Applicability of Acceptance and Commitment Therapy Based Mobile App in Depression Nursing

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Abstract

Background: Due to the high burden of depression, new models and methods of mental health care need to be developed. Prior research has shown the potential benefits of using technology tools such as mobile apps as self-help or combined with psychological treatment. Therefore, professionals should acquaint themselves with evidence-based apps to be able to use them with clients and guide the clients in their use.

Purpose: To explore how an acceptance and commitment therapy based mobile app was perceived as a self-management tool among nurses, and how it could be applied in the prevention and treatment of depression and other mental health issues.

Methods: Sixteen Finnish nurses undergoing depression nurse specialist education used the app for five weeks and participated in semi-structured focus group interviews. Interviews were analyzed by qualitative content analysis.

Results: In general, the nurses found the app suitable as a self-management tool and identified three models of using it in clinical practice. Having used the app personally, the nurses were eager to take it into use with various client groups, especially in occupational health but also in the treatment of mental health problems. However, they also raised concerns about the effort needed in familiarizing oneself with the content, and pointed out specific client groups for whom the benefits of the app should be carefully weighed against the potential risks.

Conclusions: Despite the small sample size, the findings suggest that involving technology tools as part of the nurses' education could ease their adoption in clinical practice. The degree of professional support in the app use should be aligned to the severity of the mental health problems.

Keywords: depression; mobile app; mHealth; acceptance and commitment therapy; nurse education; stepped care; mental health

Implications

Practice: Acceptance and commitment therapy methods can be delivered via a mobile self-help app that can be applied flexibly in nursing practice after initial training in its use.

Policy: Policymakers should consider including the use of self-help apps in the education curriculum of mental health professionals, both to improve the professionals' own mental health and skills, and to train them to use apps with clients.

Research: Further research should examine how the personal use of self-help apps during mental health professionals' education influences the actual uptake in clinical practice.

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Introduction

Depression is one of the greatest global health concerns. Around 350 million people are affected by depression globally [1], and in Europe, depression affects 6.9% of the population [2]. WHO estimates that the burden of unipolar major depression will be the largest global cause for disability-adjusted life years in 2030 [3]. These figures highlight the challenges for health care systems, for professionals' clinical competence and first of all for people suffering from depressive symptoms [4]. Knowledge and competence in the treatment of depression is needed in primary health care as well as in the specialized services [5,6].

Depression nurse specialist (DNS) education in Finland is based on the previously reported models of cooperation between a nurse, a general practitioner (GP) and a consultant psychiatrist [7–9]. Collaborative care models for depression have demonstrated positive outcomes and good economic value, although most studies have been based in the USA [10–12]. In the Finnish model, a primary health care GP refers the persons with symptoms of depression to a DNS, who then works independently with clients suffering from mild or moderate depression. A psychiatrist has a consultative role and people with severe depression are referred to specialized mental health care. This model is recommended in all primary health care services for the treatment of mild and moderate depression, as it leads to improved outcomes [5].

New, innovative treatment options for depression are also needed: tools to support wellbeing and prevent depression, or tools such as web-based therapies which can reduce the

workload of a professional. Online and mobile tools can reach large populations and lower the barrier for seeking help [6,13,14]. RCT studies of technology-aided treatments for depression have shown their efficacy and effectiveness among diverse populations, especially when the treatments are professionally supported [13,15]. Mobile apps are especially promising tools in prevention and treatment of mental health problems because they can easily support self-management in everyday life [16]. Key elements in depression prevention among adults are healthy coping strategies and sufficient recovery from stress [17,18].

The present study examines DNS students' experiences and perceptions of a mobile app, named Oiva, which teaches coping strategies for stress and mood problems through active experiental exercises [19]. The exercises are based on Acceptance and Commitment Therapy (ACT), a psychological intervention approach which belongs to third-wave cognitive behavioural therapies [20]. ACT utilizes acceptance and mindfulness methods to increase psychological flexibility, which allows a person to commit valued actions despite psychological distress [21,22]. ACT appears to be equally effective in treating depression as established psychological treatments [23,24], and recent studies suggest that ACT-based online programs can be feasible in reducing or preventing symptoms of depression [25–28]. Mobile delivery of ACT has been studied in small-scale non-clinical samples and initial findings suggest that it can promote well-being and satisfaction with life [19,29].

Translating the research results into practice can be problematic if the real-world conditions and needs are not adequately addressed. New tools need to fit the existing care practices or, at their best, spur the creation of innovative care processes [30]. Taking

technological tools into use in collaborative care requires that nurses see their potential and are able to integrate them into their daily work. Negative attitudes towards mobile devices and apps as well as insufficient skills in using them can limit the applicability of such tools [31,32], and new techniques are more likely to be adopted if they are taught in connection to trainings and workshops [33]. Hence, the objectives of this study were the following:

1. To collect DNS students' experiences of the Oiva mobile app as a self-management tool for mental health improvement or maintenance.
2. To understand how the Oiva app could be applied as a tool in the care of depression and other mental health issues from a nurse's viewpoint.

