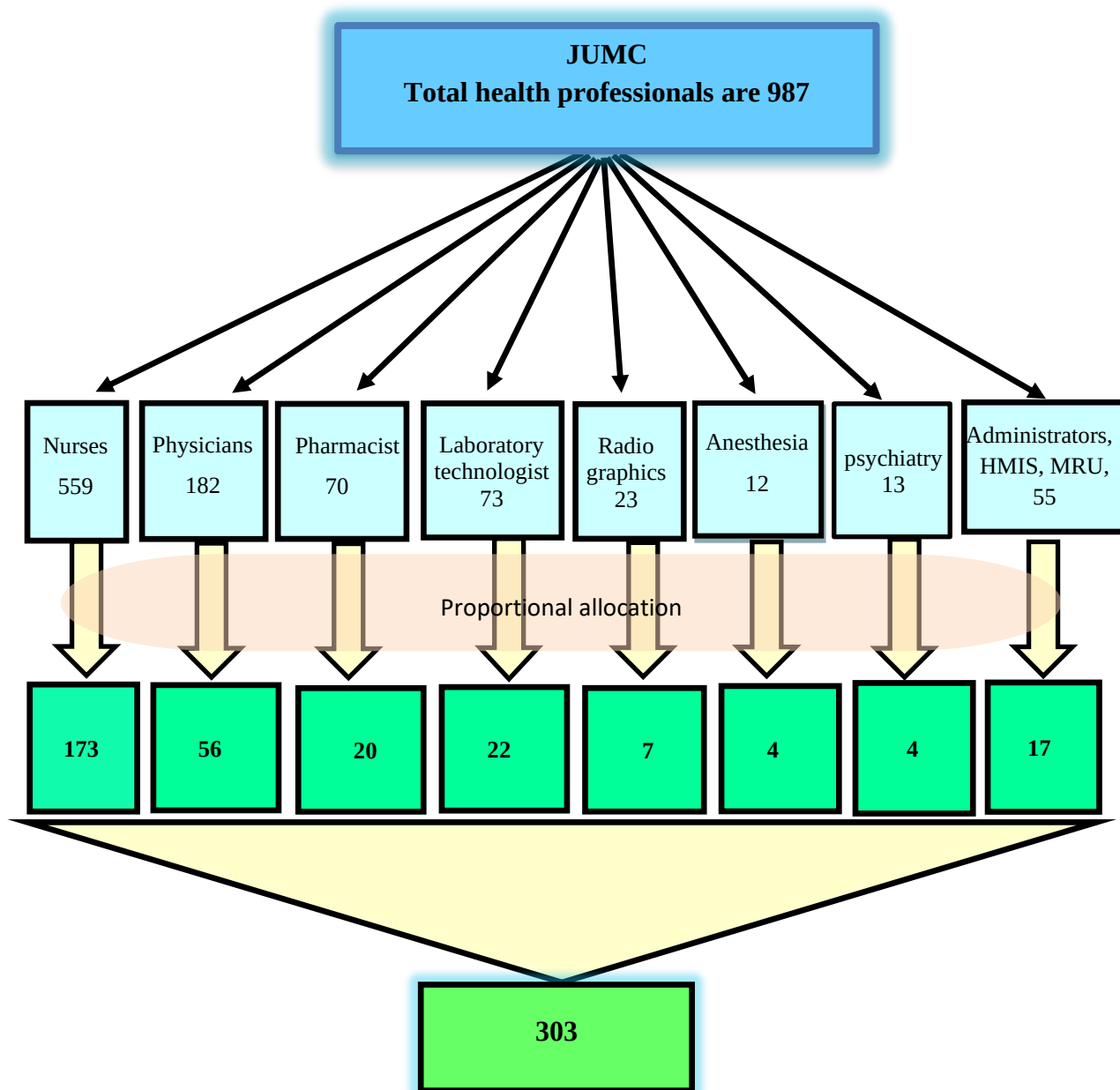


Figure 3 :- Schematic presentation of sampling techniques for participants in Jimma University Medical Center in Jimma town, Southwest Ethiopia, 2024.

4.6. Data collection instrument and procedures

Questionnaires adapted to assess readiness and associated factors were applied for data collection. The data collection tool contains questions that help to assess Socio-Demographic Characteristics, Organizational and resource variables, Health professional Willingness to Use the EMR system, Attitude to use the EMR system, technical variable questions and Computer skill and Knowledge on EMR system (2, 4, 64, 80-82). Data was collected through face-to-face interviews administered method by data collectors from health professionals who are working in JUMC during the study

periods and fulfilled the inclusion criteria by using Kobo Collect or Open Data Kit (ODK) Collect

4.7. Data processing and analysis

The questionnaires were designed using kobo tool box which is a tool used to create and control surveys. Data was exported into SPSS version 27.0 for analysis from the Kobo toolbox. The data cleaning was done for missing data by using descriptive statistics to observe. The reliability was also checked using Cronbach alpha's test.

Logistic regression was used because of majority literatures that I was referred where done using this method, therefore Binary logistic regression analyses examined the relationship between the outcome and independent variables. In the bivariate regression analysis, variables with a $p < 0.25$ were considered potential candidates for the multivariate regression analysis to assess their adjusted impacts on the dependent variables. The frequency, mean, and standard deviation were calculated for continuous variables and categorical variables were assessed by computing frequencies. The data was presented by using tables, charts, and graphs.

4.8. Study variables

Dependent variable

- ✚ Readiness of the health professional to use EMRs. (Ready / not ready)

Independent variables

- ✚ **Socio-demographic factors** Sex, Educational level, working experience
- ✚ **Technical factors** Computer and Internet access, Previous training and experience using EMRs
- ✚ **Organizational factors** Perceived Management support and Budget allocation
- ✚ **Behavioral factors** Knowledge about EMR, Language barrier, Attitude towards EMR

4.9. Data quality control

The data collection tools were tested before actual data collection at Shenen Gibe Hospital on 5% equivalent of the sample size of 12 health professionals, to assess the reliability, clarity, sequence, consistency, and understandability. After the pretest, necessary modification like skip pattern was made. Two days of training were given for two BSC Nurses data collectors on the research objectives, data collection tools, data collection techniques and ethical issues. During data collection, the whole procedure was supervised and checked frequently.

