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# Effectiveness of Mobile Health Applications in Mental Health Nursing

## A Scoping Review

Metropolia Ammattikorkeakoulu

Degree

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Mielenterveys on perusihmisoikeus, jonka avulla ihmiset voivat selviytyä päivittäisestä stressistä ja saada aikaan myönteistä muutosta ympärillään oleviin ihmisiin. Matkapuhelinten käyttö on lisääntynyt viime vuosina, ja hyvän internetin saatavuus on tehnyt siitä entistäkin paremman. Näiden sovellusten edistyminen on johtanut henkisen hyvinvoinnin sovellusten kehittämiseen, jotka ovat nyt erittäin suosittuja. Näiden palvelujen saatavuus on erittäin tehokasta, koska ne ovat helposti saavutettavissa älypuhelimilla.

Tässä tutkimuksessa kuvataan, kuinka mobiiliterveyssovelluksia voidaan käyttää parantamaan mielenterveyshuoltoa. Tämän tutkimuksen tavoitteena on tuottaa uutta tietoa käytettäväksi mielenterveyssairaanhoidon alalla potilaan hoidon, tulosten ja yleisen henkisen hyvinvoinnin parantamiseksi.

Tutkimuksessamme käytetty menetelmä oli rajauskatsaus, tietokantahauina käytettiin MEDLINE- ja CINAHL-hakuja, ja päädyimme neljätoista vertaisarvioitua artikkelia. Kvalitatiivisella tutkimuksella saadun tiedon analysoinnissa käytettiin induktiivisen sisältöanalyysin periaatteita.

Mielenterveyssovellukset ovat hyödyllisiä mielenterveyshoitajille, koska ne lisäävät potilaiden osallistumista ja hoitokäytäntöjen noudattamista. Näiden sovellusten tarjoama reaaliaikainen tuki ja seuranta auttavat vähentämään oireiden vakavuutta, mahdollistaen yksilöllisemmän hoidon ja parantaen potilaan seurantaa, mikä lisää hoitotyön tuottavuutta. Online-itseraportoinnin arvioinnit osoittautuivat päteväksi menetelmäksi potilaiden jakaa kokemuksiaan kliinisen ympäristön ulkopuolella, tarjoten lääkäreille arvokasta lisätietoa. Näitä sovelluksia käyttävillä potilailla oli enemmän tietoa ja parempaa itsehoitokäyttäytymistä kuin ei-käyttäjillä.

Tutkimus osoittaa mielenterveyssovellusten ja digitaalisten mielenterveyshuollon interventioiden tehokkuuden mielenterveystyössä. Reaaliaikaisen tuen tarjoaminen asiakkaille, parempi saatavuus, tasapuoliset mielenterveysresurssit, välitön tuki, nimettömyys, räätälöity sisältö, alhaisemmat kustannukset sekä palvelukyvyn ja tehokkuuden lisääminen. Näistä eduista huolimatta kohdataan haasteita, kuten tietojen tietosuoja, asiakkaan antamat epätarkat tiedot, sääntelyn ja hyväksynnän puute, sovellusten huono suunnittelu.

Avainsanat: Mobiiliterveyssovellukset, mielenterveyshoito, mobiiliterveys (mHealth)

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## Abstract


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Mental health is a basic human right which enables people to cope with the daily stresses and bring about positive change to the people around them. The use of mobile phones has increased over recent years, and the availability of good internet has made it even better. The advancement of these apps has led to the development of mental wellness apps which are now extremely popular. The availability of these services is very efficient because of easy accessibility through smartphones.

This study describes how mobile health applications can be used to improve mental health care delivery. This study aims to produce new knowledge to be used in the mental health nursing field to improve patient care, outcomes, and overall mental well-being.

The method used in our study was a scoping review, database searches used were MEDLINE and CINAHL and we ended up with fourteen peer-reviewed articles. The principles of inductive content analysis were used in analyzing the data obtained through qualitative research.

Mental health applications are beneficial for mental health nurses, as they enhance patient involvement and adherence to treatment protocols. The real-time support and monitoring offered by these apps help reduce symptom severity, enabling more personalized care and improving patient tracking, which boosts nursing productivity. Online self-report assessments proved to be a valid

method for patients to share their experiences outside of clinical settings, providing clinicians with valuable supplemental information. Patients using these apps exhibited greater knowledge and better self-care behaviours compared to non-users.

The study shows the effectiveness of mental health applications and digital mental health care interventions in mental health nursing. Provision of real time support to clients, greater access, equity of mental health resources, immediate support, anonymity, tailored content, lower cost and increasing service capability and efficiency. Despite these benefits, there are challenges faced like data privacy, inaccurate information by the client, lack of regulation and approval, poor design of the apps among other things.

Keywords: Mobile Health Applications, Mental Health Nursing, Mobile Health (mHealth)

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# Contents

# 1 Introduction

Mental health is a basic human right which enables people to cope with the daily stresses and bring about positive change to the people around them. It enables individuals to make meaningful decisions. Mental health and wellbeing vary from person to person and is determined by protective or risk factors which increase or decrease their vulnerability to mental problems. The risk factors include individual psychological and biological factors, for example substance use, genetics, exposure to violence and poverty. These risks come along at various stages of life and become more detrimental if a person undergoes them at critical stages of development such as early childhood. However, protective factors such as quality education and positive social interactions help build resilience and reduce the risk of mental problems. (WHO,2022).

In recent years, mental problems have been an issue with most individuals. The accessibility of mental health services was provided by nurses and therapists to help individuals deal with mental health problems. Advancement of technology has led to the development of mobile health applications designed to address various aspects of mental issues, offering potential solutions for enhancing mental health care delivery enhance patient engagement and advancement of technology has led to the development of mobile health applications designed to address various aspects of mental issues, offering potential solutions for enhancing mental health care delivery. Additionally, this would also help in symptom tracking, providing support and education, crisis intervention, supporting personalized care and tracking the patient’s progress. (Lopez, 2024:357-362).

The demand to improve mental quality of life has increased along with the recent increase in awareness of mental health. The use of mobile phones has increased over the last few years and the availability of good internet has made it even better, smartphones have integrated to be part of our lives where we can do technically everything using them. Mobile health apps are extremely popular in the current society where anyone can track their blood pressure, weight, and fasting

among other things. The advancement of these apps has led to the development of mental wellness apps which are now extremely popular. The availability of these services is very efficient because of easy accessibility through smartphones. The World Health Organization (WHO) defines mobile health or mobile healthcare as medical and public services that are provided through mobile devices like smartphones. This is a type of care where services are provided between physicians and the patients via their mobile devices free from restrictions of time and space. (Wang et al.2021:23(12)1-2).

Among the mental health patient's population, many of them are hard to reach hence more use of the mobile applications. These mobile health applications have helped in mental health management through symptom tracking, provision of support and education, crisis intervention as well as supporting personalized care and tracking their progress, they are also cost effective and user friendly. Despite the efficacy of mobile health applications there are also challenges that hinder their usage, adoption and effectiveness. These challenges include issues on data privacy and security, there are difficulties in integrating with the present healthcare system, inaccuracy of information from some apps, inequalities in accessing technology, and existence of language barriers. (Zhou et al.2019:1-2).

The purpose is to describe how mobile health applications can be utilized to improve mental health care delivery. The aim is to produce new knowledge to be utilized within the mental health nursing field to improve patient care, outcomes, and overall mental wellbeing.

# 2 Background

## 2.1 Mobile Health

According to (WHO,2011) mHealth is a term used for medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, Personal Digital Assistants (PDAs), and other wireless devices. Mobile health includes the use of mobile devices in collecting community and clinical health data, delivery of healthcare information to practitioners, researchers and patients real time monitoring of patient vital signs, and direct provision of care. (WHO,2011).

It can also be defined as the use of mobile and wireless communication technologies to improve healthcare delivery, outcomes, and research. (Karandeep & Landman, 2017:183-196.) mHealth (mobile health) is a general term for the use of mobile phones and other wireless technology in medical care. (Holman,2018).

In the past years, there has been a rise in the use of technology in healthcare. This has enabled efficiency in delivering health services. Many people have been reached through these services without having to visit health centers and this has a greater benefit to a wider population. Mobile health has rapidly become the most common way to deliver health care services and track health behaviors of individuals. Traditional ways of health promotion, for example printed information leaflets and face-to-face appointments with healthcare professionals can be replaced using mobile health. mHealth lets patients access UpToDate health information remotely via mobile devices. mHealth has become a more popular option in areas where most of the population use mobile phones. mHealth is used to educate people on preventive measures, checking of own symptoms and treatment support. Adoption of mHealth has enabled continuous tracking and management of health data without visiting healthcare providers. It has also allowed patients to communicate with their physicians remotely. (Koh et al.2022:22-24).

