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A telenursing application Innovation based on local wisdom in nursing care for chronic disease patients

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Abstract

Background: Patients with chronic diseases generally experience repeated hospitalizations. Cultural diversity can affect communication and engagement from health care providers and recipients. An interactive culturally sensitive telenursing application is needed as a form of continuous nursing intervention when patients are at home.
Purpose: To build and test the culturally sensitive telenursing application of Suster Kita.
Method: Using the ADDIE (Analysis, Design, Development, Implementation, Evaluation) process design. The research was conducted from August 2022 to February 2024 and tested on 20 respondents in the DKI Jakarta area. The evaluation of the effectiveness of the Suster Kita culturally sensitive telenursing application at the implementation stage was carried out using a questionnaire on the use of the application developed by the research team. The final results of the application are evaluated 2 weeks after the respondent uses the application.
Results: the use of the application showed that the average knowledge of chronic diseases and their treatment consisting of 10 knowledge components increased before and after the trial of the use of the culturally sensitive application of Suster Kita.
Conclusion: the intervention is acceptable to users and is worth using. Application suggestions are integrated with laboratory results.

Keywords: Application; Chronic Diseases; Suster Kita.

INTRODUCTION

Patients with chronic diseases are at high risk of relapse (Brunner-La Rocca, Peden, Soong, Holman, Bogdanovskaya, & Barclay, 2020). The study showed that 77.4% of patients with chronic diseases returned to re-treatment (Hoyer, Odonkor, Bhatia, Leung, Deutschendorf, & Brotman, 2016). The incidence of readmissions in congestive heart failure in three to six months after discharge reaches 29% to 47% in hospitals in Riau. Meanwhile, in Yogyakarta, the prevalence of congestive heart failure patients undergoing retreatment is 52.21% and is treated more than once within one year after discharge (Siallagan, Suza, & Ariani, 2018).

A study on inpatients from thirteen partner hospitals of the Sukabumi Branch of the Health Social Security Administration which was verified during 2015, the cost of inpatient readmission services was 104%-113% more expensive than the initial treatment cost. The total claim of INA-CBG costs for inpatient services from January 2014 to August 2015 amounted to Rp. 42.4 trillion and re-

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cost expenditure of Rp. 4.17 trillion (Atmiroseva & Nurwahyuni, 2017).

Research related to the causes of chronic disease patients experiencing relapse has been carried out a lot. Chronic patients undergoing readmissions can be caused by inadequate management of discharge planning (Meurs, Siegert, Uitvlugt, Morabet, Stoffels, Schölvinck, & Karapinar-Çarkit, 2021). Service continuity is described as meeting the individual needs of patients in accordance with the level and type of care, treatment, and health services within the hospital and between hospitals/referrals. The Directorate General of Health has developed an Integrated Referral System (Ministry of Health of the Republic of Indonesia, 2024). The integrated development with several applications including *telemedicine,* medical resume, outpatient systems, and inpatient systems (Ministry of Health of the Republic of Indonesia, 2020).

Nurses play a key role in discharging patients from hospitals (Bahr, Bang, Yakusheva, Bobay, Krejci, Costa, Hughes, Hamilton, Siclovan, & Weiss, 2020; Miedaner, Allendorf, Kuntz, Woopen, & Roth, 2016). With their autonomy and competence, nurses facilitate and manage the discharge process. They also facilitate the network of nursing services received after patient's finish treatment (Guzmán, Ferreira, & Andrade, 2020; Anonymous et al., 2020; Barker, Steventon, & Deeny, 2017). The telenursing method can be incorporated into the continuous nursing model because it has been proven effective in communicating with patients after they return home to prevent readmissions (Piscesiana & Afriyani, 2020).