4.10. Operational definitions

Electronic Medical Record: - EMRs is a digital version of a patient's paper chart in a clinical setting. It contains the medical and treatment history of patients within one healthcare organization, facilitating easier access to patient data by authorized health professional. It help for service like writing patient history, physical examination findings, diagnosis and treatment, prescribing medications, ordering laboratory and receiving results, tracing drug-drug interactions and allergies without direct physical contact between providers.(83, 84)

Core readiness: Core Readiness is defined as the realization of needs and expressed dissatisfaction with the current way of working. It was measured as a latent variable of two sets of questions based on Li Et al. that addressed satisfaction with the current system and the need for change.(85) It was measured on a five-point Likert scale. Responses 1=strongly disagree to 5=strongly agree were summed up. After the normality of data was assessed, a given health professional was said to have core readiness if he/she scored equal to or above the mean score for core readiness questions (47, 85, 86)

Engagement readiness: Engagement Readiness is defined as active willingness and participation of people for EMR implementation. It was measured as a latent variable of three sets of questions based on Li Et al.(85, 87) that addressed the willingness to use EMR and the professional's perceived benefits and harms of EMR. It was measured on a five-point Likert scale. Negatively worded questions were recorded. Responses 1=strongly disagree to 5=strongly agree were summed up. A given health professional was said to have engagement readiness if he/she scored equal to or above the mean score for the engagement readiness questions (47)

Overall readiness: defined Overall readiness as the intersection of core readiness and engagement readiness. That is, health professional is said to have overall readiness he or she must have both engagement readiness and core readiness.(85) Health professional must express dissatisfaction with a paper-based recording system and should have the desire for change as well as a willingness to use EMR to be labeled ready(85, 86). Thus, health professionals who have both core readiness and engagement readiness were labeled as having an overall readiness.(47)

Knowledge: - Knowledge was measured on a 5-point Likert scale ranging from "strongly disagree" (score 1) to "strongly agree" (score 5). Thirteen knowledge

questions were added and divided by 13 to create a composite variable scale (ranging from score 1 to 5) for data analysis. Finally, the composite variable score was dichotomized as "good knowledge" or "poor knowledge" based on the final score. Accordingly, a final score of the above three (agree and strongly agree) was categorized as "good knowledge," while those final scores of three or below (strongly disagree, disagree and neutral) were categorized as "poor knowledge"

Willingness to use: - The willingness of health professionals to use the EMR system was rated as "willing" or "not willing" using composite scores obtained from all five willingness questions(2, 4). Five questions were scored and the maximum score obtainable is five marks. A score of 3 or above out of 5 marks suggests willingness, while a score of less than 3 marks suggests an unwillingness to use the EMR system.

Attitude: It is the perception, feeling, or thinking towards EMR. It was measured by asking 15 questions such as benefit to the patient side (4 questions), the effect on the quality of care (2 questions), ease of use (5 questions) and cost of implementation and organizational benefit (4 questions). The basis for the classification of favorable and unfavorable attitudes towards EMR was based on the mean of each score. A favorable attitude is an attitude score that falls to the mean and above and an Unfavorable attitude is an attitude score below the mean.

Computer and IT skill: it was measured by using 8 questions on a 5-point Likert scale ranging from "strongly disagree" (score 1) to "strongly agree" (score 5). Those who score above the mean are competent in computers use and incompetent in computers use if the score for the incompetent in computers question is below the mean.

4.11. Ethical considerations, approval, and consent to participate

The study protocol was reviewed and ethical approval was obtained from the ethical review committee of the Jimma University Institute of Health. A support letter was obtained from department of Health Policy and Management. Informed written consent was obtained from each study participant after telling them the objective of the study. They were also informed about the benefits of the study. The data collection was anonymous and the information was kept confidential. In a case if you are not comfortable you have the right to withdraw the interview.

4.13. Dissemination and utilization plan of result

The final report will be presented as a partial fulfillment of the degree of Master of Health System Management to the department of Health Policy and Management, Institute of Health, Jimma University. This paper was submitted to Jimma University, Institute of Health Department of Health Policy and Management. The final document will be submitted to JUMC. It was also disseminated through publication in local or international journals and presentations at scientific conferences and workshops.

Chapter five: Results

5.1. Socio-demographic characteristics

A total of 291 health professionals participated in the study with 96.03% response rate. 149(51.2%) of the study participants were male and 58.8% of the study participants were located age between 30-39 years. Majority of the study participants 61.5% were married and 38.5% Orthodox followers. 43.6% of the participants were first-degree holders, 58.4% nurses and 43.0% where the working experience of 6 - 10 years (table .1)

Table 1. Socio-demographic and socio-economic characteristics of health professional at JUMC in Jimma Town, Southwest Ethiopia, 2024. (N=291).

Variable	Category	Frequency	Percent (%)
Sex	Male	149	51.2
	Female	142	48.8
Age	under 30 years	104	35.7
	30 – 39	171	58.8
	40 – 49	14	4.8
	50 and above	2	0.7
Religion	Orthodox	112	38.5
	Muslim	110	37.8
	Protestant	65	22.3
	Catholic	2	0.7
	Jehovah witness	2	0.7

Variable	Category	Frequency	Percent (%)
Marital states	Single	106	36.4
	Married	179	61.5
	Divorced	1	0.3
	Separated	3	1.0
	Widowed	2	0.7
Educational level	Diploma	77	26.5
	Degree /including GP	127	43.6
	Masters/Specialist	87	29.9
Profession	Nurse	170	58.4
	Physician	51	17.5
	Laboratory	20	6.9
	Pharmacy	19	6.5
	Psychiatrist	4	1.4
	Administrative staff	16	5.5
	Radiographer	7	2.4
	Anesthetist	4	1.4
Working experience	6 months to 2 years	20	6.9
	3 - 5 years of work experience	120	41.2
	6 - 10 years of work experience	125	43.0
	11 - 15 years of work experience	12	4.1
	More than 15 years	14	4.8
Monthly income of respondents	less than 6169 Birr (50.90\$)	75	25.8
	6169 Birr (50.90\$) – 9056 Birr (74.73\$)	152	52.2
	9057 Birr (74.74\$) – 12579 Birr (103.80\$)	26	8.9
	Above 1259 Birr (103.80\$)	38	13.1

5.2. Health professional Willingness to Use EMR system

Most health professionals 253 (86.9 %) were willing to take training to enable EMR system use, 95.2% of study participant believe that implementation of EMR save the time and 91.1% of them believe as implementation of EMR save the money (table 2).

