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Perspectives of Health Personnel on Information and Communication Technologies Towards a Patient Records Management Impact Assessment Framework: A Namibian Case

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Abstract: ***ICTs are increasingly visible in the health sector. A significant part of the healthcare system includes management of patient records. Hospital administrators and medical practitioners have different roles and functions within the healthcare sector. It is significant for medical practitioners to be trained on the use of ICT, to improve on their capability to deliver services to the patients and the community in general. The problem however is that unfortunately some medical practitioners do not embrace the use of technologies in the execution of their duties, despite the possible benefits identified with the use of ICT. The lack of adoption of these technologies could result in the elimination of prospective ICT projects in the healthcare sector. This research paper therefore aimed to investigate the perspectives of health personnel in the use of ICTs for Patient Records Management (PRM) towards developing an impact assessment framework. The Windhoek Central Hospital is a case study in this research. Data collection consisted of questionnaires. The outcomes of the study were perspectives of the health personnel on the PRM system and an impact assessment framework subsequently. The framework consists of three components namely the usefulness, significance and attributes of the electronic PRM system.***

Keywords: information and communication technology; impact assessment; patient records management; health information systems

1. Introduction

ICTs are increasingly visible in the health sector. Governments and other organisations such as NGOs' that encourage healthcare quality and services are contributors towards the use and incorporation of ICT in the health sector [1]. ICTs in healthcare are associated with benefits such as a reduction in patient information duplication, medical errors by practitioners and faster access to patient records [2]. A significant part of the healthcare system includes management of patient records. Managing patient records is necessary for assessing patients' needs to produce a consistent plan of care for optimal health output [3]. The system often used for this purpose is called the Electronic Health Record (EHR) [4]. A general definition of EHR is an electronic storage of any kind of patient record [5]. Patient information is gathered and managed by an entity such as a healthcare facility and ICTs can be used for such management [5]. Examples of systems that can be used for EHR management are MedVault, Indivo, Google Health and Microsoft HealthVault [5].

The healthcare sector consists of technical and non-technical personnel. Technical personnel include ICT professionals responsible for the smooth running of any ICT system within the healthcare system. The non-technical personnel are hospital administrators and medical practitioners such as nurses and doctors, who are also the end users of the ICT system. Hospital administrators and medical practitioners have different roles and functions within the healthcare sector and they all contribute to healthcare service delivery in one way or another. Hospital administrators, in some cases also called secretaries, capture and manage patient information upon a patient's visit to the hospital. Nurses are primarily responsible for the day-to-day operations and monitoring of the health progress and care-giving of patients. As such, they are considered primary aid to patients. Nurses trained in the use of ICT in the healthcare industry are crucial [6]. Doctors on the other hand, are trained on a higher level than nurses and are generally trained in dealing with cases ranging from simple illnesses to more complex situations. Doctors usually work hand in hand with nurses to carry out healthcare service delivery to patients.

It is significant for medical practitioners to be trained on the use of ICT, to improve on their capability to deliver services to the patients and the community in general [7]. The problem however is that unfortunately, some medical practitioners do not embrace the use of technologies in the execution of their duties, despite the possible benefits identified with the use of ICT. The lack of adoption of these technologies could result in the elimination of prospective ICT projects in the healthcare sector [8]. It is argued that the resistance is primarily due to the fact that ICT was not part of healthcare studies in the past [7]. Along the same argument, the portrayed attitude by some of these medical practitioners could be attributed to the fact that in the decades past, they were not required to utilise computers [9]. This research paper therefore aimed to investigate the perspectives of health personnel in the use of ICT for Patient Records Management (PRM) towards developing an impact assessment framework.

2. Literature Survey

This section examines related literature. Critical analysis of key topics namely definitions of impact assessment, patient records management, ICT in healthcare, and health information systems in Namibia were discussed. The critical analysis process entails the detailed study of existing

literature around the said topics by conspicuously looking at what was said, and methods and techniques that were used.

a) The empirical studies on definitions of impact assessment

"Untangling the complexity of connected health evaluations" was a study that focused on developing an evaluation model to support adopting connected health for primary care-based dementia patients [10]. The information systems success model by DeLone and McLean was used in the study. Data collection methods included literature review as secondary data and semi-structured interviews. The study was conducted in Ireland, in a dementia setting. Sampling consisted of four industry partners who were interviewed and used as a case in evaluating or applying the developed framework that was based in an industry workshop. The outcome of the study was an assessment framework of connected health solutions. Although mentioned in the study, there was less focus on assessment of crucial technologies that would enable connection between health providers such as EHRs and/or a central database that could enable access and the use by different stakeholders for holistic health care. Nonetheless the study recognised the use of ICT in healthcare organisations and the potential of added healthcare quality by these technologies. The study further emphasised that impact assessment of these technologies would indicate real progress areas and identify strengths and weaknesses of the health systems. As such, the study was found to be relevant to this research.

