RESEARCH ARTICLES

'One size does not fit all': Nurses' and midwives' opinions about using electronic medical records

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ABSTRACT

Objective: To describe the impact that electronic medical record (EMR) documentation has on nurses' and midwives' practice.

Background: Although both advantages and disadvantages of a digitised health system have been documented, nurses and midwives continue to express concerns about the effect EMRs and computers have on their practice and patient relationships.

Study design and methods: A cross-sectional survey design was used. An anonymous questionnaire was distributed in electronic and paper formats to identify nurses' and midwives' opinions of the impact of EMRs and computers on their practice and patient relationships in a regional tertiary-level hospital. Quantitative data was analysed descriptively; free-text responses were analysed thematically.

Results: Nurses ($n = 31$) and midwives ($n = 49$) responded. Both respondent groups disagreed that the EMR had improved teamwork with other health professionals. Overwhelmingly, midwives disagreed that EMRs had improved the quality of care ($n = 43$, 87.8%). Nurses agreed EMRs had improved documentation standards ($n = 24$, 77.4%) and patient safety ($n = 22$, 71%). However, midwives responded that EMRs had not improved women's safety ($n = 31$, 63%). Three themes emerged from the data: computers affect my productivity; computers affect my relationship with the patient/woman; the EMR increases my frustration and stress levels. Nurses and midwives felt the heavy documentation load and lack of integration across the EMR platform reduced efficiency, discouraged teamwork, and further excluded patients/women from participating in their care.

Discussion: Although nurses and midwives agreed that the accessibility of EMRs to all health care staff is advantageous, the documentation demands of each clinical area are vastly different. The hybrid system of paper and electronic documentation increases documentation workload. Generally, midwives were more critical of the impact of EMRs on their practice.

Conclusion: Nurses and midwives identified current challenges of EMRs with respect to productivity, relationships with patients and colleagues, and user wellbeing aligning with results of other published studies. As primary users of EMRs, nurses and midwives can offer valuable feedback to health services to help deliver digitised healthcare that is user-friendly, and patient/woman centred.

Implications for research, policy, and practice: Organisations need to enact policies and procedures that facilitate nurses and midwives identifying areas of potential improvement to increase the usability and operability of the EMR. Such processes should lessen the negative impacts of EMR (such as documentation burden) on nursing/midwifery practice, with the aim of enhancing clinical and safety outcomes. It is suggested that ethnographic research studies be undertaken to gain a deeper understanding of the EMRs on nurse/midwife productivity, wellbeing, job satisfaction and patient safety concerns.

Keywords: Attitude to Computers; Electronic Health Records; Cardiovascular Nursing; Midwifery; Nursing; User-Centered Design.

What is already known about the topic:

- Positive and negative EMR outcomes for patients and clinicians have been documented.
- Involving clinicians (especially nurses and midwives) in the development of digital systems prior to implementation has been shown to reduce negative attitudes towards them.
- Ongoing user analysis is recommended in human-centred design to improve usability and user wellbeing.

What this paper adds:

- Description of the differing experiences and challenges faced by nurses and midwives using the EMR program and computers in the same hospital.
- Positive and negative effects of the current EMR program and computers have been identified.
- This paper verifies the results of other national studies about the effects of EMRs and computers on nurses' and midwives' productivity, relationships, and wellbeing.

OBJECTIVES

The objective of this study was to describe the impact that electronic medical record (EMR) documentation has on the practice of nurses and midwives.

BACKGROUND

Digitalised medical information is transforming healthcare. Nurses and midwives are at the forefront of patient care and are the primary users of EMRs. Whilst nurses and midwives have the skills and knowledge to adapt to complex systems,[1] it is reported that nurses feel negatively towards using EMR due to the difficulty of use and irrelevance to meaningful patient care.[2] Debono et al. suggest that nurses do not always use electronic documentation systems because such systems require them to adapt their usual routines and behaviours.[3] For example, because of either clutter or infection risks, nurses may not take a computer into the patient's room when administering medication, meaning that documentation of medication administration occurs away from the patient. Mysen, Penprase and Piscotty advise that nurses and midwives must be able to use technology without sacrificing patient/woman care relationships and interactions to improve client satisfaction.[4]