Table 2:- The study participant's willingness to use the EMR system at Jimma University Medical Center in Jimma Town, Southwest Ethiopia, 2024 (N=291).

Variables	Categories	Frequency	Percent (%)
Willingness to take training to enable EMR system usage	Yes	253	86.9
	No	27	9.3
	I don't know	11	3.8
willingness to implement an EMR system after taking EMR training	Yes	269	92.4
	No	21	7.2
	I don't know	1	0.3
willingness to use EMR system for quality health care if properly trained	Yes	260	89.3
	No	16	5.5
	I don't know	15	5.2
willingness to use the EMR system if the technical infrastructures are available	Yes	261	89.7
	No	21	7.2
	I don't know	9	3.1
Implementation of EMR save the time	Yes	277	95.2
	No	9	3.1
	I don't know	5	1.7
Implementation of EMR save the money	Yes	265	91.1
	No	13	4.5
	I don't know	13	4.5

5.3. Technical, Computer and IT skills

From the study participant 187 (64.3%) of them not experiencing language difficulties when using basic computer operating system, the majority 231(79.4%) study participant was not received EMR system training and majority of them 205(70.4%) replayed that the reason for not taking training is there is no training opportunity on EMRs for them. 196(67.4%) of study participant are used computer at work place and from those they used computer for reading, for watching videos and listening to music and for report writing 165(56.7%) and 162(55.7%), 133(45.7%) respectively.

Table 3:- The study participant's Technical, Computer and IT skills at Jimma University Medical Center in Jimma Town, Southwest Ethiopia, 2024. (N=291).

Variable	Category	Frequency	Percent (%)
Experiencing language difficulties when using basic computer operating system	Yes	104	35.7
	No	187	64.3
Have you received EMR system training	Yes	60	20.6
	No	231	79.4
The main reason for not taking EMR training	I have no access to take training	205	70.4
	I'm not interested to take training	10	3.4
	Previously I was trained	16	5.5
Use of computer at your workplace	Yes	196	67.4
	No	95	32.6
Frequency of computer use	Daily	122	41.9
	In every healthcare delivery	60	20.6
	Not specific.	5	1.7
	Three times a week	9	3.1
The main purpose of computer use	those use computer for report writing	162	55.7
	those use computers for reading	133	45.7
	those use computer for watching videos and listening to music	165	56.7

5.4. Core readiness, Engagement readiness and overall readiness to use EMR

The reliability was also checked using Cronbach alpha's coefficient (e.g., Cronbach alpha for health professionals' overall readiness = 0.740). The study findings show that we are 95% confident that the true proportion of health professionals who have Core readiness to use EMRS is lies between 58.5% and 69.8% when having Engagement readiness to use EMRS is lies between 48.7% and 60.5%

In general, this study shows that we are 95% confident that the true proportion of health professionals who are ready to use EMRs lies between 52.2% and 63.8%. This means that more than half of the respondents are ready (Table 4).

Table 4. Readiness to use EMRs with 95%CI of health professionals working in in Jimma university medical center in Jimma Town, Southwest Ethiopia, 2024.

Parameter	Estimate	95.0% Confidence Interval	
		Lower	Upper
Having Overall readiness	58.1	52.2	63.8
Having Core readiness	64.3	58.5	69.8
Having Engagement readiness	54.6	48.7	60.5

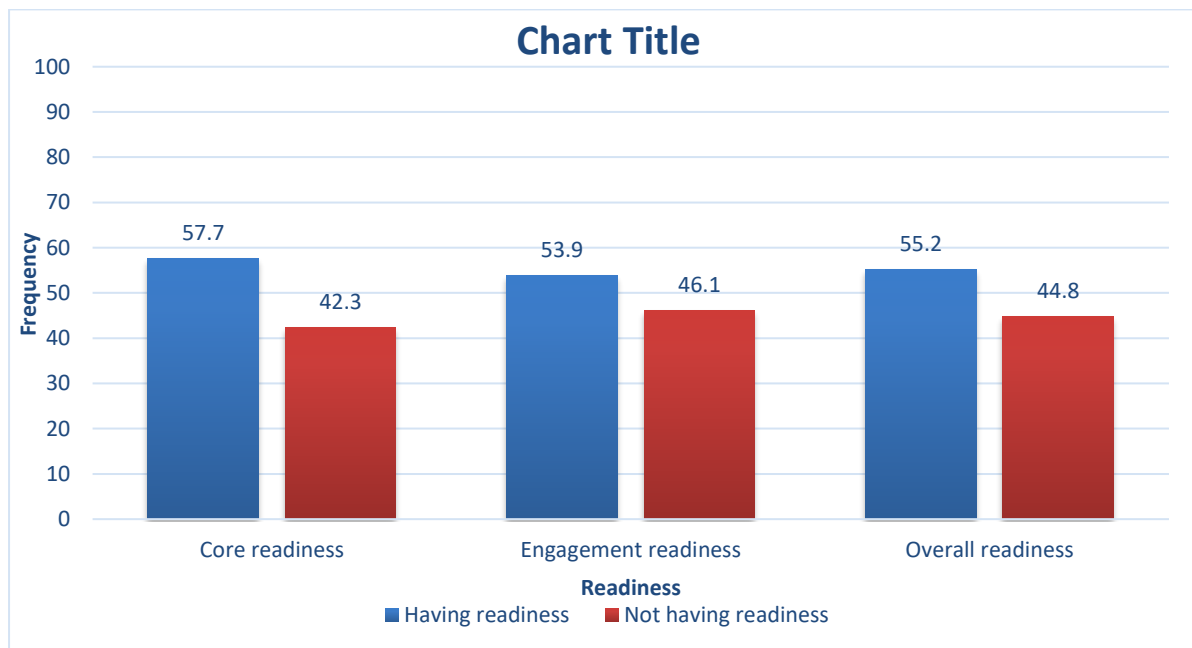


Figure 4:- Core, Engagement, and overall readiness to use EMRs in Jimma University Medical Center in Jimma Town, Southwest Ethiopia, 2024. Frequency

Among those health professionals not have readiness 122(41.9%) to implement EMR system 69(56.6%) of them have poor knowledge about EMR and 54(44.3%) have unfavorable attitude on EMR system. 55(45.1%) of them experiencing language difficulties when using EMRs.

