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**The Development of Information System for
 Mental Health Nursing Interventions:
 A Literature Review**

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Abstract

Background: Technology is used for not only the development of the health industry but also the advancement of health services, especially in mental health nursing. The current service of mental health nursing needs quick and accurate actions and security of documentation. An information system is a form of technology which can provide a solution to improve the quality of mental health nursing services. **Objectives:** This paper aims to review some information system or application that was used in mental health and describe information systems associated with the patients' ability in performing self-care also the outcomes of services. **Methods:** This study is a literature review which collected its data from journal articles published from 2000 to 2019, with keywords: mental health, information technology, and mobile application. The articles were retrieved from the electronic databases of Google Scholar, PubMed, Wiley Online Library, and Science Direct. Seven articles were included in this review. The theme of this study is the information system in mental health nursing interventions. **Results:** The results of the analysis show that technological development is applied in the information system of patient monitoring and independent actions in caring for symptoms of mental health disorders to increase the quality of mental health. **Conclusions:** The implementation of information technology on the documentation of mental health nursing service has not been extensively developed in hospitals.

Keywords: Information technology, mental health nursing, mobile application

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1. Introduction

Mental health disorders such as anxiety, stress/depression, social isolation, or substance abuse have been a common problem in the community. World Health Organization (WHO) reported an increasing gap between the need for treatment of mental disorders and accessibility of care. Data from the WHO also mentioned that approximately 35% to 50% of patients with mental health problems do not receive optimal care due to a limited number of mental health centers [1]. The service of mental health nursing

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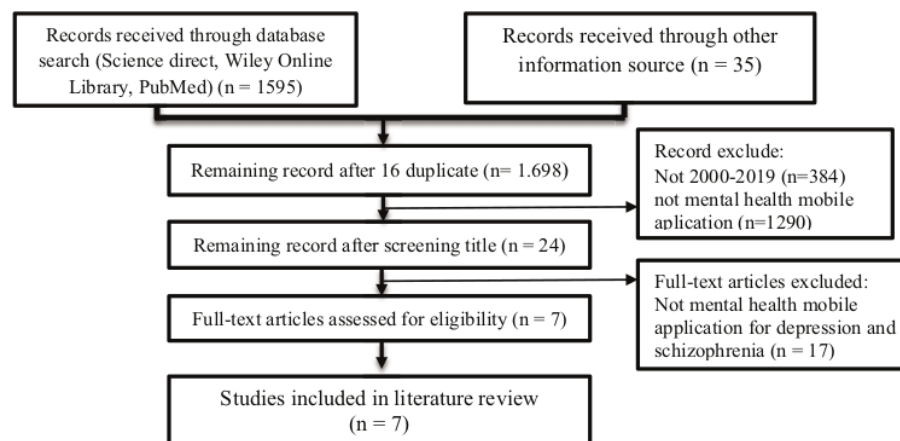
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requires proper care and security of documentation. One of the alternative solutions to meeting the demand for mental health care is online care/intervention. Along with the availability of increasingly advanced communication technology, it is essential to have a quick and accurate presentation of patient data and service results so that the health services provided can guarantee specific procedures that are matching with the patient's needs.

Innovations of the information systems using mobile applications and web applications are considered more advantageous as they are more flexible to use and easily accessible. A recent study reported the results of internet-based applications for clinical care in mental health nursing through some existing devices or media [2]. The study reported that smartphones could help reduce obstacles and help patients with mental illness complete the treatment when they return home. Information systems in the form of mobile web applications for stress management also improved adaptive copings in patients with mental disorders [2].

Technological advances can be an alternative solution for solving existing problems in nursing. The development of technology-based interventions continues to progress, which can affect the quality and future services of mental health nursing. This review aims to describe the technological development of information systems on how to deal with problems faced by patients independently, and how the documentation system of mental health nursing looks like.

2. Methods



The present study is a literature review. Data were collected from journal articles published from 2000 to 2019 in the online databases of Google Scholar, PubMed, Wiley Online Library, and Science Direct. The keywords used during the search were 'mobile application', 'information technology', and 'mental health nursing'. Seven articles were included and analyzed in this article. The theme that supports this review is the information system on mental health nursing interventions. The sample of this review is mental health patient especially with depression and schizophrenia. One of the instruments used in the information system in this article is DASS.

3. Results

The application of information system in mental health mobile applications is not only limited for use among health workers/professionals. Larger community members are now aware that mental health, in addition to physical health, should be given emphasis, and they can do this by accessing mobile applications. Some mobile applications of mental health, which are currently used as interventions in nursing include *Mobile Therapy*, *MyCompass*, and *FOCUS for Mental Health*.

