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USING MOBILE APPS AS A SOCIO-PSYCHOLOGICAL STRATEGY OF REHABILITATION

Dvornyk M.S. Using mobile apps as a socio-psychological strategy of rehabilitation

The article is dedicated to the role of mobile apps in the psychorehabilitation strategy alignment. The main benefits for mental health mobile apps users are underlined. It is also postulated that the target of numerous mental health mobile applications is providing psychoeducation and interventions for disorders. But the psychorehabilitation process should focus on disorders prevention and turning a person back to his/her normal resourseful condition. It is shown that for Ukrainian citizens in a current military situation in the East the usage of nonclinical population friendly apps is urgent and promising. The requirements for three Ukrainian-language mobile services are overwieved. The "Socio-Psychological Support of Adaptation of Veterans" course embedded in the app "Pocket Psychologist" meets 9 out of 16 requirements for mental health mobile apps. The "Mobile psychological help" service matches 8 requirements. The "PFA Mobile Ukraine" app has 7 strong advantages. The synchronous usage of presented apps as a wide socio-psychological psychorehabilitation strategy is substantiated.

Keywords: electronic health services, mHealth, mental health mobile apps, psychological rehabilitation, PTSD prevention.

Дворник М.С. Використання мобільних додатків як соціально-психологічна стратегія реабілітації

Статтю присвячено розгляду ролі мобільних додатків у вибудовуванні психореабілітаційної стратегії. Підкреслено основні вигоди для користувачів мобільних додатків зі збереження ментального здоров'я. Постульовано також, що метою більшості психологічних мобільних додатків є

психоедукація та провадження інтервенцій щодо діагностованих розладів. Але психореабілітаційний процес вимагає фокусування на попередженні розладів та поверненні людини до її нормальних ресурсних станів. Показано, що для жителів України в умовах наявної воєнної ситуації на Сході, використання неклінічно орієнтованих психологічних додатків є нагальним і багатообіцяючим. Оглянуто 3 додатки з ракурсу задоволення базовим вимогам до мобільних додатків зі збереження ментального здоров'я. Курс «Соціально-психологічна підтримка адаптації ветеранів», вбудований у додаток «Карманный психолог» задовольняє 9 з 16 вимог. Сервіс «Мобільна психологічна допомога» відповідає 8 вимогам. Додаток «PFA Mobile Ukraine» має 7 сильних переваг. Обґрунтовано одночасне використання представлених додатків в якості широкої соціально-психологічної стратегії психореабілітації.

Ключові слова: електронні сервіси зі збереження здоров'я, mHealth, мобільні додатки зі збереження метального здоров'я, психологічна реабілітація, попередження ПТСР.

Дворник М.С. Использование мобильных приложений как социально-психологическая стратегия реабилитации

Статья посвящена рассмотрению роли мобильных приложений в выстраивании психореабилитационной стратегии. Подчеркнуты основные выгоды для пользователей мобильных приложений по сохранению ментального здоровья. Постулировано также, что целью большинства психологических мобильных приложений является психоедукация и предоставление интервенций относительно диагностированных расстройств. Но психореабилитационный процесс требует фокусировки на предупреждении расстройств и возвращении человека к его нормальным ресурсным состояниям. Показано, что для жителей Украины в условиях имеющейся военной ситуации на Востоке, использование неклинически ориентированных психологических приложений является

безотлагательным и многообещающим. Осмотрено 3 приложения с ракурса удовлетворения базовым требованиям к мобильным приложениям по сохранению ментального здоровья. Курс «Социально-психологическая поддержка адаптации ветеранов», встроенный в приложение «Карманный психолог» удовлетворяет 9 из 16 требований. Сервис «Мобильная психологическая помощь» соответствует 8 требованиям. Приложение «PFA Mobile Ukraine» имеет 7 сильных преимуществ. Обосновано одновременное использование представленных приложений в качестве широкой социально-психологической стратегии психореабилитации.

Ключевые слова: электронные сервисы по сохранению здоровья, mHealth, мобильные приложения по сохранению ментального здоровья, психологическая реабилитация, предупреждение ПТСР.

