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Digital Health implementation experiences among nurses with and without Donor-Funded project affiliation in Kenya: An exploratory cross-sectional study

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Abstract

Background

Nurses' participation and continuing support are important dimensions of electronic medical record (EMR) implementation. Evidence comparing these experiences across donor-funded and facility-employed nurses in Kenya is limited. This study compared reported design participation, pilot participation and ongoing training between these groups.

Methods

This exploratory secondary analysis used a cross-sectional, self-administered nursing survey conducted between March and May 2025. Analyses included 329 nurses: 190 reporting donor-funded project work and 139 identifying as facility employed without donor-funded project work. Design participation was the primary outcome; pilot participation and ongoing training and sensitisation were secondary outcomes. Agreement combined agree and strongly agree responses. Modified Poisson regression estimated prevalence ratios (PRs) with facility-clustered robust standard errors, adjusting for gender, age, education and facility tenure. Sensitivity analyses examined alternative sample definitions and modelling approaches.

Results

Agreement with design participation was 26.3% among donor-funded respondents and 47.5% among facility-employed respondents; corresponding proportions were 43.7% and 69.8% for pilot participation, and 96.8% and 55.4% for ongoing training. After adjustment, differences in design participation (PR 0.85, 95% confidence interval [CI] 0.53–1.34) and pilot participation (PR 0.87, 95% CI 0.65–1.16) attenuated. Higher agreement with ongoing training persisted (PR 1.83, 95% CI 1.49–2.26), with consistent findings across sensitivity analyses. All respondents agreed with deployment training. Non-agreement with ongoing training among facility-employed respondents was predominantly neutral.

Conclusions

Work affiliation was associated with reported ongoing EMR training, while adjusted differences in design and pilot participation remained uncertain. Nursing managers should assess continuing support separately from deployment training and review training opportunities across work affiliations. These exploratory associations do not establish causal effects of employment or donor funding.

1. Background

Electronic medical records are introduced into settings where clinical information must be collected, retrieved and communicated during patient care. For nurses, the implementation question extends beyond whether a system is available: it concerns whether the system can be used within everyday work and whether staff have opportunities to shape its operation. The World Health Organization (WHO) Digital Implementation Investment Guide situates digital investment within health programme priorities, readiness and national architecture [1]. In the present study, implementation experience refers specifically to respondents' reported involvement in design or enhancement, pilot participation and continuing training or sensitization.

Evidence from nursing settings illustrates why these experiences deserve attention. In a qualitative study of 158 Australian nurses following an organization-wide implementation, Jedwab and colleagues identified changes in how nurses experienced their work, professional roles and patient care, with adaptation continuing well beyond deployment [2]. Their study shows that implementation can be experienced differently within a nursing workforce, even when nurses encounter an organization-wide system. These findings caution against equating successful installation with satisfactory implementation, although transferability to Kenya cannot be assumed.

Implementation also has a temporal dimension. Zadvinskis and colleagues interviewed nurses at three, nine and eighteen months after electronic health record and barcode medication administration implementation [3]. Equipment and workflow remained recurrent concerns, while the pattern of perceptions changed over time. This longitudinal evidence suggests that a single survey can capture different stages of adaptation among respondents. It also explains why an initial training episode and continuing support should be distinguished analytically. For the current comparison, frequent training is a reported experience rather than a verified count of educational sessions. Whether nurses were employed at a facility during an earlier pilot is another temporal consideration, particularly when groups differ in facility tenure.

Participation in design requires similar precision. A case study by Vossebeld and colleagues examined a mobile documentation application developed with extensive nursing involvement that ultimately did not fit nurses' needs [4]. Some feedback was not effectively translated into the final product, and workflow mismatches remained. The study highlights a distinction between participating in development and having influence over design decisions. Consequently, an item asking whether a nurse gave input cannot establish the quality, representativeness or impact of that input. It can, however, identify whether nurses remember having a route through which to contribute. Comparisons of this experience may raise practical questions about whose knowledge enters design and enhancement processes.

