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LEVEL AND SOCIO-DEMOGRAPHIC PREDICTORS OF ELECTRONIC MEDICAL RECORDS UTILIZATION AMONG HEALTHCARE WORKERS AT MBAGATHI COUNTY REFERRAL HOSPITAL, KENYA

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ABSTRACT

Purpose of the Study: This study sought to assess the level of Electronic Medical Records (EMR) utilization and determine how socio-demographic characteristics influenced utilization patterns among healthcare workers at Mbagathi County Referral Hospital, Nairobi, Kenya.

Statement of the Problem: Despite over a decade of EMR implementation in Kenyan public hospitals, utilization gaps continue to persist, especially in public healthcare facilities. These gaps are linked to challenges such as unreliable internet connectivity, insufficient hardware, low uptake among some healthcare workers, and data inconsistencies between electronic and paper-based records.

Methodology: The study adopted an analytical cross-sectional design integrating quantitative and qualitative approaches. A sample of 210 healthcare workers was drawn from a target population of 449 using stratified random sampling proportional to cadre size. Data were collected using a semi-structured self-administered questionnaire and a focus group discussion involving eight purposively selected participants. EMR utilization was measured through self-reported frequency of use. Quantitative data were analyzed using descriptive statistics, Chi-square tests, and binary logistic regression in SPSS Version 24, while qualitative data were analyzed thematically.

Findings: The findings revealed that the majority of respondents, 72.1%, reported full EMR utilization, while 27.9% were classified as partial utilizers. Age was significantly associated with EMR utilization, $\chi^2 = 18.691$, $p = 0.001$, with the highest full utilization recorded among healthcare workers aged 26–35 years at 50.7%. Education level was also significantly associated with EMR utilization, $\chi^2 = 13.900$, $p = 0.003$, with diploma holders recording the highest full utilization at 70.7%.

Conclusion: The study concluded that the majority of healthcare workers at Mbagathi County Referral Hospital were utilizing EMRs. Age and education level were significant socio-demographic predictors of EMR utilization, while gender did not significantly influence utilization patterns.

Recommendation: The study recommends targeted practical EMR training and refresher programs, particularly for older healthcare workers and partial utilizers, to bridge existing utilization gaps and strengthen effective EMR use in routine healthcare service delivery.

Keywords: *Socio-Demographic, Predictors, Electronic, Medical Records, Healthcare Workers*

BACKGROUND

The exponential advancement of information technology has fundamentally transformed multiple facets of human existence, with the public health sector being among the most profoundly affected. The integration of information technology into healthcare has ushered in a revolutionary approach to service delivery globally, shifting the paradigm from traditional paper-based record keeping towards more dynamic, digital systems (Thacharodi et al., 2024). Conventional paper-based records, while still widely used due to their familiarity and accessibility to workers with limited training, have consistently demonstrated inefficiencies in data quality, information retrieval, accuracy, and synchronization of data access (Essuman et al., 2020; Jagannath et al., 2021).

In response to these limitations, Electronic Medical Records (EMRs) have gained considerable global momentum (Chatta et al., 2024). They refer to computerized health information systems designed to replace paper-based medical record keeping with evidence of their used documented across diverse settings. In the United States, healthcare professionals in New York have demonstrated effective EMR use in clinical service delivery, and adoption rates have risen markedly over the past two decades alongside similar trends in China (Allen et al., 2025; Liang et al., 2021). Walsh et al. (2021) similarly documented increasing EMR uptake across Irish hospitals. At the regional level, Oumer (2020) reported that 66% of healthcare workers in Ethiopia expressed preference for EMRs over paper-based systems, while Feldacker et al. (2023) documented utilization of EMR functions across central hospitals in Malawi, albeit with implementation challenges persisting.

In Kenya, formal EMR implementation dates to 2012, when the country, supported by partners including USAID and the Centers for Disease Control and Prevention (CDC), introduced systems such as International Quality Patient Care (IQ-Care), Kenya EMR, and the Comprehensive Care Centre Patient Database (C-Pad) (Mudavadi et al., 2023). Despite this early adoption, Kenya, as a developing country, continues to grapple with inefficiencies in healthcare information system use (Bagherian & Sattari, 2022), and more recent evidence confirms a mixed record of EMR success within the country (Chepkirui et al., 2025).