Methods

Participants

Participants were recruited among the nineteen nurses who were enrolled in one year post-graduate DNS studies at Tampere University of Applied Sciences. Sixteen of them agreed to participate in this study. They all had work experience as nurses in mental health services or in other services for people suffering from mental health problems, and they mostly worked with clients or patients having mild or moderate depression. Their workplaces included primary health care (2/16), community mental health services (4/16) occupational health care (3/16), general hospital (4/16), and private sector (3/16). The average age of the nurses was 43 years (range 28-55) and 15/16 were female. Most of the nurses (13/16) did not have previous experience of any well-being apps on mobile phone, but nine reported they were somewhat familiar with ACT and

used the methods at least occasionally in their work. Nine out of sixteen were using a smartphone.

Procedure

Two researchers (the first and the second author) presented the app to the DNS students during a lesson at the beginning of September 2013. Those who agreed to participate (16/19) gave their informed consent and completed a brief questionnaire with background information. Five participants had personal Android phones where the researchers installed the app, and the rest were given research phones with pre-installed app for the duration of the study. Three participants used an older version of the app due to the limited availability of different research phone models to give to the participants; the visual appearance was somewhat different in the older version, but the structure and the content of the app were the same and the user experience was very similar. The participants were instructed to familiarize themselves with the app and its exercises during the following weeks, and discuss their experiences on the online discussion board they were already using for other assignments in the training. One of the researchers initiated a dedicated thread on the board about the app and took part in the discussion.

Semi-structured focus group interviews [34,35] were carried out during the next face-to-face lessons in DNS training five weeks later by the same two researchers. One female participant was absent due to illness, and thus fifteen participants took part in the focus group interviews. The participants were divided into three groups with five people per group. The interviews lasted 1 hour 24 minutes for the first group, 55 minutes for the second group, and 1

hour 19 minutes for the third group. They were recorded and transcribed by one of the researchers. The main themes for the discussion are displayed in Table 1.

[TABLE 1]

Ethical approval for the study was received from the Tampere University of Applied Sciences.

Mobile app

The mobile app, named Oiva, was originally designed for working-age adults suffering from stress. Its purpose was to train the user in ACT skills that promote mental wellbeing and prevent burnout and depression [19,36]. The app was originally designed as a toolkit of exercises to 1) teach psychological flexibility through the ACT processes and skills, and 2) support learning ACT as a daily habit. Similar methods and exercises had previously been studied in treatment of depression symptoms with web-based interventions [27,28,37,38]. The app was available for the Android platform at the time of the study (September 2013).

The app contained 46 exercises that were presented as text and audio so that the user could choose between reading the instructions or listening to them. The exercises were arranged into four sections called Aware Mind, Wise Mind, Values and Healthy Body (see Figure 1). The first three sections taught the user ACT skills in mindfulness, cognitive defusion and values clarification, respectively, and the fourth section focused on physical wellness (relaxation, mindful eating and physical activity). The sections were further divided into 1-4 steps each with 5-8 exercises. All steps and sections had an introduction video which introduced and motivated the topic, and outlined the learning objectives. The exercises consisted of three parts:

introduction that presented the motivation to the exercise, exercise content as text and audio, and reflection that typically contained questions to help the users reflect upon what they had learned. The exercises were designed to be performed in different contexts: come exercises required a peaceful and quiet place to allow concentration, and certain exercises had more specific requirements such as walking in nature or performing mindful household chores. The exercise duration also varied from less than two minutes to over ten minutes, and duration could be freely chosen in some (e.g. the aforementioned household chores). While the user could navigate to any exercise in the app, it offered gentle guidance in the process by displaying the completion status of exercises and highlighting the next uncompleted exercise. A more detailed description of the app can be found in prior publications [19,36].

[FIGURE 1]

Qualitative data analysis

First, the second author listened to the interview recordings, entered notes into a spreadsheet according to the original interview themes (see Table 1) and transcribed significant parts. Then, the first author listened to parts of the interview recordings and read the notes and transcripts. In the subsequent analysis, qualitative content analysis approach was used [39]. Both researchers analyzed the data independently and grouped the emerging categories under the two overarching themes related to the objectives of the study: mobile app in self-management, and mobile app in depression nursing. The identified categories and sub-themes were then compared, reflected, discussed and refined at several meetings with all three authors to achieve consensus.

