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A holistic approach to geriatric telemedicine: developing and implementing the Shinta workflow and communication model for senior health services in Indonesian hospitals

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Abstract
This qualitative study delves into the intricacies of geriatric telemedicine clinics in hospitals, collaboratively examining technological, human, and organizational aspects. The analysis involves health service providers, elderly patients, and related agencies, identifying service needs based on System Quality (human-computer interface, infrastructure, workflow, and communication) and Information Quality (clinical content). The resulting Hybrid Telemedicine Geriatric Clinic Service Flow Model (SHINTA Workflow and Communication) comprehensively illustrates the elderly patient journey through the hospital's telemedicine geriatric clinic service platform. Emphasizing direct and indirect access through smartphones, puskesmas, and family doctors, the model underscores the crucial role of collaboration within the healthcare ecosystem. Puskesmas and family doctors serve as referral points and facilitators, highlighting the holistic approach of the service flow model. Figure 5.4 illustrates a design prioritizing the Human-Computer Interface, technology infrastructure, workflow, and communication for optimal accessibility. The model's implementation is expected to enhance the effectiveness, accessibility, and acceptance of senior health services in Indonesia. The study concludes by recommending a pilot implementation on a limited scale, considering integration challenges, and emphasizing continuous monitoring and evaluation for improvement. Future research should assess the model's impact on elderly health outcomes and explore regulatory and financing readiness for telemedicine services in senior care.

Keywords: Shinta workflow, senior health services, Indonesian hospitals

Introduction
Telemedicine visits have become a feasible innovation strategy to solve the ageing phenomenon in many countries today. Several studies have proven that telemedicine can provide easy access to services and reduce costs [1] optimize patient management in healthy geriatric conditions and medical/neurological disorders, and reduce the number and time of hospitalizations [2]. Telemedicine is also effective for improving psychological well-being, social functioning, cognitive level, dietary habits and health quality in older adults and can also support the prevention of exacerbations of pre-existing chronic diseases thanks to constant telemonitoring/teleassistance through a multidisciplinary telemedicine approach [3].
Telemedicine has evolved from 1845 to the development of telehealth services in 2013, and in 2015, the emergence of smartphones for mobile healthcare. Currently, various models of telemedicine services have been provided in hospitals globally, such as Singapore with the Community Nursing Team for the Old Adult Model, Tunisia with the Home Hospitalization system model based on the Internet of Things (IoT), Malaysia with the Geriatric Telemedicine (GT) Clinic Model and various other models [4].
Meanwhile, in Indonesia, with the issuance of government policies on the appeal for the use of telemedicine in health services, it is known that 36 hospitals have provided telemedicine services [5]. Some of them provide telemedicine services for the elderly, such as Cipto Mangunkusumo Hospital and Dharmais Hospital with its mobile RSKD application, which allows older adults who have registered and have a medical record number to use it for registering and screening health. Meanwhile, in Padang, only M.Djamil Hospital has the Si-Hotri (Geriatric homecare system) website.

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This telemedicine service model is very likely to be developed when viewed from the high interest of the elderly in accessing the Internet. Based on data from the Indonesian Central Bureau of Statistics, the number of older adults accessing the Internet in 2021 was 14.10%; this figure increased sharply compared to 2017 when only 2.98% of the elderly accessed the Internet. Meanwhile, in West Sumatra alone, 69.31% of the elderly use cell phones, with 11.88% accessing the Internet (Indonesian Central Bureau of Statistics, 2021).

However, the community-based telemedicine service model in hospitals has yet to run optimally in Indonesia, and many of the reported obstacles in adopting telemedicine services are multifactorial. Verma et al. (2023) stated that 75% of telemedicine implementations fail during their operational phase. From the literature study conducted, several obstacles were found in the implementation of telemedicine services, including: 1) The constraints of technological factors, namely, the telemedicine infrastructure (ICT) used by hospitals such as Zoom, telephone and online chat are inadequate in data collection and diagnosis enforcement, platforms that do not support video calls, no drug delivery features, unclear patient data security, followed by uneven internet networks, and poor signal quality [6]. Furthermore, 2) Individual factor constraints, namely the lack of technical skills in the use of technology for both providers and patients and the culture of face-to-face doctors for physical examinations [7].