"An overview of electronic health information management systems quality assessment" is an article focusing on quality assessment [11]. The model of the patient/clinician encounter by Brown and Warmington and six dimensions model of quality in information systems were used in the study. Literature review was the means of data collection. Sampling consisted of health professionals, patients, healthcare organisations and policymakers. An overview of data and information quality assessment in electronic health systems was the finding of the study. The most significant contribution of technology to quality of care improvement was through increasing adherence to guideline and protocol-based care. Increased adherence is supported by decision support functionalities embedded in the EHR systems. The study proposed to be used as a benchmark in the initial stages of system development or implementation. The study however does not show the actual quality impact of health information management systems in a real world setting. Nonetheless, relevance was seen in terms of application and definition of impact assessment.

"Evaluating the financial impact of modelling and simulation in healthcare: Proposed framework with a case study", was a paper which purposed to propose an analytic framework to quantify the value of modelling and simulation [12]. The rationale was that the benefits can be evaluated more objectively by the healthcare stakeholders and can be compared across a broad range of health innovations. The angle of this paper was on the financial value, taking the perspective of administrators who need to plan and manage healthcare budgets. The model used in the study was budget impact analysis used in Health Technology Assessment. Literature review was the method of data collection. The context was a case of acute care for Ischemic stroke and the target population being administrators of national or regional healthcare programs, administrators of accountable care organizations, and administrators of private insurance plans. At the time of the study the use of simulation was found to be a cost- saving exercise only when the long term cost of care is considered for more than one year. It was estimated to saving a total of 27,534 Euros when the long term cost of care is considered over a two year period and 114,674 Euros for a five year period. Only modelling and simulation technologies in healthcare were considered for the study which lacked on impact assessment areas of PRM technologies. The study provided a perspective on how impact assessment is defined and applied in the context of financial impact assessment.

b) The empirical studies on PRM

A study titled "E-EPR: a workflow-based electronic emergency patient record" aimed at supporting the execution of EMS workflows by providing integrated patient information to EMS process participants [3]. No theoretical model was used in the study. E-EPR was built on top of an enhanced IHE-based collaborative network, consisting of health and social care providers that use existing applications and IHE profiles for managing the sharing of document-based patient information. The context was Athens Ambulance Service (AAS) and the ''Gennimatas'' General Hospital of Athens (GGHA). The study presented a workflow-based electronic patient record for emergency healthcare (E-EPR) on cloud that is based on a service-oriented architecture. The element of implementing the proposed E-EPR was lacking and what impact it would have on health service delivery was not discussed. Its relevance was found in the discussion of electronic patient records although from an emergency medical service perspective.

"The role of electronic medical records in the identification of suboptimal prescribing for hypertension management: An opportunity in unchanged therapy", was a study that had its purpose in the role of electronic medical records in the prescription process [13]. No theoretical model was used in the study. The Participatory Action Research (PAR) approach was followed by the study. As the study's method in each PAR cycle, queries to identify patients with prescribing at variance from evidence-based practice were formulated and run, relevant patient notes were retrieved and a quality audit of the medication decisions was carried out by a medical practitioner working in the practice. The study was conducted in New Zealand. The results of the study are that a promising area for the use of EMR queries to improve long-term condition management is in the identification of patients with persistently high risk of adverse outcomes and concurrent unchanged therapy during successive general practice visits. Though the role of electronic medical records (EMR) in the prescribing process was discussed, not much was said on impact assessment matters of the EMR system in healthcare. In terms of relevance the element of EMR, what it is and how it was applied in the health setting links it to the research.