Nurses not only provide direct patient care but also serve as 'knowledge workers', managing vast amounts of data daily. Nurses utilise EMRs to create a comprehensive patient narrative that can enhance the quality and safety of care they deliver.[5,6] While it is reported that EMRs have the potential to streamline and automate processes, increase time to focus on direct care, improve patient outcomes and experiences of care, some nurses are struggling to see the benefits and efficiencies of EMR as patient care shifts towards technology and away from the bedside.[7,8]

Research is divided as to the impact of digital health systems on nurses' workload. Some studies conclude that digital health systems improve nurses' efficiency,[9,10] or make little difference.[11] However, other studies have identified documentation in EMRs as a major contributor to significantly increasing nurses' workloads.[12-15]

In the public health system in Queensland, Australia, there has been an investment in digital hospitals with the progressive rollout of EMRs across the state. Following a trial at a large public hospital in Queensland, there was a multi-phase rollout of the integrated electronic medical record (ieMR, Cerner) at Townsville University Hospital from 2015, taking the hospital from a paper-based system to a digital system. Whilst the EMR platform has been used in the hospital since then, nurses and midwives anecdotally report they face multiple challenges associated with the EMR. For instance, the capabilities of the EMR vary across the hospital as many specialised areas require specialised documentation that have not yet been digitised due to financial or technical constraints. This means that the EMR is constantly changing across the health service

with new capabilities being rolled out frequently. In some clinical situations (e.g. monitoring a patient post-angiogram), paper-based systems may still be required and later uploaded to the EMR. If there are physical restrictions (e.g. room size) or technical limitations (e.g. battery failure) which prevent the use of mobile workstations, nurses will utilise fixed workstations where available.

Given the small number of studies that have explored the perspectives of nurses and midwives towards EMRs, this study addressed this gap in evidence by describing the collective perspectives of both nurses and midwives about the EMR and how EMRs have impacted their practice.

METHODS

STUDY DESIGN

A cross-sectional survey design was used. An anonymous questionnaire was developed to identify nurses' and midwives' opinions of EMRs and computers in nurse/midwife practice. This design aimed to ascertain whether nursing and midwifery practice is impacted by EMRs and provide further understanding of how technology can influence their productivity, relationships, and wellbeing.

Setting

This study was conducted in the Cardiac Centre and the Maternity Service within the largest tertiary hospital in Northern Australia. The Cardiac Centre includes the Cardiac Ward and Coronary Care Unit. The Maternity service includes the Antenatal Clinic, Maternity Ward, Birth Suite and Birth Centre.

Participants

All nurses (approximately 80) employed in clinical positions in the Cardiac Centre at the time of survey distribution (September 2021) were invited to participate. Agency and student nurses were excluded.

All midwives (approximately 120) employed in clinical positions at the time of survey distribution (April 2020) were invited to participate. Agency and student midwives were excluded.

Questionnaire tool

At the time of designing the study, we could not find a validated questionnaire that addressed our area of interest. Thus, the questionnaire items were developed from a review of the literature, piloted for face validity, and offered in both electronic and paper formats. The anonymous questionnaire took approximately 10 minutes to complete. There were four sections to the questionnaire. Section A was comprised of statements about using the EMR and its impact on nursing/midwifery practice. An example statement was: "Use of the EMR improves the efficiency of nursing/midwifery care".

Section B comprised statements about the impact of the EMR on their nursing/midwifery practice, and Section C comprised statements about perceptions of patients'/women's experience of the EMR. Participants were asked to respond to statements in each of these three sections using a five-point Likert scale of agreement. Table 1 lists the statements from these three sections. Section D asked questions about respondents' nursing/midwifery practice and professional development. The questions asked about: years of practice; employment (full-time, part-time, or casual): methods of documentation (electronic and/or paper); where they access the EMR (fixed workstation and/or mobile workstation); whether the initial training and ongoing support to use the EMR met their needs. There were several free-text questions in the questionnaire, which asked for comments about the impact of the EMR on nursing/midwifery in general and on their nursing/midwifery practice, any perceptions of the impact of the EMR on patients'/women's experience of care, and any suggestions they had for improving the EMR. It is from these responses that the themes were developed. Slight changes were made to the number and wording of the statements/questions when the tool was modified for use in the cardiac setting.