Despite the many advantages of mHealth, it also faces challenges related to data privacy and security therefore, safeguarding sensitive health information and ensuring reliability remains a priority, there is limited access to mobile health in some regions since there is uneven access to mobile phones and internet services especially in rural areas and in poor communities. Another challenge is health inequality since individuals with limited access to technology may be excluded from mHealth services. (Tanya et al.2022:7-8).

## 2.2 Mobile Health Applications

In recent years, there has been increased use of mobile applications to help manage people´s health, this has led to better health outcomes and service delivery. These services are found through smartphones and wearable devices where a patient can be monitored remotely thus very accessible for use. The advancements in technology have helped improve overall healthcare service delivery by enabling quality services, effective communication and being cost effective. Mobile health has been a major contributor to personalized and patient-centered care. (Wang et al 2021:23(12)1-2) Globally there has been increased smartphone ownership and with that the smartphone software and hardware has become advanced. (Statista,2024).

Mobile healthcare delivery methods have replaced the older methods of healthcare delivery as they are more integrated and adapted by many people. (Karandeep & Landman 2017:183-196.) Rapid growth in mobile health applications has been experienced with recent estimates suggesting that more than 259,000 mHealth apps are available on app stores and contribute to up to 3.2 billion downloads annually (Karandeep & Landman 2017:183-196).

According to (Ahmed et al.2021:2-4.) mobile applications are important in that they enable patients to feel autonomous and take responsibility for their own care thus promoting self-care. With the growing advancement in technology and

smartphone use these mobile health applications have come in handy because of their availability and easy accessibility for use by the public. A survey conducted by WHO in 2015 showed that there are over 15000 mHealth available applications of which 29% of it are applications intended for use by mental health patients. (Ahmed et al.2021:2-4).

Even though mobile applications' use has helped in promoting better healthcare services, it still has its disadvantages. These include confidentiality breaches, user engagement challenges and untimely assistance during emergencies. (Koh et al .2022)

## 2.3 Mental Health Nursing

According to (Smith,2019.) mental health nursing is a specialized field of nursing practice that involves the care of individuals who suffer from mental health disorders to help them recover and improve the quality of life. Mental health nursing is also known as psychiatric nursing. Mental health nurses have the knowledge to assess and treat patients with psychiatric disorders which helps them to provide specialized care. They typically work with other health professionals in a medical team to provide the optimal clinical outcomes for the patient. Mental illness can affect any individual at any age, any socioeconomic status, and any ethnic origin. Mental health needs to collaborate with different people with diverse backgrounds. A mental health nurse is responsible for assessing and evaluating patients' mental health, developing a treatment care plan, provision of care to their patients, maintenance of medical records and offer support and education to patients and their relatives. (Smith,2019)

According to (AIMLAY,2023.) mental health nursing is important in many aspects , the healthcare professionals feel fulfilled with the ability to help patients recover from mental illness, there is satisfaction that comes from knowing that

difference is made in somebody else life, there is flexibility in schedule that allows you to choose where and when to work, there is the opportunity to work in a variety of settings like hospitals, clinics, community mental health centres among other places. Mental health nursing faces a lot of challenges because it is an ever-changing field, they are usually the first line of defence for people experiencing mental health crisis and play a vital role in helping them, nurses working hours are extremely long, exposure to high stress levels and exposure to traumatic events. (AIMLAY, 2023.)

Mobile health applications, Mental health nursing, Mobile health(mHealth)

# 3 Purpose, Aims and Research Questions

The purpose of this thesis is to describe how mobile health applications can be utilized to improve mental health care delivery.
The aim of this thesis is to produce new knowledge to be utilized within the mental health nursing field to improve patient care, outcomes, and overall mental well-being.

**Research Questions**

1.How can mobile applications be utilized to improve mental health nursing?

# 4 Methodology and Methods

## 4.1 Methodology

In our research we used qualitative methodology to seek evidence-base**d** knowledge on our topic. Medical practitioners undergo research in their daily

work which involves determining the best care for individuals based on evidence-based practice. Evidence-based practice helps a nurse make decisions in different patient situations to produce the best patient care. Qualitative research aims to provide an in-depth understanding and exploring the reason behind a phenomenon and giving meaning to people's beliefs and actions. (Maltby et al,2010:47-55). Research methodology discusses and explains the data collection and analysis method used in the research. A research methodology explains how and what was done, which allows the readers to evaluate the reliability and validity of the research. (Maltby et al,2010:47-55).

A methodology should include the type of research conducted, collection and analysis of data, materials used in the research, inclusion and exclusion criteria and the reason for choosing the method used. Research methods are specific procedures for collecting and analyzing data. Developing research methods is an integral part of research design. Collecting and analyzing data are key decisions when planning your methods. In data collection, the research method depends on the type of data needed to answer the research question, qualitative vs. quantitative, primary vs. Secondary, descriptive vs. experimental can be used. In data analysis, for quantitative data statistical analysis methods can be used to evaluate relationship between variables while for qualitative data, methods such as thematic analysis are used to interpret patterns and meanings in the data. (McCombes & George,2023).

## 4.2 Data Collection Method

In our study we utilized scoping review approach to identify and break down the existing and future knowledge on our topic In .scoping review a systematic and continual approach is used to provide an overview of the available research evidence .The main reason of using scoping reviews is to map the extent ,range and nature of the literature and also identify gaps in the research evidence to help in future research. Scoping review is mostly done before performing research or introducing another type of review. It is of importance when

conducting research on emerging topics and where the goal in the research is to identify gaps. (Mak&Thomas,2022:14(5)565-567).

The main characteristic of a scoping review is that it provides an overview of a broad topic. It allows for a more general question and exploration of the related literature rather than basing the research on a more limited question. Scoping review is more flexible since it accounts many different studies. Scoping review has several purposes, it provides a quick overview of the topic being researched on, it provides a deeper synthesis potentially with more speed and the final is that used for coming up with conclusions and to identify the existing gaps in different studies done. (Peterson et.al 2017:29(1)12-16).

When conducting scoping reviews there are steps to be followed. The first step is to come up with the research question.It is recommended to have an appropriately scoped question which is not too broad and too narrow to achieve a quality in-depth review .At the second step relevant studies are identified where the key words,databases and medical subject headings are used to further refine the search. Here also, the inclusion and exclusion criteria are defined. In the third step, studies to be included in the review are selected. At the fourth step, data is extracted from the included data in a standardized manner. The extracted data is gathered and summarized at the fifth step; results are also reported. The final step may be to consult stakeholders to provide insights on a certain topic and also obtain feedback on the topic.
(Mak&Thomas,2022:14(5)565-567).

## 4.3 Data Search and selection

The data for this thesis was collected by searching, reviewing, and analyzing published research articles and studies about the effectiveness of mobile health applications in mental health nursing.
The data was searched from reliable databases including CINAHL complete, MEDLINE and PubMed which are some of the main databases used in the Metropolia University of Applied sciences. In addition, a manual search for scientific publications was also applied. Our search will include all primary research

articles published between 2014-2024 related to effectiveness of mobile health application in mental health nursing.