In other ways from those having readiness 111(65.7%) of them believe that, there is no sufficient budget allocation for EMRs and 116(68.6%) of them believe that, there is no management support to implement EMRs. (Table 5)

Table 5. Overall readiness health professionals working in in Jimma university medical center in Jimma Town, Southwest Ethiopia, 2024.

Variable	Category	Having readiness 169 (58.1%)		Not have readiness 122(41.9%)	
		Count	Percent	Count	Percent
Knowledge	Poor knowledge	61	36.1	69	56.6
	Good knowledge	108	63.9	53	43.4
Attitude towards EMR	Unfavorable attitude	29	17.2	54	44.3
	Favorable attitude	140	82.8	68	55.7
Computer and IT skills	Incompetent in computers use	42	24.9	95	77.9
	Competent in computers use	127	75.1	27	22.1
experiencing language difficulties	Having language difficulties	49	29.0	55	45.1
	No having language difficulties	120	71.0	67	54.9
Perception of sufficient budget allocation	No	111	65.7	68	55.7
	yes	58	34.3	54	44.3
Perception of management support	No	116	68.6	81	66.4
	yes	53	31.4	41	33.6

5.5. Knowledge about EMR system

Of the study participants, 161 (55.3%) had good knowledge of the EMRs system (Figure 5). The study finding conducted in southern Ethiopia, northwest Ethiopia and Southwest Ethiopia on the knowledge level which is 64.75%, 71.3% and 65.0% respectively, it was higher than finding study which is 55.3% this could be because of individual knowledge of EMR and Computer/IT skills also infrastructures and exposure to digital system could be another factor (2, 46, 51).

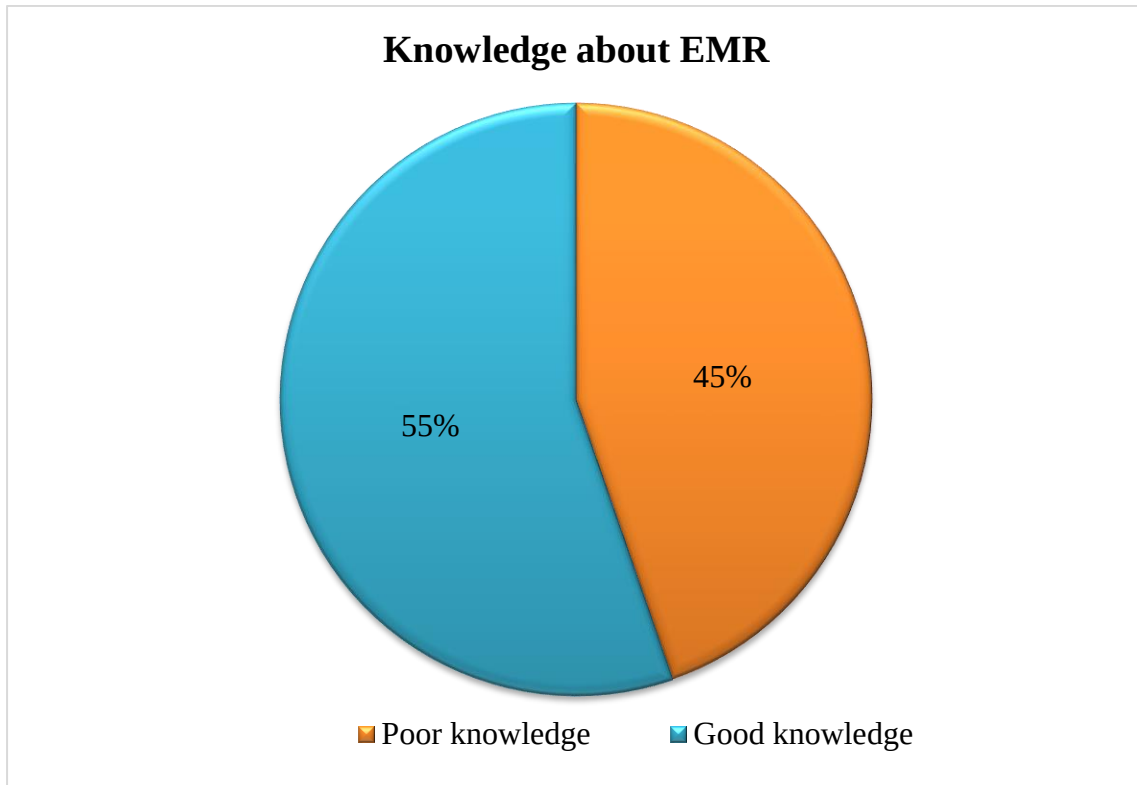


Figure 5:- knowledge about the EMR system among health professionals working in Jimma University Medical Center in Jimma Town, Southwest Ethiopia, 2024.

5.6. Attitude towards EMRs

In this study, 208(71.5%) respondents had a favorable attitude toward the EMR system (Figure 6). The finding of this study is higher than study conducted in northwest Ethiopia, Gamo southern Ethiopia, north Gondar Zone and Southwest Ethiopia 65.7%, 57.25%, 54.6% and 46.9% respectively (2, 46, 51, 57). This study finding is high which could be because of JUMC is in teaching and learning institution which has deferent technologies in the university.

