

Development and Assessment of User Acceptability of a Clinical Nursing Mobile Application Tool for Patient Follow-Up in Lusaka, Zambia

Etambuyu Akufuna
*Department of Basic and Clinical
Nursing
University of Zambia, School of
Nursing Sciences,
Lusaka, Zambia
akufunaetambuyu@gmail.com*

Dr. Marjorie Kabinga-Makukula
*Department of Basic and Clinical
Nursing
University of Zambia, School of
Nursing Sciences,
Lusaka, Zambia
chlhmakukula@gmail.com*

Dr Ruth Wahila
*Department of Basic and Clinical
Nursing
University of Zambia, School of
Nursing Sciences,
Lusaka, Zambia
ruth.wahila@unza.zm*

Dr. Mayumbo Nyirenda
*Department of Computer Science
University of Zambia, School of
Engineering
Lusaka, Zambia
mayumbo@gmail.co m*

Abstract—This study aimed to develop and assess user acceptability of a clinical nursing mobile application tool (CNMAT) to enhance follow-up care for patients in Lusaka, Zambia. A mixed-methods sequential exploratory design was employed, involving three phases: exploration of nursing procedures for home-based care, CNMAT design and prototyping, and user acceptance assessment. This write-up focuses on phase one which involves the exploring suitable clinical nursing care procedures for the CNMAT and assessing the intention to use the CNMAT through in-depth interviews with 13 clinical nurses. Findings suggest that a wide range of nursing procedures can be safely conducted at home, but successful implementation requires addressing challenges such as limited resources, patient factors, and the need for training and support. The CNMAT offers potential benefits in improving follow-up care, but the research is still ongoing for the subsequent stages.

Keywords— (Clinical Nursing, Mobile Application, Nursing Procedures, Design and Prototyping, Assessing User Intention, Home Based Care)

I. INTRODUCTION

Quality access to healthcare services, mainly in follow-up care services for patients by clinical nurses, remains a challenge in resource-constrained settings like Lusaka, Zambia [1]. This is exacerbated by the increasing burden of chronic diseases, such as diabetes, hypertension, and cardiovascular diseases, which require ongoing management and follow-up [1] [2]. The lack of accessible and affordable healthcare services can also lead to poor patient outcomes, leading to increased morbidity, and mortality [3]. To address these challenges, innovative approaches are needed to improve the delivery of healthcare services [4]. Mobile health

(mHealth) technologies have emerged as promising tools for enhancing access to healthcare, especially in underserved areas [4] [5]. By leveraging the power of smartphones and mobile health applications (mHealth) can facilitate communication between healthcare providers and patients, improve adherence to treatment regimens, and provide timely interventions [5][6][7][8]. This study seeks to close up this gap by developing and assessing user acceptability of a clinical nursing mobile application tool (CNMAT) for follow-up care at the University Teaching Hospitals (UTHs) in Lusaka, Zambia.

II. METHODOLOGY

A mixed-methods sequential exploratory design has been employed [9], this involves three phases: phase one, stage one involves information gathering using key informant interviews from various units at the UTHs, to identify suitable home-based nursing procedures and associated challenges for follow up care and their intention to use the application if implemented. For phase one stage two, a validation of the tool will be done were 200 patients and care givers will be interviewed using a structured interview schedule. They will also be assessed on the intention to use the application. Phase two will involve the CNMAT Design and Prototyping based on the findings from phase one, the CNMAT will be designed and prototyped to incorporate relevant features and address identified challenges. Lastly the user acceptance assessment will be conducted i.e. the CNMAT will be evaluated for user acceptability among clinical nurses, patients, and caregivers. However, this write up only encompasses results for phase one, stage one were a qualitative research design was employed, involving in-depth interviews with 13 clinical nurses working in various medical, surgical units and

specialty clinics at the University Teaching Hospitals (UTHs) in Lusaka, Zambia. Participants were asked about their experiences and perspectives regarding follow-up care services, the types of procedures they thought were suitable for follow-up care services in patients' homes, challenges and opportunities associated with follow-up care, their views on mobile health applications in general and their intention to use the CNMAT. The interviews provided important insights into the possibility and potential benefits of follow-up care for surgical and chronic medical patients in Zambia.

III. FINDINGS

Key findings from the interviews included the feasibility of home-based procedures for follow up care. A wide range of clinical nursing procedures such as wound care, medication administration, vital signs monitoring and patient education etc. were identified as suitable procedures to be conducted in patients' homes for follow-up care. Some challenges to follow-up care which participants highlighted were Limited human & material resources, including insufficient staff, inadequate infrastructure, and lack of equipment to use for follow-up care services. These were consistently highlighted as significant barriers. One of the key informants emphasized the impact of these challenges, stating, "There's no proper system, No, there's nothing like that, because most of the time you just see them (patients) again once they're re admitted, yes, that's when we get to see them. Otherwise, once they're discharged, that's where the relationship is broken" (RN 11). Other factors that were mentioned as barriers to effective follow-up were systemic issues such as lack of management support. Participants in this study recognized the potential of mobile health applications to improve access to follow-up care for patients with surgical and chronic medical conditions in Zambia, particularly for those living in remote areas. A participant expressed enthusiasm for the use of mobile applications, stating, "I think it's convenient, like we talked about transportation issues and other challenges that patients may face, so it can be of help, like a patient just being followed to their home, or maybe using the app just to get in touch with the patient is okay, yeah. (RN 8)."