An article titled "Evaluating the impact of Electronic Health Records on Clinical Reasoning Performance" aimed to address a gap in literature and this gap was understood to be the lack of a tested, validated instrument for evaluating and

predicting the impact of EHR used on clinical reasoning performance [14]. Task-Technology Fit (TTF) was the theoretical model used in the study. For data collection purposes the method used were semi-structured interviews and paper and online surveys. Dakota, USA was the basis of the study. Sampling consisted of a hundred and seventeen physicians, twenty advance practice nurses and twenty four physician assistants. The outcome of the study was an evaluative framework for understanding the factors that impact clinical reasoning performance. The study evaluated the tool to be used to measure impact of EHR and not necessarily the actual impact which is an essential component in healthcare service delivery. The study nonetheless provided understanding to the use of EHR which is about patient record management though the direction was on clinical reasoning performance.

c) The empirical studies on ICT in healthcare

The focus of the study titled "Utilisation of the District Health Information Software in Botswana: from Paper to Electronic Based System" was to investigate matters of poor data management and reporting through a data warehousing system, the District Health Information Software (DHIS) or simply to determine the utilisation of the DHIS in the districts [15]. Data was analysed using descriptive statistics and content analysis and the method of gathering data was through semi- structured questionnaires. Botswana was the base of the study. The target population to which the questionnaires were sent were all District Health Management Team (DHMT) heads and monitoring and evaluation officers in twenty seven districts. Inadequate IT infrastructure such as computers and unstable internet access, limited skills and insufficient human capital were some outcomes of the study. A need for more investment and leadership skills in health information management was identified. Although health information management was the focus, impact assessment thereof was not addressed. Relevance of the study was recognised in that ICT in health organisations were discussed.

"A security technique for authentication and security of medical images in health information systems" study proposed a fully recoverable encrypted and watermarked image processing technique for the security of medical images in health information systems [16]. No theoretical model was used in the study and data gathering techniques consisted of literature review. The study was conducted in Ghana and France. The proposed work addressed statistical and brute force attacks and was found to be resistive. Effectiveness was found in the encryption process for all images with zero pixel expansion. The entropy and mean values for the images in were computed. That is the average total pixel before encryption was the same as the average total pixel after encryption. But there was a change in pixel value during the watermarking process. Since the emphasis of the study was on security of data or images contained on the HIS, matters of impact assessment of ICTs were not discussed. However the element of ICT, more specifically HIS, covered in the study provided a connection to this research.

An article titled "A design strategy for health information systems to address care process management" focused on systems design and interoperability considerations for a collaborative HIS [17]. A participatory design approach was used in the study with literature review being the data collection technique. As the context the study used a three year case study of the design of the Palliative Care Information System (PAL-IS). An important finding is that the evaluation of HISs takes time and longitudinal studies are necessary to understand the overall ecosystem where technology, processes, and people interact. The focus of the study was on interoperability of HIS and not necessarily on its impact towards healthcare service delivery. The study describes HIS with emphasis on integration matters. The study thus provides perspectives on HIS integration requirements in healthcare.

d) The empirical studies on HIS in Namibia

A chapter contribution to a book titled, "Maximizing healthcare delivery and management through technology integration" aimed at investigating human interaction in the use of health information systems [18]. The study adopted a thematic analysis approach. Semi- structured interviews was the method of data collection. The study was conducted in Namibia at Windhoek Central hospital. A total of ten participants were interviewed consisting of pharmacists, nurses, network administrators, payroll administrators, administrative assistants and systems administrators. The results of the study were outlined as obsolete infrastructure, lack of integrated systems, parallel systems (manual and HIS), lack of technical know-how by users, data omission occurrences due to parallel systems and trivial use of the HIS. The study investigated the interactions of humans with the HIS system in a public hospital but however lacked an impact assessment report specifically on patient record management systems. The study however provided an understanding to the existing HIS in the Namibian context.

Furthermore in the same book, a chapter contribution on healthcare services for nomadics through a mobile framework, focused on identifying and discussing actors in the mobility of healthcare services [19]. The theoretical model used for the study was Moments of translation from the perspectives of ANT. Data gathering methods included questionnaires and interviews. Sampling consisted of the Ministry of Health and Social Services (MoHSS), health givers, patients, medical paper technology and medical ICT tools. The outcomes of the study were that patients in transit were found to have received service in accordance with the national health policy as promulgated by the MoHSS. Healthcare service providers through the use of spoken language and tribal origin and at the same time constrained the services that they were supposed to render to the patients for better healthcare. Impact assessment of HIS or the ICT medical tools as was mentioned for service delivery was lacking in the study. The study nonetheless provided a general understanding of the existing Namibian health system.