Results

Mobile app in self-management

Content and structure

All nurses considered the mobile app content very extensive (46 exercises about 10 topics). Most found it useful and interesting to have a large amount of material with a lot variety, although a few nurses brought up difficulties in grasping all the content: *"It could be condensed somehow. For example Aware Mind had many screens, could some of them be left out or combined?"* The app's guidance features that display the progress in the exercises were considered helpful in navigating the amount of information it offered, especially when returning to the app after several days of inactivity: *"If I had a week's break and didn't remember where I left off, it showed me that oh, it's completed. It was really good."*. The structure was considered logical, with brief and clear exercises: *"It was a bit like Wikipedia, you could narrow down what interested you and go there, and it was still easy."* Most of the exercises were well liked, but there was one values clarification exercise that most nurses found off-putting due to its name: *"The Obituary exercise made me cringe. I didn't dig it at all. The name made me feel that I really don't want to listen to this."*

Listening to the exercises was universally preferred over reading them. The nurses commented that listening was a more engaging way to go through the exercise, and that it provided the proper rhythm and pace: *"Some of the exercises I just read, blah blah blah, somehow the reading was really quick and I got nothing out of it, but listening gave a lot more"*. Through listening, the nurses were more likely to perform the actual exercise according to the

instructions, such as taking deep breaths. Nevertheless, audio was not pleasing to everyone due to the narrator's voice: *"The woman's voice was disturbing, a deep male voice would be more suitable. I've noticed that relaxation exercises are more calming when they're read by a man."* The nurses who disliked the female voice mentioned that being able to choose the narrator's gender would be the best solution, also because of possible past traumas: *"I think it would be good to be able to choose, because some people have had bad experiences."* Although the app was considered easy to use, several nurses found its appearance somewhat plain and wished for more colors and visually pleasing pictures to tune the user into the right mindset.

Learning process

Generally, the nurses who were familiar with ACT saw the mobile app as a suitable tool to learn ACT skills to maintain and improve mental health. Others mentioned the importance of the abilities to observe thoughts and develop a healthy self-image, and saw the app's exercises as a good way to learn them. The nurses viewed the app as an entity, and considered it beneficial to go through all the sections and exercises from the beginning to end: *"I think these exercises work as a whole"*. However, since the app tackled mental and physical wellbeing from so many angles, including mindfulness, acceptance, personal values, physical activity and eating behaviors, many nurses felt that users could benefit from starting from a specific exercise depending on their personal needs: *"People often seek help for symptoms"*. They suggested that the app should allow the user to search for exercises based on specific needs, such as relaxation, insomnia, stress, anxiety or self-esteem issues, or based on a specific situation or time such as workplace, bus or evening. As the other side of the coin, some nurses expressed concern that if a symptom-based solution were too easy to locate, the users might skip the rest of the exercises

and not benefit from the whole process. This concern was mitigated by a remark that if users would get help for an acute problem, the positive initial experience could motivate them to try out also other exercises.

The app's metaphors were in general considered fun and engaging, with a lasting impact: *"When you listen to and repeat the metaphors, I guess they stay in your subconscious and then pop up in some situation. And when you need that exercise, it comes into your mind in a nice, positive way"*. Two nurses also told anecdotes about anxiety-provoking situations in which they had already performed exercises that they had learned through the app: *"I was going to the doctor and was terribly afraid of it, my heart raced like crazy. And then it was funny, I wondered what Oiva would tell me to do, although I didn't have it with me, and then I started laughing that it would probably tell me to sit down, take a few deep and calm breaths, let your mind rest"*. However, some metaphors were considered demanding and several nurses said that understanding them requires commitment and planning from the user: *"If it's just there, even if it's in your own phone, but you don't plan ahead that today you'll do this and that, well, I didn't get around to doing them"*. One nurse even reported skipping difficult exercises, and another commented that the interest in the app waned over time.

Most nurses considered the video introductions to different topics a necessary part of the learning process, both to teach and to motivate the user. They stated that the introductions by a professor of psychology made the app credible and helped to gain the user's trust in the therapeutic approach: *"There's so much hooey around nowadays, how to find things that have a health-promoting impact? That's why it's good that it has those introductions before the sections,*

it adds to the impression that it has a scientific basis." Some nurses who had prior experience with ACT mentioned they found the video introductions more approachable and understandable than reading the same material from a book. However, the professor's presence in the videos divided opinions. In one of the groups the videos were felt to be lengthy: *"Introductions were quite long, I got the feeling that it's boring. I was looking at the plantations, what kind of flowers there are."* Also, this group saw the professor as *"a bit stiff, not an inspirational person"*. Incidentally, the nurses in this group were the least familiar with ACT, which may indicate that introductions were less comprehensible to people with little prior knowledge of the therapeutic approach.

The general consensus about the optimal pace for learning was to practice one or two exercises each day, instead of trying to tackle the whole content on one sitting: *"I think it should be that you use it daily during a longer period. Because it's a process, not like, you know, I listen to the whole thing in two days and then I'm like, what's wrong, why is my mood not lifting"*. For most nurses, especially those with no prior knowledge of ACT, the five week period was barely enough to go through all the material. They also stressed repetition: performing an exercise only once is not enough, the exercises should be repeated either with or without the app until the skills they teach become natural.