Then 3) regulatory constraints. Currently, specific regulations governing telemedicine services for the elderly are not fully contained in the laws and regulations, and there is a fear of error/malpractice [8]. 4) Financial constraints, namely telemedicine service rates in hospitals, have not been accommodated by JKN, so patients need help paying [9]. 5) integration and coordination constraints, namely, the lack of coordination between stakeholders, causing compatibility constraints with other health institutions (Sidik, 2022). Finally, 6) organizational constraints such as the lack of operators, lack of training and socialization, followed by the problem of taking a long time to make appointments and the speed of responding to complaints [10]. Therefore, to provide telemedicine services in hospital geriatric clinics that are feasible for the elderly, especially in the city of Padang, in order to be able to provide benefits and support the health of the elderly at home, it is very necessary to evaluate the needs of both elderly patients and hospitals as service providers, and also conduct an assessment based on the perspective of other relevant stakeholders. This is important because several obstacles to telemedicine services were found in the literature study related to involvement with other institutions and cost constraints. The consideration is that implementing geriatric clinic services in hospitals in Indonesia currently uses a referral system for elderly participants in the Social Security Organizing Agency (BPJS), namely referrals from Puskesmas. 69.8% of Padang City residents have been registered as BPJS participants, and only 30.2% are not yet JKN participants. Therefore, it is hoped that telemedicine services can also support elderly health for JKN benefit users (Padang et al. Office, 2021).

Based on the empirical conditions and descriptions of the problems that have been described, a study is needed to examine more deeply the needs of hospital telemedicine geriatric clinic services based on the perspectives of the elderly, hospital providers and related stakeholders (Multiple perspectives) in order to design a feasible telemedicine geriatric clinic service model for the elderly in Padang city. The expected benefit of this research is to build a telemedicine geriatric clinic service model that suits the needs of a health support system for the elderly at home with easier access. This service model is expected to align with the Decade of Healthy Aging concept by WHO in 2020-2030, which states that the elderly health service system is directed to support healthy ageing at home.

Materials and Methods

The type of research conducted in this phase is qualitative grounded theory research to analyze the need assessment of geriatric telemedicine clinic services in hospitals from a collaborative perspective. In this study, the sampling technique was carried out by Purposive sampling. Purposive sampling is a sampling technique with certain considerations where the number of samples is selected based on the suitability, adequacy, and depth of information relating to the needs of telemedicine geriatric clinic services based on a collaborative perspective. Informants sampled in this study were taken from the main stakeholders involved in telemedicine geriatric clinic services at the hospital and informants from related institutions, namely the Padang City Health Office, Puskesmas and elderly patients in Padang City. The informants in this study are:

1. Head of Public Health Division of Padang City Health Office
2. Head of Public Health Section at the Padang City Health Office
3. Director of Medical, Nursing and Support of M. Djamil Hospital Padang
4. Internal Medicine Specialist Consultant Geriatrician of M. Djamil Hospital Padang
5. Geriatric Polyclinic Nurse of Andalas University Hospital Padang
6. IT staff of M.Djamil Hospital Padang
7. Head of Puskesmas Andalas Padang City
8. Elderly Patients / Elderly Families as many as 11 people

Data collection in this stage was obtained by conducting semi-structured in-depth interviews and unstructured interviews face-to-face with informants. Semi-structured in-depth interviews were conducted using guidelines covering all in-depth interview questions. Meanwhile, unstructured interviews were conducted without interview guidelines, starting from general issues and then continuing with the research topic, namely the need for application-based telemedicine geriatric clinic services in elderly health services in hospitals in Padang city, while data collection with documents was only to complement data from interviews with informants, such as technical guidelines for telemedicine services, hospital profiles, and medical record formats.