In our thesis, we created a PICo tool (Table 1)

| **P-POPULA-TION** | | **I - INTEREST** | | **Co- CON-TEXT** |
|---|---|---|---|---|
| Mental health patients | | Mobile health applications | | Mental health |
| OR | | OR | | |
| Mentally ill clients | AND | Digital care | AND | |
| OR | | | | |
| Mental Disor-der patients | | | | |

(patients mental health patients OR mentally ill clients OR mental disorder AND mobile health applications OR digital care AND mental health)

4.3.1 Results from Database

Table 2

| **Database/Date/Li-mits** | **Search Phrase** | **Total Number** | **Records included** | **Records based** | **Records included** |
|---|---|---|---|---|---|

| | | **of citations** | **based on title** | **on abstract** | **based on full text** |
|---|---|---|---|---|---|
| CINAHL/ O9.03.2024<br>Limits:<br>Abstract available<br>2014 – 2024 | (mental health patients OR mentally ill clients OR mental disorder patients AND mobile health applications OR digital care AND mental health) | 13 | 11 | 9 | 6 |
| MEDLINE / 09.03.2024 | (mental health patients OR mentally ill clients OR mental disorder patients AND mobile health applications OR digital care AND mental health) | 39 | 34 | 25 | 15 |
| **Records in total** | | 52 | 45 | 34 | 21 |
| Records after duplicates removed | | - | - | - | 14 |
| **Total number of articles included studies** | | - | - | - | 14 |

To improve the accuracy were our thesis results we formulated the inclusion and exclusion criteria that are used as guide. (Table 3)

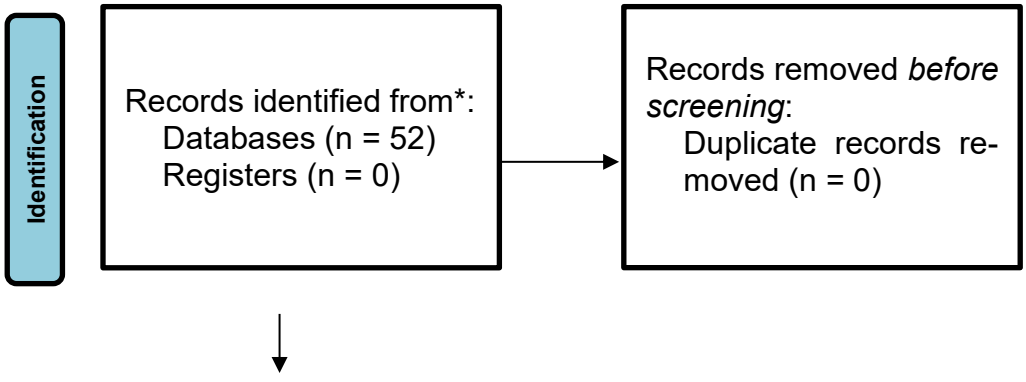
### **4.3.2** Inclusion and Exclusion Criteria

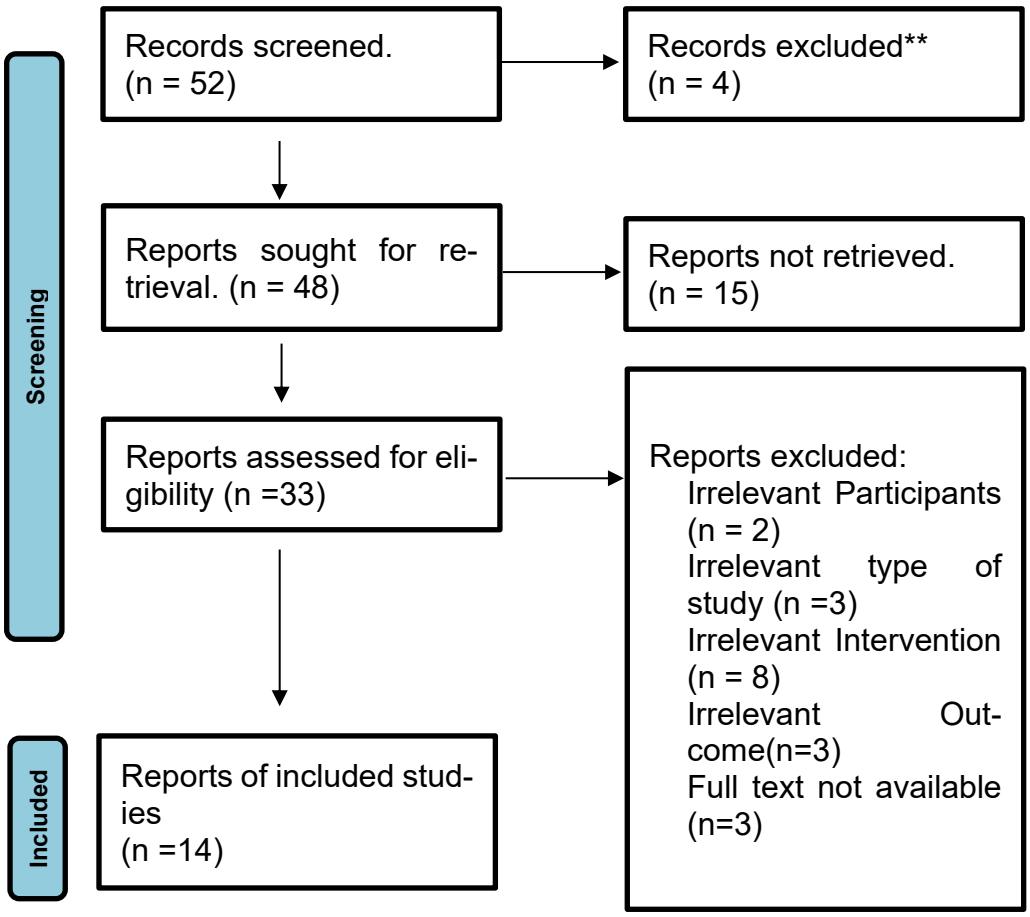
The table below (Table 3 ) shows inclusion and exclusion criteria.

| **INCLUSION** | **EXCLUSION** |
|---|---|
| Studies published between 2014–2024 | Studies older than 10 years |
| Studies in English | Studies in other languages. |
| Studies that focus on the effectiveness of mobile health applications in mental health nursing. | Studies that focus on the effectiveness of mobile health applications outside mental health nursing. |
| Peer reviewed primary studies and scientific based nursing articles. | Dissertations. |

### 4.3.3 Prisma Chart

Chart 1 shows the Prisma chart.






## 4.4 Data Analysis Method

Details of search articles (Table 4)

| **Author(s), Year, Country** | **Topic/Title** | **Methodology and Methods** | **Participants** | **Main Outcomes** |
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| 1-Margot J.Metz, Iman Elfeddalli, David G.H.Krol, Marjolein A.Veerbeek, Edwin de Beurs, Aartjan T.F.Beekman & Christina M. van der Feltz-Cornelis,2017, Netherlands. | A digital intake approach in specialized mental health care - study protocol of cluster randomized controlled trial | A cluster randomized controlled trial. | 176 patients in a Mental Health institution across four participating departments, divided into two groups,88-intervention,88-controlled, each team with their clinicians. | The study provides valuable information about the efficacy of a digital intake approach facilitated by peer support and training clinicians. It answers the question whether this intervention helps to reduce decisional conflict, enhance patient participation and adherence to treatment. Gives an evidence base for future eHealth initiative. One of the limitations found was that it is |

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| | | | | impossible to prevent contamination bias completely. |
| 2-Kaitlyn Arrow, Philip Resnik, Hanna Michel, Christopher Kitchen, Chen Mo, Shuo Chen, Carol Espy-Wilson, Glen Coppersmith, Colin Frazier &Deanna L. Kelly, 2023, United States. | Evaluating the Use of Online Self-Report Questionnaires as Clinically Valid Mental Health Monitoring Tools in the Clinical Whitespace | Mixed method research was used. Online questionnaire responses, social media, and semi-structured interview. | 4134 participants were recruited online. 54 participants participated in the study which comprised of 3-diagnostic groups (schizophrenia=23, depression=14, and health controls=17) | The study indicates that online self-report assessments may represent a different, but equally valid, environment for patients to share their experience outside a clinical setting. self-report measures provide valuable supplemental information to clinicians to be used in the future. There were limitations to the study |

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| | | | | which were, participants were compensated with 15$ gift card for participation. |
| 3-Golnar Aref-Adib, Puffin O' Hanlon, Kate Fullarton, Nicola Morant, Andrew Sommerland, Sonia Johnson & David Osborn, 2016 United Kingdom (UK) | A qualitative study of online mental health information seeking behavior by those with psychosis- | Semi-structured interviews were used. | A total of twenty-two participants were recruited for this study. They were all English speakers, aged 18-65 and are diagnosis of psychosis. They were currently using or had previously used the Internet. | The study showed that people with psychosis use the internet to acquire mental health related information. It is also suggested that those with psychosis have active digital lives and that the introduction of a mental health app into services would potentially be well received. |
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| 4-Tobias Vitger, Carsten hjorthøj, Stephen F Austin, Lone Petersen, Esben Sandvik Tønder, Merete, Nordentoft, Lisa Korsbek,2022, Denmark | A smartphone app to promote patient activation and support shared decision making in people with a diagnosis of schizophrenia in outpatient treatment settings (Momentum trial): randomized controlled assessor-blinded trial. | randomized controlled assessor blinded trial was used. | 194 patients with diagnosis of schizophrenia or delusional disorder were recruited aged between 18 to 35 years. They were recruited from nine outpatient treatment sites in the capital region of Denmark | There was an increased level of patient activation and confidence in communicating with their provider. The patients felt more prepared for decision making at the post-intervention time. |
| 5-Lisa Parker,Lisa Bero,Donna Gillies,Melissa Raven,Barbara Mintzes,Jon Jureidin,Quinn Grundy ,United States,the United States,the United Kingdom,Canada , Australia 2016. | Mental Health Messages in Prominent Mental Health Apps | A qualitative content analysis method was used here. | Sixty-one mental health apps were identified with each addressing different mental issues. | It was seen that mental health apps. Encourage frequent use by people and promote personal responsibility for improvement. |