IV. DISUSSION

The findings of the phase one, stage one of this study suggest that home-based nursing procedures can be a valuable approach for providing follow-up care services in Lusaka, Zambia [10]. However, addressing challenges such as limited human and material resources, patient factors, and the need for training and support is essential for successful implementation [11][12]. The CNMAT offers potential benefits in improving access to nursing follow-up care, facilitating communication between patients, caregivers and clinical nurses, and providing educational resources for patients and care givers[14][15]. However, the study is still on going and further research will be needed to assess its effectiveness and address identified challenges, such as internet connectivity and device limitations. Please note that the remaining phases of the study (CNMAT design and

prototyping, and user acceptance assessment) would be conducted in subsequent stages and would provide additional insights into the feasibility and acceptability of the CNMAT.

V. CONCLUSION

Overall, the findings suggest that follow-up care using the CNMAT can be a valuable approach for providing clinical nursing services for chronic medical and surgical patients in Lusaka, Zambia. The CNMAT if it is to be implemented will also requires a comprehensive and well-supported implementation strategy. The CNMAT has the potential to significantly increase access to follow-up care in Zambia, for patients in remote and urban areas. By addressing the identified challenges and implementing a comprehensive approach, Clinical Nurses can enhance patient outcomes and lessen the strain on healthcare facilities.

References

- [1] L. Muyunda and M. Mpundu, Mapping the Regulatory Framework for Telemedicine in Zambia: A Content Analysis. *International Journal*, 10(3), pp.3445-3461, 2023.
- [2] E. Musonda, P. Mumba and J.R. Malungo, Mortality from non-communicable diseases and associated risk factors in Zambia; analysis of the sample vital registration with verbal autopsy 2015/2016. *BMC Public Health*, 24(1), p.666, 2024.
- [3] R. Muliokela, G. Uwayezu, C. Tran Ngoc, M. Barreix, T. Tamrat, A. Kashoka, C. Chizuni, M. Nyirenda, N. Ratanaprayul, S. Malumo, and V. Mutabazi. Integration of new digital antenatal care tools using the WHO SMART guideline approach: experiences from Rwanda and Zambia. *Digital Health*, 8, p.20552076221076256, 2022.
- [4] A. Bohr and K. Memarzadeh, The Srise of artificial intelligence in healthcare applications. In *Artificial Intelligence in healthcare* (pp. 25-60), 2020. Academic Press.
- [5] O. Byambasuren, E. Beller, T. Hoffmann, and P. Glasziou, Barriers to and facilitators of the prescription of mHealth apps in Australian general practice: qualitative study. *JMIR mHealth and uHealth*, 8(7), p.e17447, 2020.
- [6] F. Ehrler, P. Ducloux, D.T. Wu, C. Lovis, and K. Blondon, Acceptance of a mobile application supporting nurses workflow at patient bedside: results from a pilot study. In *Building Continents of Knowledge in Oceans of Data: The Future of Co-Created eHealth* (pp. 506-510). IOS Press, 2018.
- [7] S. Nezamdoust, M. Abdekhoda, and A. Rahmani, Determinant factors in adopting mobile health application in healthcare by nurses. *BMC medical informatics and decision making*, 22(1), pp.1-10, 2022.
- [8] K. J. Prabhod, The Role of Artificial Intelligence in Reducing Healthcare Costs and Improving Operational Efficiency. *Quarterly Journal of Emerging Technologies and Innovations*, 9(2), pp.47-59, 2024.
- [9] M. P. Gagnon, P. Ngangue, J. Payne-Gagnon and M. Desmarts, 2016. m-Health adoption by healthcare professionals: a systematic review. *Journal of the American Medical Informatics Association*, 23(1), pp.212-220, 2016.
- [10] J.C. Moses, S. Adibi, S.M. Shariful Islam, N. Wickramasinghe, and L. Nguyen, Application of smartphone technologies in disease monitoring: a systematic review. In *Healthcare* (Vol. 9, No. 7, p. 889). MDPI, 2021.
- [11] S. Monaro, J. Pinkova, N. Ko, N. Stromsmoe, and J. Gullick, Chronic wound care delivery in wound clinics, community nursing and residential aged care settings: A qualitative analysis using Levine's Conservation Model. *Journal of clinical nursing*, 30(9-10), pp.1295-1311, 2021.
- [12] D. Gezer, and S. Arslan, Patient satisfaction on nursing care: the case of in day surgery. *Cukurova Medical Journal*, 46(2), pp.663-669, 2021.
- [13] Z. Gizaw, T. Astale, and G.M. Kassie, What improves access to primary healthcare services in rural communities? A systematic review. *BMC Primary Care*, 23(1), pp.1-16, 2022.
- [14] A. Haleem, M. Javaid, R.P. Singh, and R. Suman, Telemedicine for healthcare: features, barriers, and applications. *Sensors international*, 2, p.100117, 2021.
- [15] A. Haleem, M. Javaid, R.P. Singh, and R. Suman, Medical 4.0 technologies for healthcare: Features, capabilities, and applications. *Internet of Things and Cyber-Physical Systems*, 2, pp.12-30, 2022.