Learning from others' experiences came up as a potentially important aspect. Several nurses mentioned the discussion board as a reflection aid, both in terms of making them verbalize their thoughts and learning from others: *"Looking at the others' texts was like, oh, that's a new way of thinking, and then I checked out some things in the phone again. The*

discussion was motivating." They commented that any user of the app could benefit from having a discussion forum instructing them in the use of the app and keeping up the motivation.

Contexts of use

The nurses used the mobile app typically during breaks in their daily life. Most nurses had families and other duties beyond work, so the time they could spare on the exercises was limited. Therefore they considered short exercises an essential part of the app; they could find something suitable to practice even during short breaks: *"I think it's nice that the sections have different lengths, because often the free moments are minimal, so if you do an exercise in the middle of a workday it's good that there are shorter ones"*. The time issues were partly affected by the fact that most of the nurses did not have the app in their personal phone, and had to specifically arrange time to use the research phone: *"Such situations when I could have taken it into use in my own phone, like on a bus or sitting down on a bench during a walk, I couldn't make use of, and actually they were planned situations that today I'll listen to some section because it was a separate device"*. Also, three nurses reported initial problems in using the app due to technical glitches and unfamiliarity of the research phones. However, even those that used the app in their own phones sometimes found it challenging to find suitable time for practicing. The nurses also perceived some exercises more mentally taxing than others, either because they required long concentration or the topic was serious, such as an in-depth analysis of personal values.

Contexts of use mentioned by the nurses were night shifts in nursing work, exercising outdoors, at home and generally whenever they had free time or short breaks available. A few nurses had tried to use the app during household chores but noted that without proper

concentration, it was no use to try to go through the app while distracted with something else. Many used the app, especially its relaxation exercises, at bed before falling asleep. Some nurses performed exercises also together with their spouses or children, or gave the app to them to try out. One nurse kept the research phone visible as a reminder to use it: *"It was all the time on the living room table so that I could decide that now, now I'll start browsing this and looking at something. If I hadn't had it all the time visible on the table, I'd probably have forgotten about it."*

Dissemination

All groups spontaneously expressed views of possible dissemination methods for the general public, including word-of-mouth, app stores, print media and integration into education. Some nurses had already told about the app to their family or colleagues and inspired them to use it: *"My colleague had it a few times, and when she put on the progressive relaxation in the evening she woke up in the middle of the night like okay, it passed! She thought it was really good."* One nurse thought that ACT skills should be taught to all citizens as preventive health care and suggested including the app in high school curriculum. Similar line of thinking was apparent in other nurses' ideas about having the app's exercises in digital screens in transportation, when people tend to use their phones: *"On a train you'd get an advertisement, that since you're tapping on your phone, check out Oiva. And instructions, sit down, take a deep breath."*

Mobile app in depression nursing

Suitability for different client groups

All nurses saw uses for the app in prevention or treatment of mental health problems among adults and youth. The main issues the nurses would use the app for included depression, weight management, stress and substance abuse. The variety of the content was seen to offer something also for other care professionals, in addition to nurses: *"I thought that each occupational group can use it in their own sector, for example our nutritionist who talks a lot about mindful eating can take new elements into his practice... everyone can take a slice of it into their own work."* The nurses who worked in occupational health said that the app could be offered to anyone: *"I don't know any working-age adult who wouldn't benefit from this. I don't think you need to have a diagnosis to practise these."* Furthermore, the nurses who worked in a hospital setting saw potential uses in alleviating patients' fears and anxieties related to illness and treatment, and providing them something meaningful for long periods of waiting: *"During a long treatment the patient could have an opportunity to listen to an exercise."*

Many saw the app as a suitable tool for treating mild to moderate depression, but stressed that in severe depression comorbidities and the stage of recovery process would dictate its suitability for a particular patient: *"In specialized care, depression is usually so severe that it wouldn't work, but when the person gets better and goes home, it wouldn't be bad at all at that point"*. One nurse expected that the app would be received positively by depression patients, and would provide a convenient tool into clinical practice: *"We already give tools and practise relaxation, breathing during appointments. I think this is pretty clear, no need to go browse the Internet or get some cd from the library, this would be in the phone or on the computer."* The

initial breathing and observation exercises were considered beneficial for all clients regardless of their issues.

Psychosis and schizophrenia were identified as conditions that would in most cases preclude using the app with the patient: *"If you already hear voices inside your head, this might make you break down some"*. The nurses who worked with such patients who teeter on the edge of reality felt it would be safest to limit access to the app, and one mentioned that the leading psychiatrist at her workplace had made it a policy that psychotic patients would not be offered any audio exercises. Still, most commented that ACT principles about thoughts and attitudes would be useful to learn also for these patient groups, and it would not make sense to forbid the app: *"They find all sorts of stuff in the Internet anyway"*.