Problem statement in general and its connection with important scientific and practical tasks. The modern world is saturated with ubiquitous technologies and electronic services – from governmental management to providing the most diverse services to average users. Personal computers and a variety of portable devices became extremely popular and persistently rooted in the everyday reality of life, changing the ways of human interactions. Of course, the swiftness and ambiguity of the impact of such technological transformations on the human psyche are often a cause for worries. But why not think more optimistically? Why not bet on the fact that the skillful use of electronic gadgets, in contrast, has enormous potential for ensuring the psychological well-being of the population?

Electronic gadgets with their quick information and gamification tools can play a big part in rehabilitation and readaptation processes for lots of people. Western healthcare specialists have been using electronic health services since 1990-s as mailing by sms and e-mail, specified computer programs, online counseling and psychotherapy. And today there are thousands of mental health mobile applications to promote healthy lifestyle by

psychoeducation, to provide self-assessment and self-monitoring, psychological prevention and intervention, and to encourage in social support using for numerous mental health problems.

For the present-day Ukraine, the solution to the problem of psychotraumatization, which arose very sharply due to military events in the East, is one of the most important directions of psychorehabilitation. After all, among soldiers participating in military operations, there is a risk of neuropsychic disorders receiving for every fifth participant without physical injuries, and among the injured and disabled ones – every third participant. The peaceful population, in particular, the families of militarians and internally displaced persons, as well as those who are monitoring events remotely, also experience destructive consequences of psychotraumatisation. Using mobile apps can be the gateway to provide help to every victim without any special procedures, while traditional psychological interventions need more time, space and money.

Recent research and publications analysis. The reviews of acceptability of electronic mental health services for solving psychological problems in terms of advantages and disadvantages were made by Klein and Cook, 2010, Casey L.M. et al., 2013, Eichenberg et al., 2013, Musiat et al., 2014, Brown, 2015, Prentice, Dobson, 2014, Bakker et al., 2016, Apolinário-Hagen et al., 2017. The agenda of integrating mental health mobile applications (MHMAs) into psychological counseling and therapeutic practice was in works of Cuijpers et al., 2010, Andersson et al., 2012, East, 2015, Watanabe et al., 2015. The most effective psychotherapeutic modality delivered electronically was presented as cognitive behavioral therapy by Kaltenthaler et al., 2008, Richardson et al., 2010, Foroushani et al., 2011, Ly et al., 2012, Muench, 2012, Aguilera, Watts, 2013, Andersson et al., 2013, So et al., 2013, Musiat, Tarrier, 2014, Bucci et al., 2015, Tang, Kreindler, 2017. The ideas on how to provide better healthcare delivery to users by means of mental health apps were in works of Donker et al., 2013, Jones et al., 2014, Mar et al., 2014, Musiat et al., 2014, Price et al., 2014,

Dicianno et al., 2015, Macias et al., 2015, Proudfoot et al., 2015, Yardley et al., 2015, Loo Gee et al., 2016.

Previously unsolved aspects of the problem. Numerous mental health apps are already developed and available to every mobile device user. But there are any guidelines on how to make this usage efficient, which apps have sufficient evidence for usage, and why do specialists have to popularize verified mental health mobile apps. So **the purpose of the article** is to reveal the features and to clarify the appropriateness of mental health apps usage for Ukrainian-speakers who seek psychorehabilitation.

The main research material. Smartphones and other mobile devices are becoming integral to mental health apps for several reasons. First, as mobile devices become more prevalent, individuals are becoming accustomed to carrying them unremittingly and using them for many different purposes, one of which is healthcare in general and mental healthcare particularly. Second, as people carry smartphones throughout the day, the device can collect ecological momentary assessment data, which are data obtained in real time when a person is in his or her natural environment, so it is easy to dispense timely, point-of-care treatments delivered when a symptom or need is identified. Third, smartphones can connect to external devices either directly or wirelessly. These external devices can be placed on or within the body to sense, sample, process, or transmit physiological signals. Examples of signals include temperature, heart rate, blood pressure, oxygen saturation, electrocardiography, electromyography, energy expenditure, glucose level, and environmental conditions. This information may be useful clinically to reduce cost and time associated with travel and from a research perspective because it provides objective data on adherence. Finally, smartphones also contain numerous internal sensors (eg, global positioning system, gyroscope, oscillometer) that can be used with external devices to allow specialists to monitor a variety of contextual factors about a client's activities [2, p. 399].