The benefits of EMR utilization are well established in the literature. EMRs provide accurate and current patient information at the point of care, facilitate electronic information exchange between

patients and providers, enhance privacy and security of patient data, reduce costs associated with paperwork, and enable safer prescribing practices and improved care coordination (Adeniyi et al., 2024; Uslu & Stausberg, 2021). Notwithstanding these advantages, utilization remains constrained by a wide spectrum of barriers. These include financial, technical, time-related, psychological, social, legal, and organizational impediments, as well as negative perceptions among clinicians (Jimma & Enyew, 2022; Alhur, 2024). Factors such as attitude towards EMRs, ease of use, adaptability, and reliability have been identified as key determinants of EMR acceptance among healthcare workers (Singh et al., 2020), with organizational, technical, and human factors collectively acting as either facilitators or barriers in low-resource settings (Bostan et al., 2024).

Among the individual-level determinants of EMR utilization, socio-demographic characteristics have attracted growing scholarly attention. Attributes such as age, gender, educational level, and years of experience have been theorized and empirically examined as predictors of technology adoption behaviour (González-Anleo et al., 2024; Sezis, 2023). Evidence from private hospitals in the Amhara region of Ethiopia established that age and gender predicted EMR use among healthcare workers (Senishaw et al., 2023), while a Saudi Arabian study similarly identified gender, age, education level, and years of experience as influencing nurses' acceptance of EMRs (Alrasheeday et al., 2023).

However, findings in this area are not uniform. Studies conducted in Canada and Tanzania found that age, gender, and years of experience did not significantly influence EMR acceptance or utilization (Ifinedo, 2020; Kessy et al., 2024), though educational attainment and employment level retained positive associations with EMR use in the Tanzanian context. Closer to the study setting, Ndemi (2025) reported that socio-demographic factors had no significant effect on EMR utilization across public healthcare facilities in Kiambu County, Kenya. These inconsistencies across settings underscore the context-specific nature of socio-demographic influences on EMR utilization and highlight the need for facility-level evidence. It is against this backdrop that this study sought to assess the level of EMR utilization and examine the socio-demographic predictors of EMR utilization among healthcare workers at Mbagathi County Referral Hospital, Nairobi, Kenya.

STATEMENT OF THE PROBLEM

Despite over a decade of EMR implementation at Mbagathi County Referral Hospital, where EMR use is mandatory across outpatient services, special clinics, and the Comprehensive Care Clinic, optimal utilization of the system remains an elusive goal. Persistent challenges including unreliable internet connectivity, insufficient desktop computers, low uptake among clinicians, and a critical mismatch between hardcopy registers and EMR data continue to undermine effective use. The severity of this data quality problem is illustrated by Ajwang et al., (2019), who revealed a 67% discrepancy between physical registers and EMR records. These challenges are neither isolated nor new. In particular, public hospitals including Mbagathi, experience disproportionately greater difficulties in EMR utilization compared to private facilities. This is indicated by a report by the Ministry of Health which showed persistent gaps in health data integrity and the capacity of health practitioners to effectively utilize health records and information (Ajwang et al., 2019).

Compounding these systemic challenges is the continued preference for paper-based documentation among healthcare workers. According to a study by Jagannath et al. (2021) healthcare professionals spend approximately half their working time on manual data tasks, causing significant delays in service delivery. Despite this, facility-specific evidence remains inadequate. It is against this backdrop insufficient local evidence that this study sought to establish the level of EMR utilization and examine the socio-demographic predictors of EMR utilization among healthcare workers at Mbagathi County Referral Hospital.

