Nurses' Attitudes Towards a Computerised Health Information System in a Private South African Hospital

Khumoetsile D. Shopo
https://orcid.org/0000-0001-5940-6222
North-West University, South Africa
16470087@nwu.ac.za

Lanthé Kruger
https://orcid.org/0000-0002-8636-7174
North-West University, South Africa
Lanthe.Kruger@nwu.ac.za

Petra Bester
https://orcid.org/0000-0002-8440-7638
North-West University, South Africa
Petra.Bester@nwu.ac.za

Abstract

Various researchers have explored the use of health information systems (HISs) in the public sector in South Africa, including users' experiences thereof. However, there is limited research relating to the private health sector. Nurses form the majority of the health workforce and are therefore essential for capturing clinical data into an HIS. The study under review aimed to obtain a better understanding about nurses' attitudes towards a computerised HIS. The objectives were to explore and describe nurses' attitudes towards the HIS in a private hospital in North West, South Africa. The research followed a qualitative design using interpretive, descriptive and contextual strategies. Purposive sampling was done (*n*=14) and semi-structured individual interviews were conducted, while thematic analysis was done according to Creswell's steps. It was found that the nurses held specific affective, cognitive and behavioural attitudes towards the HIS. The findings indicated how the HIS challenges the caring ethos of nursing as information technology (IT) infiltrates the caring presence between nurse and patient. The study confirmed that nurses have positive attitudes towards the HIS. It is recommended that managers include confidentiality measures as part of HIS standards and ensure adherence thereto. Further research could be done on the relation between the HIS and the ethics of nursing as a profession.

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Keywords: health information system; nurse; attitudes; private hospital

Introduction and Background

South Africa has a complex health care landscape faced by a quadruple burden of disease, namely: HIV/AIDS and tuberculosis (TB); maternal and child morbidity and mortality; prevalence of non-communicable diseases; and violence, injuries and trauma (SA 2017, 10). Within this landscape the National Health Insurance (NHI) was piloted in various health districts in 2012 (SA 2015, 1). The NHI represents a substantial policy shift that will ensure that there is reorganisation of the current health care system in order to address structural changes that exist in the public and private sectors (SA 2017, 3). McIntyre and Ataguba (2014, 55) identified health inequalities in the country characterised by differences between the groups within a country that are often related to economic position, race, ethnicity, geographic location, gender and age.

The South African health care system is divided into private and public sectors, which further delineates the inequalities of the population with reference to their access to quality health care services (McIntyre and Ataguba 2014, 10). The private health sector has efficient systems accessible only to a minority of the population (StatsSA 2013, 108). According to Statistics SA (2013, 28), 70.2% of the population consult the public health facilities compared to 28.9% who consult those in the private health sector. McIntyre and Ataguba (2014, 10) emphasise that the private health sector plays a complementary role as most people who access its services belong to medical aid schemes. The National Department of Health (DoH) acknowledged the need for an HIS for efficient decision-making and responded by implementing the District Health Information Management System (SA 2011, 13). The department recently developed the National Digital Health Strategy for South Africa 2019–2024 which aims at fostering effective collaboration mechanisms between public and private sector stakeholders (SA 2019, 11).

Kula and Fryatt (2014, 560) identified a need for stakeholders from both health sectors to engage in public-private interactions). The authors highlight that there are public-private partnerships which are recognised in South Africa including companies like AngloGold Ashanti Health, Netcare, Discovery Health and Vodacom (Kula and Fryatt 2014, 565). Private health care organisations report communicable diseases such as HIV/AIDS and TB to the DoH. Therefore, the incorporation of timeous health information from the public and private health sectors is needed in order for the DoH to get a full view of the country's health status (WHO 2008, 1).