But what are the benefits of mental health mobile apps namely for users? First, the client may be able to use the system to track and

record data of interest, such as vital signs, or time spent exercising. The user also may access educational materials such as exercise videos, diagrams, or instructions. MHMAs may also extend the therapeutic interface time by enabling 2-way communication at a time and place of convenience for the client. This mobile on-demand access creates new opportunities for clients to strengthen their relationship with their psychotherapist, reinforce their understanding of the plan of care, confirm home exercise techniques, receive education, and proactively address relevant concerns [2, p. 400].

On the other hand, when a person who needs psychorehabilitation doesn't have opportunity to receive any individual psychotherapy in terms of payment limits, there are dozens of cost-free MHMAs to download and use without guiding specialist. Apps are great opportunity to get specified help by individuals without transportation or by those who live in rural settings as they may have access to interventions that otherwise wouldn't be available to them. Furthermore, once a program is downloaded and installed, several of the apps do not require an Internet connection, and access is therefore not confined to network parameters [7, p. 285]. In terms of negative stigma associated with seeking psychological support MHMAs are also very helpful as allow anonymous utilization in the privacy of the user's home without any shade of shame.

Although there are thousands of mental health mobile applications, most of them don't focus on psychorehabilitaion as a target. MHMAs, actually, provide psychoeducation and interventions on a myriad of topics, including dementia, anxiety, depression, relaxation, sleep, obsessive compulsive disorder, burnout prevention, stress management, mood tracking, domestic violence, and posttraumatic stress disorder [3]. In Western clinical traditions psychorehabilitation concerns a range of disabling conditions which are, first of all, mental disorder. But we should focus on prevention the disorder and turning a person back to his/her normal resourseful condition.

Taking into account current military conflict situation in Ukraine there are more risks of posttraumatic stress disorder (PTSD)

symptoms developing than in peaceful times. Thus, MHMAs should become a tool for quick access to specified information about PTSD and its managing. Re-experiencing, avoidant and hyperarousal symptoms can really be managed and decreased on the first stages of PTSD while using the MHMA. This was demostrated in the evaluation studies of such app as "PTSD Coach" on a 45 sample of military veterans, who endorsed being moderately to extremely satisfied with the app and showed significantly greater managing improvements in PTSD symptoms (p = .035), depression symptoms (p = .005), and psychosocial functioning (p = .007) [5; 6].

While "PTSD Coach" is available only in English Ukrainians have another apps to use. These are the course "Socio-Psychological Support of Adaptation of Veterans" ("SPSA") which is integrated to the Russian-language app "Pocket psychologist"; the modification of the Canadian app "OSI Connect" named "Mobile psychological help"; and Ukrainian version of "PFA Mobile". To understand their appropriateness and other usability issues for clients we can use the recommendations for MHMAs utilization conducted in the study of Bakker et al., 2016 [1].

The first course abbreviated **"SPSA"** suggests 30-days-program and encourages the user to work on his/her own. It is free of charge and can be downloaded in the PlayMarket for Android devices. This app is very promising because it is *based on cognitive behavior therapy* (CBT), which is recognized as the most supported approach to generate behavioral, cognitive, and emotional adaption as self-help. Researches demonstrated that CBT-based self-administered computerized interventions are successful for improving depression and anxiety symptomatology in young people and adults [1]. This means that CBT-based mental health app has the potential to be effective for managing both clinical and subclinical psychological problems. The "SPSA" unifies the factors context engagement, attention change, and cognitive change, which are needed in CBT, and includes therapeutic processes such as attention training, acceptance or tolerance training, and mindfulness. Behavioral experiments are CBT-based challenges that individuals

perform to challenge their own beliefs about the negative outcomes of various situations, so this process can challenge unhelpful beliefs.