Pilot involvement is related to design participation but is not interchangeable with it. Kernebeck and colleagues used concurrent think-aloud sessions and interviews with nurses and physicians to examine an electronic record prototype for paediatric palliative care [5]. Their approach demonstrates how structured user testing can make practical requirements visible before routine implementation. A brief agreement item about pilot involvement cannot reproduce such an evaluation. It also does not indicate

whether participants tested software, reviewed workflow, received orientation or contributed to a subsequent enhancement.

Kenyan implementation experience provides a context in which these opportunities can be examined. Kang'a and colleagues described a Ministry of Health-led, partner-supported EMR rollout that combined technical deployment with user training, facility multidisciplinary teams, county coordination and support mechanisms [6]. This programme report illustrates that training and staff engagement were recognized components of implementation rather than optional additions to software installation. It describes implementation activities and programme achievements; it does not provide the affiliation-specific nurse comparison addressed here. Its relevance is therefore contextual: nurses' accounts of participation and continuing support can be considered against an implementation approach that explicitly incorporated both.

The Kenyan digital health landscape is also heterogeneous. Muinga and colleagues collected information from county health records officers, hospital managers, system users and vendors, identifying administrative and clinical systems with differing functionality and interoperability [7]. Users described issues involving training, usability, infrastructure and support. These findings make it important to specify which systems respondents are describing and to avoid assuming that every digital application has the same clinical purpose. They also suggest that implementation comparisons may partly reflect variation across facilities and systems. The present dataset contains Kenya EMR selections alongside other digital tool names, making technology scope a limitation that requires explicit reporting and sensitivity analysis.

Smaller-scale Kenyan evidence reinforces the relevance of local implementation conditions. Jawhari and colleagues explored staff perceptions after an open-source EMR deployment in two clinics in Kibera, Nairobi [8]. Alongside technical constraints, their findings identified social and organizational issues, including training and incentives. This provides a further reason to ask about support experienced by users, rather than inferring readiness from system availability. It does not establish that donor-project nurses and facility employed receive different support. That distinction remains an empirical question for a comparative study, and any observed association must be interpreted within the sampling and measurement limitations of the available data.

Work affiliation may be a useful way to describe variation in these experiences, but its meaning requires care. Nurses reporting work for donor-funded projects may differ from facility employed in age, tenure, clinical responsibilities, recruitment pathways or the systems they use. Current affiliation cannot establish who financed an earlier training or whether a nurse was present when a system was piloted. A comparative analysis should therefore describe these groups operationally, examine measured composition and avoid treating an affiliation coefficient as a causal effect of funding. It should also preserve neutral responses, which do not necessarily indicate exclusion, absence of training or dissatisfaction.

The studies reviewed above address implementation programmes, systems or user experiences; they do not answer the same item-level affiliation comparison posed here [2–8]. The present exploratory secondary analysis asks whether agreement with design participation, pilot involvement and frequent training differs between nurses reporting donor-funded project work and respondents explicitly identifying as facility employed. Design participation is the primary outcome; pilot involvement and frequent training are secondary. This focused question uses an existing doctoral survey to generate evidence relevant to nursing implementation support. It remains distinct from the companion work on instrument validation and framework development and does not attempt to re-estimate technology acceptance or sustainability pathways.

2. Methods

2.1 Design, setting and participants

This exploratory secondary analysis used data from a cross-sectional, self-administered survey (Annex 1) of nurses conducted in Kenya between March and May 2025. Facilities implementing donor-supported digital public health interventions (DPHIs) were selected purposively. Eligible nurses who were available and willing to participate were recruited through convenience sampling. Eligibility required at least two years of experience using one or more relevant DPHIs during 2018–2023.

Respondents reported working in facilities across 12 counties: Busia, Homa Bay, Kakamega, Kiambu, Kisii, Kisumu, Meru, Migori, Mombasa, Nairobi, Nakuru and Siaya. Three respondents selected more than one county; these responses were retained as recorded without assigning a single location.