A study titled "national health information systems assessment" focused on the assessment of the national health information systems [20]. No theoretical model was used in the study. Data collection methods included documentation and interviews. In more detail, a review of documents and statistics, interviews, group meetings and a detailed review

of sixty-one systems and databases were done. The study was conducted in Namibia. It was found that the Namibian HIS were in an isolated state at the time of the study. No sharing of information between systems exited. Registers were incomplete and often filled not at the time of service but retroactively and tally sheets were not filled out correctly. Additionally, across all systems and databases there was no common patient identification number and agreed standard or definition for various data elements. Finally, numerous systems had duplicative functionalities and others were not used to their fullest capability. Though the study reports on the status of HIS in Namibia, impact assessment of these isolated HIS were lacking. The study was found to be relevant in that it discussed and described the Namibian HIS.

3. Methodology

a) Research Design

The study adopted a case study approach. The case was Windhoek Central hospital. It is a public situated in the capital city of Namibia, Windhoek. The selected hospital receives patients from the city as well as from all the regions in the country, and thus, it is a national referral hospital. An interpretivist approach was selected for the study as the study's paradigm. A qualitative data collection method was possible because of this approach. Qualitative data helped provide an understanding of the activities which took place between the users of the PRM system as well as activities between the users and the PRM system.

b) Participants' Sample

The healthcare participants consisted of the users of the PRM system. A random sampling of participants was done. The users of the system were nurses and administrative officers. These were primary users of the system. A total of 43 participants were selected, of whom 38 were nurses and eight administrative officers. These participants received questionnaires. The participants used the same PRM system and this was the rationale that motivated the sample size.

c) Data Collection

The mode of data collection was paper-based questionnaires. The questionnaires were conducted to gather data that would produce the perspectives of the participants about the use of the PRM system as well as the criteria needed to formulate the impact assessment framework. The questionnaires followed a Likert scale that aided with gauging perspectives of the participants by agreeing or disagreeing to statements in the questionnaire. There were a few open ended questions included in the questionnaire to accommodate elaboration on some answers. The questionnaires were only distributed to nurses and administrative officers, as they were the primary users of the PRM system.

4. Results and Discussion

a) Nurses' perspective on the usefulness of the existing PRM system

As primary care givers and users of the PRM system a perspective in percentage was presented using the questionnaire feedback, that was related to the usefulness of the PRM system. The analysis of the data shows that out of the 36 nurses who completed the questionnaires, 70% of them agreed that the existing PRM system is effective for capturing patient medical records, 25% were undecided and 5% disagreed. 65% of them agreed that the existing PRM system is effective for managing patient medical records whereas 23% were undecided and 7% disagreed. One nurse did not answer this question. As for the effectiveness of the system in accessing patient medical records, 58% of the nurses agreed, 36% were undecided and 6% disagreed. One nurse did not answer this question. 66% of the nurses agreed that the storage for patient medical records were effective. 28% were undecided and 6% disagreed that the existing PRM system is effective for storing patient medical records. One nurse did not answer this question.

b) Administrative officers' perspective on the usefulness of the exisiting PRM system

The analysis of the data shows that out of the seven administrative officers who completed the questionnaires, 100% of them agreed that the existing PRM system in healthcare is effective for managing and accessing patient medical records. 85% agreed that capturing patient medical records was effective with 15% disagreeing. As for the effectiveness towards storing patient medical records 86% were in agreement and 14% undecided.

c) Summary of perspectives of nurses and administrative officers as it pertains to usefulness of the existing PRM system

The data shows that nurses found the existing PRM system to be most effective for capturing patient medical records followed by storing and managing patient records as the second and effective use of the existing PRM system as the third highest. Effective accessing of patient medical records came in as fourth. The administrative officers on the other hand rated the existing PRM system as equally effective for capturing, managing, accessing and storing patient medical records. Accessing and managing patient medical records effectively was rated the highest followed by storing and capturing by the administrative officers. Easy access to patient records is a benefit attributed to the effective use of the PRM system [21]. It is however argued that for reasons of enhanced health outcomes, managing patient records were necessary for the purpose of assessing patient's needs in developing a steady health care plan [3].