The second benefit of using "SPSA" is a *mood tracking opportunity* which is not bounded to specific psychological problem, but can be used both for anxiety and for just low mood. It means that the app can be used not only by veterans or those who necessarily had the PTSD symptoms. Thus, the app is also good for *use by nonclinical populations*. The support conducted by this app can help prevent relapse, expand an individual's coping skills repertoire, and assist individuals experiencing psychological distress to avoid developing a clinical disorder.

As for the *automated tailoring*, the "SPSA" is not highly sensitive for user's needs. You can only regulate your feedback by e-mail after the course end. The notifications for mood tracking are not regulated by user and the mails with every-day instructions come only at the set by developers time.

Reporting of thoughts, feelings, and behaviors is available in this app just as self-monitoring which is not interactive, so the user cannot get immediate online support. But "SPSA" have the feedback tools about user's mood history, what can boost overall emotional self-awareness. The ability to differentiate and understand personal emotions is positively related to adaptive regulation of emotions and positive mental health outcomes. Using technology for self-monitoring can also increase help seeking outside the app and encourage user to get face-to-face therapy (because factors preventing help seeking include low emotional competence and low self-awareness).

The "SPSA" also recommends such activities as exercises and *direct mood improvement, behavioral activation, and coping skills training*. As for activities that directly enhance mood improvement there are recommendations to increase physical activity. It is well established that increasing physical activity and promoting exercise can reduce depressive symptoms and anxiety, and improve psychological well-being [Bakker]. Another activity that has been directly linked to mood improvement is music listening, but there are

not recommendations for it in this app, so there must be used apps founded by "relaxation music" search in the application store.

It is known that inactivity perpetuates itself via a vicious cycle of low mood: inactivity can lead to decreased opportunities to experience pleasure or gain a sense of mastery, which in turn leads to an increase in negative thinking [1]. So the behavioral activation which is a key CBT technique to help relieve anxiety is also there in the app program. Its aims are to (1) encourage the planning of activities and the setting of goals so that clients move away from relying on mood-dependent behaviors; (2) break cycles of avoidance behavior; and (3) develop skills that focus attention on the present moment to enable engagement in activities and associated experiences of pleasure [1].

As for the coping skills training it is the most direct way of improving self-efficacy and decrease the negative effect of stressful events on physical health. Avoidance plays a key role in the development of range of psychological disorders, so interventions that boost coping skills by encouraging participation in psychologically beneficial activities will both reduce day-to-day distress and help prevent disorders from developing. The app offers the user to develop the relaxation skills which are not only develop skills to reduce physiological arousal, but also builds self-efficacy and confidence in coping ability.

While using "SPSA" clients can also get special *mental health information* about PTSD. This teaches them about the psychological processes underlying their distress and inform them of resources available to manage it. Unfortunately, the app is not using the range of smartphone possibilities such as multimedia and audiovisual tools, because this kind of brief, passive psychoeducation shows up to be more effective than just text. Anyway, any mental health information can increase treatment credibility, thereby motivating users to engage with a given treatment, and can provide evidence-based justifications for performing recommended activities.

The high engagement potential of smartphones means that users are able to seek help for psychological challenges in the

moment they are experiencing them or soon after [1]. The "SPSA" has a little gap before the user can be involved in self-guided psychorehabilitation. While *real-time engagement* opens up more opportunities for learning and applying coping strategies in ecologically valid contexts, long-running interventions which are using in "SPSA" are designed to increase users' overall resilience and optimism.

As for *linking recommended activities to specific psychological challenges* the "SPSA" does not trigger engagement with an intervention. The app requires users to engage with it regularly and encourage them to do so by reminding them of the benefits offered by the app (by notification for mood tracking). However, the activities recommended by this app are not directly linked to any specific mood problems that users may be experiencing.

The "SPSA" still *encourages nontechnology-based activities*. Encouraging users to engage in real-world activities, off the device they are using, respects therapeutic ethos and fosters the environmentally valid application of skills. In this context, it is also of note that depression and lower psychological well-being are correlated with Internet use, especially among introverts with low levels of social support. Thus, the app helps to balance app-based technology use with positive behavior change strategies and limits use of avoidance coping strategies.