Results

The qualitative research findings explore the needs of hospital telemedicine geriatric clinic services from both technological aspects of System Quality (Human-computer interface, infrastructure, workflow and communication) and Information Quality (clinical content), human and Organizational aspects. Analyze phase to find the needs of

geriatric telemedicine clinic services in hospitals based on collaborative perspectives, namely hospital health service providers, elderly patients and related agencies. The flow design is made according to the needs of the triangulated results of the data sources in the analysis phase. The following is the draft flow design of the telemedicine geriatric clinic service in the hospital.
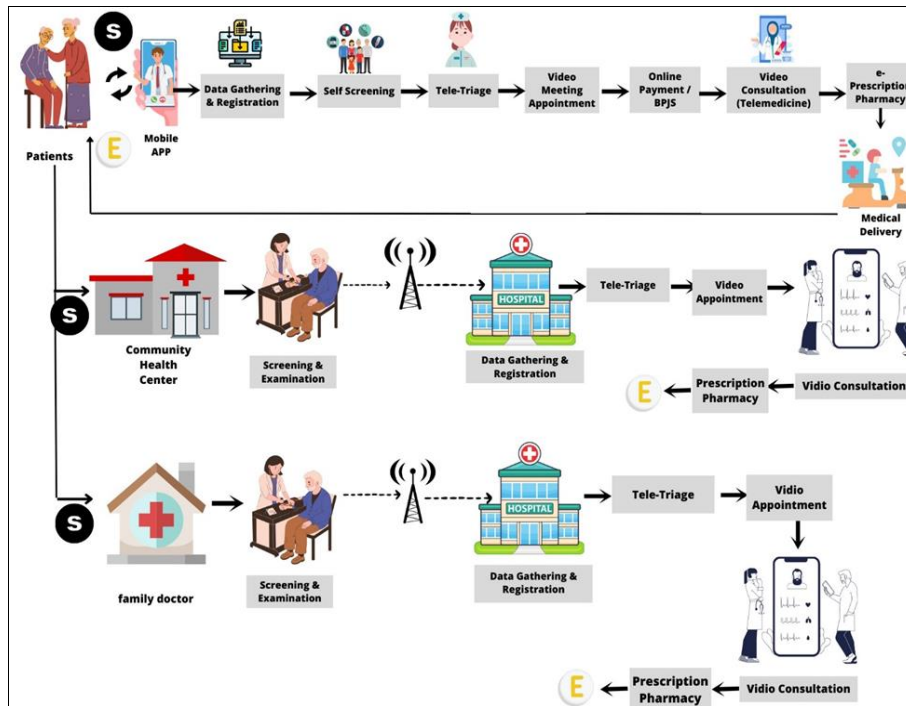
Fig 1: Hybrid model of geriatric telemedicine clinic service flow in hospital (SHINTA workflow and Communication) (Researcher 2023)

Description
S = Start
E = End

Figure 1. Illustrates the comprehensive elderly patient journey design of the hospital's telemedicine geriatric clinic service platform. In the context of this research, the elderly/family can access the telemedicine geriatric clinic service, either directly by logging into the hospital's geriatric clinic service application through their smartphone or indirectly through the hospital's telemedicine geriatric clinic service application at the Puskesmas or the family doctor as a referral patient. The health centre and family doctor are facilitators and referrals for elderly patients. Based on the comprehensive design of the hybrid model of the SHINTA service flow model, the operational procedure information of the telemedicine geriatric clinic service translated from the analysis phase is compiled as follows:

Table 1: Operational procedure information design hybrid model of geriatric telemedicine clinic service flow in hospital

Operational Procedures	Procedure Information	Description
1	2	3
Straightforward flow from home		
Registrasi data gathering	Elderly patients/families log-in/sign in to create their own account/profile Continued by registering geriatric clinic visits and collecting/inputting elderly patient data.	The process in which the elderly/family must enter the necessary information, such as username and password, to access the application for account creation and patient profile. As well as the process of inputting non-clinical patient data.
Self-Screening	Elderly patients conduct a simple medical examination at home and then enter it into the page column.	simple screening data can be: Weight, TB, temperature, blood pressure, medical history, medications used, whether the patient has wounds, whether the patient can walk, whether the patient is fitted with equipment, and complaints. Submission of photos of previous examination results (if any) This screening data can be filled in if the elderly / family has their own measuring instrument at home, if not, it may not be filled in.
Tele-Triage	The operator / nurse makes a phone call or chat to the elderly / family to conduct an initial assessment of the elderly's condition. In this process, the geriatric team conducts a comprehensive geriatric assessment (GCA) which is the hallmark of the geriatric clinic compared to	The process of conducting an initial assessment of the severity and priority of a patient's health condition via telecommunication or telephone services. The aim is to determine whether the patient requires immediate hospitalization or whether self-care or remote care is adequate.