d) Nurses' perspectives on the significance of the PRM system

The analysis of the data shows that 89% of the nurses agreed that there is a need to use ICT for PRM while 3% was undecided and 8% disagreed. Equally 89% of nurses agreed that ICT will help improve PRM, whereas 3% nurse was undecided and 8% disagreed. As it relates to whether or not ICT will make work easier, faster and efficient for the nurses in regards to PRM, 89% nurses agreed that it will with 3% undecided and 8% disagreeing.

e) Administrative officers' perspective on the significance of the PRM system

100% of the administrative officers agreed that there is a need to use ICT for PRM and that the use of ICT will help improve the PRM system. 86% of the administrative officers

agreed that the use of ICT will make work easier, faster and efficient in PRM, whereas 14% was undecided.

f) Summary of perspectives of nurses and administrative officers as it pertains to the significance of the existing PRM system

The data shows that 89% of the nurses agree there is value in using ICT for PRM, in that there is a need for the use of ICT in regards to PRM as it will aid in improving the PRM system and make work easier, faster and efficient. In all three instances 3% of nurses were undecided and 3% disagreed. Whereas 100% of administrative officers agreed that there is a need for using ICT for PRM and that ICT will improve the PRM system. 86% agreed to the use of ICT in making work easier, faster and efficient with 14% undecided on whether this can be achieved by using ICT. The possibility to reduce medical errors and enhance clinical work processes by the healthcare personnel could be realised when using electronic PRM [22].

g) Perspectives of nurses on attributes which contribute to the use of PRM

The analysis of the data shows that from the 36 nurses that completed the questionnaire, 70% agreed that patients will benefit from the use of ICT in the PRM system with 14% undecided and 16% disagreeing to the statement. One nurse did not answer this question. 89% of nurses agreed that financial resources must be allocated to purchase and maintain ICT for PRM with 8% undecided and 3% in disagreement. 89% said that the ICT utilised for PRM must suit the Namibian hospital context, whereas 8% were undecided and 3% disagreed. 58% of the nurses agreed that the infrastructure in the Namibian hospitals is sufficient to support the use of ICT for PRM at the time of this research study with 20% of the nurses undecided and 22% in disagreement on the matter. 42% of the nurses agreed that the hospital has sufficient staff to use the ICT for PRM, 13% of the nurses were undecided and 45% disagreed that there were sufficient staff to use the ICT. Furthermore 94% nurses agreed training to use ICT for PRM must be provided whereas 3% was undecided and 3% disagreed. 95% of the nurses agreed that the ICT for PRM must be easy to use. One nurse did not answer this question. Finally 50% of nurses agreed a salary increment would encourage them to use ICT for PRM with 11% undecided and 39% of nurses disagreeing to the statement.

50% agreed that a culture of using ICT in the PRM exists in Namibia at the time of this research study, with 17% of nurses undecided and 33% in disagreement. 70% of the nurses agreed that healthcare ICT policies must be followed when using ICT for PRM. 25% were undecided and 5% disagreed. 55% of the nurses agreed that the Namibian health sector encourages the use of ICT for PRM and 23% were undecided on the statement and 22% disagreed. 50% of nurses agreed that the Namibian government is willing to invest in ICT for PRM, 44% were undecided and 6% disagreed. Finally 72% of the nurses agreed that there is a satisfactory level of internet infrastructure in the hospital and Namibian health sector to support the use of ICT in PRM whereas 11% were undecided and 17% disagreed.

h) Perspectives of administrative officers on attributes which contribute to the use of electronic PRM