The source dataset contained 332 records. The comparative analysis included 329 respondents: 190 who reported donor-funded project work without also identifying as facility employed, and 139 who reported no donor-funded project work and explicitly identified as facility employed. Three respondents with overlapping or incomplete affiliation responses were excluded from the primary comparison. Sensitivity analyses examined alternative classification decisions.

2.2 Exposure and outcomes

Participants were recruited based on experience using digital public health interventions. Although the selected implementation questions referred to EMRs, instructions identifying the system respondents should consider could not be verified. Responses were therefore analyzed as reported implementation experiences within a broader digital health survey and could not be attributed to a specific EMR. The exposure was operationalized using two questions: whether respondents worked for a donor-funded project, and, if not, whether they were facility employed. Respondents answering Yes to both were unresolved rather than assigned automatically. These answers are a proxy for work affiliation, not verified employment contracts or payroll sources.

The primary item was engagement in design or enhancement of the EMR. Involvement in piloting before rollout, and frequent training and sensitization, were secondary items. The set was fixed before new inferential testing, although descriptive differences were already visible in the earlier audit; selection was not prospectively preregistered. Responses used a five-point agreement scale. Agreement combined Agree and Strongly agree; all other non-missing responses were non-agreement. Neutrality was not equated with disagreement. These single items do not measure training quality, actual training frequency or a validated participation composite. Deployment training was reported descriptively because all included respondents agreed.

2.3 Statistical analysis

Data were checked for completeness and consistency, and facility names were standardised to derive provisional identifiers for clustered analyses. The main analysis included 329 respondents with classifiable work affiliation and complete responses to the selected outcomes. Adjusted models included 327 respondents with complete covariate data. Missing values were not imputed. Participant characteristics and response distributions were summarised by reported work affiliation.

Modified Poisson regression with a log link estimated prevalence ratios (PRs) for agreement among nurses reporting donor-funded project affiliation relative to facility employed [9, 10]. Linear probability models estimated absolute differences in agreement prevalence. Both approaches used facility-clustered robust standard errors with a finite-sample correction. Confidence intervals and hypothesis tests used a t distribution with the number of clusters minus one degree of freedom. Estimates were reported with 95% confidence intervals (CIs).

Adjusted models included gender, age (< 35 versus ≥ 35 years), education (diploma versus other recorded qualifications) and tenure at the current facility (< 5 versus ≥ 5 years). These variables accounted for measured differences in workforce composition potentially associated with reported implementation experiences. Age and education may reflect professional experience, while facility tenure may reflect opportunities to have been present during design and pilot activities. Gender was included as a demographic adjustment variable. Categories were combined to limit sparse cells. Adjustment did not establish comparable implementation opportunities, and limited covariate overlap, particularly in facility tenure, constrained interpretation.

Design participation was the primary outcome; pilot participation and agreement with frequent training and sensitisation were secondary outcomes. Holm correction was applied to the two secondary unadjusted PR tests; confidence intervals were pointwise and were not adjusted for multiple comparisons. Outcome selection followed inspection of descriptive distributions, and all analyses were interpreted as exploratory.

Sensitivity analyses assessed alternative handling of potentially duplicated records and overlapping affiliations, restriction to respondents reporting Kenya EMR use, exclusion of multiple-county responses, alternative facility-name groupings and restriction to facility labels represented by both groups.

Additional analyses examined county adjustment, exclusion of respondents with missing facility names and an alternative response threshold combining neutrality with agreement. Logistic regression with covariate standardisation provided marginal PRs as an additional model check. These estimates used bounded fitted probabilities and cluster-robust delta-method confidence intervals, holding the observed covariate distribution fixed. Non-converged estimates were not reported. Detailed specifications and results are presented in the supplementary methods and Supplementary Table S1.