	other specialty clinics. The geriatric clinic team reviews the elderly's medical records, and the elderly's complaints that have been entered to assess their role before the appointment is scheduled.	Teletriage is conducted by the nurse as admin/operator, via telephone or chat.
Video meeting agreements	The nurse confirms with the specialist in geriatric consultation to determine the schedule and time The nurse enters the date and time for the video meeting. Confirmation to elderly patient/family for video meeting appointment	Operators / Nurses can make phone calls with doctors and patients to confirm video appointments
Online payment	For elderly patients / families who register independently, then make payments to the hospital account number that has been displayed on the payment page. Elderly patients who register as BPJS patients, do not make payments	This page contains the hospital account number At the time of registration, it can be seen whether the patient's data is an independent patient or a BPJS participant patient.
Vidio consultation	Doctors make video calls, through available applications, or available zoom links Doctors provide feedback on complaints, diagnoses, treatment plans on the medical record page in the application If at the time of consultation the doctor plans the treatment of elderly patients for referral to other specialists, or laboratory examinations and / or x-rays, the doctor will suggest a referral for a face-to-face visit to the hospital. at that time the doctor fills out a referral file note.	The length of time for video consultation is regulated in the hospital's internal rules This process is the process of making decisions on the elderly patient's treatment plan by a geriatric consultant specialist. In this process, the doctor's decision may include a follow-up via telemedicine or a face-to-face visit.
e-prescription	doctor prescribes medicine through the app prescription is received by the pharmacy department through the application pharmacy staff dispense and pick up medicine according to prescription Pharmacy officers can provide educational notes related to drug use (both online and offline), offline notes are given to the admin / nurse.	This process can be through 1 telemedicine geriatric clinic service application integrated with the pharmacy department
Medical delivery	Pharmacy staff/operators/nurses confirm drug delivery, through delivery services or hospitals managing their own deliveries.	In this process there are 2 payment flows: Medicine delivery costs are borne by elderly patients/families The cost of drug delivery is included in the telemedicine bill, if the delivery process is managed by the hospital.
Indirect Elderly travel flow from health center/family doctor		
Elderly/Family come to the health center or family doctor	Elderly patients/families come to the health center/family doctor for examination.	
Scrining	Puskesmas nurses and doctors/family doctors screen and examine elderly patients. If the elderly patient falls into the geriatric category and is required to be referred to the hospital, the doctor will issue a referral letter. Puskesmas doctors/family doctors provide information about the hospital's telemedicine geriatric clinic services and procedures. For elderly patients/families who want hospital geriatric clinic services through telemedicine, the health center and family doctors can facilitate it.	At this time it is a process of examination and also education and socialization of the telemedicine geriatric clinic service model. If elderly patients/families want to get geriatric clinic services through telemedicine, the Puskesmas can facilitate meetings with hospital Geriatric Specialists through the application. Puskesmas doctors/family doctors can also provide education and socialization, about hospital telemedicine geriatric clinic services that can be accessed from the elderly's own homes.
Registrasi data gathering	Puskesmas doctors/family doctors log-in/sign in to create their own account/profile. Continued by registering and collecting and inputting patient data, both non-clinical and clinical data.	In this process, the health center doctor creates a health center account or profile and a family doctor account to access the telemedicine geriatric clinic service application.
Tele-Triage	The operator/nurse makes a phone call or chat to the health center doctor/family doctor to confirm the assessment of the elderly's condition.	
Video meeting agreements	The nurse confirms with the specialist in geriatric consultation to determine the schedule and time. The nurse enters the date and time for the video/telephone meeting. Confirmation with Puskesmas doctor/family doctor for video meeting appointment.	Operators / Nurses can make phone calls with doctors and puskesmas doctors / family doctors to confirm video appointment schedules In this process, the hospital telemedicine geriatric clinic visit remains a visit by an elderly person who is a referral patient from a health center/family doctor.