Questionnaire distribution

Potential participants were informed about the research via email, flyers, and staff meetings. Researchers took paper copies to each area along with a box in which to place completed paper questionnaires. Nurses and midwives were also informed about the option of completing the questionnaire electronically, via the Qualtrics platform, by following a link in the email or a QR code. The data collection period for each group was four weeks; reminder emails were sent at two weeks.

Ethical considerations

The study was approved by the Hospital and Health Service Human Research Ethics Committee (HREC/QTHS/71848). A Participant Information Sheet was attached to the paper questionnaires; consent was implied by placing a completed questionnaire in the collection box provided. For the electronic format, the Participant Information Sheet was inserted as a landing page to the questionnaire. Participants consented by checking that they agreed to participate in the study and questionnaire logic progressed the participant to the items. If they did not agree, they were diverted to a "thank you" message and exited the questionnaire.

DATA ANALYSIS

Responses to the online questionnaire were downloaded from the Qualtrics software and merged with the responses from paper questionnaires, that had been manually entered into an Excel spreadsheet. Each set of questionnaire data was then assigned a unique participant number (N01-N31, M01-M49).

For data analysis, the original response categories to the five-point Likert-scale questions were collapsed into three categories. The original response categories of 'strongly agree' and 'agree' were collapsed to form the new response of 'Agree'. Similarly, the original response categories of 'disagree' and 'strongly disagree' were collapsed to form the new response of 'Disagree'. Data were summarised descriptively using SPSS Version 28 (IBM Corp. 2021).

Open-text responses were analysed thematically, guided by the framework of Braun and Clarke.[16] This framework has six stages: becoming familiar with the data; generating initial codes; searching for themes; reviewing themes; defining the themes; and producing a report of the analysis. Firstly, responses to all free-text questions were collated and entered into an Excel spreadsheet, from which two researchers independently familiarised themselves with the text and developed initial sub-themes. The researchers then conferred to visually map their notes to identify patterns across the sub-themes and develop tentative themes. A brainstorming meeting was held to discuss these and refine the final set of themes.

RESULTS

RESPONSE RATE

Thirty-one nurses (31/80, 39%) and 49 midwives (49/120, 41%) responded. Twenty-one nurses and 36 midwives completed the paper version of the questionnaire.

PROFESSIONAL DATA – NURSES

Twenty-eight of the nurses indicated their years of nursing experience. This ranged from 1 to 41 years, median = 10.0 years (IQR 16.25). The majority worked part-time (n = 20/31, 64.5%), with the remainder (n = 11/31, 35.5%) working full-time. Four (12.9%) nurses said they exclusively used electronic documentation, whereas the remaining 27 (87.1%) documented on a combination of paper and electronic. Eleven (35.5%) used the EMR on a mobile workstation, and the remainder (n = 20, 64.5%) used the EMR on both mobile and fixed workstations.

PROFESSIONAL DATA – MIDWIVES

Most midwives primarily worked in the inpatient maternity ward (n = 33/48, 68.8%) with the remainder in Birth Suite (n = 6/48, 12.5%), antenatal clinics (n = 5/48, 10.4%), or care models providing both antenatal and birthing care (n = 4/48, 8.3%). Midwife respondents had been practicing midwifery between 1 and 36 years, median = 8.5 years (IQR 15.75). Half indicated they worked full-time (n = 23/46, 50%), with the remainder working part-time (n = 22/46, 47.8%) or casually (n = 1/46, 2.2%). Midwives documented on a combination of workstations (fixed or mobile), laptops or on paper, depending upon their area of practice at any given time.

EXPERIENCES OF USING EMR

Nurses and midwives were asked about their agreement with statements related to their experiences of using the EMR. There were differences in the level of agreement across some questions by disciplines (Table 1). For example, the nurse respondents were more positive about the EMR improving the safety of care than the midwife respondents. No midwife respondents agreed that the EMR improved the quality of care they provided. Approximately one-quarter of nurses and midwives agreed that the EMR improved efficiency of their care. Whilst approximately half of the nurses and midwives agreed that the initial training about the EMR met their needs, fewer midwives agreed that their ongoing training needs were being met.