Applications related to the implementation of telehealth and telenursing have been widely carried out in Indonesia. Such as *halodoc* (Izzati & Firmanto, 2021; Kalumata, Waleleng, & Kalangi, 2021), Telenursing application "SIPISPeKa" (Aliyanto, Suarni, Sono, & Hajar, 2021), Telenursing Me-Care (Slametiningsih, Yunitri, Hendra, & Nuraenah, 2021). Patients who are often retreated at the same hospital as the previous hospital, using *the Telenursing* application is an effective the effort (Fuller, Atkinson, Mccullough, & Hughes, 2013; Henke, Karaca, Lin, Wier, Marder, & Wong, 2015; Bautista, Bingham, & Sterling, 2021; Altuwayrib, Win, & Freeman, 2024) Culturally sensitive continuous nursing interventions are essential with the aim of establishing communication and involvement from health care providers and recipients from the cultural diversity that exists during the interaction. The culturally sensitive Telenursing *application* in the form of *a mobile* is expected to help nurses and patients in carrying out and monitoring the process of continuous nursing services. In this study, a culturally sensitive telenursing model was built for the sustainability of continuous nursing interventions in patients with chronic diseases.

RESEARCH METHOD

The research was conducted from August 2022 to February 2024 using the ADDIE (Analysis, Design, Development, Implementation, Evaluation) process (Davies & Mueller, 2020; Yardley et al., 2015). The culturally sensitive telenursing application is made in the form of a smartphone-based application.

In the analysis stage, model development analysis, application use needs analysis, and application development analysis are carried out. In the design stage, the researcher uses use case diagram activity and activity diagram. The Development stage aims to produce an applicative-interactive nursing intervention prototype. The Implementation stage aims to see usability, applicability in terms of application users, application accessibility, informative applications, applications that provide convenience to users, and easy-to-understand feature choices. The usability test was carried out using a questionnaire, namely the system usability scale standard version (SUS). The next application test is a feasibility test of the application conducted using a pre-elimenary study to users and see the effect on knowledge after using the application for two weeks.

To find out the need to use smartphone applications, a survey was conducted on 30 patients with chronic diseases. The survey consisted of five questions related to the use of smartphones in seeking information, the frequency of searching for health information, trust in health information on smartphones, the need to use health applications in remembering to take medicine, the need to use applications in remembering the next treatment schedule.

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Followed by an activity diagram aims to understand the dynamic behavior of a system by showing the flow of messages from one activity to another. The activity diagram of the Suster Kita, which starts from the process of the patient, the nurse registers and logs in to the Suster Kita, followed by the system asking to fill in and select data, entering into the next command according to the stages of the patient and nurse so that there is activity in the application system.

In the implementation stage, the first step is to provide a link to the Suster Kita application for use. The second step, residents who are intended and have received access are given the opportunity to register followed by a pre-test. The third step is that residents are given time to learn about their education in the Suster Kita culturally sensitive application for two weeks. The fourth step, after completing the education, a post-test is carried out.

The results found are related to public knowledge about self-care of patients with chronic diseases provided by the culturally sensitive telenursing application of Suster Kita.

Data on knowledge were processed per question item and a dependent t-test analysis test was carried out to determine the effect. Evaluation is carried out to see the quality of the application from SUS. The evaluation was also carried out using the results of the preliminary study. This research received a feasibility permit from the ethics committee of the Faculty of Nursing, University of Indonesia (FIKUI) with No: KET-179/UN2. F12. D1.2.1/PPM0002/2022.

RESEARCH RESULTS

Table 1. Characteristic of the Respondents (N=30)

Variable	Results
Age (Mean±SD)(Range)(Year)	(53.67±12.734)(16-77)
Gender (n/%)	
Male	14/46.7
Female	16/53.3
Education (n/%)	
Elementary School	6/20.0
Junior High School	3/10.0
Senior High School	15/50.0
University	6/20.0
Religion (n/%)	
Muslim	29/96.7
Christian	1/3.3
Ethnic (n/%)	
Betawi	10/33.4
Javanese	16/53.3
Sundanese	2/6.7
Batak	1/3.3
Tanjung	1/3.3
Diagnosis (n/%)	
Diabetes Mellitus	14/46.7
Stroke	6/20.0
Heart Disease	2/6.7
Kidney Disorders	8/26.6

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From the table above, it is known that respondents with an average and standard deviation age of 53.67 ± 12.734, the age range is between 16 and 77 years. the majority are female as much as 53.3%, have a high school education as much as 50%, are Muslim 96.7%, Javanese 53.3%, and with a medical diagnosis of diabetes mellitus as much as 46.7%.

