



Original research article

Mindfulness-based mobile applications for social interaction in people with schizophrenia

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Abstract

People with schizophrenia experience limited social interaction because of affective, cognitive, and psychomotor alterations. The problem of interaction requires intervention to increase their social interaction. There is a need for a system that can monitor the development of the interactive social abilities of people with schizophrenia. The purpose of this study was to determine the impact of mindfulness therapy on the social interaction of people with schizophrenia using a mobile application (SI-DESI). Fifty-two people with schizophrenia who met the criteria were divided into an intervention group and a control group. The mindfulness therapy was carried out in six sessions for three weeks. Data were collected using pre-test and post-test scores with the Social Interaction Questionnaire and Behavior Observation Sheet. The results showed an increase in the level of social interaction for participants who were given the intervention ($U = 12,000$, $p < 0.05$). The rise of social interaction emphasized the stages of mindfulness therapy: the comfort stage and the independently healthy target stage. Mindfulness-based mobile applications are useful to enhance the social interactions of people with schizophrenia.

Keywords: Digital; Mental illness; Mindfulness; Mobiles application; Schizophrenia; Social interaction

Introduction

Schizophrenia is a mental condition that often occurs in the community. It has two main types of symptoms; positive and negative (Malky, 2016). One of the negative symptoms of schizophrenia is a persistent change in social function. This condition inhibits the recovery process, as well as roles and functions in daily activities (Alloy et al., 2004). The decline in social interaction is experienced by 72% of people with schizophrenia (Jumaini et al., 2010). In addition, people with schizophrenia also experience psychomotor disorders in the form of motor retardation (Bervoets et al., 2014). The surrounding environment such as family, neighbours, and friends also influences the social interaction of people with schizophrenia. Disorders that occur are affective, cognitive, and psychomotor, and the absence of positive support from the environment can result in the ability of social interaction of people with schizophrenia to be less active. This has an impact on the occurrence of self-exile, and increases risk of suicide (Ventriglio et al., 2016) and depression (Sari et al., 2017). For individuals who experience persistent symptoms and mental disorder, personal recovery has become an important target of mental health services internationally (Thomas et al., 2016). Personal recovery can be achieved if people with a mental disorder can be independent and positive (Thomas et al., 2016).

Handling social interaction problems in people with schizophrenia can be achieved with psychotherapy and mindfulness therapy (Dekeyser et al., 2008). Mindfulness therapy is useful in providing calm, comfort, being aware of and focusing on problems, and helping in solving problems independently (Davis et al., 2007). Mindfulness therapy has been proposed as an alternative to CBT (cognitive behavioural therapy) for use in people with a severe mental illness like schizophrenia who have cognitive impairment or disorganized thinking – as mindfulness improves emotion regulation (Mistler et al., 2017). So far, the development of mindfulness therapy is not only for direct research but also for indirect research in the form of mobile-based applications. It is supported by a previous study on mindfulness therapy; as one of the holistic therapies developed with mobile technology that affects the recovery process for patients with mental illness (Stjernswärd et al., 2017). The development of nursing interventions in the form of an android application is a recent form of technological innovation in nursing science (Locsin and Kongsuwan, 2017). Technology in nursing is a development of nursing science based on caring for persons through technological means (Locsin and Kongsuwan, 2017).

Several android applications for mindfulness-based nursing interventions have been developed in Indonesia. One of them is SI-BESUTA (Learning Success Information System with Love), which measures the stress level of nursing students

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(Ningsih, 2018). The SI-BESUTA application motivates nurses, especially psychiatric nurses, to be able to develop technology to help people with schizophrenia. There are still very few technologies, such as the information systems designed in psychiatric nursing in Indonesia, that can assist nurses in providing interventions and monitoring patient development quickly and efficiently. Therefore, it is essential to create an android application that contains mindfulness therapy to monitor social interactions of people with schizophrenia.

Materials and methods

This study was approved by the Psychiatric Hospital in Central Java Province, and all respondents gave informed consent. All research respondents in this project were informed that participation was voluntary; they had the right to participate in the study at any time and could also resign at any time. Respondents in this study were selected using purposive sampling techniques in the inpatient room. The research lasted for one month with the help of nine enumerators. These were nurses who had received mindfulness training before the study began.