METHODOLOGY

This study employed an analytical cross-sectional design that integrated both quantitative and qualitative approaches to assess EMR utilization. The target population consisted of 449 healthcare workers at Mbagathi County Referral Hospital, a public facility under the Nairobi City County Government serving approximately 3,000 inpatients and 1,500 outpatients monthly. A sample size of 210 was derived using the Krejcie and Morgan formula and selected through stratified random sampling proportional to cadre size. Data were collected using a semi-structured questionnaire comprising of socio-demographic characteristics section and EMR utilization section. EMR utilization was operationalized through self-reported frequency of use, with daily users classified as full utilizers and those reporting sometimes or rarely classified as partial utilizers. Eight

purposively selected healthcare workers were involved in a semi-structured interview to enrich the quantitative findings. The questionnaire was pre-tested on 21 healthcare workers at Mama Lucy Kibaki Hospital, with reliability confirmed through a Cronbach's Alpha coefficient of 0.79 Quantitative data were analyzed using SPSS Version 24 through descriptive statistics, Chi-square tests of association, and binary logistic regression, while qualitative data from the focus group discussion were analyzed thematically. Ethical approval was obtained from the Kenyatta University Ethics Review Committee and NACOSTI, and informed consent, anonymity, and confidentiality upheld throughout the study.

RESULTS

The results of the study are presented in line with the study objectives, beginning with the socio-demographic characteristics of the respondents. This is followed by findings on the level of electronic medical records utilization among healthcare workers. The section further presents the relationship between socio-demographic characteristics and EMR utilization at Mbagathi County Referral Hospital.

Sociodemographic Characteristics of Respondents

Most of the respondents were female (58.2%); males accounted for only 41.8% of the sample. Majority (45.2%) were aged 26-35 years, with the least representation (1%) from those above 55 years. Regarding the level of education, a large number had diplomas (63%), followed by degrees (27.4%). Only 4.3% had a master's degree or higher. 48.6% of the respondents had 1-3 years of work experience at the hospital. 39.9% had worked at the hospital for three or more years while only 11.5% had worked there for less than a year. Thus, this demographic distribution suggests a predominantly young, well-educated, and moderately experienced workforce; these factors are likely to be associated with positive EMR utilization.

In regard to the professions of the respondents, the majority were nurses (25.5%), followed by health records information officers (21.2%), pharmacists (8.7%), and clinical officers (5.8%). Other recorded professions included laboratory technicians, public health officers, orthopedic professionals, radiographers, and pediatricians among others. This is illustrated in Table 1.

Table 1: Sociodemographic Characteristics of Respondents

Characteristic		Frequency	Percent
Gender	Male	87	41.8%
	Female	121	58.2%
Age	Below 26	24	11.5%
	26-35	94	45.2%
	36-45	66	31.7%
	46-55	22	10.6%
	Above 55	2	1.0%
Education	Certificate	11	5.3%
	Diploma	131	63.0%
	Degree	57	27.4%
	Master's and above	9	4.3%
Work	Less than a year	24	11.5%
	1-3 years	101	48.6%
	3 and above years	83	39.9%

Electronic Medical Records Utilization Among Healthcare Workers

Regarding the level of EMR utilization, majority of respondents reported full utilization of the EMR system, with 72.1% indicating that they used the system on a daily basis as part of their routine service delivery. The remaining 27.9% of respondents reported partial utilization, indicating that their engagement with the EMR system was either occasional or infrequent rather than consistent and routine. These findings suggest that while a substantial proportion of healthcare workers at Mbagathi Hospital are actively engaging with the EMR system on a full-time basis while a considerable minority continues to interact with the system only partially, pointing to persistent gaps in complete EMR uptake across the facility. These findings are summarized in Table 2.

Table 1: EMR utilization

	Frequency	Percent	Valid Percent	Cumulative Percent
Full	150	72.1	72.1	72.1
Partial	58	27.9	27.9	100.0

Most respondents strongly preferred EMRs over paper-based records, as reflected by a high mean score of 4.72 out of 5, indicating that the majority of healthcare workers at Mbagathi Hospital held a strong favorable disposition towards electronic records as opposed to traditional paper-based documentation systems. Regarding actual system engagement, the regular login score returned a

mean of 3.65, suggesting moderate levels of EMR utilization among the respondents, with healthcare workers logging into the system with reasonable but not consistent frequency during their routine service delivery. Additionally, respondents perceived the EMR system as relatively consistent with traditional paper-based records, evidenced by a mean score of 4.08, which is a positive indicator of system credibility and suggests that healthcare workers found the information captured in the EMR system to be broadly aligned with what they were accustomed to recording in physical registers. These findings are summarized in Table 3.