The analysis of the data from seven administrative officers who completed the questionnaire 100% agreed that patients will benefit from the use of ICT in the PRM system with one undecided. One administrative officer did not answer this question. 100% of the administrative officers agreed that financial resources must be allocated to purchase and maintain ICT for PRM and that the ICT used for PRM must suit the Namibian hospital context. 71% agreed that the infrastructure in the Namibian hospitals is sufficient to support the use of ICT for PRM at the time of the research study, whereas 15% was undecided and 14% disagreed. 71% of the nurses agreed that the hospital has sufficient staff to use the ICT for PRM with 29% that disagreed. 100% of the administrative officers agreed that training to use ICT for PRM must be provided and that ICT for PRM must be easy to use. Finally 30% agreed a salary increment would encourage the use of ICT for PRM whereas 70% disagreed. 72% agreed to a culture of using ICT in the PRM that exists in Namibia at the time of this research study; however 14% were undecided and 14% disagreed. 86% of the administrative officers further agreed healthcare ICT policies must be followed when using ICT for PRM with 14% undecided. 85% agreed that the Namibian health sector encourages the use of ICT for PRM and 15% were undecided. 57% of the administrative officers agreed that the Namibian government is willing to invest in ICT for PRM whereas 43% were undecided. Lastly, 85% agreed that there is a satisfactory level of internet infrastructure in the hospitals and Namibian health sector to support the use of ICT in PRM with 15% in disagreement.

i) Summary of perspectives by nurses and administrative officers on attributes which contribute to the use of electronic PRM

The findings show a majority of nurses and administrative officers agreed that there are internal factors influencing the use of ICT for PRM. These factors consist of patients benefiting from the use of ICT in the PRM system, the necessity of financial resources to be allocated to purchase and maintain ICT for PRM, the use of ICT for PRM that must suit the Namibian hospital context, that the current infrastructure in the Namibian hospitals is sufficient to support the use of ICT for PRM, sufficient staff at the hospital to use ICT for PRM, that training must be provided in the use of ICT for PRM, ease of use of ICT for PRM and finally a salary increment that would motivate the use of ICT for PRM. The rest (minority) were either undecided or disagreed to the listed internal factors.

A study showed that the infrastructure at the Windhoek Central hospital was obsolete and had a lack of integrated systems [18]. However in this research study 61% of the participants indicated that the infrastructure in the Namibian hospitals is sufficient to support the use of ICT for PRM. A lack of technical know-how by users of the HIS system and data omission occurrences due to parallel systems and trivial use of the HIS were further outcomes of a study [18]. These results supports this research finding of needed training as 96% of the participants agreed that training to use ICT for PRM must be provided.

j) A PRM impact assessment framework based on the perspectives of nurses and administrative officers

As indicated in figure 1, the findings from the questionnaires provided the components and aspects making up the framework. The framework is made of healthcare personnel and the electronic PRM system as aspects of the framework. The framework was developed for a public healthcare. The base of the framework which links the two aspects is the identified components in relation to the PRM system. One of the framework aspects which are healthcare personnel are the users of the PRM system. The components at the centre of the framework are the usefulness, significance and attributes of the electronic PRM system. The components are explained below.

k) Usefulness of the electronic PRM system

The usefulness of the PRM consists of capturing, managing, accessing and storing patient medical records. The PRM system is useful when these processes can be easily achieved. Therefore these attributes should play a crucial role in assessing the usefulness of a PRM system.

l) Significance of the electronic PRM system

A significantly high rating from the nurses and administrative officers about the use of electronic PRM was indicative of the importance of electronic PRM. Over 80% of the participants perceived that their daily tasks at the healthcare can be aided by the use of an electronic PRM system. It is thus vital to assess how the PRM system enhances tasks by the healthcare personnel.

m) Attributes which contribute to the use of electronic PRM

The identified attributes in the framework are crucial factors that would encourage the use of electronic PRM. These attributes must be considered if impact assessment is to be carried out for PRM. The identified attributes are benefits associated to the use of the electronic PRM, budgets to support the use of electronic PRM, a PRM system specific or aligned to the healthcare (meeting healthcare requirements), proper healthcare infrastructure, sufficient staff to use the PRM system, training of the users of the PRM system to ensure competence, non-complex use of the system, a technology culture in the healthcare, ICT policies, managerial support and encouragement in using the PRM system, technology investment efforts from government, able internet infrastructure.

