Indonesian Journal of Pharmacology and Therapy

Submissions

Review: *Development of the smartphone application for patients with dementia – Literature review of function and content*

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Article Title

Development of the smartphone application for patients with dementia – Literature review of function and content

Abstract

Primary Technological developments are developing rapidly, and dementia patients and caregivers feel more tolerant of online interactions in improving dementia care. However, most existing applications only target patients, while caregivers must be expanded. Ideally, the application is designed with the companion considering the impact the companion receives while caring for dementia patients. Families specifically targeted caregivers who are most at risk of caregiver burnout, such as those caring for patients. For this reason, this research describes what functions and content are needed by dementia caregivers to be used as a reference in designing, developing, and implementing smartphone solutions by considering user needs. This research design selected the literature review using three databases: PubMed NCBI, ScienceDirect, and Tandfonline. The Boolean approach method was used to generate the exact keywords. The inclusion criteria for this study were the function and content of smartphone applications for dementia patients which were published in English-language journals within five years old publication date, original rese arch, and free full access. There were six articles obtained in this investigation. Based on the six articles,

interactive health promotion, interaction from stakeholders, and references to information sources. These four aspects could be a reference in making smartphone applications for caregivers so that their use could be integrated and comprehensive health care.Use Arial font for the text with one spacing between lines.

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Review Schedule

2023-08-29	2023-09-19	2023-09-12
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Development of the smartphone application for patients with dementia – Literature review of function and content

ABSTRACT IN ENGLISH

Primary Technological developments are developing rapidly, and dementia patients and caregivers feel more tolerant of online interactions in improving dementia care. However, most existing applications only target patients, while caregivers must be expanded. Ideally, the application is designed with the companion considering the impact the companion receives while caring for dementia patients. Families specifically targeted caregivers who are most at risk of caregiver burnout, such as those caring for patients. For this reason, this research describes what functions and content are needed by dementia caregivers to be used as a reference in designing, developing, and implementing smartphone solutions by considering user needs. This research design selected the literature review using three databases: PubMed NCBI, ScienceDirect, and Tandfonline. The Boolean approach method was used to generate the exact keywords. The inclusion criteria for this study were the function and content of smartphone applications for dementia patients which were published in English-language journals within five years old publication date, original rese arch, and free full access. There were six articles obtained in this investigation. Based on the six articles, four findings were used as functions and content: education, interactive health promotion, interaction from stakeholders, and references to information sources. These four aspects could be a reference in making smartphone applications for caregivers so that their use could be integrated and comprehensive health care.Use Arial font for the text with one spacing between lines.

ABSTRACT IN BAHASA

Perkembangan Teknologi Primer yang pesat, dan pasien serta perawat demensia merasa lebih toleran terhadap interaksi online dalam meningkatkan perawatan demensia. Saat ini sebagian besar aplikasi yang ada hanya menyasar pasien, sedangkan untuk pendamping pasien harus diperluas. Idealnya, aplikasi dirancang dengan mempertimbangkan dampak yang diterima pendamping saat merawat pasien demensia. Keluarga secara khusus menargetkan pendamping yang paling berisiko mengalami kelelahan, misalnya mereka yang merawat pasien. Oleh karena itu, studi ini memaparkan fungsi dan konten apa saja yang dibutuhkan oleh pendamping pasien demensia untuk dijadikan acuan dalam merancang, mengembangkan, dan mengimplementasikan solusi melalui *smartphone* dengan mempertimbangkan kebutuhan pengguna. Desain penelitian ini adalah tinjauan literatur menggunakan tiga database: PubMed NCBI, ScienceDirect, dan Tandfonline. Metode pendekatan Boolean digunakan untuk menghasilkan kata kunci yang akurat. Kriteria inklusi penelitian ini adalah fungsi dan konten aplikasi *smartphone* untuk pasien demensia yang dipublikasikan di jurnal berbahasa Inggris dalam waktu lima tahun sejak tanggal publikasi, penelitian original, dan dapat diakses secara gratis. Ada enam artikel yang didapat dalam pencarian. Berdasarkan enam artikel tersebut,

terdapat empat artikel temuan yang dijadikan fungsi dan konten: edukasi, promosi kesehatan interaktif, interaksi pihak yang berkepentingan, dan referensi untuk sumber informasi. Keempat aspek tersebut dapat menjadi acuan dalam pembuatan aplikasi *smartphone* bagi pendamping pasien agar pemanfaatannya dapat menjadi pelayanan kesehatan yang terintegrasi dan komprehensif.