INITIAL AND ONGOING TRAINING ABOUT EMR

There were no statistically significant relationships between mode of work (full/part time) and agreeance whether either the initial, or the ongoing, training to use the EMR met midwife respondents' needs ($\chi^2 = 0.782$, $p = 0.376$; $\chi^2 = 0.297$, $p = 0.586$ respectively). The assumptions for undertaking other chi-square analyses of relationships between nurses' and midwives' professional characteristics and agreeance whether either the initial or ongoing training to use the EMR met their needs were not met.[17]

FREE-TEXT RESPONSES

Three themes were developed from the free-text responses: "Computers affect my productivity"; "Computers affect my relationship with the patient/woman"; and "EMRs increase my frustration and stress". Themes, sub-themes and illustrative comments are presented in Table 2.

Theme 1: Computers affect my productivity

There were positive comments about the potential of EMRs to improve communication amongst the multidisciplinary team, and the ability for multiple health professionals to document in the chart simultaneously. For example, one nurse with 8 years' experience wrote that "It does make it easier that all teams and nurses can document at the same time" (N01); another nurse with 20 years' experience agreed that the EMR "is good for the clinician having all the available information quickly" (N04). However, negative comments were more common (refer to Table 2). One nurse, with 8 years' experience, shared concerns that the administration of newly prescribed medications in the EMR could be delayed, because the system provided no alerts to a new medication being prescribed (N01). The nurse (N01) suggested a pop-up box alerting them to changes in the patient's medication orders would be ideal to prevent delayed medication administration and would bridge this gap in communication between doctors and nurses.

TABLE 1: USING THE EMR: NURSES' AND MIDWIVES' AGREEMENT WITH STATEMENTS ABOUT THEIR EXPERIENCES

		Nurses' responses (*N* = 31)[a]			Midwives' responses (*N* = 49)[b,c,d,e]		
		Agree	Neutral	Disagree	Agree	Neutral	Disagree
Section A: Experience of using the EMR and its impact on nursing/midwifery practice in general							
1	Use of the EMR improves the overall safety of nursing/ midwifery care	22 (71%)	3 (9.7%)	6 (19.4%)	8 (16.3%)	10 (20.4%)	31 (63.3%)
2	Use of the EMR reduces the likelihood of drug errors	18 (58.1%)	4 (12.9%)	9 (29%)	8 (16.3%)	13 (26.5%)	28 (57.1%)
3	Use of the EMR improves the quality of nursing/ midwifery care	12 (38.7%)	6 (19.4%)	13 (42%)	0 (0%)	6 (12.2%)	43 (87.8%)
4	Use of the EMR improves the documentation of nursing/ midwifery care	24 (77.4%)	3 (9.7%)	4 (12.9%)	19 (38.8%)	8 (16.3%)	22 (49.9%)
5	Use of the EMR improves the quality of the handover of care[a]	20 (66.7%)	7 (23.3%)	3 (10%)	11 (22.4%)	7 (14.3%)	31 (63.3%)
6	Use of the EMR improves teamwork between nurses/midwives[a]	9 (30%)	9 (30%)	12 (40%)	11 (22.4%)	22 (44.9%)	16 (32.7%)
7	Use of the EMR improves teamwork between nurses/midwives and doctors	12 (38.7%)	5 (16.1%)	14 (45.2%)	19 (38.8%)	11 (22.4%)	19 (38.8%)
8	Use of the EMR improves the efficiency of nursing/ midwifery care	8 (25.8%)	6 (19.4%)	17 (54.8%)	13 (26.5%)	17 (34.7%)	19 (38.8%)
9	The EMR is integrated with other databases and systems	10 (32.3%)	6 (19.4%)	15 (48.4%)	7 (14.3%)	6 (12.2%)	36 (73.5%)
Section B: Impact of EMR on your nursing/midwifery practice							
10	i. Use of the EMR has improved the way I practice midwifery				5 (10.2%)	5 (10.2%)	39 (79.6%)
	ii. Use of the EMR has improved the delivery of my nursing care	14 (45.2%)	7 (22.6%)	10 (32.3%)			
11	i. Use of the EMR has changed the relationship between me and the woman/women in my care				36 (73.5%)	5 (10.2%)	8 (16.3%)
	ii. Use of the EMR has improved my ability to provide woman centred care				0 (0%)	12 (30.8%)	27 (69.2%)
	iii. Use of the EMR has improved my autonomy as a midwife				0 (0%)	13 (26.5%)	36 (73.5%)
	iv. Use of the EMR has improved my interactions with the patients	6 (19.4%)	4 (12.9%)	21 (67.7%)			
12	I do not miss the triggers for care provided by a clinical pathway[a,b]	12 (40%)	7 (23.3%)	11 (36.7%)	7 (14.9%)	22 (46.8%)	18 (38.3%)
Section C: Your perceptions of patients'/women's response to the EMR							
13	i. Use of the EMR improves women's experience of pregnancy care				0 (0%)	16 (32.7%)	33 (67.3%)
	ii. Use of the EMR improves the patients' experience	6 (19.4%)	11 (35.5%)	14 (45.2%)			
	iii. Use of the EMR assists patients/women to participate in their care[c]	5 (16.1%)	10 (32.3%)	16 (51.6%)	0 (0%)	8 (16.7%)	40 (83.3%)
Section D: Training and ongoing support							
The initial training provided to use the EMR met my needs[d]		15 (48.4%)	7 (22.6%)	9 (29%)	21 (50%)	10 (23.8%)	11 (26.2%)
The on-going support to using the EMR meets my needs[e]		17 (54.8%)	7 (22.6%)	7 (22.6%)	16 (37.2%)	11 (25.6%)	16 (37.2%)