Vidio consultation	Doctors make video calls, through available applications, or available zoom links Doctors provide feedback on complaints, diagnoses, treatment plans on the medical record page in the application If at the time of consultation the doctor plans to treat elderly patients for referral to other specialists, or laboratory tests and / or x-rays, the doctor will recommend a face-to-face visit to the hospital. at that time the doctor fills out a referral file note.	This process is the process of making decisions on the elderly patient's treatment plan by a geriatric consultant specialist. In this process, the doctor's decision can be in the form of re-follow-up through telemedicine services, required face-to-face visits to the hospital, or continuing treatment through Puskesmas and family doctors.
e-prescription	doctor prescribes medicine through the app medicine can be taken to the hospital or delivered to the elderly patient's home, And can be taken at the health center / family doctor if available	During this process, medication can be collected at the health center/family doctor if available. Or from the hospital pharmacy. In this case, a clear MOU arrangement is needed between the hospital and the health center and family doctor.

Source: Researcher 2023

Discussion

The findings of this qualitative study provide in-depth insights into the service needs of geriatric telemedicine clinics in hospitals, focusing on technological, human, and organizational aspects. The analysis was conducted collaboratively, involving hospital health service providers, elderly patients, and related agencies. In the analysis phase, the service needs of the senior telemedicine clinic were identified based on System Quality (Human-computer interface, infrastructure, workflow and communication) and Information Quality (Clinical content). Human and organizational aspects were also explored to understand the roles and structures that support this service's implementation. The results of data triangulation from various sources were integrated to design the service flow of the telemedicine geriatric clinic in the hospital.

The resulting Hybrid Telemedicine Geriatric Clinic Service Flow Model (SHINTA Workflow and Communication) comprehensively illustrates the journey of elderly patients through the hospital's telemedicine geriatric clinic service platform. The importance of elderly and family involvement in accessing telemedicine geriatric clinic services is emphasized, both through direct access through the application on their own smartphones and through puskesmas or family doctors as referral pathways. The function of puskesmas and family doctors as facilitators and referrers demonstrates the importance of interagency cooperation in the healthcare ecosystem. Figure 5.4 shows that the service flow was designed with Human-Computer Interface (HCI), technology infrastructure, workflow, and communication in mind to ensure optimal accessibility and engagement for older adults. The selection of the Hybrid Service Flow model reflects a holistic approach, considering technological, human, and organizational aspects. In this context, puskesmas and family doctors are not only referral points, but also play an important role in supporting elderly patients to access and utilize telemedicine geriatric clinic services in hospitals. The implementation of this model is expected to improve the effectiveness, accessibility, and acceptance of geriatric health services in Indonesia.

Conclusion

This research produced a telemedicine geriatric clinic service model and digital application prototype based on a multi perspective needs analysis. This service model was designed by considering ease of access for the elderly, service integration between hospitals and primary health facilities, and time efficiency. Thus, in implementing the telemedicine geriatric clinic service model in hospitals, it is necessary to pilot the implementation on a limited scale before it is widely implemented. This is to ensure feasibility and get feedback from elderly users/families, service providers and related stakeholders.

To implement the telemedicine geriatric clinic service model, hospital management needs to consider the challenges of integration with existing hospital information systems and the readiness of service model implementation needs both from the human aspect, collaboration within the organization and technology. Conduct regular monitoring and evaluation when implementing the hospital's telemedicine geriatric clinic service model for continuous improvement. For further research, it is necessary to evaluate the implementation and impact of this service model on elderly health outcomes. As well as the need for in-depth studies related to the readiness of the regulatory model and BPJS financing scheme to support the implementation of senior clinic telemedicine services.

Conflict of Interest

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