Analyses were conducted in Python using pandas, NumPy and SciPy. The main modified Poisson and linear probability models were independently refitted using stats models, with identical analytical samples, design matrices and facility-cluster assignments. Verification used the same finite-sample covariance correction and t-based confidence intervals. All 12 main model specifications reproduced the original point estimates and confidence limits to within an absolute difference of 0.0000001. Reporting followed the cross-sectional STROBE guidelines [11].

3. Results

3.1 Participants characteristics

The original workbook contained 332 records, of which 329 had unambiguous group classifications: 190 donor-funded respondents and 139 facility employed. The main clustering had 120 non-missing normalized facility labels plus one pooled missing-name category; these are not confirmed distinct facilities. Adjusted analyses included 327 respondents across 119 non-missing labels plus the pooled missing-name category. The groups differed markedly in age and tenure. Among donor-funded respondents, 21 were aged 25–<30, 125 aged 30–<35 and 43 aged 35–<40, with one age missing. Facility employed included 59 aged 30–<35, 76 aged 35–<40 and four aged 40–<45. Nine donor-funded respondents (4.7%) and 87 facility employed (62.6%) had at least five years at their current facility. Diploma qualifications were reported by 134/190 (70.5%) and 87/139 (62.6%), respectively.

3.2 Implementation experiences

Participant characteristics by reported work affiliation are presented in Table 1. Facility employed had longer tenure at their current facilities: 62.6% had worked there for at least five years, compared with 4.7% of donor-affiliated nurses. Age distributions also differed between groups.

Agreement with design participation was reported by 26.3% of nurses reporting donor-funded project affiliation and 47.5% of facility employed. Corresponding proportions were 43.7% and 69.8% for pilot participation, and 96.8% and 55.4% for frequent training and sensitisation (Table 2).

Unadjusted absolute differences in agreement prevalence, comparing donor-affiliated nurses with facility employed, were − 21.2 percentage points (95% CI − 33.7 to − 8.6) for design participation, − 26.1 (− 39.0 to − 13.2) for pilot participation and 41.4 (32.6–50.3) for frequent training and sensitisation (Table 3).

After adjustment for gender, age, education and facility tenure, differences in design participation (adjusted PR 0.85, 95% CI 0.53–1.34) and pilot participation (adjusted PR 0.87, 95% CI 0.65–1.16) attenuated. Their confidence intervals included one and did not establish equivalence between groups. Higher agreement with frequent training and sensitisation persisted (adjusted PR 1.83, 95% CI 1.49–2.26; Table 3). The unadjusted design comparison had $p = 0.0035$; Holm-adjusted p values were 0.00040 for pilot participation and < 0.000001 for frequent training and sensitisation.

The training difference largely reflected agreement versus neutrality. Six donor-affiliated nurses were neutral, and none disagreed, compared with 61 neutral responses and one disagreement among facility employed. These responses should not be interpreted as evidence that facility employed received no ongoing training. All 329 respondents agreed with deployment training.

Table 1
Participant characteristics by reported work affiliation

Characteristic	Donor-funded project affiliation (n = 190), n (%)	Facility employed (n = 139), n (%)
Age, years		
25–<30	21 (11.1)	0 (0.0)
30–<35	125 (65.8)	59 (42.4)
35–<40	43 (22.6)	76 (54.7)
40–<45	0 (0.0)	4 (2.9)
Missing	1 (0.5)	0 (0.0)
Gender		
Female	114 (60.0)	78 (56.1)
Male	75 (39.5)	61 (43.9)
Missing	1 (0.5)	0 (0.0)
Education		
Diploma	134 (70.5)	87 (62.6)
Advanced diploma	12 (6.3)	20 (14.4)
Degree	43 (22.6)	32 (23.0)
Master's	1 (0.5)	0 (0.0)
Missing	0 (0.0)	0 (0.0)
Tenure at current facility, years		
< 1	4 (2.1)	0 (0.0)
1–<5	177 (93.2)	52 (37.4)
5–<10	9 (4.7)	84 (60.4)
10–<15	0 (0.0)	3 (2.2)
Missing	0 (0.0)	0 (0.0)