The role of people as users of HISs has been explored and described through various national and international studies; however, for the context of the current study the focus was on the nurses. Nurses form the majority of the health workforce and are

therefore essential to capture data into an HIS. However, Wright, O'Mahony and Cilliers (2017, 55) highlight that in the public sector the data capturers are responsible for data entry into the HIS. Various researchers have explored HISs in the public sector including the users' experiences thereof (Cline and Luiz 2013; Nkosi, Asah and Pillay 2011). Nkosi, Asah and Pillay (2011) concluded that public health care-based nurses in KwaZulu-Natal, South Africa, were positive about HIS, although their study focused on post-basic nursing students. Yet, Nkosi, Asah and Pillay (2011, 879) state that although the students had positive attitudes, challenges such as being overworked and hardware problems influenced their resistance to use computers.

Jaducci, Shaw and Braa (2006) explored the sustainability of HISs in Eastern Cape, South Africa, and concluded that successful HIS implementation was influenced by contextual needs of the specific health system rather than global needs. Whittaker, Van Zyl and Soicher (2011) explored ICU professional nurses' responses to a point-of-care (POC) e-health system in a large private hospital in South Africa. Their research concluded that nurses resisted the system which was consequently discontinued (Whittaker, Van Zyl and Soicher 2011, 59). Some of the factors that led to resistance included lack of fit between POC and nursing identity, high workload, time constraints, and patients' complaints about nurses' use of the system. Wright, O'Mahony and Cilliers (2017, 56) reviewed electronic HISs in the public sector and concluded that lack of patient-centred care was one of the reasons why health care workers resisted using HISs as they perceived the systems not to benefit patient care.

The Technology Acceptance Model (TAM) underpinned the theoretical framework for the current study. Davis (1989, 320) developed the TAM to explain the use of information systems by employees in general. Two fundamental constructs in the TAM are Perceived Ease of Use (PEOU) and Perceived Usefulness (PU). Applied to the health care industry, the TAM stipulates that if nurses perceive that technology will be beneficial to patients, then it will impact on their use of technology (PU).

The current study was conducted in 2015 at a private hospital (Hospital X) in North West, South Africa. Hospital X is a wholly-owned subsidiary of a global mining company which renders primary health care services, trauma, intensive care, medical and surgical including occupational diseases (TB and MDR-TB). Hospital X started investigating medical information software to meet its business needs in 1997 using Meditech, a medical information software package used for clinical patient management, administration, billing, financials and reporting functions. The setting was chosen after IT support personnel at the hospital highlighted challenges experienced with regard to using an HIS. The challenges included user reluctance by some doctors; nurses not using the HIS effectively for record-keeping; incorrect patient identification, costs to maintain the system, lack of computer skills, and at times nurses complaining of a shortage of computers in the wards (I Tsehisi, Hospital

X, individual communication 2014). The research question was: "What are the attitudes of nurses working in a private hospital towards the HIS?"

Problem Statement

The growing need for an interoperable HIS is a reality in South Africa as well as the public-private partnerships in the health care sector in order to strengthen the health systems. HISs are relied on to provide information to decision-makers in the format of statistics on disease profiles and delivery of health services. With nurses comprising the majority of the health workforce, their perceptions of the usefulness of HISs might impact on their adoption of the system, its implementation and operationalisation. However, the researcher identified a gap in the literature on nurses' attitudes regarding HISs in the private health sector in South Africa which prompted the study to be conducted at a private hospital where an HIS had been used for almost a decade. The study aimed to obtain a better understanding about the nurses' attitudes towards the computerised HIS. The objective was to explore and describe the nurses' attitudes towards the HIS in a private hospital.

Materials and Methods

Definitions of Keywords

- According to Jain (2014, 6), "attitude" represents the positive or negative mental or neural readiness towards a person, place, thing or event.

- A "health information system refers to an integrated effort to collect, process, report and use health information and knowledge to influence policy-making, programme action and research in order to assess the health system performance" (WHO 2011, 1).

- A "nurse" refers to any health care worker registered or enrolled to practise nursing according to Section 31 (1) of the Nursing Act 33 of 2005 (SA 2005).