Mobile Therapy is a mobile application in which users can show their mood every time throughout the day. This application records the level of energy, sleep patterns, activities, and eating habits, and offers therapeutic exercises starting from breathing visualization, progressive muscle relaxation, and ways to relax from stressful situations. All information in this application is measurable and printable so that the users can evaluate the relationship between moods and other factors in the user's daily activities [3].

MyCompass is an information system which is developed based on cognitive behavioral therapy (CBT). This application contains independent mental health care, which is provided through cellphones and computers/web. *MyCompass* application is developed to help reduce mild and moderate depression, anxiety, stress, and improve work and social functions. This application invites its users to monitor moods independently and triggers mood changes as well as lifestyle behaviors using text messages and emails[4].

FOCUS for Mental Health is an information system on smartphones, which is developed to provide mental health nursing services to schizophrenic patients [2]. This information system is specially designed for use by people with psychotic disorders who may have cognitive and psychotic symptoms. *FOCUS for Mental Health* can be used by patients who have had scheduled interventions or upon individual requests. This information system can facilitate the management of symptoms, mood, medication

TABLE 1: Characteristics study (n=7).

Literature	Aim (Study or report)	Setting of study	Design of study	Participant	Ethical approve	Main variables measured	Follow up	Finding/ Results
[2]	This study aim to described the feasibility, acceptability, and preliminary efficacy of the FOCUS intervention for schizophrenia	Community-based treatment programs in Chicago.	Quasy experiment Pre post intervention	33 individuals with schizophrenia or schizo-affective disorder	The study was approved by the Committee for Protection of Human Subjects at Dartmouth	measures of symptoms of schizophrenia (PANSS), symptoms of depression (BDI-2), and sleep difficulties (ISI).	1 month	Approximately 62% of use of the FOCUS intervention was initiated by the participants, and 38% of use was in response to automated prompts. Baseline levels of cognitive functioning, negative symptoms, persecutory ideation, and reading level were not related to participants' use of the intervention. Approximately 90% of participants rated the intervention as highly acceptable and usable.
[3]	This exploratory study examined the potential of mobile phone technologies to broaden access to cognitive behavioral therapy techniques and to provide in-the-moment support.	Participants were employees at a large corporation	Descriptive qualitative	8 Participants with a stress level of 3 or above on a 5-point scale.	This study was approved by a board responsible for privacy considerations at the participants' place of employment.	a series of single-dimension mood scales and MOOD MAP	1 month	The mean anger, anxiety and sadness ratings all were lower in the second half of the field study than in the first ($P \leq .01$ for all three scales)
[4]	The aim of this paper is to report the outcomes of a CONSORT-compliant randomised controlled trial (RCT) to evaluate the efficacy of the myCompass program in a large community sample of people experiencing mild-to-moderate depression, anxiety and/or stress	Community in Australia	A mixed factorial repeated measures design was employed, with full randomization to three conditions	720	The RCT was approved by the Human Research Ethics Committee at the University of New South Wales, Sydney, Australia (HREC 100019), and registered as Australian New Zealand Clinical Trials Registry ACTRN 12610000625077.	The Depression, Anxiety and Stress Scales (DASS) measure and The Work and Social Adjustment Scale (WSAS)	3 month	Retention rates at post-intervention and follow-up for the study sample were 72.1% (n = 449) and 48.6% (n = 350) respectively. The MyCompass group showed significantly greater improvement in symptoms of depression, anxiety and stress and in work and social functioning relative to both control conditions at the end of the 7-week intervention phase

TABLE 1: Continued.

Literature	Aim (Study or report)	Setting of study	Design of study	Participant	Ethical approve	Main variables measured	Follow up	Finding/ Results
[1]	This research analyses the acceptance of mobile mental health applications by young adults in Germany in order to identify inhibiting factors regarding their use.	Germany	Structural equation model	125	-	a structured questionnaire (the concept of perceived usefulness, the concept of ease of use, perceived task-technology fit were previously, Social influence, Trust and self-efficacy consist. The outcome variable behavioral intention)	3 month	The findings suggest that knowledge about the existence and clinical effectiveness of mobile mental health applications are considerably low. Even though, mobile applications are considered easy to use, their effectiveness in treating mental disorders is questioned by the young adults. Furthermore, concerns that personal information can potentially be revealed arise.
[5]	The purpose of this paper is to review the current state of the art of the development of mobile health applications dedicated to chronic and disabling diseases that are manifested by a physical or mental disability in the patient, namely: brain injury, stroke and spinal cord injury; psychoactive substance abuse and addiction, depression, stress, and anxiety	Maroko	Analysis	136 application	-	Measuring psychological or physical symptoms like Hamilton Depression Rating Scale (HAM-D) or National Institutes of Health Stroke Scale (NIHSS, USA).	-	We performed search in both Android and Apple apps stores and developed a database to carry out searches' results analysis. Many apps dedicated to diagnostic and treatment are designed without involvement of healthcare professionals and there is an inequality of users' profiles in both mental and physical mobile apps.