Five of the nurses expressed concern about one particular exercise, named "Obituary", which they felt was off-putting also on personal level. While they were positive about the purpose of the exercise, reflection on personal values, they suggested renaming it to e.g. "Anniversary speech" which would not immediately make the user think about death. The nurses said that although they discussed issues related to death and suicide with patients, they felt it was risky to have a direct reference to such themes in the app, especially since some patients could have terminal illnesses such as cancer.

In terms of demographics, age and gender came up several times. One nurse observed that her male colleagues had been a lot more interested in the app than her female colleagues. She assumed this was because of the typical male interest towards technology, although the nurses generally considered ACT more interesting to women. Many nurses presumed that the app

would be suitable mainly for young people: *"It's good for young people who walk around with earplugs on all the time"*. They also assumed older clients would have resistance against using a mobile app. However, some nurses were irritated by their colleagues' presumptions and instead insisted that the app should be targeted to people who are willing to work on their issues in such a way regardless of their age and gender: *"It's important not to target just certain age groups, but people who are interested and for whom this way of working would be suitable"*.

The need for a smartphone was noted to be a barrier for some clients. Some nurses stated that many depression patients come from demographics in which smartphone penetration is lower than average, which would make it more difficult for them to use the app. One nurse remarked that the users of the app would therefore be primarily those who can afford smartphones, which may not be equal to the clientele of DNS practitioners. In contrast, in occupational health the app was seen to be more easily deployable to clients.

Guided use with clients

Three more or less guided approaches in using the app as a tool in nurses' work with the clients emerged from the discussions:

1. In the first approach, a nurse assesses a client's need for care and based on the assessment may recommend the app to the client: *"For example, during a checkup I could give a leaflet and it would be the client's own responsibility if he's interested"*. This approach corresponds to the nurses' view that ACT skills are useful and beneficial for almost all adults and adolescents, even for clients without mental health problems. In this context,

the app works as an educational, preventive self-help tool, or as an initial help for mild symptoms.

2. The second, more engaged approach is guided use between face-to-face meetings with a nurse. The nurse chooses certain parts of the app according to the client's needs, e.g. choosing certain exercises for mild depression and other ones for weight management. The client would then perform the chosen exercises at their own pace between face-to-face sessions: *"One way to work with it is giving home assignments, you can instruct and guide that here's this kind of an exercise, how does it feel"*.

3. The third, even more engaged approach is to perform the exercises together with a client during a face-to-face meeting. The nurse guides the client in choosing appropriate exercises, they go through the exercises and finally reflect upon the thoughts raised by the exercise together. Such meetings could also be group sessions, in which several clients perform chosen exercises with the nurse and reflect together in the group afterwards: *"It's a really easy way for groups, since you don't have to know so much about the topic, you can just press play"*.

In all approaches, the nurses noted that motivating the client to use the app is a challenge. They remarked that especially clients with more severe problems are often resistant to new approaches: *"If a person is not so ill yet, he may be more receptive to such help, but when you go to specialized care, inpatient care, people may be more suspecting towards everything"*. With such clients, it is essential that the app feels credible and is based on scientifically proven

methods. According to most nurses, the introductory videos in the Oiva app make a good impression and help convince the client in this regard.

The nurses also engaged in a general discussion about motivating their clients to action in any therapy. They mentioned that especially depressive clients may have problems motivating themselves to any therapy form, and thus the potential benefits of using the app should be clearly presented to increase intrinsic motivation. However, they also remarked that if the client expects immediate benefits or "quick fixes" from using the app or practising ACT skills, there is a danger that they feel pressure to be immediately successful and as a result may end up with even more anxiety than before starting to use the app: *"How to get them realize, how to somehow emphasize that the idea isn't to browse through a lot of exercises in one day, I think it just increases anxiety, that this didn't help, and this didn't either"*.

Nurse education and training

The nurses emphasized that the more intensive guidance nurses provide to a client, the more knowledgeable they must be about the app: *"I should get even more familiar with it so that I could right away pick things from there, not just say that here's an app, try it out. So I could choose things that bring most benefit to the client"*. Considering the amount of content in the app, the nurses noted that taking it effectively into guided use would require a lot of work and commitment from themselves. They did not consider this a negative thing, but something that has to be taken into account in planning and resourcing.

Most nurses mentioned that having the app as an assignment in the DNS training forced them to dedicate time in exploring it: *"I probably wouldn't have had time to focus on this if I had*

just been interested, but now that it was also an obligation it kind of came with it." Having the app in the personal phone also made it easier to arrange time for it. Eleven of the sixteen nurses did not own a personal Android phone and were thus given a research phone for the duration of the study, and since they did not carry the research phone with them all the time, they used it less and had to put extra effort in learning to use the phone in the beginning. To get really familiar with the app, it would be best for the nurse to have access to it through their own personal device.