Table 2
Reported agreement by group

Outcome	Donor group	Facility group
Design participation	50/190 (26.3%)	66/139 (47.5%)
Pilot participation	83/190 (43.7%)	97/139 (69.8%)
Frequent training	184/190 (96.8%)	77/139 (55.4%)

Table 3
Comparative estimates with 95% confidence intervals

Outcome	Difference in percentage points	Unadjusted PR	Adjusted PR
Design	−21.2 (− 33.7 to − 8.6)	0.55 (0.37–0.82)	0.85 (0.53–1.34)
Pilot	−26.1 (− 39.0 to − 13.2)	0.63 (0.49–0.81)	0.87 (0.65–1.16)
Training	41.4 (32.6–50.3)	1.75 (1.50–2.04)	1.83 (1.49–2.26)

3.3 Consistency of EMR implementation findings

Higher agreement with frequent training and sensitization among donor-affiliated nurses persisted across alternative sample definitions, facility classifications and modelling approaches. Adjusted differences in design and pilot participation remained uncertain. Combining neutral responses with agreement substantially attenuated the training difference, indicating that the main comparison largely distinguished agreement from neutrality. The county-adjusted design model did not converge, and its estimate was not reported. Detailed estimates, analytical sample sizes and cluster counts are presented in Supplementary Table S1.

4. Discussion

This study identified differences in nurses' reported EMR implementation experiences across work affiliations, with the clearest finding concerning ongoing training. Donor-funded respondents reported greater agreement with ongoing training than facility-employed respondents, and this association persisted after adjustment for gender, age, education and facility tenure (adjusted PR 1.83, 95% CI 1.49–2.26). In contrast, differences in design and pilot participation attenuated after adjustment. These findings suggest that work affiliation may be more consistently associated with reported continuing support than with involvement in earlier implementation stages.

The training finding adds a workforce perspective to Kenyan digital health implementation research. Previous studies have described the importance of continuing support [6] and identified training, usability, infrastructure and technical support as interconnected implementation challenges [7, 8]. Muinga and colleagues also documented differing implementation pathways, including donor-supported systems for HIV services and systems purchased by hospitals for other functions [7]. The present study

extends this evidence by comparing reported experiences across nursing work affiliations. However, the comparison concerns respondents' work context rather than ownership or financing of the EMR; nurses from both groups could use the same system. The observed association therefore cannot be attributed directly to donor financing or a particular training provider.

Universal agreement with deployment training, alongside substantial variation in ongoing training, highlights the importance of distinguishing initial orientation from continuing support. Assessing deployment training alone would have concealed the difference between groups. Nevertheless, most facility-employed respondents who did not endorse ongoing training selected a neutral response. The findings therefore indicate differing agreement with continuing support rather than documented exclusion from training. The survey did not directly measure the number of training sessions, their quality or their effects on competence and clinical practice.

Workforce composition is important when interpreting the participation findings. Facility-employed respondents were substantially more likely to have worked at their current facility for at least five years than donor-funded respondents (62.6% versus 4.7%). Longer tenure may provide more opportunities to participate in design consultations or pilot activities. The attenuation of the associations after adjustment is consistent with measured differences in participant composition contributing to the unadjusted comparisons. However, current tenure does not establish whether a nurse was present when implementation began. The adjusted confidence intervals also remain compatible with meaningful differences in either direction or do not establish equivalence between groups.

Reported participation should be distinguished from influence over implementation decisions. Vossebeld and colleagues described a mobile EMR that failed to meet nurses' needs despite nursing involvement in its development, highlighting the importance of translating user feedback into decisions that support nursing workflows [4]. Structured prototype evaluation similarly illustrates how user testing can examine practical requirements beyond participation alone [5]. In this study, agreement with design or pilot involvement does not establish whether feedback was incorporated or whether the resulting system met nurses' needs.