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| | | | 34=anxiety, panic, and stress<br>16=mood disorders<br>11=well-being or other mental health issues. | |
| 6-Andrea. K.Graham, Carolyn J.Greene, Mary J.Kwasny,Susan M.Kaiser, Paul Lieponis,Thomas Powell,David C.Mohr . Chicago 2020. | Coached Mobile app platform for the treatment of depression and anxiety among primary care patients: a randomized clinical trial. | A two-arm randomized controlled trial was used. | 146 patients with depression and anxiety participated.<br>119 out of 146 (85%) were women.<br>122(83.6%) diagnosed of depression<br>131(89.7 %) = anxiety | It was found that a mobile intervention app was effective among primary care in depression and anxiety patients.<br>Patients can easily use mobile apps to meet their needs.<br>However, mobile apps require design work to allow translation of its information. |

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| 7-Sophie C Reid Sylvia D Kauer Angela S Khor Stephen JC Hearps Lena A Sanci Andrew D Kennedy George C Patton Australia,2012 | Using a mobile phone application in youth mental health | Mixed research methods were used. They include Quantitative, qualitative, and structured interviews. | There were forty-seven adolescents aged between 14-19 years (40 of them female) 6 Pediatricians with special interest in adolescent health also participated, they recruited the adolescents. | It was noted that self-monitoring by use of mobile phone applications helps facilitate communication of mental health issues between pediatricians and patients . It is therefore an important tool in management of mental health issues in young people. |
| 8-Kemp J Zhang T, Inglis F, Wiljer D, Sockalingam S, Crawford A, LoB, Charow R, Munnery M, Singh Takhar S, Strudwick G, 2020, Canada. | Delivery of compassionate mental health care in a digital technology-driven age-protocol for | The study used a scoping review through a search Cumulative index to Nursing and Allied | The articles screened were from 7 English-speaking countries. A total of 5310 articles were retrieved but | This summary can aid in the evaluation of digital technologies to ensure decision makers are investing |

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| | a scoping review. | Health Literature, Medical Literature Analysis and Retrieval System Online (MEDLINE) and Web of Science for articles published 1990-2019 | only thirty-seven articles were included in this study. | in technologies that are aligned with organizational values and principles that relate to the provision of person-centred and compassionate care and help to audit existing technologies in relation to delivering compassionate care. One limitation owing to the nature of scoping reviews the quality of each identified article was not assessed. |
| 9-Sun Kyung Kim<br>Mihyun Lee<br>Hyung Jeong | Effectiveness of mobile health | Qualitative method of research | 14 Randomized | It was evident that mo- |

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| Young Mi Jang South Korea ,2021. | applications for patients with severe mental illness: A meta-analysis of random controlled trials | was used - an electronic literature search in PubMed, Embase , the Cochrane Library,CINAHL, PsycINFO was conducted. The research was based on Randomized controlled trials written in English and Korean only. | Control Trials involving 1307 patients with depression, schizophrenia, and bipolar disorder | bile applications could assist patients with mental disorders. Mobile applications are effective supplements to clinical treatment of patients. |
| 10-Liza Hoffman, Emily Benedotto, Hsiang Grossman, Dorosella Kaluma, Ziva Mann, John Torous, 2019, USA | Augmenting Mental Health in Primary Care: A 1-Year Study of Deploying Smartphone Apps in a | 4 - Phase implementation as undertaken, evaluation of mobile Apps, developing | Patients were chosen from six primary care clinics where trained care managers were located. | Mental health apps are applicable and relevant to patients with integrated primary care settings in safety-net |

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| | Multi-site Primary Care /Behavioral Health Integration Program | apps, conducting pilot, rolling out the toolkit and conducting the survey for 1 year | | health systems but require training to increase their comfort – level and confidence applying these tools with patients. |
| 11-Yonas Deressa Guracho,Susan J. Thomas,Khin Than Win,2023, Australia,Ethiopia | Smartphone applications use patterns for mental health disorders: Systematic literature review and meta-analysis | Systematic review and meta-analysis according to PRISMA statement. PubMed/MEDLINE, EMBASE, PsycINFO, Scopus and google scholar were used. | Articles that involved studies that involved individuals who had mental disorders were included. | Results indicated that individuals who use smartphone apps for their mental health conditions have higher knowledge and good self-care behavior than non-app users also the apps are essential for those with mental health conditions to learn more about |

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| | | | | their disorder. |
| 12-Nora Atallah, Mohamed Khalifa,Ashraf El Metwali, Mowafa Househ,2017, Saudi Arabia | The Prevalence and usage of mobile health applications among mental health patients in Saudi Arabia. | Quantitative cross-sectional descriptive design, Survey was done online via Twitter and Facebook Pages | 376 participants with depression and anxiety completed an online survey distributed by social networks asking questions related to mobile phone ownership, usage of health applications | The study concluded that a significant number of mental health patients are using and intend to use smartphones and various apps which includes the mental health apps, the use of mobile health applications to increase healthcare services to patients in general and specifically to mental health patients, indicates great benefits to the overall |

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| | | | | healthcare system in Saudi Arabia and abroad. |
| 13-Janos L. Kalman, Gerrit Burkhardt, Jerzy Samochowiec, Christian Gebhard, Geert-Dom, MiriamJohn, Ozge Kilic, Tamas Kurimay, Lars Lien, Meryam Schouler-Ocak, Diego Palao Vidal, Jan Wiser, Wolfgang Gaebel, Umberto Volpe, Peter Falkai ,2023, Europe | Digitalizing mental health care; Practical recommendations from the European Psychiatric Association | Digitalizing mental health care; Practical recommendations from the European Psychiatric Association | Representatives of the individual European Psychiatric Association (EPA) | Digital Mental Health interventions (DMHI can substitute face to face mental health provision regarding outcomes, compliance,and access to services, but the uptake DMHI and digitalization of mental health services still needs improvement. |
| 14-Lindsay H.Dewa, Mary Lavelle, Katy Pickles, Caroline Kalorkoti, Jack Jaques, Sofia Pappa, Paul Aylin.2019, Canada. | Young adults' perception of using wearables, social media, and | Semi-structures interviews were used | Sixteen participants were interviewed.81% were females, two researchers | The study showed that mobile apps could be viable technological options to help |

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| | other technologies to detect worsening mental health. | | and two co-researchers | detect deterioration in young people to intervene early and avoid delay in accessing mental health services. however, immediate action following detection is required for the patient to trust and use the intervention |

# 5 Results

In our research study ,14 articles were selected for this literature review by conducting content analysis to formulate the results. The main category was telehealth and telemedicine advantages which resulted from 14 generic categories and 14 sub-categories.

**Telehealth and telemedicine advantages**

Some of the advantages of telehealth and telemedicine are promoting remote patient monitoring, supporting selfcare through digital health tools, helping in real

time data collection in mental health care and enhancing care quality in telepsychiatry.

### 5.1.1 Benefits of remote patient monitoring and health

Digital health solutions are becoming more popular in clinical psychiatry whereby utilization of technology is used to monitor patients outside clinic. Supplementing routine care with digital information from the mobile applications between visits could improve care for patients with severe mental illness. Remote patient monitoring helps to provide clinically valuable information to clinicians at a time when they are not able to see a client in person. There is increased efficiency since the clinicians can monitor operations without needing face to face appointments with clients, the remote monitoring system also allows for acquisition of real time data thus enhancing individual decision making. Remote patient monitoring has minimized the need for physical visits. (Kaitlyn et al,2023(94)221-231).

It provides supplemental information and is promising to be used in future in mental health care. Remote monitoring generates large amounts of data (feedback from clients and healthcare providers) which can be analyzed for potential improvements in the development of the applications. Long-term planning is enhanced by predicting future trends and improving system performance based on past data.(Kaitlyn et al,2023(94)221-231).