Study Design

The study followed a qualitative design using interpretive descriptive (Thorne, Reimer Kirkham and O'Flynn-Magee 2004, 2) and contextual strategies (Botma et al. 2010) as little was known about nurses' attitudes towards using an HIS in private hospitals in South Africa.

Population and Sampling

Hospital X in North West, South Africa, was selected as the context for the research because it had been using a computerised HIS called Meditech since 1997. The target population comprised 132 employed nurses who had experience in using the HIS. Different categories of nurses had access to the HIS based on their scope of practice: enrolled nursing assistants (ENAs) had access to capture vital signs and notes on the

care they rendered to patients; while enrolled nurses (ENs) used the HIS to order diagnostic blood tests and x-rays as prescribed by the doctor, write admission reports and nursing notes on daily care rendered as well as discharges. Professional nurses (PNs) had a broader scope of practice which included writing reports, stock ordering and control.

Sampling Criteria

Purposeful selection of participants was used to get in-depth and new information to answer the research question (Thorne, Reimer Kirkham and O'Flynn-Magee 2004, 6). The following inclusion criteria guided the selection of participants: All categories of permanently employed nurses – male and female were included. They should have been trained on the HIS and had access to the system. They had to be willing to consent voluntarily to participate and be digitally voice recorded during the interviews. The nurses working for Hospital X as locum staff were excluded. The sample size was determined by data saturation when no additional new information was gathered from the collection process (Botma et al. 2010, 200). Data saturation was declared after 14 (*n*=14) interviews. The participants were labelled P1 to P14.

Data Collection

The data collection method used was semi-structured individual interviews (Botma et al. 2010, 208) which were digitally voice recorded (Botma et al. 2010, 214). The data was collected from 11–17 September 2015. The interview questions were set according to the components of an attitude: (1) affective (feelings and emotions); (2) behavioural (response and action); and (3) cognitive (beliefs and evaluation) (Jain 2014, 6). The researcher encouraged the participants to explain further their responses to provide more clarity during interviews.

Data Analysis

Data analysis was done by following Creswell's (2014, 197–200) six steps of qualitative data analysis. The data was transcribed from the digital voice recordings and written down for analysis while ensuring that it was not distorted during transcription. This was done by the researcher immediately after the interviews with assistance of an experienced transcriber. The data was then read and the researcher got a general sense of the information and reflected on the overall meaning. Coding of all the data was done by hand, making representations of information in the margins. The coding was used to generate descriptions of people as well as categories or themes. The researcher and supervisor discussed the themes and reached consensus to prevent bias. The last step involved interpreting the findings.

Ethical Considerations

The researcher adhered to international and national health research ethics guidelines which included the Department of Health's ethical guidelines (SA 2015). Written ethical approval was obtained from the Health Research Ethics Committee of the North-West University (NWU-0009-15-S1). Approval was granted by the Nursing Services Manager of Hospital X. The participants received information about voluntary participation in the study, and they signed informed consent forms. No participant was unduly influenced to take part.

Trustworthiness

Trustworthiness has four epistemological standards which the researcher followed (Botma et al. 2010, 230). Strategies to enhance trustworthiness were based on Guba and Lincoln's guidelines (in Botma et al. 2010, 233). Credibility was ensured when the researcher engaged with participants for at least 30 minutes and probed with follow-up questions for more in-depth explanations during interviews. A voice recorder was used to capture data when the participants were interviewed. The researcher applied transferability by selecting participants purposefully to inform the study; rich and thick descriptions of the research methodology were provided to assist other researchers who might want to conduct similar studies. Dependability was applied by making use of clear and identifiable sources which are included in the list of references. The researcher obtained assistance with co-coding from an experienced qualitative researcher with a consensus discussion. During data collection the researcher kept field notes, thus ensuring confirmability of the research. The participants' views were honestly portrayed by having the supervisor verify transcriptions. The researcher also observed the principle of fairness (authenticity) added by Botma et al. (2010). The researcher conducted this research observing the principle of fairness from sampling until the report was disseminated.