Table 2: Descriptive statistics on EMR utilization

	N	Mean
I prefer using electronic medical records to paper-based records	208	4.72
I regularly login to the EMR system to use it	208	3.65
The electronic medical records are consistent with paper-based records	208	4.08
Valid N (listwise)	208	

Sociodemographic Characteristics and EMR Utilization

A Chi-Square test of association was conducted and the analysis revealed a statistically significant association between EMR utilization and age (χ^2 (4) = 18.691, p = 0.001). Furthermore, the results show that the 26–35 years' group has the highest full EMR utilization (50.7%), followed by 36–45 years (27.3%). Partial utilization is more evenly spread but also peaks among 26–45-year-olds. Notably, older age groups (46–55 and above 55) have much lower full utilization rates. The qualitative results echo this trend, as many participants observed that older colleagues were reluctant or even resistant to using the system. "People see EMR as being set in its ways… they don't understand it and choose to ignore it," (FGD participant 3, nurse). This corresponds with the attitudinal barriers which correspond to the statistical results.

The results also indicate that there was a statistically significant association between education attainment and EMR utilization (χ^2 (3) = 13.900, p = 0.003). Those with a diploma have the highest full EMR utilization (70.7%), followed by those with degrees (21.3%). Higher proportions of partial utilization can be observed in those with degrees and certificates. The number of people with master's and higher is small, but their use is towards partial. But, the participants who attended a focus group discussion many times highlighted training and refresher sessions as a more

important tool over formal education in order to enable effective utilization of the EMR system. "Those who don't have the knowledge of the system… it will really influence them because it will be very difficult for them to use," (FGD participant 2, health records officer). This is the message that it means practical knowledge of the system is more important than paper qualifications.

However, the results show that there was no statistically significant association between gender and EMR utilization (x^2 (3) = 0.502, p = 0.479). Among males, 43.3% fully utilize EMRs, while 37.9% partially utilize them. Among females, 56.7% fully utilize EMRs, while 62.1% partially utilize them. This is summarized in table 4.

Table 4: Socio Demographic Factors and EMR Utilization

Variable	Category	Partial EMR Utilization (N)	Partial EMR Utilization (%)	Full EMR Utilization (N)	Full EMR Utilization (%)	Chi-square	df	p-value
Gender	Male	22	37.9%	65	43.3%	.502	1	.479
	Female	85	62.1%	36	56.7%			
Age	Below 26 years	8	13.9%	16	10.7%	18.691	4	.001
	26-35 years	18	31.0%	76	50.7%			
	36-45 years	18	31.0%	41	27.3%			
	46-55 years	9	15.5%	10	6.6%			
	Above 55 years	5	8.6%	7	4.7%			
Education	Certificate	5	8.6%	7	4.7%	13.900	3	.003
	Diploma	23	39.7%	106	70.7%			
	Degree	25	43.1%	32	21.3%			
	Masters and above	5	8.6%	5	3.3%			

DISCUSSION

The findings indicate a relatively high level of EMR utilization among healthcare providers at Mbagathi Hospital, with 72.1% reporting full utilization and 27.9% partial utilization. This suggests a promising uptake of EMRs in clinical workflows. This is also reflected in the descriptive statistics. The results showed high user acceptance of the EMRs, with most respondents strongly preferring the EMRs over paper-based records (mean = 4.72). The average login frequency (mean = 3.65) indicates moderate but regular use of the system, and a relatively high mean score for consistency with paper records (mean = 4.08) suggests a perceived system reliability and consistency with paper records.