TABLE 1: Continued.

Literature	Aim (Study or report)	Setting of study	Design of study	Participant	Ethical approve	Main variables measured	Follow up	Finding/ Results
[6]	This article aimed to explore the using smartphone in a stress management to improve adaptive coping in Indonesia.	Indonesian	Literature review	15 article	-	Management stress and adaptive coping	-	Literature study in this scientific paper to get the result that the application of stress management based on smartphone applications need to be applied because it can prevent the occurrence of severe mental problems, decreasing stress level, easy to do with the simple features, more effective than face-to-face intervention, and can increase the duration of the effects of therapy.
[7]	To describe about design and implementation of a mobile web app for stress management	India	Descriptive design	-	-	Detect the stress of a person using Temperature, GSR and Pulse sensors	-	This work proposes a system which can detect the stress of a person using Temperature, GSR and Pulse sensors to measure body temperature, Skin conductance and Heartbeat respectively and provides a suitable medication. The system can also be used as personal stress assistance system which creates a calm environment to meditate with a time interval of 2minutes, 5minutes and 10minutes

adherence, social function, and improvement in sleep quality. The application of *FOCUS* had been under a study for one month in 33 schizophrenic patients. The results indicated that 22 patients could learn how to use the interventions independently, and one patient completed a pretest using a smartphone. All patients accessed 86.5% features of the application or five times every day [2].

4. Discussion

The lack of availability of health service in the community, especially in remote areas, which might be due to time constraint and costs during treatment, still becomes a challenging problem in healthcare. However, the existence of technology is expected to help and provide opportunities to increase health services, especially in nursing [4].

MyCompass, a CBT-based application, helps in the planning of patient safety by increasing long-term and short-term happiness. The application focuses on cognitive-based care, using games to stimulate a great focus to reduce anxiety and stress. However, the use of mobile applications for patients with mental disorders also have some limitations such as technological constraints, internet connections, theft, loss and problems with the function of cellular devices, causing data loss as the users have no control over the utilized devices[4].

Mobile Therapy application detects stress based on changes in the patients' heart rate, which is triggered by physiological stress problems. This application allows patients to report emotional states by accessing therapeutic exercises based on cognitive behavioral therapy. The use of this application increases awareness in times of stress and strategies to deal with stress. *Mobile Therapy* application invites patients to know the relationship between patients' moods to determine suitable goals and activities for the patients. Thus, this application can track which therapies can help or similar strategies that can be used to help improve the patient's mood [3].

FOCUS for Mental Health is an application which is freely downloaded and directly installed into a smartphone. Patients can use this application without having to visit a mental health center. Patients use this application for mental health care without time restriction as what they would have when visiting a health care center. A previous study on the use of *FOCUS* application in patients with schizophrenia had some limitations as it did not involve a control group and only employed a small sample size and short duration of time. Thus, it was difficult to determine whether the patients experienced significant changes in positive symptoms after using the application [2] *FOCUS* application does not only provide interventions but also introduces a new approach to care for patients

with schizophrenia. This application allows patients to use the time and place according to their needs. The data of patients stored in this application can be used for references or reports in improving the care for future patients with mental disorders[2].

The utilization of information system through mobile applications in mental health nursing services have been developed in the forms of monitoring systems, interventions for symptoms, and management of patients' data. *Mobile Therapy* is able to monitor and detect the symptoms of stress occurring in patients through the heartbeats, including its management. Using *Mycompass* application, patients can independently monitor their cognitive conditions to detect anxiety and stress as well as its management based on cognitive behavioral therapy. According to a previous study, this application is able to reduce mild and moderate depression, anxiety, and stress, and improve work and social functions [4].

The *FOCUS* application is developed to store data of its users in smartphone applications. These data can be used by nurses in determining the actions needed for the patients. Based on the results of a previous study, *FOCUS* application is worthy of being used by patients with schizophrenia. The patients can learn how to use the application quickly, feel more confident and comfortable, as well as satisfied with the interventions. *FOCUS* application provides interventions which can be implemented to help and reduce positive symptoms and general symptoms of psychopathology and depression in patients with schizophrenia.

5. Conclusion

The information system technology has been used and developed to help patients do self-monitoring to recognize the experienced symptoms and find ways to solve problems independently through physical and cognitive detections. Regarding the nursing documentation, the information system is also used in the documentation of nursing service through Android applications by storing essential data from patients as a basis for required nursing actions. It is necessary to develop an information technology system for the documentation of mental health nursing services at psychiatric hospitals.

6. Disclosures

The authors report no real or perceived vested interests that relate to this article that could be construed as a conflict of interest.

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Conflict of Interest

The authors have no conflict of interest to declare.

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