Prior knowledge of ACT played a role in the nurses' willingness to start using the app with their clients. Those less familiar with ACT said they could nudge the patients towards trying out the app, but they were hesitant to actively guide the clients in the app's exercises: *"My own training limits it, since I don't have enough knowledge... I never perform any exercises with patients because I don't have the skills. But I'd like to do it, if I knew how. And if I knew it helps with acute problems."* The work setting and problem severity also played a role – nurses working in specialized care services had more restrictions, whereas nurses working in occupational health, community care or rehabilitation were more open in taking the app into use.

Adoption in organizations

As the app was received positively by most nurses, several had already taken steps in introducing it into their workplace: *"I took it to work and well, we are using cd's for the patients, so they got excited and now we've ordered a smartphone. When the app comes out we'll take it into use and there are people who are more familiar with the topic."* One nurse was planning to start a new group using the app, and some said that it was their mission to spread the word to other

professionals. The app was seen as easy to adopt into practice because it could be offered to almost anyone: *"I showed it to the senior physician like, look what we got from school, and he was very interested too. It could work really well with some and it would be accessible."* However, some nurses pointed out that using the app effectively would require an explicit care model and pathway which the nurse could rely on.

While most nurses were willing to take the app into use in their work, they mentioned the need for smartphones as a barrier. At the time of the interviews, the mobile app was soon to be released for the general public and the web version was due in a few months. The nurses asked spontaneously whether the app was going to be available on the web, and the interviewers told them that an iOS version already existed and a web-based version would soon be available, allowing use also on computers, tablets and other smartphones. Hearing this, the nurses commented that a browser-based web service would be easy to take into use in nursing practice, because many of their facilities already had web-enabled computers in the premises for client use. Overall, the nurses still preferred mobile phone due to its support for varied contexts of use and it being a personal device for sensitive issues.

Only two nurses explicitly expressed some resistance towards using the app in nursing work. One of them preferred human contact over computers, and the other was slightly concerned about technology replacing other treatment options: *"It's all right, as long as it won't become the only treatment. It's one tool, not an end in itself."* However, several noted that the general resistance to new approaches among patients and professionals could hinder the

adoption. The growing evidence base about ACT and specifically about the Oiva app was considered to be essential precursor in the widespread adoption.

Discussion

The results of the study indicate that nursing professionals consider the Oiva mobile app a credible, feasible and useful self-management tool, suitable for use in prevention and treatment of depression and other mental issues. Most nurses were eager to adopt the app in their clinical practice and three distinct models of using the app with clients emerged, with varying degrees of professional support. However, in order to take the app optimally into use in clinical practice, organizations would need to invest in training the personnel and acquiring the necessary technology. Moreover, although the findings suggest that the app could be a beneficial tool in treating mild to moderate symptoms in primary care, occupational health and rehabilitation, only trained professionals should use it with patients who have severe problems such as psychosis or schizophrenia.

The results about the app's use as a self-management tool among the nurses correspond to earlier findings: short and simple exercises were considered essential and useful, and the primary contexts of use were during short breaks, at home and before bedtime [19,29]. The nurses described the optimal use of the app in a similar way as forming a habit: one or two exercises at a time, focus on the long term process with repeated practice until the skills become ingrained into daily life [40]. This indicates that the design of the app supports training ACT skills and turning them into habits, and provides a flexible tool for professionals.

In previous studies, some users would have liked to have more guidance in the Oiva app, such as a scheduled program or tailored content to their personal needs [19,41,42]. As the nurses primarily observed the app as a tool they would use with their clients, they suggested that planning the scheduled program would be their responsibility and integrated into their face-to-face or group therapy meetings. Guided use is likely to produce a higher impact than stand-alone use; prior research has established that having professional support increases commitment and impact of mental health apps [43]. The original design of the app guides a user through the program but does not support a professional in finding suitable material to a client. Hence, a successful adoption of the app into clinical practice is likely to require additional decision support and training to help nurses to provide blended care by choosing exercises to recommend to their clients or schedule into their client meetings [44]. This kind of tailored support could also be built into the app [45], which could ease the adoption by reducing the time and effort needed to get thoroughly familiar with the app. In a wider context, decision support tools for choosing the suitable evidence-based app for a particular client are also needed [46].

The nurses acknowledged the potential benefits of the app on mental health and were generally eager to take it into use, especially in preventive settings such as occupational health. This aligns to the original purpose of the app: a self-management tool for people with mild symptoms, who could find the app on their own or through a professional's recommendation [19]. The app was also considered a potentially useful treatment supplement for moderate or severe mental health problems, although supervision of use is essential with such client groups to prevent harmful consequences. In addition to guiding the client to independent use, the nurse could also perform the app's exercises with a client in a face-to-face meeting or in group

sessions, which considerably broadens the possible use scenarios. The app can make a nurse's work easier in such a context by allowing the exercise to be listened from the app. The findings suggest a stepped care model with an increasing degree of professional support and guidance as the severity of the problems increase (see Figure 2), which bears resemblance e.g. to the model utilized in the United Kingdom [47]. In such a model, it should be made clear to the clients that the purpose of an app is to complement face-to-face support, not substitute it, and the evidence base needs to be clearly illustrated [48]. Otherwise, the clients may be resistant towards the blended care model, as the nurses' perceptions in the present study also indicate.