Results

Most (78.5%; n=11) of the participants were females and 42.8% (n=6) were 30–39 years old. These demographics are congruent with the South African Nursing Council's (SANC 2015) profile of nursing being a female-dominant profession with the mean age being 40. Of the participants, 57.1% (n=8) had 1–5 years' working experience with the HIS, followed by 21.4% (n=3) having 11–15 years' exposure. PNs comprised 35.7% (n=5) of the sample, while ENAs and ENs comprised 28.5% (n=4), respectively. Only one (7.1%) participant was in a management position.

The results were ordered into three categories and six main themes, namely: components of nurses' attitudes towards the HIS (category 1); nursing-specific themes related to the HIS (category 2); and acquired computer skills (category 3).

Four Components of Nurses' Attitudes

Affective

The participants experienced fairly to very positive feelings about using the HIS and some were enthusiastic. No participants voiced negative emotions regarding the HIS while carrying out their duties. The responses varied from "I find it very attractive" (P1) to "Yeah I feel great" (P3), and "I feel positive about it" (P4).

Cognitive

The participants' cognitive attitude was that the HIS is a meaningful system compared to a paper-based, manual system. The HIS is meaningful because it is time-efficient and enables nurses to structure their patient workflow to that of a system. It was perceived as being safe to use; the data is always retrievable; and the paperless environment is cost-efficient. The HIS is user-friendly and interesting, and stimulates nurses to discover more functionalities within the system, thus generating a need to have more access:

> That motivated me when the professional nurses do the diagnosis I usually look and even when they are ordering. (P2)

Behavioural

The first inclination was receiving adequate training prior to using the system. Initially after receiving training, the nurses perceived Meditech as deficient and demanding as they had never used a computerised HIS. With continued use, however, the nurses' skills improved and led towards them becoming independent users:

> We are sent to the training. (P2, P14, P3)

The second inclination was teamwork and support, especially in units with high patient turnover rates. IT support was available 24-hours a day, seven days a week, provided by IT support personnel and the nurses also received support from management and fellow colleagues combined with a culture of tolerance among nurses:

> Call somebody on another unit ... Okay I'm busy with 1, 2, 3, but I'm stuck come and help me. (P6, P3)

The third inclination was the system's easy-to-follow structure. Meditech presents a logical scheme that permits nurses with inadequate computer skills to use it. The nurses were able to document the patients' information with ease as the system had templates:

It's easy for me to know the system because even though I'm not too fast in it ... they understand in the ward. (P2)

The fourth inclination was following a specific work routine that allowed the nurses to use the HIS parallel with nursing care actions, where patient care was not affected:

So I have to prioritise first thing, work with patient and then later computer. (P6, P12)

It was encouraging to know that fellow nurses in other hospitals only have access to paper-based systems, so the HIS is:

… easy, very easy compared to public hospital you can see there it's a lot of paper work and it takes a long to admit the patient there. (P7)

The realities of IT becoming inevitable in health care and a hospital standard were the fifth inclination: "HIS ... makes us clever". The desire to keep up-to-date with IT was voiced by the participants:

You can just go with ease its technology; it's beautiful. (P7)

Information technology is used all the time – but the importance of nursing care while using technology should not be underestimated. The HIS is a hospital standard and the use thereof is compulsory:

When you are in this hospital you cannot do your work without the system. (P11)

Evaluative

Positive, negative and contradictory aspects of using the HIS surfaced. A positive aspect was that the participants felt able to structure their routine, giving them a sense of being in control and not spending too much time away from direct patient care. The participants perceived the HIS as being useful and easy to use. Emphasis was placed on using the system despite having poor computer skills or being a slow typist:

Once you have been trained on it, it is easy to use it. (P1)