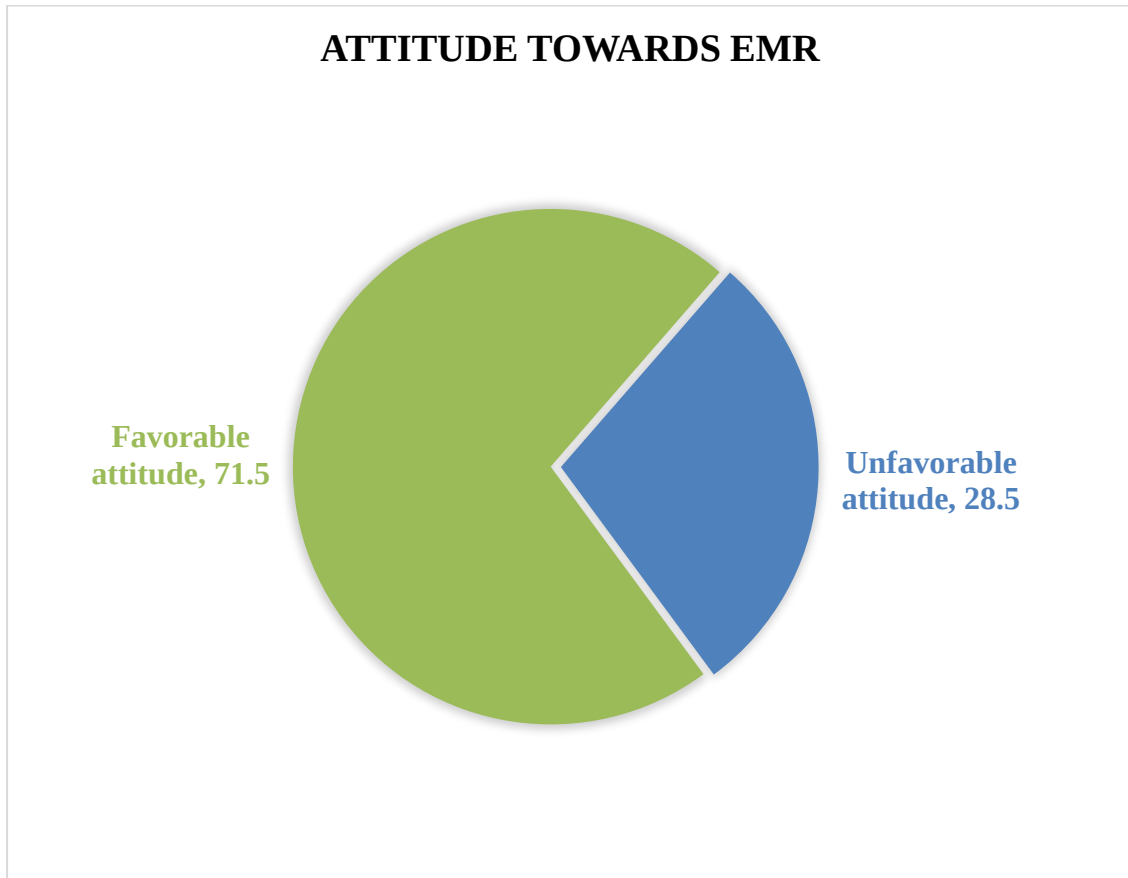


Figure 6:-Attitude towards EMR among health professionals working in Jimma University Medical Center in Jimma Town, Southwest Ethiopia, 2024.

5.7. Factors associated with Readiness to implement EMR

5.7.1 Bivariate logistic regression

From the total variables entered in to the bi-variable logistic regression model sex, educational level, working experience, computer skill, Previous experience of using of EMR, Language barrier when using a basic computer operating system, attitude and knowledge were factors associated with readiness to use EHR in the bi-variable analysis at P-value less than 0.25.

Those who are ready to implement EMRs are 105 (62.1%) male, 70 (41.4%) of them are masters or specialists and 81 (47.9%) have working experience of 6–10 years. 127 (75.1%) were competent in computers use and 149 (88.2%) previous experience of EMR use. (Table 6)

Table 6: - Bivariate analysis of predictors of readiness of health professionals working in JUMC in Jimma Town, Southwest Ethiopia, 2024.

Variable	Category	Ready 169 (58.1%)		Not ready 122(41.9%)		p-value	COR (95% CI)
Sex	Male	105	62.1%	44	36.1%		1
	Female	64	37.9%	78	63.9%	<0.001	2.908 (1.794, 4.714)
Educational level	Diploma	28	16.6%	49	40.2%	<0.001	1
	BSC / GP	71	42.0%	56	45.9%	0.007	2.219 (1.240, 3.969)
	MSC /Specialist	70	41.4%	17	13.9%	<0.001	7.206 (3.562, 14.578)
Working experience	≤ 2 years	8	4.7%	12	9.8%	0.044	1
	3 – 5 years	70	41.4%	50	41.0%	0.132	2.100 (0.800, 5.514)
	6 – 10 years	81	47.9%	44	36.1%	0.040	2.761 (1.050, 7.262)
	11 – 15 years	3	1.8%	9	7.4%	0.391	0.500 (0.103, 2.436)
	≥ 15 years	7	4.1%	7	5.7%	0.564	1.500 (0.378, 5.948)
Computer and IT skill	Incompetent in computers use	42	24.9%	95	77.9%		
	Competent in computers use	127	75.1%	27	22.1%	< 0.001	10.639 (6.128, 18.473)

Management support for EMR implementation	Poor mgt support	116	68.6%	81	66.4%		
	Good mgt support	53	31.4%	41	33.6%	0.686	0.903 (0.549, 1.483)
Sufficient budget allocation	Not sufficient budget	111	65.7%	68	55.7%		1
	There is a sufficient budget	58	34.3%	54	44.3%	0.086	0.658 (0.408, 1.061)
Language barrier when using a basic computer operating system	Yes	49	29.0%	55	45.1%		1
	No	120	71.0%	67	54.9%	0.005	2.010 (1.235, 3.273)
Attitude towards EMR system	Unfavorable attitude	29	17.2%	54	44.3%		
	Favorable attitude	140	82.8%	68	55.7%	<0.001	3.834 (2.243, 6.554)
Knowledge of wards EMR	Poor knowledge	61	36.1%	69	56.6%		
	Good knowledge	108	63.9%	53	43.4%	<0.001	2.305 (1.432, 3.711)
EMR use	I have experience	149	88.2%	90	73.8%	0.002	2.649 (1.429, 4.909)

5.7.2. Multivariate analysis

From the total variables entered in to the bi-variable logistic regression model sex, educational level, working experience, computer skill, Previous experience of using of EMR, Language barrier when using a basic computer operating system, attitude and knowledge were factors associated with readiness to use EHR in the Multivariate analysis at P-value less than 0.05.

Consequently, those variables were subjected to the multivariable logistic regression analysis to control potential confounders. Finally Sex, Computer skill, Attitude towards EMR system and Working experience are significant factors that affect readiness to use EMRs.