[FIGURE 2]

While adopting the app in preventative settings and with mild symptoms appears relatively easy, several barriers for using it with depression and other mental disorders were identified. In addition to potential harmful effects among patients with a thin grasp on reality, the time and effort needed to utilize the app effectively is likely to hinder app usage among clients with mental fatigue and limited cognitive capacity. Professional support plays a crucial role in maintaining motivation and helping in reflection. Clients suffering from depression may not necessarily have to do all the exercises in the app, and those with severe depression could be guided to take it slow and do only a couple of new exercises per week. It should also be noted that while the timeline of the present study was only five weeks, the optimal timeline of using the Oiva app is likely to be significantly longer for clients with no prior exposure to ACT. In comparison, the feasibility study of the app [49] had 15 stressed participants who were given the app for one month after a brief introduction. They used it on average 3.2 hours spread over 12

different days, and 73% said that one month was too short to apply the skills properly to their own life. Further, in the RCT study with stressed and obese adults [36], participants had an initial group meeting and 8 weeks of independent use of the Oiva app. Although the results of the RCT study have not yet been published, it appears that 8 weeks is closer to a suitable schedule, with one or two exercises performed several times a week.

Prior knowledge of or parallel training in ACT would be recommended for nurses working with challenging client groups in order to apply the app's exercises properly. If a nurse is well acquainted with ACT, they can teach the skills to their clients even without the app, and the findings of this study suggest that the app can work as a “refresher”. ACT is not yet commonly taught to DNS practitioners in Finland, although it has recently been included in the official care recommendations as one of the options for treating mild depression [5]. Using ACT and the app may thus depend on the individual nurse’s knowledge and motivation. However, this may not be enough; the care organization must also support or at least accept using the app in clinical work in order to utilize it on a wider scale. This naturally depends on the severity of the problem: nurses can easily recommend the app to clients with no or mild problems but using the app in treating more severe problems such as psychotic depression or schizophrenia is likely to require approval from their superiors. Approval process for using the app with the patient varies depending on the work setting, but it is usually the senior physician, psychiatrist or psychologist who makes the decision in applying new methods, and after the formal decision the methods still need to be disseminated to the wider organization. Training selected professionals, such as the nurses in the present study, may help in dissemination. Mental health professionals may be more likely to adopt new techniques when hearing about them from a colleague or a mentor [33].

Another challenge in the organizational adoption is the technology itself, since not all facilities are equipped with modern devices or technological expertise [6]. Mobile technology with audio and video content that requires a good-quality device has been particularly challenging. The nurses in this study were positive towards using smartphones in nursing practice and some of them had already convinced their managers to invest in a smartphone to be able to use the Oiva app. However, as other researchers have noted, it falls under the responsibility of managers and leading physicians to spur the adoption of new technology in the organization [32]. Furthermore, our findings indicate that nurses should have the app in their personal devices in order to become truly knowledgeable about it. Web apps that can be used on most devices can be a big step towards wider adoption of technology-aided prevention and treatment methods. All nurses in our sample knew how to use a computer and a web browser, and Internet use is still higher in Finland compared to smartphone penetration; in 2015, 87% of Finns aged 16-89 used the Internet, and 69% owned a smartphone [50]. However, both the participants in a previous study [19] and the nurses in this study stressed that it is best to have the app in a mobile device that is always with the user.

The nurses' assumptions about gender and age as barriers to the use of app will be an interesting challenge. These assumptions may be somewhat grounded to reality, or they may be mainly prejudices, as some nurses pointed out. This suggests that the professionals' reluctance to recommend technological tools to certain client demographics can be a barrier to their adoption. While a smaller proportion of older age groups owns a smartphone [50], individual differences are likely to outweigh the demographic differences and one of the main determinants for assessing client suitability should be their willingness to try out the new approach. Moreover, the

roles of technology literacy, education level and socioeconomic status as determinants of the app use may merit further investigation.

This study has three major limitations. The first is the small sample size of fifteen interviewed nurses, whose views do not represent all nursing professionals, especially since they were all recruited from the same DNS training. However, the nurses came from a variety of work settings, so they were able provide a broad view on the field ranging from occupational health to psychiatric wards. The second main limitation is that the nurses had the app only in their personal use, not in actual work with clients. This was partially due to the short duration of the study, which was dictated by the schedule of face-to-face lessons in the DNS training. Although a few nurses had shown the app to their clients, the results are mainly based on the nurses' opinions and speculation about how they would use this kind of tool, not on observing the actual use with clients. However, many nurses had sufficient time to get deeply familiar with the app, and thus they were able to form a solid view about how they could use the app in clinical practice. This provides an interesting direction for future research. The third limitation is the lack of prior experience with wellness apps and smartphones among most of the participants, which may bias the observations about technological challenges. Nevertheless, the lack of experience reflects the real-life situation, where many nursing practitioners do not have sufficient skills to use mobile devices. Studies in other countries have also identified technical issues as barriers in using technology in nursing education and practice [31,32].