It has improved access to healthcare since patient users can access the services at any time, which is more beneficial for patients who need ongoing clinical monitoring. Remote patient monitoring is advantageous in that it reaches a wider population compared to traditional ways of receiving treatment. In emergency situations patients can receive quicker responses to their concerns or worsening symptoms thus saving lives. (Margot et al, 2017:17(1)86).

M-Health apps can be tailor made based on a client's needs and patient health conditions to suit their specific preferences. These apps also offer a variety of services for mental health clients such as meditation and crisis helplines which provide help for people in need at their time of need. This ability to monitor clients in real time has improved the provision of care thus enhancing positive health care outcomes. Stigma surrounding mental healthcare has been reduced since patients can communicate with clinicians anonymously and feel comfortable seeking help from online platforms rather than face to face appointments. e-health services are cost effective since they have minimized hospital visits as remote consultations and self-monitoring are possible without the need for appointments.( Margot et al, 2017:17(1)86).

### 5.1.2 Effectiveness of digital interventions

Access to information has made easier access to websites, apps and online forums has made it possible to access immediate mental health information and care, it has made it easier to access information regarding their illness without the need to visit the hospitals. The ability to seek information about the symptoms, diagnosis and treatment options online has been made possible. The access of this information helps patients to better get to know and understand their mental health conditions and make informed decisions.( Golnar et al, 2016:16,232)
Digital interventions have encouraged more support and community engagement, and access to online communities through social media groups, forums, and individuals with similar experiences get to share their experiences, they provide emotional support, reduce feelings and can give advice to their peers. Coping mechanisms have improved by learning more about their conditions through a reliable online source, improving coping strategies and managing their symptoms better. Through the apps access to the services is easier and more helpful. Seeking help and necessary information is possible through anonymity and privacy. The settings have made it possible for mental health patients to reduce the

stigmatization that comes along with, seeking help anonymously encourages openness without fear of any criticisms that may come along with it. ( Golnar et al 2016:16,232).

Digital interventions have made engagement with health professionals easier; it complements the normal healthcare through engagement with individuals between the care appointments, through the mobile applications tracking of medication, symptoms are shared with the healthcare professionals, whereby a treatment plan suited for the patient is tailored. Development of tailored interventions like cognitive behavior therapy (CBT) apps ,mood tracking apps and mental health platforms that are specifically designed for the targeted group, can provide interventions, track the progress made and can offer reminder of taking medication and helping symptom management better providing better outcomes. (Golnar et al, 2016:16,232).

### 5.1.3 Impact of digital tools on patient engagement

There has been a great impact of digital tools on patient engagement which has proved to be beneficial to those involved. There has been an increased patient activation, the patients are empowered and are greatly involved in the management of their empowered executional content, symptom monitoring and the individual management techniques have enabled the patient to have information and empowered to have a full understanding and management of their condition. Self-monitoring has enabled the patients to be conscious of the steps they are taking regarding their health, progress, and setbacks that make them proactive in the process. Self-monitoring has made it possible to have full responsibility for their ow health. ( Tobias et al,2022:24(10)2-10).

Decision making is shared among all stakeholders involved. Through mobile applications, an improved communication between the patients and the healthcare providers is achieved, the gap between them is reduced whereby every party is

given a chance to give a view and a decision is made together. Checking collected data about their health about symptoms for example together and discussing them during appointments makes the patient feels more involved, and a treatment plan is tailored together ,hence patients being passive recipients of care are reduced. ( Tobias et al,2022:24(10)2-10).

There has been enhanced engagement with treatment, adherence to the treatment plans through the set reminders in the mobile apps, like taking medications, attending appointments, and self-care activities which are helpful for mental health patients who may suffer cognitive problems, these reminders make it better to follow up the treatment and enhance engagement. There is continuous support from the apps ,support that may be unavailable in the other treatment setting, constantly being involved with the mental wellbeing between appointments. Through the apps a person can set their goals which they may want to achieve before their next visit hence being involved with their mental wellness continuously. ( Tobias et al,2022:24(10)2-10).

Access to information has been made easier by digital tools, there is a vast pool of informative information regarding the different mental health issues, the treatment options which enhance the understanding of the conditions better which promotes better self-management. Through learning more about their mental illness and knowing that several people face similar challenge, confidence levels in discussing their problem increases and hence playing a key role to becoming better. ( Tobias et al,2022:24(10)2-10).

### 5.1.4 Risks and Considerations of digital health tools

The mobile health apps have proven to be beneficial in many aspects but there are issues that may need to be considered in the development the mobile applications. The quality and accuracy of information needs to be considered, there is lack of specialized care in the development of the apps, the system may be tailored for general mental illness, but a tailored app needs to be designed for users with severe conditions like bipolar disorder, schizophrenia or severe depression. Through these better systems can be added to the apps hence better use and benefit to both parties. Some apps may provide accurate information which is a big risk, content which may not be based on evidencebased practice leading users to adopt wrong information, hence thorough research needs to be done by the app developers to ensure no misinformation is done. (Lisa et al, 2018:16(4)338-342).

There are accessibility issues where access to smartphones and internet connection by other people is impossible, especially rural areas which hinders the use of these online health tools, digital illiteracy is very common, especially among the elderly people who may struggle to effectively navigate the use of these apps which limit their effectiveness. App developers may be inconsiderate, and some communities' needs may not be met. (Lisa et al. 2018:16(4)338-342).

Concerns on privacy and data security are a big issue the app development. Confidentiality should be the priority and the main consideration. Mental health data is sensitive information since there is personal information of the clients which when not protected could be misused. Absence of mental health professionals in app designing and development causes a risk of not meeting the required standards which may pose the apps in effective to the user's wellbeing. (Lisa et al, 2018:16(4)338-342).

### 5.1.5 Designed and customized digital health intervention

There are many online interventions that have been tailored to optimize mental healthcare through digital platforms. There is personalization of treatment plans, mental health apps are designed to meet different individual needs. Some apps have been designed according to the type of disease a person is suffering from, their specific symptoms and the progress they have been making in the process. Adaptive interventions have been included where patient engagement has been encouraged, symptom tracking and self-assessment, these adjustments have ensured that the users get the best and most relevant support that is related to the situation they are in. There are other services provided like journaling, mood tracking and goal setting that have enabled patients to develop better coping mechanisms which have improved their mental well-being and general health.
( Andrea et al,2020:77(9)906-914).

The designed and customized digital health interventions have enhanced psychoeducation. App users become more knowledgeable on matters of mental health because psychoeducational materials have helped them understand better, different mental health issues, treatment options and self-betterment strategies, well informed patients do much better in trying to be involved In their mental health. Interactive learning is found in these apps such as quizzes that ensure users are learning effectively strategies they can use and adapt to help control and manage their health conditions. These are some of the features that ensured customized treatment and ensured the patients remain engaged in their treatment. ( Andrea et al,2020:77(9)906-914).

Through the app, patients can customize their goal setting, they can set a goal they wish to achieve to better their mental health, activities like going to the gym, sleeping patterns among other things. The goals set are a part of a larger treatment plan that is relevant to improving mental wellbeing. The app enables the patient to keep track and data is saved; the feedback is based on the targets achieved hence a sense of accomplishment is felt when the set goals are achieved. ( Andrea et al,2020:77(9)906-914).

### 5.1.6 Assessment and management tools for mental health

Using mobile phone applications in youth mental healthcare is a time saver tool for the assessment and management of patient´s health. The youth can write their daily activities into the apps thereby helping clinicians to provide better and self-centered care to the patients. Through the apps the youth can record several aspects of themselves such as their eating habits, exercises they perform daily, different moods ,sleeping patterns, how they manage stressful situations and ways in which they cope with it. Clinicians then easily obtain the logged in information from the mobile apps and determine the client's mental health well-being based on the acquired information .logging in the information by the youth is made easier using mobile apps because it provides anonymity of the client and sensitive information can be easily shared compared to face-to-face appointments .(Sophie et al,2012:41(9)711-714).