The HIS enabled the nurses to document all applicable information ranging from admissions, diagnoses, care plans, and laboratory orders to wound care. Support from the IT personnel was confirmed:

If there is any problem or anything … If you need help they are always there for you. (P7)

The first negative aspect was that the nurses were frustrated at having limited access to the HIS. Access was related to the nurses' scope of practice and therefore lower

category nurses did not have similar access as PNs. High workloads or staff shortages risked retrospective recording with possible less accurate information records in the system:

> I could undergo other training like having other access modules in the computers like the one PNs use is not the same as us. So I wish I could use things like ... (P1)

The nurses complained about double work caused by system downtime due to maintenance. Although limited, downtime is perceived as negative. The hospital still used the paper-based patient files:

> It's okay even though sometimes you may find that it's like lot of work because you have to write down on the file and then go to the computer to like write the same thing that you wrote on the file. (P14)

Another negative aspect was that the doctors did not use the HIS effectively, they continued to write in the patients' files and the nurses had to capture the doctors' clinical notes and prescriptions into the system after the ward rounds. The participants acknowledged that they did not use the HIS to its full potential. Some nurses did not know certain functions, especially when completing a nursing care plan:

> We no longer go back to the patient and do our history taking. We rely on the doctor's notes. (P11)

There was also a contradictory result. PNs blamed the HIS for "stealing patient time" yet ENAs and ENs voiced the opposite opinion. ENs documented vital signs of patients, but PNs had to design patient care plans, write admission reports and order stock on the computer – requiring much time and concentration. Some nurses admitted that they neglected patient care to nurse the system:

> Especially PNs they are not so in contact with our patients ... people become so lazy to an extent where they like computers more than their job. (P6)

Nursing-specific Themes Regarding the HIS

The HIS Challenges the Caring Ethos of Nursing

Nursing as a caring profession is challenged by the HIS, risking patient confidentiality. The participants acknowledged that patient confidentiality was important and exceeded the boundaries of the hospital. Confidentiality could be at risk when the patients' information is available to all personnel. Authorised system users are given appropriate level of access which differs:

> So if the patient is a staff member it's unfair because the information is not confidential. (P10)

You'll find that the very same colleague who's ill at that time … The colleague that you are nursing is a bit uncomfortable. (P14)

The HIS Infiltrates the Caring Presence in Nursing

The HIS (and IT) were seen as a new and significant dimension that infiltrates the caring presence in nursing. Most participants stated that the nurses like spending more time working on the HIS than being with the patients:

Let us not forget that we don't have to nurse the system, let's nurse our patients, that's the bottom line. (P6)

The contact with the patient is less because you've been taking data, feed the computer. (P8)

The nurses acknowledged that the HIS "makes nurses lazy thinker(s)" (P11). Within Meditech, certain modules are designed so that the nurses can only fill in the applicable information, such as the nursing care plan and discharge summary. By just filling in templates, the nurses miss out on opportunities to learn about patient care:

People no longer think, we don't use our brains, for example when you do the care plan you just do look-up … (F9)

… and then you just click and choose. (P6)

Nurses' caring presence could be influenced by having a reductionist view of their patients rather than a holistic view. The HIS software is designed that nurses are able to move from one screen to the next when entering patient information but does not provide nurses with a holistic view of total patient care:

We no longer go back to the patient and do the assessment like the way we are taught people would just use the doctors' notes and write. (P11)

Acquired Computer Skills

The participants entered the hospital with minimal computer skills. Yet, with training and continuously using the HIS, the nurses progressively improved their computer skills and became more computer literate. They acquired computer skills after being trained on the HIS and developed an interest in IT:

I find it very attractive because of where I was before there were no such things. So since I was here I got attracted and then I am even willing to go further. (P1)

Discussion

Regarding the demographic data, Chan et al. (2010) and Kipturgo et al. (2014) associate nurses' age with HIS adoption, yet in the current study age was not an identified theme. The nurses' gender, years of exposure and qualifications did not impact on their attitudes towards the HIS. This result is congruent with several studies conducted in public and private facilities worldwide (Alquraini et al. 2007; Asiri, Aldosari and Saddik 2014; Chan et al. 2010; Cline and Luiz 2013; Kipturgo et al. 2014; Nkosi, Asah, and Pillay 2011). The participants perceived the HIS as user-friendly and easy to use. This is aligned with constructs of PU and PEOU in the TAM.