a – Questions 5, 6, 12 only had 30 responses from nurses
b – 47 responses from midwives
c – 48 responses from midwives
d – 42 responses from midwives
e – 43 responses from midwives

TABLE 2. THEMES, SUB-THEMES AND REPRESENTATIVE QUOTES FROM FREE-TEXT RESPONSES

Theme	Sub-Theme	Quotes
1. Computers affect my productivity	1.1 Potential for improved communication not always realised	I also believe it reduces and inhibits communication between multidisciplinary teams and they do not need to talk face to face about a patient. [They] just expect the nurses to read their notes – which with our workloads may not happen in a timely manner and leaves room for missed interventions (N27, 5 years' experience). If all staff utilised [the EMR] to its full capacity than yes it would improve safety and communication. The system currently is not utilised fully by all medical and midwifery staff therefore finding information at times is challenging and time consuming (M02, >30 years' experience).
	1.2 System limitations and lack of integration	[The] EMR is not a maternity friendly system. The program has too many errors in its current state to be useful or helpful. The need for triple documenting between other systems and paper creates an increased 'time with computer' instead of increasing 'time with woman'. The downtime system is also not user friendly and during an unexpected downtime we found that half of the women admitted to our ward were not on the system (M05, 5 years' experience). [The] time taken to find information is unacceptable… postnatally, [I] have to use both fixed and mobile workstations because mobile [workstations] do not have all the programs… [there's] not enough integrative hardware to run a digital hospital (M27, 20 years' experience).
	1.3 Hardware limitations	I spend a lot of time waiting for the computer to allow me to log on, can be anywhere up to 10-15 mins [minutes]…I spend time looking for recharged batteries [and] often have to borrow from other wards (N03 >40 years' experience). I wish that using the computer was a streamlined process instead of spending 20 minutes waiting for a computer to load or constantly changing batteries (N26, 7 years' experience).
2. Computers affect my relationship with the patient/ woman	2.1 Computers are a physical barrier	[I] think it [EMR] detracts from the patients experience i.e., connecting with the nurse. Patients have stated nurses are behind computers all the time (N15, 25 years' experience). It has removed my ability to truly connect with the women I care for, there is too much focus on 'keeping up to date' on the computer. I have had women comment on how much time midwives spend on the computer. How sad that they are noticing that instead of focusing on their labour/birth (M16, 7 years' experience).
	2.2 The system is impersonal and de-humanising.	How do patients feel seen and cared for when we scan them like they're being bought at a grocery store and we stare at computers clicking away instead of looking at them face to face (N27, 5 years' experience)? [The EMR] has made my care no longer personal. I feel that I am not providing woman-centred care and no longer have autonomy as a midwife because I do what a computer tells me to do (M34, 4 years' experience).
3. The EMR increases my frustration and stress	3.1 Documentation burden	The sheer volume of documentation that nurses are expected to collate is getting overwhelming. The balance between [the EMR] and actual nursing care is impacting negatively on [the] quality of nursing. [The] double documenting between your notes is also frustrating (N26, 7 years' experience). Documentation feels like it's never done. I'm repeating myself, then it's a constant cycle of picking on each other [with other midwives saying] 'this wasn't done, that wasn't done' etc. (M44, 5 years' experience).
	3.2 Concerns about patient/ woman safety	Faulty computers put all patient care, especially medication administration, at risk (N07, 3 years' experience). When computers on wheels stop or freeze in the middle of the drug rounds, [there is a] delay in medication and nursing care documentation (N19, >30 years' experience).
	3.3 Concerns about nurse/ midwife safety	I get a sore back and neck from using COWs [computers on wheels] all day, we are not provided with workstations in CCU (N01, 8 years' experience). Having to drag computers around especially with wheels that catch is harmful to nurses in causing back injuries and tripping hazards/hallway clutter (N27, 5 years' experience).