This study multivariate regression result show that, Female health professionals are 55.7% less likely to be ready to use the EMR system than males, AOR = 0.443, 95% CI [0.232, 0.847], indicating that sex is a statistically significant factor influencing readiness to use the EMR system. Those health professionals who are 52.9 % competent in computers and IT Skills are 1,042.6% more likely to be ready for EMRs AOR = 11.426, 95% CI [4.796, 27.220]. It shows that computer skills are a crucial factor (Table 7).

Health professionals those have Working Experience of 11 to 15 years are 86.1% less likely to be ready to use EMRs compared to those with less than 2 years AOR = 0.139, 95% CI [0.020, 0.968]. It shows that adaptation to the existing system is one of the factors that affect receiving the new system. Health professionals with a favorable attitude are 176.1% more likely to be ready to use EMRs compared to those with unfavorable attitude AOR = 2.761, 95% CI (1.383, 5.513). This indicates attitude is a significant factor that influencing readiness to use the EMR system (Table 7).

Table 7:- Multivariate analysis for predictors of health professionals’ readiness to implement EMR in JUMC in Jimma Town, Southwest Ethiopia, 2024.

Variable	Category	AOR (95% CI)	P-values
Sex	Male	1	-
	Female	0.443 (0.232, 0.847)	0.014
Computer and IT skill	Incompetent in computers use	1	-
	Competent in computers use	11.426 (4.796, 27.220)	0.000
Attitude towards EMR system	Unfavorable attitude	1	-
	Favorable attitude	2.761 (1.383, 5.513)	0.004
Working experience	≤ 2 years	1	0.052
	3 – 5 years	0.475 (0.138, 1.638)	0.238
	6 – 10 years	0.997 (0.294, 3.387)	0.996
	11 – 15 years	0.139 (0.020, 0.968)	0.046
	≥ 15 years	0.361 (0.060, 2.157)	0.264

Chapter six: Discussion

This study was conducted with objective of determining the magnitude of readiness to implement EMR among health professionals working in general hospitals of Sidama region and to assess the factors that are associated with readiness.

In this study Sex, Computer skill, Attitude towards EMR system and Working experience are significant factors that affect readiness to use EMRs.

This study multivariate recreation result show that, Female health professionals are 55.7% less likely to be ready to use the EMR system than males, AOR = 0.443, 95% CI [0.232, 0.847], indicating that sex is a statistically significant factor influencing readiness to use the EMR system. Male health professionals show higher readiness to use EMRs than their female counterparts. This finding suggests there may be gender-related differences in technological readiness that warrant further investigation.

A cross-sectional study done in the North Gondor zone, in 2014 revealed that male health professionals were 1.87 times more likely to be ready to use EMR systems than female health professionals which is almost similar finding with this study finding (64). But a cross-sectional study conducted in public hospitals in Malawi, in 2017 indicated that both sexes had equal utilization levels for EMR systems b/c both have equal exposure to technology which is different from this study finding (62).

Those health professionals who are 52.9 % competent in computers and IT Skills are 1,042.6% more likely to be ready for EMRs AOR = 11.426, 95% CI [4.796, 27.220]. It shows that computer skills are a crucial factor. Being competent in computer use is the most significant predictor of readiness to use the EMR system. Health professionals with insufficient computer skills are significantly less ready to use the system.

A cross-sectional study done in the North Gondor zone, 2014 revealed that 10.2% of health professionals had no computer-related (64). While a study done in Egypt, in 2013 showed that 17% of health professionals had lack of computer skills which caused barriers to using EMR system skill which is strongly support finding of this study finding (69)

Health professionals those have Working Experience of 11 to 15 years are 86.1% less likely to be ready to use EMRs compared to those with less than 2 years AOR = 0.139, 95% CI [0.020, 0.968]. It shows that adaptation to the existing system is one of the factors that affect receiving the new system. (Table 7).

Similarly, A cross-sectional study conducted in public hospitals in Malawi, in 2017 indicated that 58.6% of healthcare workers within the 21-30-year age group used EMR system more than paper-based records. Within this study participants aged 61 to 70 years used paper records more than electronic records which is almost similar finding with this study finding (62). A cross-sectional study done in Addis Ababa, Ethiopia, in 2015 indicated that health professionals aged ≤ 30 years use 2.57 times computers to manage patients as compared to those aged >30 years which is strongly support finding of this study finding (63).

Health professionals with a favorable attitude are 176.1% more likely to be ready to use EMRs compared to those with unfavorable attitude AOR = 2.761, 95% CI (1.383, 5.513). This indicates attitude is a significant factor that influencing readiness to use the EMR system. Having a favorable attitude toward the EMR system is associated with greater readiness to use it, which underscores the importance of fostering positive perceptions of EMR use.

Similarly Study conducted in southern Gamo woreda Ethiopia show that factors that significantly associated with readiness to use EMR in the multivariable logistic regression model: EMR knowledge, and EMR attitude which is almost similar finding with this study finding.(51)

The study findings show that we are 95% confident that the true proportion of health professionals who have Core readiness to use EMRS is lies between 58.5% and 69.8% when having Engagement readiness to use EMRS is lies between 48.7% and 60.5% In general, this study shows that we are 95% confident that the true proportion of health professionals who are ready to use EMRs lies between 52.2% and 63.8%. This means that more than half of the respondents are ready.

The finding of the study was almost consistent with readiness assessment levels in other resource-constrained settings. The overall readiness in sub-Saharan Africa is range between 40-60%, depending on the specific country and healthcare setting.

The study conducted to asses level of readiness shows that they are almost similar with this study finding Myanmar 54.2% ,54.9% in Gana and 54.1% in North Gondar Zone Southwest Ethiopia. But study conducted in northwest Ethiopia which is 42.1 and Southwest Ethiopia 65.25% are deferent from the finding of this study this could be because of infrastructure, digital skill, and healthcare system.(43, 47, 51, 57)

Chapter seven: Strengths and Limitations of the Study

Strength

This study utilized a quantitative design and face to face interviews were conducted which increase the quality of data to assess factors associated with readiness. The study also used a reliable tool to assess the readiness of health professionals. All health professionals in the hospitals were given a chance of being included in this study equally.

Limitation

However, the study was not without limitations. First, this study utilized quantitative study design which can compromise exploring readiness and factors associated with readiness. The reason was the time given to data collection and analysis is a few days.

Secondly, the study would not explore the reason behind those health professionals not ready to use EMRs. This issue needs additional assessment to explore the reason behind.