Table 2. Survey Results of Smartphone Usage

Statement	Already (n/%)	No (n/%)
The use of *smartphones* in searching for information	21/70	9/30
Frequency of seeking health information	20/67	10/33
Trust in health information on *smartphones*	9/30	21/70
The need to use health applications in remembering to take medication	8/27	22/73
The need to use the application in remembering the next treatment schedule	8/27	22/73

Based on the results of the survey in Table 1, it was found that almost all patients used smartphones to search for information as many as 21 (70%) out of 30 people. The survey results are used as a basis for research in designing the use of applications through smartphones. *Smartphones* that are designed according to the needs of patients are to provide accurate, scientific health information and are presented in a combined form, namely by watching videos and reading.

Table 3. Average Knowledge Before and After the Trial Use of the Suster Kita Application

Knowledge	Mean Before	Mean After
Understanding	7.25	10
Cause	6.25	9.33
Signs and symptoms	9.33	9.50
Risk factors	4.25	8.58
Prevention	6.30	9.30
Complications	2.25	5.08
Non Pharmacological Therapy	4.25	8.00
Pharmacological Therapy	4.83	7.58
Activities for patients	3.00	5.53
Healthy food	6.50	7.92

The table shows that the average knowledge of chronic diseases and their treatment, which consists of 10 questions, the knowledge component has increased before and after the trial of the use of Suster Kita culturally sensitive telenursing application. It is explained that there is an increase in the average knowledge before and after. The average increase in knowledge about chronic diseases and their treatment was found to be the highest was non-pharmacological therapy and the lowest were signs and symptoms.

DISCUSSION

The development of Suster Kita culturally sensitive telenursing for ongoing nursing interventions with interactive applications aims specifically to improve the knowledge of chronic disease patients. This is in line with research which revealed that application development can educate patients through written and visual information, then monitor with automatic reminders (Rahmawati, 2024).

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The learning method available in the Suster Kita application uses the help of an android smartphone application which consists of two forms, based on research the material is presented in the form of reading materials and videos. The material presented is aligned with the results of previous research as evidence-based to determine the learning needs of patients. Some of the research results that are used as a reference in determining the learning needs of patients based on the material provided are disease introduction materials: definition, symptoms, risks, complications; treatment information. Diet information, physical activity (Lu Hu, Xie, Fu, Leigh, Governor, & Wang, 2018; Relawati, Syafriati, Al Hasbi, & Fitria, 2018; Slama-Chaudhry, Golay, & World Health Organization, 2019; Shao, Hu, Liang, Hong, Yu, Liu, & Xu, 2023).

The discussion room presented in the Suster Kita application aims for patients and nurses to interact with effective communication and a place to share complaints so that nurses can monitor patient progress. The purpose of the discussion room in the Suster Kita application is in line with previous research that explains that patient and nurse interaction through effective communication improves patient satisfaction, service quality, patient recovery, to ensure optimal health outcomes, empowerment, and patient safety (Fernández, Vicente, Guilabert, Carrillo, & Mira, 2023; Chapman-Goetz, Packham, Yu, Gabb, Potts, Prosser, & Suppiah, 2023; Ma, Liu, Lin, Liao, Hung, Chen, & Zheng, 2022; Altuwayrib et al., 2024).

Another feature of the application is notifications or reminders to patients that appear according to the schedule written by the patient to take medication and visit the next hospital. Reminders are part of the role of nurses as providers of nursing care to patients. Reminders are given with the aim of making patients comply with the drug therapy regimen and visit the hospital and form self-awareness and good habits to take care of themselves. In several studies, research related to reminders to take medication with various methods was explained. In this study, patients will get a notification that appears on the homepage *of the smartphone* according to the date listed. Research related to digital medication reminders can improve medication adherence in studies in hypertension, cancer, and heart disease patients (Fandinata, Lubada, Ulfa, & Darmawan, 2022; Park, Kang, Kim, & Singh-Carlson, 2022; Srisuwattananun & Pongsathonviboon, 2023). Researchers suggest that the next study uses voice notifications so that it will pay more attention to the user.