The distinction between deployment training and ongoing support also complements longitudinal nursing research examining how experiences evolve after implementation [3]. Whereas longitudinal research captures change over time, this cross-sectional survey combines recalled participation with reports of continuing training. Differences between groups may therefore reflect their exposure to different implementation stages as well as their current work affiliations.

4.1 Implications for nursing practice and research

The findings support reviewing opportunities for ongoing EMR training across work affiliations. Nursing managers could examine refresher-session invitations, shift arrangements that affect attendance, orientation for nurses joining after deployment and access to implementation support. Comparing

training records with nurses' reported experiences would help determine whether the observed differences reflect access, frequency or perceptions of support.

Implementation teams should also assess how nurses' design and pilot feedback informs system improvements, including whether proposed changes are implemented and improve nursing workflow. This would provide a more informative assessment of participation than attendance or reported involvement alone.

Further research should distinguish employment status, programme affiliation, training provider and system funding, and document nurses' tenure at implementation. Longitudinal studies within verified facilities represented by both groups could track participation, subsequent system changes and continuing support. Qualitative interviews could clarify what nurses understand by frequent training and why they select neutral responses. Linking these experiences to competence, workflow and sustained EMR use would help establish their practical consequences for nursing.

4.2 Strengths and limitations

Strengths include a focused outcome set, reporting of relative and absolute differences with facility-clustered uncertainty estimates, and sensitivity analyses examining alternative sample definitions and modelling approaches. However, purposive facility selection and convenience recruitment limit generalisability. Self-reported experiences are susceptible to recall and response bias, and the cross-sectional design does not establish temporal relationships or causal effects.

Work affiliation was classified using responses about donor-funded project work and facility-employed status rather than verified employment contracts. Respondents also reported diverse digital systems, creating uncertainty about whether all implementation experiences referred specifically to clinical EMRs. Facility identifiers were derived from reported names and could not be independently verified. Clustered standard errors account for correlation within the specified groups but do not remove unmeasured facility differences. Department, programme role, recruitment pathways and timing of implementation were not adequately controlled, while limited overlap in age and tenure constrains adjusted comparisons.

Combining agreement categories aided interpretation but reduced information about response intensity. The broader response-threshold analysis demonstrated that the ongoing-training difference depended largely on agreement versus neutrality. Some modified Poisson models produced fitted means above one; a bounded logistic model with covariate standardisation supported the overall interpretation. The county-adjusted design model did not converge, and its estimate was not reported. Finally, outcome selection followed an audit in which descriptive group differences were visible. The analyses should therefore be interpreted as exploratory, and sensitivity analyses do not eliminate residual confounding or establish equivalence between groups.

5. Conclusion

Nurses' reported EMR implementation experiences differed by work affiliation, with the most consistent difference concerning ongoing training and sensitisation. Donor-funded respondents reported greater agreement with ongoing training than facility-employed respondents, and this association persisted after adjustment and across sensitivity analyses. Differences in design and pilot participation attenuated after adjustment, highlighting the importance of considering workforce composition, particularly facility tenure, when interpreting implementation experiences.

Universal agreement with deployment training did not translate into comparable reports of ongoing support. This finding underscores the value of assessing initial training and continuing support separately. Nursing managers and implementation teams should review opportunities for refresher training, orientation for staff joining after deployment and mechanisms for nurses to contribute to system improvements across work affiliations.

These exploratory findings add a workforce perspective to EMR implementation research in Kenya. They do not establish causal effects of employment or donor funding or demonstrate differences in training quality or nursing competence. Longitudinal research linking documented participation and training opportunities to workflow, competence and sustained EMR use is needed to determine the practical consequences of the observed differences.

Abbreviations

CI
confidence interval
DPHI
digital public health intervention
EMR
electronic medical record
IDHRF
Integrated Digital Health Rollout Framework
PR
prevalence ratio
STROBE
Strengthening the Reporting of Observational Studies in Epidemiology
TAM
Technology Acceptance Model
WHO
World Health Organization.