Keywords in English**:** a smartphone app, dementia, function and content, patient care

INTRODUCTION

Dementia is a multifactorial syndrome characterized by multiple cognitive deficits. This decline in intellectual function can interfere with activities of daily living. Sometimes, changes in behavior occur but are not caused by delirium or primary psychiatric disorders.[1] The problem in managing dementia therapy is the increasing morbidity and mortality of dementia patients. According to the Centers for Disease Control and Prevention (CDC), 271,872 people died from dementia in 2019. Another problem with dementia patients is that they need companions in their daily activities and require prolonged therapy, which can cause medication problems. Caregivers consist of formal and informal companions. In Indonesia, they come from families or people having a relationship with the patient. Families provide extraordinary support for patients so that sometimes they ignore their condition in managing care. Unconsciously, according to research by caregivers, levels of anxiety and depression increase, leading to an increase in the frequency of psychological or physical violence by caregivers. [2]

Nowadays, it is common for people to use technology as a communication tool and open applications, one of which is to manage health used to record information and monitor conditions. Besides, it must pay attention to the needs of elderly patients with low literacy and chronic diseases.[3] Literature showed that dementia patients and caregivers feel more tolerant of online interactions in improving dementia care.[4] WHO recognizes that digital health technology has great potential for human and public health.[5] Thus, it is necessary to develop a mobile health application, considering that currently, everyone uses mobile devices for daily activities, including patient monitoring and even diagnosis.[6] A previous study revealed a significant relationship between clinical evaluation and application use. Therefore, it is necessary to pay attention when designing, developing, and implementing targeted smartphone solutions.[7] It aligns with research showing the positive impacts of companionship for dementia patients.[8] Currently, there are applications; most are aimed at patients, while for companions, it is still limited to supporting one or two companion activities. Ideally, apps are designed with family caregivers in mind and targeted explicitly at caregivers who are most at risk of caregiver burnout, such as those caring for patients.[2]

This study aims to describe the features, functions, and materials needed by dementia caregivers in carrying out care. It will

be a reference for creating application functions and content in designing, developing, and implementing smartphone solutions by considering user needs.

METHODS

This study used the PubMed Central, ScienceDirect, and Tanfondline databases to conduct a descriptive review. In the three databases, this research strategy used the exact keywords ("app" AND "dementia" AND "patient care"). The literature search was limited to the last five journals from 2018 to 2023. It was in the form of original research in English with topics relevant to this research and fully accessible. Relevant research involved dementia patients, the use of health applications, and the functions and materials that must be included in the application.

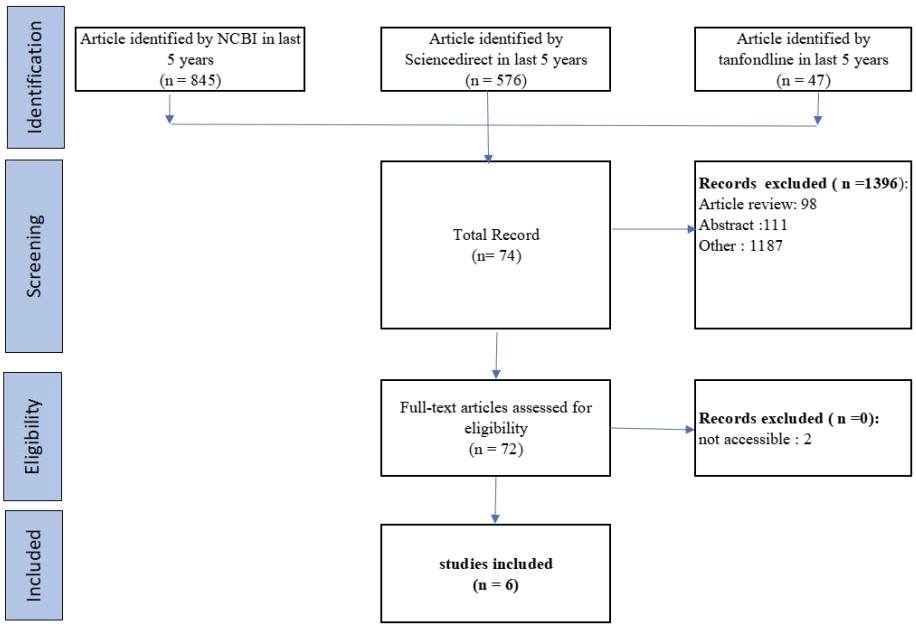

FIGURE 1. Search scheme prisma

Data Extraction and Analysis Study

The table containing the functions and content of the application used by the patient companion was used to extract data for each journal that met the exclusion and inclusion criteria. Each journal was identified and placed in an analytical framework based on research objectives.

RESULTS

Six articles were obtained when searching for articles related to the purpose of this study. The eight articles were examined based on this literature review's inclusion and exclusion criteria. Table 1 displays these findings.