Gamification is a novel solution that may help counteract problems with motivation and yield additional well-being outcomes, but this is not used in the "SPSA" at all.

The log of past app use which can potentially raise intrinsic motivation and increase users' investment in the app is shown in only in the "SPSA" just by mood tracking tool. There is no specific log for exercises and recommendations accomplishment.

As *reminders* can increase adherence and reduce dropout from self-help the "SPSA" has no troubles with this issue. The every-morning mailing and few-times-a-day push-notifications for mood tracking are good alerts to keep the user engaged to the app. But although external triggers in general can be useful to remind users of

an app, this push-notifications can be annoying and lead to disengagement. On the other hand, the user can refuse mood tracking anytime.

The requirement for *simple and intuitive interface and interactions* is also met in "SPSA". But it cannot be said that this app has interesting graphic design enough to involve the user to interventions. Although the main advantage of "SPSA" is simplicity which reduces the likelihood of technical difficulties that may dissuade users from engaging. The language of the app's psychoeducative information imple, concrete, confident, and hopeful for users to understand and engage with interventions. It is also nonclinical, nonpsychopathological, and nondiagnostic to avoid stigma.

What is not thought out in the "SPSA" are the *links to crisis support services*. They could be the valuable resources for vulnerable individuals undergoing acute psychological distress: crisis telephone hotlines could help in cases of suicidality, hopelessness, and psychological pain; social centers could help to get relevant supports in cases of any kind material losses.

As for *validity and reliability* of the "SPSA" it doesn't have proven studies on efficacy, but the CBT-based training program in its core was evaluated by the specialists of Ukrainian Catholic University in 2016 [4]. Unfortunately there are any assessment tools administered before and after a set period of app use so there is also no opportunity to understand the app efficacy.

So the "SPPA" course has about 9 strong advantages out of 16 requirements for MHMAs. In addition, it is also possible to use the app offline (Internet on the device should be turned on at least once a day for the updates).

Another service **"Mobile psychological help"** is available on http://psyservice.org/. Actually, this version is not a smartphone app, but can be conveniently opened in the browser of any mobile device. The program allows users to evaluate their own status in such categories as sleep quality, depression and PTSD, and also contains text-based materials sorted in the menu.

The strongest advantage of this service is *psychoeducative information*. The "Mobile psychological help" is well positioned to deliver psychoeducation, as it can engage users with a range of text and videos. This info concerns symptoms of PTSD; assistance to family members with combat psychotrauma; management of anger and anxiety; control of depression; alcohol and drugs addiction; stressed relations with close people; psychological resilience; returning to peaceful life.

Another strong benefit of the service is a list of *links to crisis support services*. There are presented clinics and psychological assistance services sorted by Ukrainian regions.

The advantage of the service is also an opportunity to complete *self-report questionnaires*. The menu includes the tools by which victims and caregivers can evaluate their own status (questionnaires for sleep quality, depression, and PTSD / depression and post-traumatic stress).

Except this, we can see that this service is also designed for use by *nonclinical populations*, *recommends activities* to boost self-efficacy and repertoire of coping skills, allows *real-time engagement*, encourages *nontechnology-based activities*, has *simple and intuitive interface*.

Thus, the "Mobile psychological help" in terms psychorehabilitation needs matches 8 requirements out of 16. But the tools given by this service have any therapeutic strategy embedded into an app, and should be used as subsidiary ones.

Finally, an app **"PFA Mobile Ukraine"** contains detailed recommendations for the provision of the first psychological help after receiving a psychotrauma. But the app is predominantly an informational tool for caregivers, for peers, professionals and relatives who find themselves next to the injured person.

The pshychorehabilitation seekers can find only few advantages for themselves in this app. The first one is *sorted information* conveniently embedded to the menu: About the first psychological help; Typical reactions to stress; Self-preservation; Key Stages of First Psychological Help. The second one is the list of

links to support services: The road map to the victim; Safe departure to the peaceful territory; Humanitarian help; Settlement / housing; Social welfare; Legal aids; If Ukrainian citizen is detained on the territory of Russian Federation; Medicine; Physical rehabilitation and treatment; Psychological rehabilitation.