Midwives addressed the issue of lack of integration across the platform for maternity services and ideally would have preferred to have all the woman's information in one place that can easily be shared with the woman and her general practitioner (GP). Instead, midwives are using the EMR and multiple other programs to search for patient information and to document patient care. One midwife (M05) commented that the discharge summary provided by the EMR contained insufficient information for the GP, so in the best interest of the woman, midwives took the time to handwrite their notes on the printed discharge letter as well as writing in the woman's handheld record. Midwives (M04, M05, M13, M14, M18, M24, M30, M32, M39, M41 M46) provided many examples of 'double or triple documenting'.

Nurses also shared their concerns about searching for patient information, particularly in caring for the patients with extensive health history who were arriving to the ward from the Intensive Care Unit (ICU). For example, the nurses could not access patient data from ICU as ICU nurses document into the specific EMR program called Metavision (iMDsoft) and therefore the nurses relied on an ICU colleague to upload the patient's ICU data into ieMR so it can be seen when the patient arrives on the cardiac ward from ICU.

Even with the amount of data entry nurses and midwives are asked to perform each shift, there is still a lot of documentation that is paper-based or not included within the ieMR platform at all. The nurses listed documentation that is still recorded on paper to include: continuous positive airway pressure observations, food charts, consent forms, opioid withdrawal pathways, tracheostomy pathways, pacemaker/internal defibrillator/cardioversion pathways, angiogram pathways, ICU transfers and MET (Medical Emergency Team) calls. The midwives listed documentation still recorded on paper to include antenatal and postnatal forms, neonatal feed charts, birth logbooks, MET calls including neonatal resuscitation and obstetric emergencies, breastfeeding and postnatal information for the woman, postnatal depression score form, NAS (Neonatal Abstinence Syndrome) score, CTG analysis, internal referrals and any care provided during the EMR downtime.

Both respondent groups expressed frustrations about the computer workstations, particularly the mobile workstations where over a third of nurse respondents specifically mentioned battery-related problems creating barriers to timely nursing care with batteries providing only two hours of power before needing to be replaced. Nurses also mentioned lengthy 'log-ins' at the beginning of the shift and after replacing batteries, requiring the nurses to change their actions and compensate for the computers' limitations. For example, one nurse with seven years' experience wrote, "The computers [are] extremely slow, personally I am required to come into work 15 minutes early so I have a functioning computer by the time handover is finished" (N26).

Theme 2: EMR affects my relationship with the patient/woman

Nurses commented that the amount of time spent on computers was causing 'computer-centred care' rather than patient-centred care. The nurses expressed their dislike of the positive patient identification scanner linked to the EMR and compared scanning the patients' identification armbands to scanning commodities at the grocery store. Two nurses used this comparison specifically and shared how impersonal it feels as a care provider. Both nurses and midwives commented that the mobile workstations were physical barriers placed between them and the patient/woman, directly affecting their ability to establish rapport and connect with the woman/patient. Both nurses and midwives commented on the lack of space for the workstation in the patient's/woman's room feeling forced into the corridor to document thus creating an even larger barrier. Midwives suggested that handheld devices or tablets could be a solution to this problem.

Theme 3: EMRs increase my frustrations and stress

Both nurses and midwives felt the threat to patient/woman safety posed by, for example, the potential for medication errors, contributed to their stress. The nurses commented that reading the medication orders was confusing due to the layout of the medication module and the way some medications are prescribed. The nurses also had safety concerns relating to medication administration. For example, when the platform is not accessible due to maintenance, the medical team could be left without access to critical patient information, such as allergies during medical emergencies. Further safety concerns were raised by the nurses involving the physical size and weight of the mobile workstations linking this to a frequent cause of back pain. The nurses in Coronary Care Unit (CCU) said they would like to have the option of sitting down to relieve their backs however they do not have fixed workstations in CCU, only mobile workstations.