Recording the time of taking medication and the next visit on the Suster Kita application is made as a *daily patient self-report*, aiming to form patient behavioral competence. The records filled in by patients refer to *self-care* behaviors, namely *self-management, self-monitoring*, and *self-maintenance*. The purpose *of self-report* in the Suster Kita application is the same as *the outcome* of the *self-report* study to assist patients in monitoring lifestyle factors that allow for better self-management and increase self-motivation (Osokpo & Riegel, 2021). *Self-report* is used as a basis for monitoring the patient's progress after treatment to identify the patient's prognosis (Kalaitzaki, Rovithis, Dimitropoulos, Koukouli, Linardakis, Katsiri, & Stavropoulou, 2023). What chronic patients must achieve while at home is taking medication regularly, nutrition is met, control, and physical activity (Fan & Zhao, 2022; Aria & Archer, 2020; Borja, 2024).

Telenursing applications will provide added value for patients and health services when the care provided is carried out by a nurse who is skilled in technology. Through the implementation of *telenursing*, nurses perform various variations in technology such as video conferencing to communicate with patients, supervise data collection (such as blood pressure and blood sugar results), and such as *bluetooth stethoscopes* and cameras to collect the required data (National Council of State Boards of Nursing, 2014). Explaining *telenursing* is not only monitoring conditions remotely but also designing, developing, implementing, administering, educating, and researching *telehealth* services (Chike-Harris, 2024; American Telemedicine Association, 2018; Schweickert, Schweickert, Rutledge, & Rutledge, 2024). The nurses needed in the implementation *of telenursing* are not only nurses who understand technology but also nurses who can communicate by providing education (Denieffe, Denny, & White, 2022).

The division of roles in the implementation *of telenursing* is indispensable which is grouped into three parts, namely 1) development and implementation programs, 2) direct contact with

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patients and families, 3). Nurses and collaboration with health professionals (Chike-Harris, 2024). Nurses will participate in several roles at the same time. For example, nurses will review data through remote monitoring, collaboration with patients, and video *conferencing* with patients and care coordinators (Gustin & Rutledge, 2021).

Managers play a role in the development and implementation of *telenursing*. The manager will organize *telenursing activities*, develop protocols, scheduling, licensing, assist in technology selection, differentiate patient populations for *telenursing*, organize *telenursing* programs, provide advanced arrangements and evaluate outcomes from objectives and develop programs (Chike-Harris, 2024). Managers must prepare these programs to be accessible in hospital, outpatient, emergency, National Health Insurance, and National Health System settings. The implementation of *telenursing* that is directly related to patients is educator/*health coach, triage, charge planning/follow-up, telepresenter, bedside nursing*/ICU nurse, *remote patient monitoring*. Nurses who play a role in collaboration with health professionals include care coordinators, nurse consultants, transitional care coordinators, *case management, tele-ICU, and telemetry* (Chike-Harris, 2024).

In line with what was decided in the Decree of the Minister of Health, *good telemonitoring* can have access to monitor data, send regularly summaries of patient conditions, this helps in reviewing patient data and simplifies the consultation process. To facilitate interpersonal collaboration, *telemonitoring services* need to be recognized, supported by an organizational work system between staff, hospitals, primary services, and *home care services* (Ministry of Health of the Republic of Indonesia, 2021). It is necessary to pay attention to the transformation of referral services and the transformation of integrated health technology into one *one-health service*. Through telenursing integrated in Satu Sehat, the discharge planning nursing process will be sustainable with the home care process for chronic disease patients (Ministry of Health of the Republic of Indonesia, 2023).

CONCLUSION

The Telenursing *model* for culturally sensitive continuous nursing interventions with the interactive smartphone application of Suster Kita when evaluated was shown to affect improving knowledge and care in patients with chronic diseases.

SUGGESTION

Further research is expected to add observation methods in measuring physical conditions such as blood pressure, blood sugar, blood oxygen, or heart rate so that the results obtained can overcome biased results.

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