Another benefits of this app are: *nonclinical populations* friendly, *activities recommendations*, *real-time engagement* opportunity, *encouraging nontechnology-based activities*, *and simple interface*. So, there are 7 strong advantages to use the app in the psychorehabilitation process.

As we can see, presented apps have their strengths and weaknesses. That's why the psychorehabilitation strategy should be grounded on the most effective and therapy-oriented app ("Socio-Psychological Support of Adaptation of Veterans") and include the usage of accompanying apps ("Mobile psychological help" and "PFA Mobile Ukraine"). Thus, using all their strengths the psychological self-help can be realized in all needed items:

1) Inventory (actual situation assessing tools and exercises);

2) Skills (training techniques to cope with symptoms);

3) Perspectives (exercises for reinterpreting own experience, receiving hopes, techniques for planning the future);

4) Monitoring (tracking system for changes);

5) Confidence (methods for forming a value of own priorities and acquired skills conducting into everyday practice).

While recommending an application as an instrument of psychological care, the practician need to understand whether the psychorehabilitation seeker is able to use it at all and whether he agrees to a rather routine work with his cognitive sphere, since this does not always bring fast and visible results. Also, when loading an application, you need to adequately perceive its capabilities and be careful about its development, so that the client does not hurt himself.

Conclusions. Mobile applications, for sure, solve a lot of resource issues in the psychorehabilitation process for greater number of people. There are scientifically proven strategies for providing psychological assistance to people who have undergone

psychotraumatisation and do not conflict with the electronic delivery format at all. Therefore, these strategies, packed in mobile applications, have long been used successfully in the Western countries. As for Ukraine, there are 3 available apps to be used altogether: the "Socio-Psychological Support of Adaptation of Veterans", the "Mobile psychological help", and the "PFA Mobile Ukraine". These services meet most of the requirements for mental health mobile applications, and the strongest are cognitive behavioral therapy based exercises, assessment and monitoring tools, and links to crisis support services. We still need empirical studies to prove the effectiveness of Ukrainian-language psychological mobile apps for further assistance or adaptation. So this opens up the **perspectives** for further researches on how to increase the attention of specialists to the possibility of including such an instrument in their own practice and to make the MHMAs popular among ordinary users who seek psychorehabilitation outcomes.

References

1. Bakker, D., Kazantzis, N., Rickwood, D., & Rickard, N. (2016). Mental health smartphone apps: review and evidence-based recommendations for future developments. JMIR mental health, 3(1).

2. Dicianno, B. E., Parmanto, B., Fairman, A. D., Crytzer, T. M., Yu, D. X., Pramana, G., ... & Petrazzi, A. A. (2015). Perspectives on the evolution of mobile (mHealth) technologies and application to rehabilitation. Physical therapy, 95(3), 397-405.

3. East, M. L. (2015). Mental health mobile applications in counselor education. (Doctoral dissertation, The University of West Florida), 255.

4. Gorbunova, V.V., Karatchevskiy, A.B., Klymchuk, V.O., Netliukh, H.S., & Romanchuk, O.I. (2016). Sotsialno-psykholohichna pidtrymka adaptatsii veteraniv ATO: posibnyk dlia veduchykh hrup [Socio-psychological support for the adaptation of ATO veterans: a guide for

leading groups]. Lviv : Institute of psychic health of Ukrainian Catholic University, 96. (ukr).

5. Kuhn, E., Greene, C., Hoffman, J., Nguyen, T., Wald, L., Schmidt, J., ... & Ruzek, J. (2014). Preliminary evaluation of PTSD Coach, a smartphone app for post-traumatic stress symptoms. Military medicine, 179, 12-18.

6. Kuhn, E., Kanuri, N., Hoffman, J.E., Garvert, D.W., Ruzek, J.I., & Taylor, C.B. (2017). A randomized controlled trial of a smartphone app for posttraumatic stress disorder symptoms. Journal of Consulting and Clinical Psychology, 85(3), 267-273.

7. Prentice, J. L., & Dobson, K. S. (2014). A review of the risks and benefits associated with mobile phone applications for psychological interventions. Canadian Psychology, 55(4), 282.