Nurses and midwives expressed feeling frustrated, stressed, and overwhelmed due the heavy 'data-entry' workload expected from them as well as finding time for the provision of direct patient/woman care. For example, one nurse with 10 years' experience wrote "For some nurses, using a computer system is very stressful on top of already unwell patients. This stress can also affect other staff members trying to help them" (N25). Midwives also stated that completing all the documentation tasks during the shift had become a source of stress due to fellow midwives complaining to each other if the documentation was not completed in time or in full. Both nurses and midwives commented that the 'documentation burden' was causing them to question their practice and consider a change in workplace/profession. A quarter of the midwives suggested the EMR platform does not suit the maternity service at all and six midwives went a little further by stating "Get rid of it [ieMR]" (M8, M16, M22, M37, M38, M48).

DISCUSSION

Nurses working in a specialist area and midwives have shared their opinions on the EMR platform in this regional Australian public health service and the associated effects on their productivity, patient relationships, and wellness. It is also worth noting, albeit somewhat ironically, that the workforce appreciated having the option of completing the questionnaire in paper. There was synergy between the responses to the Likert-scale statements and free-text responses. For example, nurses' comments that EMRs negatively affected teamwork were consistent with their Likert-scale responses. Similarly, midwives' comments expanded upon the responses of most of the midwives who disagreed that the EMR is integrated with other systems. Although more than half ($n = 18$, 58.1%) of the nurses agreed that the EMR reduces the likelihood of drug errors, the

questionnaire provided the opportunity for them to express their concerns. The nurses' concerns were consistent with the midwives' Likert-scale responses, in that less than one-fifth of the midwives agreed that EMRs reduce the likelihood of drug errors. As found in other studies, nurses and midwives were concerned about the safety of the medication module of the Health Service's EMR and the potential for errors occurring due to: the misinterpretation of orders; missed orders; or incorrectly charted orders.[18-20] Obtaining user feedback on these safety concerns should be prioritised to address concerns surrounding medication orders and mitigate the risk of medication errors.

The nurses' and midwives' responses in this study align with the positive and negative effects of EMRs found in other studies.[2,3,13,18,19,21-23] As nurses and midwives are accustomed to working around time-specific duties, and often under pressure to complete tasks, it is no surprise that their comments reflected concerns around the theme of productivity. Several positive effects of the EMR on the theme of productivity were identified and align with the results from previous studies, including the ease of reading and sorting digital notes, the ability for patient data to be read by multiple clinicians simultaneously, and the ability to access an extensive health history of a woman/patient in real-time.[13,14,18,24] However, negative effects were also reported by both nurses and midwives across all three themes. Like other studies, the nurses and midwives in this study found the EMR difficult to navigate,[18] understand,[19] and customise.[21] These factors reportedly affected the nurses' and midwives' time available for patient care as some felt overwhelmed if they did not finish all tasks assigned to them by the computer program and felt that the computer system was compromising their professional autonomy.

Midwives particularly addressed the lack of integration across the system and the impact this has had on their quality of care. As in another Australian study, the midwives' primary concern was that the time constraints due to documentation across multiple platforms, such as ieMR and Perinatal Data Collection (PDC, Queensland Health), placed a strain on the opportunity to develop a relationship with women and provide clinical care.[18] Due to these time constraints, the midwives reported feeling torn between completing their digital tasks and being with woman. Midwives are no strangers to the pressure of time, however the lack of shared data between general practitioners (GPs) and hospital clinicians was identified by midwives in this study as a concern and confirms an already recognised gap in the Australian digitised health system.[25] Further understanding of the data commonly shared between maternity services and GPs could assist in improving the integration of health records, which would be beneficial to the hospital, GP, midwife, and woman.