Thus, the level of computer literacy reported in this study might not reflect the truth and needs objective assessment. Finally, this study can only be generalized to health professionals working in JUMC. Additional study would be required to determine factors related with readiness in general hospitals and primary hospitals of the catchment.

Chapter eight: Conclusions

This study is the first study done to assess health professional's readiness to use EMR in the JUMC and the catchment health facility. The overall study show that majority of health professional have overall readiness to use EMR system. Majority of study participants had good knowledge and favorable attitude towards EMR. However, there was a low level of training and experience among respondents. The findings of this study show that Sex, Computer skill, Attitude towards EMR system and Working experience are significant factors that affect readiness to use EMRs.

2. Recommendation

Implementation of an electronic medical recording system is a resource-demanding process. Failure of its implementation would have a greater financial impact. Based on the study's findings, the following recommendations were made to improve EMR readiness among healthcare professionals:

1. Capacity Building Training on Computer skill should have prioritize training programs that enhance computer skills among health professionals. Special focus should be placed on those reporting incompetence in computer use to improve their readiness to use EMRs. Because it affected by Sex, Computer skill, Attitude towards EMR system and Working experience. So, the health institutions' management team should provide and organize trainings on EMR system, which incorporate knowledge and skill.

Healthcare facilities can collaborate with educational institutions or IT specialists to provide ongoing training workshops targeted on significant factors. Programs should be mandatory for new hires and available as refresher courses for current employees.

Further study is recommended to assess the factors that affect the health professional readiness to use EMR and explore the reason behind those health professionals not ready to use EMRs.

2. Further Research: This research was conducted only in JUMC, So, it would be better if further study be done on healthcare facilities in the south western of Ethiopia. Additionally In order to obtain more comprehensive information about the health professionals' willingness to use EMR system, qualitative techniques are also recommended to generate in depth information.

3. Since computer related skills were one of the perceived barriers for readiness, hospitals should avail computers for each workstation so that professionals can practice and develop their computer skills

Annex I. Questioner

Informed Consent of Statement

Hello! My name is _____ I am here on behalf of **Ermiyas Abraham Daka**, a student of Master of Public Health in Health system management at Jimma University, Institute of Health Department of Health Policy and Management. He is conducting research for partial fulfillment of a master's degree on **readiness to use the electronic medical record system (EMRs) and associated factors in a public hospital in Jimma town, Southwest Ethiopia, in 2024**. He has ethical clearance from Jimma University. You are chosen to participate in this study and your anonymous answers were used only for research purposes. To effectively attain the purpose of the research, I request you to give a genuine response to each question. There are questions for you to complete and there is no need to put your name on the questionnaire; no individual responses were reported. Your answers are completely confidential. It is your full right to refuse, to answer any or all the questions. If you don't want to participate you can leave the questionnaire empty. Study questionnaires will take a maximum of 15 minutes.

Certificate of consent:

I understand that the findings of this research were disseminated to private Hospital management and decision-makers and were useful as input for the next actual use of EMRs among health professionals and sustainability utilization of EMRs.

I voluntarily consent to participate in this study.

I agree

☐

I disagree

☐

If you agree to participate in the study, please visit the next page.

For any further questions, contact the investigator

Name of the investigator: Ermiyas Abraham Daka,

Address Phone Number: **+251-96676-4646**

Email:- ermiyas2004@gmail.com / ermiyas.abraham@ju.edu.et

Thank you for consenting to be a participant in this study

For Data collectors use only

Facility name _____ Questionnaire ID: _____

Data collector name _____ date _____

signature _____

Part 1. Socio-Demographic Characteristics of the Study Subject.

No	Questions	Responses	Skip to
101	Your sex.	1. Male 2. Female	
102	Your age in years	_____	
103	Your religion	1- Orthodox 2 - protestant 3- Muslim 4 - Others	
104	Marital status	1- Single 2. Married 3. Divorce 4. Widow	
105	Educational level	1. Diploma 2. Degree / GP 3. Master/specialist 4. above	
106	Your professional category.	1. Physician 2. Nurse 3. Laboratory 4. Pharmacy 5. Midwifery 88. Others.	
107	Working ward/unit	_____	
108	Monthly income in Ethiopia birr	_____	
109	Working experience in this health institution in years (if < 1 year in a month)	_____	
110	Total Work experience in years (if < 1 year in a month)	_____	

Part .2. Organizational and resource variables

No	Questions	Responses	Skip to
201	Do you have computer access?	1. Yes 2. No	If no skip 202
202	If your answer is “yes” for queue 201, where is your computer access?	1. At home 2. At Workplace 3. Both	
203	Do you have local area internet network access for using the EMR system?	1. Yes 2. No	If no skip 204-207
204	If your answer is “yes queue 203, Are your department computers linked local	1. Yes 2. No	

	area internet for using the EMR system?		
205	If your answer is “yes” que 204, Do you use the local area internet for EMR system?	1. Yes 2. No	
206	If your answer is “yes” que 204, how often do you use internet service?	1. Every movement of patient data mgt 2. Every data 3. At least once a week 4. At least once a month	
207	If your answer is “yes” que 205, mainly for what purpose do use the internet?	1.To get information that supports my profession. 2.To communicate with my friends 3.To get daily news 4.To manage the patient’s health profile and data 5.To report different data 88. Other.....	
208	Does your hospital have trained IT technical support personnel?	1 Yes 2. No 3. I don’t know	If no skip 209
209	If your answer is yes que 208, is there a Provision of technical support?	1 Yes 2. No 3. I don’t know	
210	Do you think that the EMR system reduces patient waiting time?	1 Yes 2. No 3. I don’t know	
211	Do you have EMR system guidelines in your health institution?	1 Yes 2. No 3. I don’t know	
212	Do you have adequate budget allocation to implement the EMR system?	1 Yes 2. No 3. I don’t know	
213	Is there management support to implement the EMR system of new technology?	1 Yes 2. No 3. I don’t know	
214	Is there monitoring and evaluation (M\$E) for effective use of the EMR system and feedback?	1 Yes 2. No 3. I don’t know	

Part 3. Health professional Willingness to Use EMR system

No	Question	Response
301	Do you have a willingness to avail a personal computer for using of EMR system?	1. Yes 2. No 3. I don't know
302	Do you have a willingness to undergo computer training to enable EMR system usage?	1. Yes 2. No 3. I don't know
303	Do you have a willingness to implement an EMR system after taking EMR training?	1. Yes 2. No 3. I don't know
304	Do you have a willingness to use the EMR system for quality health care if properly trained?	1. Yes 2. No 3. I don't know
305	Do you have a willingness to use an EMR system if the technical infrastructures are available?	1. Yes 2. No 3. I don't know
304	Do you think EMR saves time?	1. Yes 2. No 3. I don't know
305	Do you think EMR saves money?	1. Yes 2. No 3. I don't know

Part 4. Readiness questions

Use Likert scale with strongly disagree- 1, disagree- 2, Neutral -3, Agree-4 and strongly agree 5 answer the following questions.