Participants

The 52 people who participated in this study were divided into the intervention and the control groups (26 people in each group). Participants included in this study were (1) persons with schizophrenia, (2) more than 18 years old, (3) persons in a stable condition measured by PANSS score of 10, (4) could read and write. People with schizophrenia who were undergoing ECT therapy and had organic mental disorders were excluded from the study.

Procedure

The study began with the selection of respondents into the intervention and the control groups. The pre-test was conducted for both groups by enumerators using the Social Interaction Questionnaire and the Behavior Observation Sheet in the SI-DESIS android application. The intervention group received 6 sessions of mindfulness therapy for three weeks. The steps of the mindfulness therapy are as follows: (1) regulate breathing and focus on awareness, (2) body scan by feeling pain in the body and enjoying the pain sincerely, (3) feel the comfort and benefits of interacting with others, (4) accept the situation that is being experienced with sincerity and try to forgive others, (5) make healthy targets independently to interact with others.

The control group did not receive mindfulness therapy but received the treatment (TAU) that inpatients in psychiatric hospitals usually receive.

The intervention was delivered by nine nurses in a psychiatric hospital. They received one-day training in mindfulness. They were required to practice and implement the intervention and SI-DESIS for the patients with schizophrenia. After seven days, they were given feedback for the intervention.

The steps to use Information System of Social Interaction's Detection (SI-DESIS) (Fig. 1):

1. Login according to the account and password that has been registered.
2. "I list" to enter patient data.
3. Pre-test on social interaction questionnaire.
4. Steps of mindfulness.
5. Record for documentation.
6. Complete the intervention six times and write the documentation for each intervention.

Instrumentation

The instruments used in this study were the Social Interaction Questionnaire and the Behavior Observation Sheet – which were tested for validity and reliability (Nyumirah, 2012). The Social Interaction Questionnaire consists of cognitive and affective aspects and has a total of 12 questions, while the Behavior Observation Sheet consists of 6 questions. The internal consistency reliability test results of the Social Interaction Questionnaire and the Behavior Observation Sheet obtained a Cronbach's alpha of >0.60.

Data analysis

The data on patient characteristics between groups were analyzed using the Chi-Square test and the Fisher Exact test. Pre and post test data on the Social Interaction Questionnaire and the Behavior Observation Sheet were analyzed using the Wilcoxon statistical test. Post-test data of the intervention group and the control group were analyzed using the Mann-Whitney test because the data were in the form of categories.

Results

Table 1 shows the majority of participants were male and unemployed. There were no significant differences in participants' characteristics between the intervention group and the control group ($p > 0.05$).

Table 1. Characteristics of respondents in the intervention group and the control group

Respondents's characteristic	Intervention (n = 25)		Control (n = 25)		Statistic	p
	n	%	N	%		
Age	M (SD) 36,08 (12,62)		M (SD) 35,16 (10,06)		1,270 ^a	0,265
Gender						
Male	15	57,7	13	50,0	0,077 ^c	0,781
Female	11	42,3	13	50,0		
Education level						
Primary	12	46,2	15	57,7	0,698 ^b	0,705
Secondary	10	38,5	8	30,8		
Tertiary	4	15,4	3	11,5		
Occupation						
Employed	12	46,2	12	53,8	0,077 ^c	0,782
Unemployed	14	53,8	14	46,2		

Note: ^a Levene test; ^b Chi-square; ^c Fisher's exact test; M, Mean; SD, Standard Deviation

SI-DESI Application

Welcome, Cecilia Indri

Information System of Social Interaction's Detection (SI-DESI)

I-List

Mindfulness

I-Report

Pre

Post

Questionnaire

Cognitive assessment

When interacting using clear sentences	Select
When interacting the voice can be heard by other person	Select
When interacting he/she talks with the speaker	Select

Affective assessment

Interact to convey criticism or uncomfortable feelings to others	Select
Interact when receiving criticism from others	Select

Psychomotor assessment

He/she's greetings when begin the interaction	Select
He/she can introduce their self	Select
There are eye contact when interacting	Select

Intervention's History

initial of patient's name

Intervention that has been done as much:

1 times

Date of the last Intervention:

Oct, 12-2019

Account that done the last interventions:

Indri

Daily Interaction

Speaking and asking	Select
Focus on communication	Select
Convey and accept criticism	Select
Apologize and forgive	Select
Introduce own self	Select
Eye contact and smile	Select

Next Intervention

Note:

Mindfulness

Add patient's note

Mindfulness Therapy consist of 5 steps:

1. Focus (manage breathing and focus on current awareness)
2. Body Scan (feeling the pain in the body and enjoy the pain with sincere)
3. Comfort (feeling comfortable and the benefits of interact with other people)
4. Acceptance (forgive the mistake of ourself and the mistake from other people who hurt us)
5. Healthy target independently (train the independence of interact)

I-Report

A

Number of interventions: 1
Date : Oct, 12-2019
Speaking and asking:
The belief that this ability is important
Focus in communication:
The belief that this ability is important
Convey and accept criticism:
The belief that this ability is important
Apologize and Forgive:
The belief that this ability is important
Introduce own self:
The belief that this ability is important
Eye contact and smile:
The belief that this ability is important
Note :
S: patient said he was happy to acquainted with other patient
O: he often silent, passive, dan being alone
A: the problem of social interaction has been resolved
P: continue the mindfulness therapy and training of "daily interaction" everyday

Pre Test Result	Post Test Result
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Fig. 1. Example of the content of SI-DESI

The Mann–Whitney test showed an increase in the level of social interaction in the post-test after mindfulness intervention ($p < 0.05$) (Table 2). This indicated that there is a significant difference between both groups after mindfulness therapy through the application of SI-DESI (Social Interaction

Detection Information System) on the level of social interaction of people with schizophrenia. The data of demographic's data, pre-test result, and post-test result were found in the supplementary file (Indri, 2020).

Table 2. The effect of mindfulness therapy on social interaction in people with schizophrenia in the two groups

		Intervention ($n = 26$)		Control ($n = 26$)		U	p -value
		Mean rank	Sum rank	Mean rank	Sum rank		
Social interaction level	<i>Post-test</i>	39,04	1015,00	13,96	363,00	12,000	0,000

Discussion

This study aimed to examine the impact of mindfulness-based mobile applications on the social interaction of people with schizophrenia. Overall, the results showed a positive impact on enhancing social interaction among people with schizophrenia. This finding supports previous studies on mindfulness-based mobile apps. Mindfulness interventions can be provided through media assistance in the form of mobile apps or online mindfulness. Research conducted by Choo et al. (2018) explained that mindfulness therapy with a smartphone application had a positive impact on reducing the risk of suicide and increased emotional responses and interactions. Other studies conducted by Plaza Garcia et al. (2017) and Spikerjman et al. (2016) explain that mindfulness interventions provided through smartphone applications have a positive impact on improving quality of life, social response, and well-being.

The type of mindfulness therapy in this research was mindfulness self-care. Mindfulness self-care therapy to help people with schizophrenia overcome social interaction problems consists of five stages: (1) focus on awareness, (2) body scan, (3) comfort, (4) acceptance (5) independent healthy targets (Dwidiyanti et al., 2018). Mindfulness self-care can help the patient to gain insight and perspective, inner calm, and motivate him or her to be active in his or her social life (Tabak et al., 2015). In the previous study, mindfulness self-care was shown to increase independence among patients (Slatyer et al., 2017). Mindfulness self-care is useful when the third stage of this therapy (comfort stage) can be significantly felt by a person with schizophrenia. When the comfort stage is useful, then the fourth and fifth stages (acceptance and independent healthy stages) will be automatically achieved.

In this study, the increasing social interactions in people with schizophrenia was also influenced by the ability of psychiatric nurses to provide mindfulness therapy and use the SI-DESI android application. Nurses were trained in mindfulness before providing this therapy (Wolf et al., 2016). A previous study conducted by Byron et al. (2014) explains that nurses who have been trained could support the faster recovery of patients. Furthermore, in this study psychiatric nurses have been able to emphasize the components of mindfulness therapy, especially the comfort stage and self-health targets. These components may make the patients feel a sense of comfort in their social interactions (Boardman, 2018).