It also helps to reduce instances of mental health stigma by reaching out to those youth who avoid professional face to face appointments and on the other hand encouraging them to seek help .As the clinicians assess the data logged into the apps by the youths, they can easily detect mental health symptoms such as self-harm at an early stage which may be difficult to do so in brief appointments. This helps to provide on time treatment and prevent worsening symptoms . Mobile applications promote patient engagement and participation in their treatment care as well as helping clinicians provide personalized care to the patient by monitoring changes in their mental health status .As a client´s progress is tracked over a certain period and changes detected ,clinicians can adjust in the treatment methods and adopt other healthier strategies of managing stressful situations or introducing healthier sleeping patterns.(Sophie et al,2012:41(9)711-714).

Through mobile apps, communication between youth and clinicians is greatly enhanced and a rapport is established between the two parties as the youth tend to prefer seeking help through mobile devices because of the comfort it comes

with. On their mobile devices they can access real-time interventions of their mental health concerns. It is also of an advantage to the patients who find it hard to verbalize their mental health concerns as they can comfortably communicate with the healthcare providers through the apps and get the help without need of face-to-face appointments. .(Sophie et al,2012:41(9)711-714).

### 5.1.7 Role of digital technologies in enhancing care quality

Digital technologies have played a huge role in promoting and supporting better provision of mental health care. Through digital tools such as mobile phones mental health services have become more accessible to a larger audience and especially people in remote areas who find it hard to get to face to face appointments ,those who do not have access to immediate in-person therapy or have to be in hospital waitlists for a long time .With the increased advancement of technology and the rise in use of mobile applications by the youth, online health services have become more engaging and reliable to young people .Through the digital spaces the youth can also connect online with other people who are going through the same cases as them, and sharing their experiences. This helps them to reduce the feelings of being isolated and empowering them to navigate through their journey of mental health recovery. the acquirement of digital services is flexible especially to the youth who´d want to seek help anonymously as they can get help directly from their mobile devices.
(Kemp et al,2020:22(3)2-12).

As the youth seek help online through various methods such as audio or video interactions with healthcare professionals, compassionate care is still maintained as the clinicians establish a rapport with the patients thus helping in providing patient centered care. In virtual interactions between clinicians and patients ,clinicians can still get to know of clients emotions through cues such as tone and gestures in video calls thereby helping to provide good care no matter the environment.in digital spaces more consistent check ins and communication from healthcare professionals is made possible .The regular check-ins creates a

healthy connection between the two parties involved .This helps the clinicians to stay up to date with the clients mental progress by providing a care that is efficient and emotionally supportive therefore improving the overall quality of care. (Kemp et al,2020:22(3)2-12).

Digital tools provide an innovative way of engaging patients through consistent sessions with clinicians which help to keep patients engaged in their treatment plan therefore promoting adherence to care. It has also helped with access to care as patients can get help from their clinicians round the clock and outside the normal working hours, this in turn helps to fill in the gaps in the provision of care. Adherence to care is also promoted by digital tools as mobile apps can send reminders of the daily treatment routine to patients thus keeping them updated on their treatment plans .In the healthcare sector, the clinician's workload is reduced as the clients' records and documents are kept in the mobile devices hence no need for them to do so. These apps also help in detecting those who have worsening symptoms and need immediate care. The reduction of clinical workload helps the clinicians to focus on patient centered care thus promoting quality of care.(Kemp et al,2020:22(3)2-12).

### 5.1.8 Effectiveness of mobile health applications for patients with several mental illness

Mobile health applications usage in mental healthcare has been shown to reduce symptoms of severe mental illnesses such as depression and schizophrenia. The mobile apps help clients in such a way that notifications of treatments are sent to the patient's own phone to remind them of adherence to medications or exercises. These apps also allow for daily progress tracking of a client's wellbeing, through tracking worsening conditions can be detected and treatment administered in time. Mobile apps also complement the provision of care as they provide up to date and continuous support to the clients in between face-to-face appointments with clinicians. it's also of importance as it comes in handy where the availability of mental health services is lower than the demand and where psychiatric

services are too costly or inaccessible by a group of people .(Sun et al,2022:19(3)2-3).

App features such as reminders and personalized feedback to the clients have provided better care outcomes. As patients interact daily through the app their usage increases and they feel more comfortable in asking for help or logging in their symptoms or routines. As they engage with clinicians through the app, they can receive immediate help or feedback without need of appointments.by receiving help from clinicians ,they are able to track their improvements over time which acts as a motivation to them to adapt positive behaviors and take the steps towards recovery and treatment. These in turn improve adherence to care, which is very important in long-term management and treatment of severe mental health illnesses. Mobile apps can be customized to meet an individual's needs across the mental health population that they serve.(Sun et al,2022:19(3)2-3).

They can also be optimized according to the specific needs of a certain patient group .some of the features include more immediate support during symptom break outs or in emergency cases where face to face appointments are not available immediately. Mobile apps allow access to mental health services at any time compared to face-to-toface appointments. They then serve as a source of consistent support to clients as the services can be accessed at any time , They provide regular support which helps to promote consistent management of symptoms by patients thus also promoting positive patient care.(Sun et al,2022:19(3)2-3).

Mobile health apps also act as good supplements to in person therapy and medications as it allows for a combination between the two thus making it better in helping mental health clients . It enables greater support and flexibility for the patients as mental health services can also be accessed remotely after face-to-face appointments. These digital tools enable a more effective and comprehensive approach to mental health care management. Through these apps users can log in to their progress which is visible to clinicians. This helps clinicians to

continuously monitor changes in patients' symptoms and adjust treatments where needed, thus improving overall care.(Sun et al,2022:19(3)2-3).

### 5.1.9 Integration of digital health tools in primary care

Mobile health apps have expanded access to mental health support by a larger population .patients can access therapy remotely at any time and at their own convenience. This allows for self-accountability in treatment and encourages self-management strategies This helps clients to make decisions regarding their own treatment. The mobile apps are even more beneficial in cases where face to face appointments is limited and where the services may be unavailable to people. The digital tools also provide anonymity to clients to reduce stigma related issues surrounding mental illnesses. This encourages more people to seek help as it is also cost effective compared to paying for therapy which is usually unaffordable to other individuals. (Liza et al,2019:10(94)2-9).

These tools encourage increased patient engagement and empowerment by allowing patients to take an active role in their mental health. Patients can play a role in their health by logging in to their daily wellbeing in the Apps. The tools provided help clients in daily monitoring of their mental health ,managing stress and dealing with flare-ups. These way clients are encouraged to adhere to their medications and treatment modalities.by receiving real time feedback from clinicians through the apps clients are encouraged to adopt healthier behaviors thus improving delivery of mental health services. The patients also stay informed throughout the time, and they can receive help in case of emergency cases or worsening of symptoms. (Liza et al,2019:10(94)2-9).

Mobile apps are resourceful in that they offer continuous help without the need for immediate face to face appointments. They act as a supplement to clinician appointments where therapy sessions are unavailable or in higher demand and at the same time costly. It is valuable especially for patients who face challenges in accessing mental health care services .They also help in enhancing continuity

of care through remote monitoring after therapy sessions. The apps also provide cognitive behavioral therapy which helps to effectively treat mental health illnesses such as depression ,anxiety and insomnia .overall mobile applications have become a better supplement to previous mental health care services thus providing an environment for quality delivery of mental healthcare services. (Liza et al,2019:10(94)2-9).

### 5.1.10 Support for self-care through digital tools

Improving Mental Health Care Access allows availability Around-the-Clock, Mobile applications and other digital health solutions give users instant access to mental health services, enabling them to get help whenever and wherever they need it. For those who might not have easy access to conventional mental health care, this is essential. Filling up the Care Gaps for People in underserved or rural locations, where mental health care may be limited or unavailable, can particularly benefit from smartphone apps. (Yonas et al,2023:179,2-3).

Encouraging People to Manage Their Own Lives by Self-Controlling Resources, People can monitor their own mental health over time with the use of numerous applications that provide features like mood tracking, symptom blogging, and physiological monitoring (such as sleep or exercise levels). This can foster self-awareness by assisting users in recognizing patterns and triggers. A psychoeducational approach Apps frequently offer instructional materials regarding coping mechanisms and mental health illnesses, enabling users to better understand and manage their ailments. Therapeutic Approaches and Cognitive Behavioral Therapy (CBT). CBT as well as Additional Interventions Evidence-based therapeutic treatments, such mindfulness, relaxation techniques, or cognitive behavioral therapy (CBT), provide the foundation for many digital health applications. (Yonas et al,2023:179,2-3).