The nurses' perceptions that the HIS makes their work faster and improves patient outcomes were confirmed by Kipturgo et al. (2014, 6) in Kenya. Although Alquraini et al. (2007, 380) suggest that longer exposure to IT could improve HIS adoption; the current study revealed that nurses without any computer skills could access and use the HIS after training. Support from management, colleagues and IT personnel as well as HIS training were enablers for the nurses to continue using the system. These results are confirmed by Alquraini et al. (2007), Asiri, Aldosari and Saddik (2014) and Jaducci, Shaw and Braa (2006). Asiri, Aldosari and Saddik (2014) found that doctors were labelled as poor HIS users, corresponding with the research finding that doctors continued using paper-based documents whilst nurses used HISs. The finding that nurses spent more time in front of computer screens than with patients was confirmed in the literature (Asiri, Aldosari and Saddik 2014, 75; Chan et al. 2010, 23; Cline and Luiz 2013, 4). Nurses needing to have more access to the HIS irrespective of their scope of practice was a new finding that has not been confirmed in the literature.

High workload was cited as a hindering factor to accessing IT among post-basic nursing students by Nkosi, Asah and Pillay (2011, 879). This aligned partially with the research finding that during periods where the nurses perceived workloads to be high the time available to use the HIS was limited, the nurses were able to work in a team and allocate one staff member to work the HIS only. System downtime was identified as a hindering factor that necessitated retrospective recording by the nurses. Chan et al. (2010, 23) identified downtime or system failure in Singapore as a "major technical problem" for nurses.

Confidentiality of patient records is very important in the health sector. Most nurses felt that the HIS at Hospital X was safe and measures were in place to audit the nurses. Cline and Luiz (2013) make similar recommendations in their study that confidentiality must be ensured regarding patients' records. However, some nurses felt that if a patient is a health employee rather than a mine employee, then their information should remain confidential. One of the unique findings of the current study was that confidentiality is perceived as an ethical aspect that exceeds an HIS. This finding, coupled with the indication by some participants that some nurses are

capable of "lying to the system", was not confirmed in the reviewed literature. The abovementioned findings were not identified in the literature except for an emphasis on confidentiality by Cline and Luiz (2013).

Recommendations

It is recommended that nurse managers be made aware that an HIS might threaten the caring presence between nurse and patient and challenge the caring ethos of nursing. Thus, it is necessary to include confidentiality measures as part of HIS standards and ensure adherence thereto. Training, support, a tolerant environment and a specific health information software structure must be maintained to improve HIS adoption. Managers can demarcate the boundaries that IT remains a tool and that nursing is always about the patient first thereby ensuring that IT increases nursing care efficiency. The nursing ethics modules need to include the caring aspect of nurses using HISs and the associated professional integrity issues. Training nurses about a caring presence and caring behaviours amidst a technological environment is required. Further research could be done on the relation between an HIS and the ethics of nursing as a profession. The decision-making skills and capabilities of nurse managers using an HIS should also be explored.

Limitations

The study was conducted at one private mining hospital with the nurses only. Therefore the results cannot be generalised to all health care professionals at other private or public hospitals as the context would be different.

Conclusion

In general, the study found that nurses favoured using the HIS irrespective of their age, experience or nursing category. Technology adoption seemed seamless in a culture of training, tolerance and a logical scheme. The HIS was perceived as a meaningful tool. There were perceived positive and negative aspects associated with using the HIS, yet, challenges to the caring ethos of nursing and the infiltration of the caring presence of nurses were reported.

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