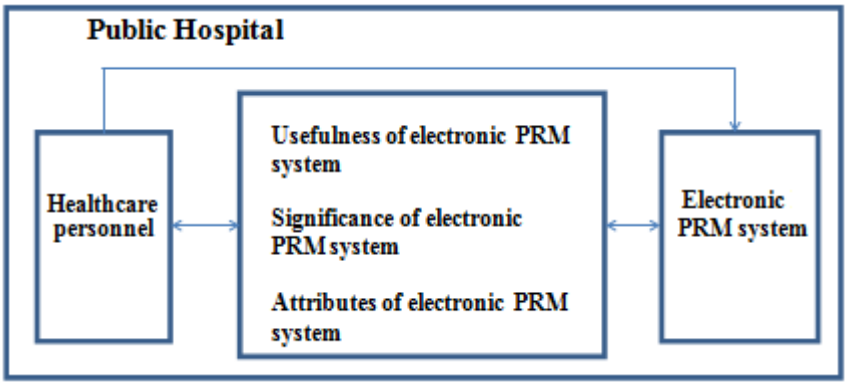

Figure 1: PRM impact assessment framework based on perspectives of healthcare personnel

n) Expert review of the framework

An expert review on the developed framework was conducted. The review was a means to evaluate the framework. Evaluation enables assessment of quality, value, effects and impacts of products such as ICT and applications in health organisations [23]. The Delphi technique was employed for the review process as it allowed for questionnaires to be used as a means of data collection from a panel of selected participants [24]. The technique provides an iterative process of feedback from panellists which allows for further clarity and deeper revelation from the panellist on the subject matter until an agreement is reached [24]. Additionally the technique provides participant anonymity and confidentiality. The weakness of the technique is that response time from the participants could be low as a result of the multiple feedback processes [24]. The expert review process entailed the empirical validation of the attributes of the developed framework. Validation was conducted using a questionnaire consisting of close (check-list) and open ended questions. The questions in the questionnaire were influenced by the fundamental attributes of the framework namely; the usefulness, significance and attributes of the PRM system. Expert reviewers were selected from the MoHSS in the IT division. The IT department at the MoHSS is the headquarters servicing all the public healthcare institutions in Windhoek. Though there are IT departments at healthcare level they are all linked to the headquarters. For example should any healthcare related system be introduced or implemented it would be channelled down from the headquarters. The selections of the reviewers were based on the roles and titles of the participants and their relationship to the PRM system. The selected panel consisted of a chief systems administrator and two systems administrators. The chief systems administrator and one systems administrator were from the headquarters whereas the other systems administrator was stationed at the healthcare (Windhoek Central hospital) and worked closely with the electronic PRM system. The selected panellists were the technical and system experts as well as the supporting staff to the users of the system. The panel participants were briefed about the purpose and scope of the study and the framework was presented and explained to them. The participants agreed that the framework addressed impact assessment elements and that it focused only on PRM related aspects. One participant however initially felt that patients should have been the focal point of the framework. The participant argued that the patients were the clients and that the reason for the PRM system was to improve healthcare services to the patients. However after the researcher explained that the study focused on the users

of the system, as they directly interacted with the system and that patients at the time did not have a direct link to the system, the participant than agreed that the framework was relevant. After several deliberations on the framework the panellists concluded and agreed that the developed framework has incorporated the necessary elements to attain impact assessment on the use of ICT for PRM at the healthcare from the perspectives of healthcare personnel.

5. Conclusions and Future Scope

ICT are increasingly utilised in organisations, including the health sector, to aid work processes. However not all healthcare personnel are keen in adopting the use of ICT, more specifically for PRM. This resistance could be attributed to by a lack of competency in using ICT. Such negative attitudes are visible in the Namibian public healthcare. Therefore the study investigated the perspectives of health personnel on the use of ICT for PRM towards developing an impact assessment framework. The presented perspectives can provide healthcare managers strategies in how such negative attitudes can be positively addressed. The framework could be used to gauge impact of electronic PRM when used by the healthcare personnel to aid decision makers on future endeavours.

According to the expert reviewers comments, for future research work this study recommends considering data collection from patients in order to get a perspective from them as clients about how the use of ICT for PRM affect them as it related to healthcare service. Another comment was to consider the financial aspect of the PRM system in whether or not healthcare related costs are reduced as a result of the use of ICT. Furthermore a consideration in studying change management aspects towards technology adoption by healthcare personnel that are resistant in adopting the use of ICT to aid their work tasks was recommended. The presented perspectives of healthcare personnel on the use of ICT for PRM would provide healthcare management with insights for better PRM system training and motivation strategies. The developed framework would aid decision makers in investment related decisions regarding ICT for PRM.