The prompt intervention where users can better manage symptoms in real time by using digital health tools to receive therapeutic solutions during times of crisis or distress. Peer networks and social support allows online communities and peer support, Numerous apps for mental health provide users with access to peer communities where they can share experience and offer support. Adaptive Feedback and Personalization, Personalized Interventions by employing data-driven algorithms to customize therapies to each person's unique needs, behaviors, and patterns, smartphone applications can provide individualized mental health care. Self-care can become more enjoyable and effective with this personalization. (Yonas et al,2023:179,2-3).

Comments and Perspectives, Certain applications (such those that track mood or exercise completion) offer frequent feedback depending on user input, which might encourage users to keep improving and taking care of themselves. Decrease in Shame, a discreet and stigma-free setting: Apps provide a discreet way for people who are afraid to seek in-person therapy to interact with mental health resources. This might lessen the humiliation or shame that some people experience when they seek mental health treatment. (Yonas et al,2023:179,2-3).

### 5.1.11 Advantages of real time data collection in mental health

Ongoing Observation and Symptom Monitoring Symptom Capture in Real Time, with real-time data on mood swings, anxiety levels, sleep patterns, and other important indications, mobile apps enable ongoing monitoring of mental health problems. Early detection of relapses or worsening symptoms may result from this, allowing for prompt intervention. Monitoring Progress of users and physicians can monitor progress over time and evaluate the efficacy of treatments or self-care techniques by gathering data in real time. (Nora et al,2017:156,163-168).

This ongoing feedback loop enables care to be dynamically adjusted. Immediate Adjustments for Personalized and Adaptive Interventions can be triggered by real-time data according to the user's current mental state. For instance, an app can provide instant coping mechanisms if it recognizes increasing anxiety levels based on user inputs or physiological data (such as heart rate), it might provide instant coping mechanisms like guided meditation, breathing exercises, or grounding techniques. Real-time data collection makes it possible to create personalized treatment plans that are adapted to each person's evolving requirements, perhaps increasing the interventions' overall efficacy. Early crisis detection, such as suicidal thoughts or severe depressive episodes, can be aided by real-time monitoring. When a user's mental health deteriorates to a critical level, real-time data collection from mobile apps can notify family members, support networks, or medical professionals. (Nora et al,2017:156,163-168).

Intervention in Critical Situations: Real-time data collecting enables actions to occur when they are most required rather than waiting for a scheduled session, thereby preventing serious self-harm. Improved Patient-Provider Communication, Data Sharing with Clinicians, Healthcare providers can remotely monitor patients' mental health by receiving real-time data gathering. Since the data offers insights into the patient's state in between consultations, this can result in better-tailored treatment programs and more informed therapeutic judgments. For example, alterations in mood or sleep patterns over time may indicate underlying cycles or triggers in conditions like anxiety, depression, or bipolar disorder. Better Results from Treatment: Clinicians and patients can work together to develop more dynamic and successful treatment plans when they can monitor and adjust to changes in mental health in real time(Nora et al,2017:156,163-168).

### 5.1.12 Treatment outcomes and care quality in telepsychiatry

Telepsychiatry Treatment Outcomes For many mental health illnesses, such as depression, anxiety, PTSD, and schizophrenia, telepsychiatry can produce treatment results that are comparable to traditional, in-person psychiatric care, according to studies reviewed by the European Psychiatric Association. With tele psychiatric therapies, patients report comparable gains in quality of life, symptom reduction, and general satisfaction. This improved access to mental health services by eliminating obstacles like travel and physical distance, particularly for people living in underserved or isolated locations. Because of continuity of treatment, this improved access may result in earlier interventions and better long-term outcomes. (Janos et al,2023:67(1)1-7).

Decreased Rates of Dropout Given its increased convenience and adaptability, telepsychiatry may result in reduced dropout rates in mental health. the comfort and seclusion of getting treatment in their own homes. Open communication and trust, two essential elements of high-quality psychiatric care, can be fostered in this setting. The utilization of digital tools for monitoring In order to give clinicians the most recent data, telepsychiatry frequently incorporates digital tools for monitoring symptoms, adherence, and mental health trends. By enabling proactive and data-driven modifications to treatment regimens, this integration raises the standard of care given. Consistency and Continuity of Care, Reliable Access to Experts, Even if a patient moves or their availability changes, telepsychiatry enables them to see the same psychiatrist on a regular basis, promoting treatment continuity and enduring therapeutic partnerships. A crucial element in guaranteeing top-notch mental health care is this constancy. (Janos et al,2023:67(1)1-7).

Optimization of Cost and Resources, Effective Utilization of Clinical Resources, By optimizing clinic resources and reducing the need for physical infrastructure, telepsychiatry can help cut total healthcare expenditures. Telepsychiatry improves the quality of care for the entire patient population by making it simpler to

accommodate patients who might require in-person care by freeing up in-person resources.

Psychiatric Services' Expanded Reach allows Psychiatrists to treat more patients when there are fewer practical constraints. This expanded reach improves the quality of care accessible to populations that might not otherwise receive it, particularly in rural or under-resourced locations.(Janos et al,2023:67(1)1-7).

### 5.1.13 Technology aided detection assessment and treatment.

Mobile sensors and wearables for the detection of changes in mental health, Monitoring of the Physiology, Smartwatches and fitness trackers are examples of wearables that gather physiological data, including heart rate, sleep habits, and levels of physical activity. Anxiety, stress, or depression are examples of mental health conditions that may be indicated by changes in these measurements. Early intervention may be necessary if symptoms like disturbed sleep or elevated heart rate variability indicate deteriorating mental health. Behavioral Surveillance, To discover behavioral changes that can be associated with a decline in mental health, sensors in smartphones and wearable technology can recognize patterns in movement, location, and phone usage. For example, less mobility or fewer check-ins to social places may indicate increasing sedentary behavior or social isolation. Evaluation via Digital Interactions and Social Media, Social Media Content analysis of Social Media Content, Language and content changes on social media platforms might be examined to see if they reflect changes in mental health. Distress, despair, or social isolation may be indicated, for instance, by postings or comments that employ more negative language, self-referential phrasing, or specific keywords . (Lindsay et al,2019:14,9).

Analysis of Sentiment and Interaction declining mental health can also be indicated by patterns in social media interactions, such as fewer posts or less interaction with friends. Algorithms can evaluate these patterns and notify users or mental health specialists of any troubling tendencies. Apps for Monitoring Mood

and Symptoms, Users can frequently self-evaluate their mood, stress levels, and mental health symptoms using mobile applications. Frequent entries offer continuous information that can aid in the early detection of negative trends. (Lindsay et al,2019:14,9).

Personalized Notifications and Interventions, Technology-Aided Interventions and Treatment, when wearables and applications identify indicators of mental health decline, they can provide real-time notifications or coping mechanisms. For instance, if a wearable detects high levels of stress, it may propose a quick walk or breathing exercise. Tools for Self-Help and Guided Therapy, Numerous apps allow users to participate independently in guided self-help modules that are based on mindfulness exercises or Cognitive Behavioral Therapy (CBT). For users who might be experiencing mental health challenges and can access it anytime. Insights into Mental Health Driven by AI and Machine Learning, Predictive Modeling, Large amounts of physiological and behavioral data are analyzed by machine learning algorithms to find patterns that could indicate mental health problems. These algorithms may be able to identify risk variables specific to each user and provide highly personalized insights and recommendations. (Lindsay et al,2019:14,9).

Empowerment via Data Visualization and Self-Awareness, Visualization of Data in Real Time, Users can see patterns and connections over time by seeing visualizations of their health information using a variety of wearables and apps. This knowledge can inspire good lifestyle changes and raise users' understanding of their own mental health. Young adults may feel more involved in controlling their mental health if they track indicators like mood or physical activity. Self-care routines are given structure by technology, which also serves as a reminder for users to integrate stress-relieving activities into their everyday life. (Lindsay et al,2019:14,9).

Ethical and Privacy Aspects of Technology Use, Health Data Privacy For technology assisted detection, evaluation, and treatment to be reliable and successful, young adults in particular place a high priority on privacy and control over their data. Ensuring the confidentiality and security of users' mental health requires ethical approaches to data use. These tech-enabled strategies give young individuals the means to proactively track, evaluate, and This knowledge can inspire good lifestyle changes and raise users' understanding of their own mental health. (Lindsay et al,2019:14,9).