This is consistent with previous research that has shown how the implementation of EMRs can enhance care delivery efficiency, accuracy, and communication (Uslu & Stausberg, 2021; Adeniyi et al., 2024). Other characteristics of acceptability, such as high levels of acceptance as seen in this study, mirror the findings of Singh et al. (2020) that ease of use and perceived reliability were important facilitators of EMR use. However, the partial use by some respondents could be due to the identified barriers in the literature, such as technical and organizational barriers (Jimma & Enyew, 2022; Bostan et al., 2024), usability concerns, and change processes (Alhur, 2024). Although Mbagathi Hospital seems to be getting it right when it comes to EMR uptake, some specific actions could be taken to eliminate some of the remaining obstacles and increase complete staff use of EMR.

Demographic results indicated that the workforce was young and moderately experienced, with relatively high education levels, which indicated a favorable situation for technology uptake. This is in line with literature which associates younger and educated individuals with greater use of technology. The Chi-Square test of association showed that there was a significant association between age and the use of EMR (χ^2 (4) = 18.691, p = 0.001). The highest full EMR utilization was the 26-35 years' group (50.7%) followed by the 36-45 years group (27.3%). Partial utilization was more evenly distributed but also peaked among the 26-45-year-old age group. Older health care workers (ages 46 and older) had significantly lower overall rates of full utilization, in comparison. These findings are similar to those of Onyeaka et al. (2021) who reported that younger HCP in their study were more likely to use HITs. Further, qualitative data identified that there were some older workers who were not very interested in using EMR systems.

Results also show there is a statistically significant relationship between education level and the use of EMR (χ2 (3) = 13.900, p = 0.003). The highest full EMR utilization (70.7%) were the diploma holders, followed by those with degrees (21.3%). Partial utilization was higher for degree holders and certificate holders, and was the inclination of those with master's and higher degrees (although not many of these latter). This could be due to variation in training opportunities or job positions, not just academic attainment. The qualitative data corroborates this, and participants often cited training sessions and refresher courses as essential strategies for effective use of the EMR system, rather than formal education. This contradicts the Rahal et al. (2021) suggestion that academic qualifications are positively related to the use of EMR.

There was however no statistically significant relationship between gender and the use of EMR (χ^2 (1) = 0.502, p = 0.479). The percentage of males who fully utilized EMRs was 43.3% and females 56.7% and males who partially utilized them was 37.9% and females 62.1%. This indicates that both sexes are distributed across the levels of utilization, and any differences may be related to other factors such as assignment to different departments, shifts, or indirect access to EMRs. Although no specific gender-related issues were identified in the qualitative results, there are indications that more detailed analysis of the effects of gendered roles in the hospital workflow on EMR use is warranted. This agrees with Malacon et al. (2024) who indicated that there is a slight gender disparity on engagement in EMR, but that this is not necessarily indicative of gender bias.

CONCLUSION

This study sought to assess the level of EMR utilization and the socio-demographic predictors of utilization patterns among healthcare workers at Mbagathi County Referral Hospital. The findings revealed that the majority of healthcare workers fully utilized the EMR system, with 72.1% reporting daily use and 27.9% classified as partial utilizers. Education level and age emerged as statistically significant determinants of EMR utilization. Full utilization was highest among younger healthcare workers aged 26–35 years and among diploma holders, while partial utilization was more prevalent among older employees and those with advanced academic qualifications. Gender did not show a statistically significant association with EMR utilization. These findings suggest that younger healthcare workers with practically oriented training are more likely to engage fully with EMR systems, and that hands-on system experience carries greater influence on utilization than academic qualification level alone.

RECOMMENDATIONS

Based on the study findings, the proposed recommendations will address identified gaps;

i. Institute regular, practical EMR refresher training programs targeting older healthcare workers at Mbagathi Hospital.
ii. Formally integrate EMR utilization into routine supervision and performance monitoring frameworks at the hospital.
iii. Prioritize improvements in EMR system usability, addressing speed, interface design, and overall system reliability.

iv. Future studies to analyses departmental difference in EMR utilization across multiple public facilities.

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