References

[1] Nyella, E. (2009). Challenges in health information systems integration: Zanzibar experience. Information and Communication Technologies and Development (ICTD), 2009 International Conference (pp. 1-2). Doha: IEEE.
[2] Jensen, T. A. (2013). Nurses' perceptions of nursing care documentation in the electronic health record. Proquest Dissertations and Theses, 1.
[3] Poulymenopoulou, M., Malamateniou, F., & Vassilacopoulos, G. (2014). E-EPR: a workflow-based electronic emergency patient record. Accumulated Computer Machinery, 91-92.
[4] Fabbri, D., LeFevre, K., & Hanauer, D. A. (2011). Explaining accesses to electronic health records. Workshop on data mining for medicine and healthcare (pp. 10-11). Michigan: Accumulated Computer Machinery.
[5] Jafari, M., Safavi-Naini, R., & Sheppard, N. P. (2011). A rights management approach to protection of privacy in a cloud of electronic health records. ACM Digital Library, 23-24.
[6] Chang, J. (2007). Nursing informatics competencies required of nurses in Taiwan: A Delphi method. Proquest Dissertations and Theses, 1-2.
[7] Jones-Zeigler, C. M. (2011). Computerization in practice: The lived experience of experienced nurses. Proquest, 1-2.
[8] Daly, G. (2012). Nursing perceptions of electronic documentation. Proquest, 3.
[9] Pack, J. (2011). Multiple intelligences and experiential learning styles: A mixed method study of registered nurses' attitudes toward computers and web-based learning. Proquest, 1.
[10] O'Leary, P., Carroll, N., Clarke, P., & Richardson, I. (2015). Untangling the complexity of connected health evaluations. IEEE, 272-280.
[11] Bouamrane, M.-M., Mair, F., & Cui, T. (2012). An overview of electronic health information management systems quality assessment. ACM, 37-44.
[12] Soorapanth, S., & Young, T. (2015). Evaluating the financial impact of modeling and simulation in healthcare: Proposed framework with a case study. ACM, 1492-1501.
[13] Patel, D., Warren, J., & Kennelly, J. (2013). The role of electronic medical records in the identification of suboptimal prescribing for hypertension management: An opportunity in unchanged therapy. ACM Digital Library, 21-22.
[14] Wills, M., El-Gayar, O., & Deokar, A. (2012). Evaluating the impact of electronic health records on clinical reasoning performance. IEEE, 2830-2836.
[15] Seitio-Kgokgwe, O., Mashalla, Y., Seloilwe, E., & Chida, N. (2016). Utilization of the district health information software (DHIS) in Botswana: from paper to electronic based system. IEEE, 1-9.
[16] Kester, Q.-A., Nana, L., Pascu, A., Gire, S., Eghan, J., & Quaynor, N. (2015). A security technique for authentication and security of medical images in health information systems. IEEE, 8-12.
[17] Baarah, A., Kuziemsky, C., Chamney, A., Bindra, J., & Peyton, L. (2014). A design strategy for health information systems to address care process management. IEEE, 1-6.
[18] Shaanika, I. (2016). Human interaction in the use of health information systems: A case of a developing country. In T. Iyamu, & A. Tatnall, Maximizing healthcare delivery and management through technology integration (pp. 257-267). Windhoek: Medical Information Science Reference.
[19] Hamunyela, S., & Iyamu, T. (2016). Healthcare services for nomadics through a mobile framework. In T. Iyamu, & A. Tatnall, Maximizing healthcare delivery and management through technology integration (pp. 46-55). Windhoek: Medical Information Science Reference.
[20] Jones-Zeigler, C. M. (2011). Computerization in practice: The lived experience of experienced nurses. Proquest, 1-2.

[21] Menachemi, N., & Collum, T. (2011). Benefits and drawbacks of electronic health record systems. Google scholar, 48-49.
[22] Pisk, R. (2010). Physician satisfaction and workflow intergration factors associated with electronic medical record implementation in a pediatric hospital. Proquest, 1-2.
[23] Sockolow, P. (2009). Measuring clinician satisfaction and evaluating an electronic health record at a "PACE" geriatric care site. Proquest dissertations and Theses, 6-7.
[24] Hsu, C.-C., & Sandford, B. (2007). Practical assessment, research and evaluation. A peer reviewed electronic journal, 1-5.