# 6 Discussion

Most people have had mental health issues in the past few years. To assist people in managing mental health issues, nurses and therapists have made mental health services easily accessible. Technological progress has resulted in the creation of mobile health applications that target different aspects of mental health problems, providing prospective means of improving the provision of mental health services. Improving patient participation and technological advancements have resulted in the creation of mobile health applications that target different facets of mental health problems and present potential ways to improve the provision of mental health care. This would also assist with monitoring symptoms, offering guidance and support, handling emergencies, facilitating individualized treatment, and monitoring the patient's advancement (Lopez 2024:2(1)357-362).

According to (Wang et al,2021:23(12)1-2), the current rise in mental health awareness has coincided with an increase in demand for improved mental quality of life. Over the years, mobile phone use has increased, and the availability of high-speed internet has only made it better. Smartphones have become important in our lives, to the point that we can essentially do anything with them. These days, mobile health applications are incredibly common. With them, anyone may track a variety of health metrics, like blood pressure, weight, and fasting.

These apps' development has prompted the de-development of mental health apps, which are currently very well-liked. These services are highly efficient in terms of availability due to their ease of access via cell phones. These services are highly efficient in their availability due to their ease of accessibility through smartphones. Medical and public services delivered via mobile devices, such as smartphones, are referred to as mobile health or mobile healthcare, according to the World Health Organization (WHO). In this kind of treatment, patients and doctors communicate with each other via mobile devices without regard to time or location constraints.

## 6.1 Ethics and Validity

According to (Cecilia &Juliana 2018:183) the validity of a research study refers to how well the results among the study participants represent true findings among similar individuals outside the study. This concept of validity applies to all types of clinical studies, including those about prevalence, associations, interventions, and diagnosis. We applied the conduct of Research Guidelines responsible to ensure reliability at each step of our research. We used many articles and journals and each of the references clearly stated to acknowledge the authors' work. We used descriptive literature reviews hence no need of seeking research permissions nor financial support while doing the research. (Cecilia &Juliana 2018:183).

According to ethical recommendations for thesis writing at universities of applied sciences, (ARENE 2018) we take into consideration that we are responsible for the conduct of research in thesis work, and we take responsibilities of research practice considering general ethical principles for research on people. (ARENE 2018)

According to Finnish Advisory Board on Research Board on Research Integrity (TENK 2012) research ethics (tutkimusetikka in Finnish) is a general concept covering all ethical viewpoints and evaluations related to science and research. At all points in our research, honesty and integrity are highly emphasized and adopted according to the required principles. All the articles used are cited appropriately, recognizing the achievement of the authors and giving them the credit they deserve. We ensure that our methods of data collection conform to scientific criteria and are ethically sustainable. Throughout our planning, recording of data and conducting research, we followed the set standards for scientific knowledge. To avoid plagiarism, we check our work frequently in a plagiarism identification system. (TENK 2012)

## 6.2 Conclusion

The study shows the effectiveness of mental health applications and digital mental health care interventions in mental health nursing. Provision of real time support to clients, greater access, equity of mental health resources, immediate support, anonymity, tailored content, lower cost and increasing service capability and efficiency. Despite these benefits, there are challenges faced like data privacy, inaccurate information by the client, lack of regulation and approval, poor design of the apps **a**mong other things. (Wang et al,2021:23(12)1-2).

## 6.3 Recommendation

From our study we produced a few recommendations that can be implemented to enhance the effectiveness of mobile health applications and telehealth in mental health nursing.

Health apps usage should be promoted among the users, nurses and patients. Increasing awareness leads to increased usage and hence implementation in the current system. More research and development on the health apps should be done, putting income to develop the existing and developing new apps, to ensure the high demand of care is met, can be done through collaboration of healthcare workers and patients. The digital care should be integrated with the traditional services, comprehensive approach provides a better service delivery ensuring patients benefit from both. A patient centered design should be created which is patient friendly and relevant that meets their needs which enhances usability and effectiveness. Healthcare professionals should be effectively trained on how to use it, the apps should follow strict data privacy to keep patient information safe. (Lal, et al, 2014:65(1)24-32).

These are a few recommendations which are essential and when applied the effectiveness of digital mental health interventions will be achieved and hence improvement in mental health care patient care.

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# Appendices

## Coding

| Meaning Unit | Coding | Sub-Category | Generic | Main Category |
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| | | | | |
| 1-The ability to monitor patients outside of the clinic will allow clinicians to see more individuals in need, feel more confident in online information gathering, and notice an individual's exacerbation of symptoms to provide life-saving interventions that may not have been possible before. | Monitoring patients outside the clinic, confidence in gathering information, provision of life saving interventions. | Remote patient monitoring, individualized care, noticing worsening symptoms. | Benefits of remote patient monitoring. | Telehealth and telemedicine advantages. |
| 2-The study demonstrates the efficacy of the new digital approach in | Efficacy of digital approach in mental health care | Patient involvement in eHealth initiatives | Benefits of eHealth in mental health care | Telehealth and telemedicine advantages. |

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| mental healthcare, findings of the study contribute to the rollout of such eHealth initiatives fostering patient involvement in decision making about their treatment. | | | | |
| 3-Online and mobile phone-based interventions are associated with improved medication management amongst people with psychosis and seem to be effective as standard care in relation to adherence | Online and mobile phone-based intervention | Medication management in psychosis | Effectiveness of digital interventions | Telehealth and telemedicine advantages. |

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| 4-This trial showed a significant effect of a digital shared decision-making tool on the subjective level of patient activation, confidence in communicating with one's provider and feeling prepared for decision making at the post intervention timepoint. | Digital shared decision-making tool5 | Patient activation and communication | Impact of digital tools on patient engagement | Telehealth and telemedicine advantages. |
| 5-Mental health apps may promote medicalization of normal mental state and imply individual responsibility for mental well-being, to prevent over diagnosis and ensure supportive | Mental health apps and medicalization | Implications of mental health apps | Risks and considerations of digital mental health tools. | Telehealth and telemedicine advantages. |

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| healthcare where needed. | | | | |
| 6-A mobile intervention app was effective for depression and anxiety among primary care patients. Findings also supported designing digital mental health interventions as platforms containing simple, brief apps that can be bundled by users to meet their needs. | Mobile intervention app for depression and anxiety. | Effectiveness of mobile mental health apps | Designed and customized digital health interventions. | Telehealth and telemedicine advantages. |
| **7** - self-monitoring facilitates communication of mental health issues between pediatricians and patients and is a promising tool for | Self-monitoring of mental health. | Communication between pediatricians and patients. | Assessment and management tools for mental health. | Telehealth and telemedicine advantages. |

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| the assessment and management of mental health problems in young people | | | | |
| **8-**Digital technologies were described as facilitating compassionate care and were classified using a conceptual model to identify each digital intersection with compassionate care. | Digital technologies facilitate compassionate care. | Conceptual model of digital intersections with compassionate care. | Role of digital technologies in enhancing care quality. | Telehealth and telemedicine advantages. |
| **9**-This review provided evidence that mobile applications could well assist patients diagnosed with mental disorders, greater benefits could be achieved by well-designed interventions | Mobile applications assisting patients with mental disorders | Design and strategy considerations for mobile interventions | Effectiveness and optimization of digital health interventions | Telehealth and telemedicine advantages. |

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| incorporating strategies with thoughtful consideration of the disease characteristics. | | | | |
| **10.**Findings indicated that mental health apps are applicable and relevant to patients within integrated primary care settings in safety-net health systems | Mental health apps in integrated primary care | Applicability and relevance in safety-net health systems. | Integration of digital health tools in primary care. | Telehealth and telemedicine advantages. |
| 11.Smartphone applications use for current mental health disorders perceived usefulness for patients to support selfcare in the growing era of digital mental health. | Smartphone applications are used for mental health disorders. | Perceived usefulness for patient selfcare. | Support for self-care through digital health tools. | Telehealth and telemedicine advantages. |

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| 12-Using interactive mobile applications for patients with depression and anxiety may unlock improved benefits to patients and providers recording real life events is an effective tool in overcoming memory issues and retrospective methods on collecting and analyzing events of depression and anxiety. | Interactive mobile applications for depression and anxiety. | Real – time event recording and memory support. | Advantages of real time data collection in mental health. | Telehealth and telemedicine advantages. |
| 13-There is increasing evidence that telepsychiatry is a good substitution for face-to-face delivery in terms of effectiveness, care | Telepsychiatry as a substitution for face-to-face delivery. | Effectiveness and quality of telepsychiatry. | Treatment outcomes and care quality in telepsychiatry. | Telehealth and telemedicine advantages. |

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| quality, treatment outcomes for many mental problems across a wide range of population. | | | | |