Part I: Core readiness questions

s.no	Measuring factor	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
401	Paper record-based documentation is a tedious process	1	2	3	4	5
402	I am dissatisfied with the completeness and accuracy of data from paper-based records	1	2	3	4	5
403	Sharing patient information with other responsible health professionals using paper records is difficult	1	2	3	4	5
404	I am concerned that patient's information on paper-based records could be accessed by unauthorized personnel	1	2	3	4	5

Part II: Engagement readiness questions

405	I am worried that EMR implementation would disrupt my routine work flow	1	2	3	4	5
406	EMR implementation requires high investment and has low return	1	2	3	4	5
407	I am worried my information technology knowledge would limit me from effectively using EMR system	1	2	3	4	5
408	EMR implementation could consume the time of health professionals and increase the workload on health professionals	1	2	3	4	5
409	EMR implementation would help me document patients' information accurately	1	2	3	4	5
410	EMR implementation would help me to serve my patients better.	1	2	3	4	5
411	EMR is helpful to protect the privacy of patients	1	2	3	4	5
412	EMR can help me easily and timely share patient information with authorized personnel	1	2	3	4	5
413	I am willing to take EMR training if provided	1	2	3	4	5

Part 5. Attitude to use EMR system

Please point out the extent about attitude towards EMR which you agree with each of the following statements. Please tick (✓) or circle the appropriate answer. Use liker scale with strongly disagree- 1, disagree- 2, Neutral -3, Agree-4 and strongly agree-5

s.no	Measuring factor	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
501	EMRs would improve and promote quality of care	1	2	3	4	5
502	EMRs would establish Proper communication among health professional	1	2	3	4	5
503	EMRs would reduce medical errors using alerts and reminders	1	2	3	4	5
504	EMRs would improve quality of work flow.	1	2	3	4	5
505	EMRs would increase health professionals 'satisfaction	1	2	3	4	5
506	EMRs benefits would outweigh than the cost.	1	2	3	4	5
507	EMRs would decrease burden on health Professionals	1	2	3	4	5
508	EMRs would make patients' data easily Accessible	1	2	3	4	5
509	EMRs would increase practice Productivity	1	2	3	4	5
510	EMRs keep patient confidentiality and Security	1	2	3	4	5
511	EMRs not cause new responsibilities and much expectations	1	2	3	4	5
512	EMRs using is easy when IT skilled support person available	1	2	3	4	5
513	EMRs use not affect the work position	1	2	3	4	5
514	To use EMRs training would be required	1	2	3	4	5
515	I would devote time to undergo training for its Implementation	1	2	3	4	5
516	Using EMRs increase level of patient satisfaction in this health institution.	1	2	3	4	5

Part 6. Technical variables

Technical variable question

No	Question	Response	Skip
601	Have you experiencing language difficulties when using basic computer operating system?	1. Yes 2. No	
602	Have you received EMR system training?	1. Yes 2. No	If yes skip 503
603	If No, for que 115, what is your main reason not taking the training?	1. Previously I was trained 2. I have no access to take training 3. I'm not interested to take training 4. My work does not need training	
604	Have you use a computer in your work place?	1. Yes 2. No	If no skip 506 - 508
605	If your answer is "yes" for que 504, how often do you use computer?	1. In every healthcare delivery 2. Daily 3. Three times a week 4. Weekly 5. Monthly 6. Not specific.	
606	If "yes" for que 504, How long have you been using the computer?		
607	If your answer is "yes" que 504, mainly for what purpose do you use computer?	1.Report writing 2. Keeping patient File 3.Seeing video and listening music 4.Reading 88. Others	

Computer and IT skill

Please point out the extent about computer skill which you agree with each of the following statements. Please tick (✓) or circle the appropriate answer.

Use liker scale with strongly disagree- 1, disagree- 2, Neutral -3, Agree-4 and strongly agree-5

No	Factor	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
608	I am competent in using computer in my department	1	2	3	4	5
609	I have good concepts for computer application	1	2	3	4	5
610	I am competent in using MS Window	1	2	3	4	5
611	I am competent in using MS Word	1	2	3	4	5
612	I am competent in using MS Excel	1	2	3	4	5
613	I am competent in using MS Access	1	2	3	4	5
614	I am competent in using power point	1	2	3	4	5
615	I am competent in using access and browse internet.	1	2	3	4	5

Part 7. Knowledge on EMR system

Please point out the extent about knowledge on EMR which you agree with each of the following statements. Please tick (✓) or circle the appropriate answer. Use liker scale with strongly disagree- 1, disagree- 2, Neutral -3, Agree-4 and strongly agree-5

No	Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
701	I have good proficiency in computer use	1	2	3	4	5
702	I am familiar with the concept of EMR system	1	2	3	4	5
703	I am familiar to the benefits of EMR system	1	2	3	4	5
704	I am familiar with tools and technologies needed for EMR system	1	2	3	4	5
705	I am familiar with EMR system of other countries	1	2	3	4	5
706	Education has effect in increasing the knowledge of hospital staff to work with EMR system	1	2	3	4	5
707	EMR system has effect in increasing the quality of health care services and patient safety	1	2	3	4	5
708	EMR system has effect in increasing the speed to deal with patients.	1	2	3	4	5
709	EMR system has effect in reducing the patients and hospital costs	1	2	3	4	5
710	EMR system has effect on public access to healthcare services	1	2	3	4	5
711	EMR system has effect in increasing patients 'satisfaction	1	2	3	4	5
712	EMR system has effect in preserving the patient's privacy	1	2	3	4	5
713	EMR system has effect in preserving the confidentiality and security of patient information.	1	2	3	4	5

Thank you

Annex II: References

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