TABLE 1. List of articles on functionality and content for smartphone apps in dementia patients

Reference	Subject	Outcome
Perry et al. (2018)[9]	Expert speakers and participants representing the fields of neurology, neuropsychology, gerontology, geropsychiatry, primary care, emergency medicine, psychology, collaborative care, social work, nursing, disease advocacy and policy groups, government agencies and providers, test issuers neuropsychologists, and insurance providers	1. Early recognition of cognitive impairment and dementia 2. Condition-specific information (e.g., symptoms, expected development, etc.) 3. Chaperone resources and support (including rest and social support) 4. Referral to existing information sources (e.g., Alzheimer's Association 5. Health promotion according to evidence (e.g., exercise, social and

Reference	Subject	Outcome
		community involvement, healthy diet, cognitively stimulating activities, etc.) 6. Information about sleep
Trymbulak et al. (2020) [10]	Patient and caregiver	1. Registration - you can log in via email, Facebook, or phone number. 2. Service Order – to enter the address and pick-up and drop-off position. 3. Tariff Calculator: Cost calculation 4. Escort Monitoring 5. Payment - there are several payment variants 6. Push alerts - essential information elements; keep customers up-to-date with trip order status, driver arrival time, driver and vehicle data, etc.
Morgan et al. (2019)[11]	Model Collaboration with primary health care	1. Team-based care: multidisciplinary team, care management, and education for patients and caregivers 2. Decision support tools: Standard tools and guidelines 3. Specialist-to-provider support: access to Dementia and Specialists and Education Sessions

Reference	Subject	Outcome
Gilson et al. (2021)[12]	The development company develops digital therapy platforms to support dementia patients.	1. Deployment of specially configured tablets to enhance user engagement routines 2. Collaboration between care providers and informal caregivers 3. Tools for assessing clinical outcomes 4. Informal care partners are prompted to share meaningful content that contains a. Formal Caregiver training, listening to music and videos b. Education email Nature Campaign
Phongtankuel et al. (2019)[13]	Caregiver	1. Communication: video chat, text messages, pictures/ videos) 2. Access to patient care information: drug information, symptoms, hospital contact. 3. Education: information on shelf-life and information on drug replacement 4. Updates from healthcare workers and scheduling services: scheduling features, patient updates)

Reference	Subject	Outcome
Thoma-Lürken et al. (2019)[14]	Community-based formal caregiver	1. A decision support tool for district nurses and case managers could facilitate the complex process of detecting specific problems. 2. Offer solutions related to detected problems, such as maintenance and support services, information resources, and supporting technology

DISCUSSION

This study discusses the functions and contents needed by dementia caregivers in carrying out care. It needs to be done as caregivers encounter many challenges. It is in line with research revealing that to produce a technology platform that supports therapeutic results, the platform must be appropriately designed according to user needs and carefully considered.[15] The six articles can be divided into four main aspects.

Information and Education Section

All selected articles stated that information and education are mandatory features in the application. Education is needed regarding early recognition of cognitive disorders and dementia, such as delirium, which is often the cause of cognitive disorders[16],

symptoms of dementia related to sleep disturbances, social support, activities that stimulate cognitive function, nutrition and drugs, information, and medication changes. This educational content could improve the function of knowledge and parenting, so it must use standard guidelines and reliable evidence.

The health promotion section complying with the evidence

Three out of six articles stated that features, functions, and content are complemented by visual communication, such as images and videos, and interactive ones, such as sports videos, cognitive stimulation activities, relaxing music, games, text messages, and videos. It aligns with Phongtankuel's research that video conferencing improves service quality.[17]

Interaction Section

Two out of the six articles written required a multidisciplinary team in medicine. Researchers, clinicians, and app developers must collaborate to develop innovative and effective solutions adapted for neurological and psychiatric patients whose cognition, quality of life, functionality, and well-being are impaired.[18] On the multidisciplinary aspect of the topic, it is essential to clarify how and by whom cognition is assessed, how assessment fits into health care models, how medical and electronic health records can facilitate assessment, and how assessment might differ depending on settings such as emergencies.[9]

Information resources in the reference section

Two out of six articles required access to treatment information, including information resources and hospital contacts. In addition to receiving access to specialist doctors, there is expected to be patient scheduling information and update features so that patients receive real-time information.

These four aspects can be used as a reference in creating smartphone applications for caregivers so that their use can be integrated and comprehensive. However, one of the app's concerns is leaking sensitive personal data. Therefore, legal protection is needed according to procedures, especially for personal information.[5] Data revealed that using apps has more positive than harmful effects in improving patient care. Thus, concerns about mixing personal data with clinical care apps can be put aside.[19] This study supported that caregivers can accept the use of the mHealth application.[13] It is expected that in the future, in addition to the functions and content created, it is necessary to test their effectiveness and consider various possibilities to ensure regular updates.

CONCLUSION

This study revealed the functions and content needed by caregivers in smartphone applications, including education, interactive health

promotion, interaction with stakeholders, and references to information sources.

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Yogyakarta, September 19, 2023
Chief Editor

Prof. Dr. Mustofa, Apt., M. Kes