Whilst nurses and midwives are agreeable to real-time shared patient data, the constant disruptions to care provision by system downtimes, computer battery issues, documentation burnout and lack of integration with other systems is increasing stress and exhaustion. By improving functionality of the technology and the interoperability between disparate systems, health services have the potential to relieve some of the documentation burden and burnout reported by the nurses and midwives in this study. This study supports the recommendations of Wynter et al. that the inclusion of clinical staff in the design of the EMR platform is needed to ensure beneficial outcomes to workflow.[18] The nurses and midwives in this study shared their disappointment in not being invited to give feedback on the development of the EMR platform and are of the opinion that it does not reflect the needs of each sector. Previous international and Australian studies have shown that improving the attitudes of nurses and midwives towards EMR platforms and increasing their acceptance of digitised health systems is dependent on the inclusion of clinicians in the continual development of the EMR.[13,18,21,26-28] The continued development of clinicians' computer skills and the instruction of computer skill courses at the undergraduate level would also be beneficial.[29,30]

Occupational health and safety concerns associated with computers have also been mentioned in the literature, outlining the issues of size, weight and mobility in regards to the mobile workstations.[22,31,32] Lack of space in the patient rooms was the most frequently stated occupational safety concern from this study. The nurses and midwives both shared concerns for back pain attributed to navigating small spaces with mobile workstations and standing for long periods of time due to insufficient fixed workstation access. With the ageing of the nursing and midwifery workforce, human factors approach to the design of technology needs to be considered. Future observational studies of nurses and midwives in their respective environments would be beneficial to assess physical safety issues and recommend solutions.

IMPLICATIONS

PRACTICE

The findings of this study contribute to evidence-based practice by identifying advantages and disadvantages of the current ieMR platform, identifying potential areas for improvement within the EMR.

POLICY

The results from this study can contribute to the development of policies surrounding clinical documentation and shared data and can inform the successful introduction of new technology in the future. Policies that support the inclusion of nurse/midwife feedback in future clinical application development need to be enacted.

EDUCATION

The results support the need for ongoing education for all clinicians in navigating an EMR; performing efficient documentation; recognising and reporting errors; improving team communication; and providing woman/patient-centred care. There is a need for ongoing training related to EMRs, tailored to the needs of the user groups. In fact, this has happened in the last 12 months at the hospital, with support being provided to individual wards and clinicians by the EMR implementation team.

RESEARCH

Future ethnographic research could identify how nurses and midwives adapt to overcome the perceived problems of digital documentation burden and how they can balance their professional care responsibilities towards patients/women with organisational demands.

LIMITATIONS

This study has limitations that are inherent in a cross-sectional survey. The questionnaire was developed specifically for this study, unlike a later study that had access to a validated questionnaire.[33] Additionally, the midwives' questionnaire was distributed prior to the hospital imposing restrictions on undertaking research in the clinical area associated with the COVID-19 pandemic. Foreboding about the implications of the pandemic may have led to midwives concentrating on clinical care rather than completing a questionnaire. Whilst the nurses' questionnaire was distributed some 18 months later, there were still pressures on the workforce associated with COVID-19. However, the response rate from both respondent groups was a little higher than was usual for previous staff questionnaires at this hospital. The similar response rate across the nursing and midwifery services gives strength to the conclusion of this paper, demonstrating that both nurses and midwives have valuable feedback to share regarding the design and implementation of technology in the health service. Since this study was undertaken at the one hospital, we make no claims as to the generalisability of the results to other settings. However, the findings may have relevance to other settings, particularly where EMRs are still to be introduced.

CONCLUSION

This study has provided feedback from one health service's nurses and midwives on the ieMR platform which could contribute to the development of future EMR applications and digital healthcare. While nurses and midwives both agreed having shared data in one place has been ideal as a digital hospital, the reality of shaping the EMR platform to fit all sectors of the hospital concurrently has been a lengthy and challenging process. Consequently, nurses and midwives have expressed an elevated level of stress and a sense of being overwhelmed due to repetitive data entry and challenges in overcoming limitations in the technology. The stress has led some midwives to question their chosen career. Nurses shared their concerns over the shifting organisational focus to statistics and data entry rather than the experience of the patients and staff. The number of international and national studies supporting the involvement of clinicians in the design of EMR platforms and applications further demonstrates the need for health services to adopt a human-centred design approach, regularly asking for feedback from their users, observing how this system affects all humans in its path (clinicians, patients, technicians), and implementing that feedback.[29,30] Further evaluation and understanding of nurses' and midwives' experiences can help to produce a user-friendly system, reduce clinician stress and burnout, promote acceptance of technology as well as improve health care and safety outcomes.

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