The app examined in this study is currently available for free in Finnish on Android, iOS and web platforms [51], and it can be easily translated into other languages. The most substantial

effort in translation relates to filming and recording the audio and video content. The app has thus far been studied only with Finnish clients and nurses and therefore the results are not necessarily generalizable to other cultures. Nonetheless, ACT is a widely used therapeutic approach and the app should therefore be applicable in any culture as a tool for professionals that utilize ACT as a therapeutic approach.

This study suggests that nursing professionals are open towards adopting mental health apps in their clinical practice, if the apps are credible, evidence-based and easy to use. Widespread adoption could be successful if app use and blended care models were integrated properly in the training of nursing professionals. Further investigate into actual uptake is warranted.

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Tables

Table 1: Focus group interview themes and example questions.

Interview theme	**Example questions**
Initial impressions about the mobile app	What was your initial impression of Oiva? How did you feel about it?
Personal use of the app during the five-week period	How have you used Oiva personally during your daily life?
Potential uses for the app at nursing work	How could you use Oiva in your work? Have you shown it to your colleagues? Do you think your clients would use the app?
Potential uses in depression care	Are you planning to use Oiva with depression patients? What benefits could it bring? Do you have any concerns about using the app with this target group?
The app's content and structure	Was it easy to understand what you should do next in the app? Which exercises were particularly useful or challenging?
Improvement suggestions	What would you change in Oiva? What is missing?
Potential harm for the clients	Could Oiva be harmful to some clients or patients?

Figure Legends and Figures

Figure 1. Screenshots of the mobile app. Top left: the main menu and the four available sections. Top right: the content of the section “Aware Mind”. The user has already seen the introduction video (“Introduction”) and completed one exercise (“Mindful Breathing”) so the app marks them as done and highlights the next exercise. Middle row: screenshots of performing an exercise by listening to the audio (left) or by reading the text (right). Bottom: after the user has performed an

exercise, the app presents reflection questions that encourage the user to think about the exercise and how to apply it in their life.

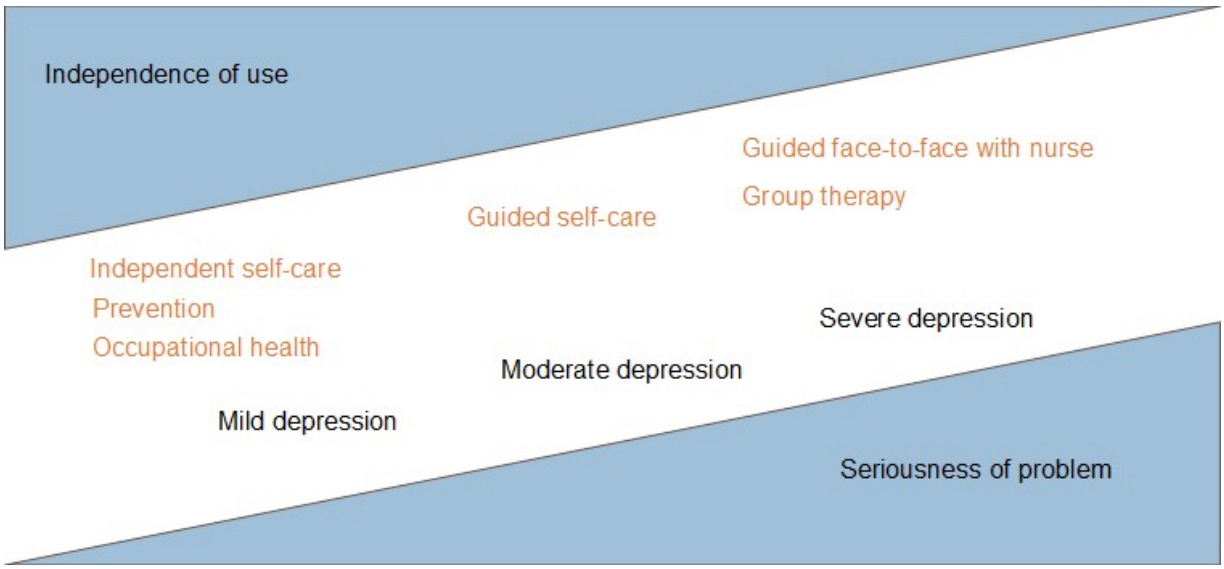

Figure 2. The degree of independent use of the mobile app in increasing severity levels of depression according to the stepped care model (based on [52,53]).