Social interaction is related to three main aspects: affective, cognitive, and psychomotor. These three aspects are measured in the SI-DESI application. Affective aspects in people with schizophrenia are associated with neurocognitive deficits, which result in impairment of attention function, visual

memory, emotion, and social cognition. Emotional instability affects social responses and the interest and motivation of people with schizophrenia to interact with others (Kanchanawan et al., 2017). This is supported by previous research by Martin et al. (2019) which showed that persons with schizophrenia had severe emotional instability in their social interactions. Affective aspects can be trained by controlling emotions and increasing interest in recovery in people with schizophrenia (Hendler et al., 2018). In mindfulness therapy, the affective aspects training is included in the third and fourth stages; namely the comfort stage and the acceptance stage.

The next aspect is cognitive, which is related to the ability to communicate and focus when interacting (Berger et al., 2019). Previous research conducted by Stefanopoulou et al. (2009), states that persons with schizophrenia have memory delay, difficulty focusing during a discussion, and experience impaired verbal responses (Stefanopoulou et al., 2009). The cognitive aspects of people with schizophrenia can be improved by cognitive remediation (Fioravanti et al., 2012). Cognitive remediation is an improvement in the cognitive or mind of people with schizophrenia. It is included in the initial stages of mindfulness therapy — namely awareness and body scan.

The last aspect of psychomotor is related to general social skills such as greeting, smiling, and answering questions (Campellone and Kring, 2018). Psychomotor can influence the process of interaction. It means that the higher the motor delays in people with schizophrenia, the higher the disruption of the interaction. Psychomotor aspects in people with schizophrenia can be improved by therapy that helps improve the patient's motor (Bervoets et al., 2014). Motor improvement can be trained with the independently healthy target stages of mindfulness therapy included in this study.

There are some limitations in this study. Firstly, the SI-DESI lacks capacity, so this application is unable to contain features such as video to guide the mindfulness steps. Secondly, this study has a small sample size and was only conducted in one psychiatric hospital — thus a lack of generalizability of the study findings. Lastly, the post-test data collection was measured after the intervention and may not measure the impact over a longer time.

Conclusions

This study showed that the mindfulness-based mobile application SI-DESI is feasible and has an impact on social interaction in people with schizophrenia. This finding supports the positive effects of mindfulness-based mobile applications in people with schizophrenia. This intervention is delivered by nurses in psychiatric hospitals. Hence it is recommended for mental health professionals to implement this intervention to

promote social interactions for persons with schizophrenia in practice. This study only examined the social interaction outcomes at one point in time. Further research is needed on developing and investigating other mindfulness-based therapy using mobile applications. Follow-up studies are also recommended to investigate the impact of the mindfulness-based therapy by mobile app intervention over a longer period of time. As this mobile app intervention showed limited therapeutic features, future research is also needed to develop applications which can provide more selections for interventions through mobile applications.

Conflict of interests

The authors have no conflict of interests to declare.

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Užití mobilních aplikací pracujících s konceptem „mindfulness“ pro zlepšení sociálních interakcí u osob trpících schizofrenií

Souhrn

Osoby trpící schizofrenií mají obvykle menší množství sociálních interakcí jako důsledek svých afektivních, kognitivních a psychomotorických poruch. Je třeba najít nástroj, který by umožnil sledovat zlepšení sociálních dovedností osob se schizofrenií. Cílem této studie bylo určit dopad „mindfulness“ terapie na sociální interakce osob trpících schizofrenií s pomocí mobilní aplikace (SI-DESI). Osoby trpící schizofrenií ($N = 52$), které splňují kritéria studie, byly rozděleny na dvě skupiny: skupinu, která podstoupila terapii, a kontrolní skupinu. Terapie byla rozložena na šest sezení během tří týdnů. Sběr dat probíhal pomocí nástrojů Social Interaction Questionnaire a Behavior Observation Sheet, a to před začátkem terapie a po jejím ukončení. Výsledky ukázaly zvýšenou úroveň sociálních interakcí u osob, které podstoupily terapii ($U = 12,000$, $p < 0.05$). Zdokonalení sociálních interakcí zdůrazňuje jednotlivé fáze „mindfulness“ terapie: „comfort“ fázi a „independently healthy“ fázi. „Mindfulness“ terapie realizovaná pomocí aplikace pro OS Android SI-DESI je užitečným nástrojem pro zlepšení sociálních interakcí osob trpících schizofrenií.

Klíčová slova: duševní onemocnění; mindfulness; mobilní aplikace; schizofrenie; sociální interakce

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