Declarations

Ethics Approval and Consent to Participate

Ethical approval for this study was obtained from the Strathmore University Institutional Scientific and Ethics Review Committee (SU-ISERC Approval No. SU-ISERC2337/24). Research authorization was granted by the National Commission for Science, Technology and Innovation (NACOSTI License No. NACOSTI/P/24/40582). The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and relevant national research ethics guidelines.

Participation in the study was voluntary. All participants were provided with information regarding the purpose of the study, study procedures, potential risks and benefits, confidentiality protections, and their right to withdraw from the study at any time without penalty. Written informed consent was obtained from all participants prior to participation.

Respondent names were removed from derived analytical files. These files retained indirect identifiers, including facility information, and were handled as confidential participant-level data

Consent for Publication

Not applicable.

The manuscript does not contain any individual person's identifiable data, images, videos, or other information requiring consent for publication.

Availability of Data and Materials

The datasets generated and analysed during the current study are available from the corresponding author upon reasonable request. Access to the data may be subject to institutional and ethical approval requirements to protect participant confidentiality.

Competing Interests

The author declares that there are no competing interests.

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Authors' Contributions

WI conceptualized the study, developed the methodology, conducted data collection, performed the statistical analyses, interpreted the findings, and prepared the manuscript. MM and J.E.E read and approved the final manuscript.

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References

1. World Health Organization. Digital implementation investment guide (DIIG): integrating digital interventions into health programmes. Geneva: World Health Organization. 2020. https://www.who.int/publications/i/item/9789240010567. Accessed 12 Oct 2026.
2. Jedwab RM, Manias E, Hutchinson AM, Dobroff N, Redley B. Nurses' experiences after implementation of an organization-wide electronic medical record: qualitative descriptive study. JMIR Nurs. 2022;5(1):e39596. 10.2196/39596.
3. Zadvinskis IM, Smith JG, Yen PY. Nurses' experience with health information technology: longitudinal qualitative study. JMIR Med Inf. 2018;6(2):e38. 10.2196/medinform.8734.
4. Vossebeld DM, Puik ECN, Jaspers JEN, Schuurmans MJ. Development process of a mobile electronic medical record for nurses: a single case study. BMC Med Inf Decis Mak. 2019;19:11. 10.1186/s12911-018-0726-3.
5. Kernebeck S, Busse TS, Jux C, Meyer D, Dreier LA, Zenz D, et al. Participatory design of an electronic medical record for paediatric palliative care: a think-aloud study with nurses and physicians. Child (Basel). 2021;8(8):695. 10.3390/children8080695.
6. Kang'a SG, Muthee VM, Liku N, Too D, Puttkammer N. People, process and technology: strategies for assuring sustainable implementation of EMRs at public-sector health facilities in Kenya. AMIA Annu Symp Proc. 2016;2016:677–85.
7. Muinga N, Magare S, Monda J, English M, Fraser H, Powell J, et al. Digital health systems in Kenyan public hospitals: a mixed-methods survey. BMC Med Inf Decis Mak. 2020;20:2. 10.1186/s12911-019-1005-7.
8. Jawhari B, Keenan L, Zakus D, Ludwick D, Isaac A, Saleh A, et al. Barriers and facilitators to electronic medical record (EMR) use in an urban slum. Int J Med Inf. 2016;94:246–54. 10.1016/j.ijmedinf.2016.07.015.
9. Zou G. A modified Poisson regression approach to prospective studies with binary data. Am J Epidemiol. 2004;159(7):702–6. 10.1093/aje/kwh090.
10. Zou GY, Donner A. Extension of the modified Poisson regression model to prospective studies with correlated binary data. Stat Methods Med Res. 2013;22(6):661–70. 10.1177/0962280211427759.

11. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP, STROBE Initiative. Strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. BMJ. 2007;335:806–8. 10.1136/bmj.39335.541782.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementaryTableS1.docx
- Annex1DatacollectioninstrumentFinal.pdf