

Effect of 'KUAT' an information motivation behavioural theory-based website on mental health literacy among young people: Randomized controlled trial

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Effect of 'KUAT' an information motivation behavioural theory-based website on mental health literacy among young people: Randomized controlled trial

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Abstract

Background: Mental illness among Malaysian youth, particularly depression and anxiety disorders are reaching an alarming point. Unfortunately, the rate of professional help-seeking among young people is low. This is mainly attributed to both low mental health literacy and high stigma. Documented interventional studies focusing on mental health literacy are concentrated among school students in high-income countries, using face-to-face methods.

Objective: This study aims to develop and evaluate the effect of 'KUAT', an information motivation and behavioural (IMB) theory-based website on mental health literacy among young people in Malaysia. The word 'KUAT' in the Malaysian language translates as 'strong' in English.

Methods: A fully online randomized controlled trial was conducted among foundation students in one of the public universities in Malaysia. The intervention was developed according to the IMB theory and was delivered via a website. The intervention was conducted for two weeks. The main outcome of this study was mental health literacy, measured by depression and anxiety literacy, stigma, and help-seeking attitudes. The measurement was done using an online 'Google form' at baseline, 2 weeks post-intervention and 1-month follow-up. The outcome was analyzed using a Generalized Estimating Equation (GEE).

Results: A total of 94 participants were recruited and randomly allocated to either the intervention or control group. There is a 15% and 11% attrition rate for the intervention and control groups, respectively at 1-month follow-up. There was a significant difference between the intervention and control groups for depression and anxiety literacy at post-intervention (p-value <0.001) and follow-up (p-value=0.004), after controlling for covariates. However, there was no significant difference in stigma and help-seeking attitudes between the intervention and control groups.

Conclusions: This study showed that 'KUAT', the IMB-based website intervention is effective in increasing depression and anxiety literacy, but not stigma and help-seeking attitudes among young people. Clinical Trial: This study was registered at the Thai Clinical Trials Registry (TCTR20210705006)

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Original Manuscript

Original Paper**Siti Hafizah Zulkipli, Rosliza Abdul Manaf*, Rahima Dahlan,
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Keywords: mental health literacy; young people; depression; anxiety; digital health.

Introduction

Mental Disorders in Young People

Mental disorders constitute a major burden of disease globally (GBD 2019 Mental Disorders & Collaborators, 2022). The burden of mental disorders is highest among young people (defined as 10-24 years old) the Disability Adjusted Life Years (DALYs) contributed by mental disorders have increased over the decade (Piao et al., 2022). Mental disorders are most prevalent among youth and it was estimated that 10-20% of youth experience mental disorders (World Health Organization, 2021). About 75% of mental disorders occur before 24 years old (Fusar-Poli, 2019). Untreated childhood mental disorders can evolve into major mental disorders that can persist into adulthood (Gustavson et al., 2018). Mental disorders can cause prolonged psychosocial, educational, and occupational impairments (Esch et al., 2014; Kessler, 2012). Furthermore, mental disorders are one the leading causes of suicide among young people (Bilsen, 2018).

The trajectories of mental disorders can be altered by early intervention. Unfortunately, mental disorders among young people are often unrecognised and untreated (Westberg et al., 2022). Mental health literacy has been proven as a key facilitator of formal help-seeking (Johnson & Possemato, 2019). Mental health literacy was first brought to attention in 1997 by Jorm and was defined as 'knowledge and beliefs about mental disorders which aid their recognition, management or prevention' (Jorm et al., 1997).

Mental health literacy is one of the important components of mental health promotion. Concurrently, mental health promotion is highlighted as one of the objectives of the Mental Health Action Plan 2013-2030 by the World Health Organization (WHO) (World Health Organization (WHO), 2021). Neurodevelopmental changes occurring during youth make it a period of both vulnerability and opportunity for mental health promotion.

Mental Health Literacy Intervention among Young People

Previous interventional studies on mental health literacy among young people were mostly conducted in a school setting (Amado-Rodríguez et al., 2022; Wei et al., 2013). There has been an increase in the usage of digital intervention in the past decade. Digital health intervention (DHI) can be defined as the digital delivery of health information, such as through websites or apps, for health-related purposes (World Health Organization (WHO), 2018). The World Health Organization (WHO) states that DHIs have many perceived benefits, including enhanced reach, accessibility, scalability, desirability, reduced stigma and perceived cost-effectiveness. Young people were found to consult the Internet regarding information on mental illness, access to psychiatrists, and exchange information with others (Weibelhorst et al., 2020). Digital psychological intervention for mental health problems has also been recommended by experts from the United Nations (UN) to provide necessary mental support. Young people also showed positive effects on emotional self-awareness using the digital platform (Punukollu & Marques, 2019). Significant improvements in mental health knowledge were also found by using digital intervention. Taking all these factors into consideration, the intervention for this study was delivered via a website.

Literally, the word 'KUAT' in the Malaysian language translates as 'strong' in English. The 'KUAT' intervention was developed according to the information motivation behavioural skill (IMB) theory. It is well understood that psycho-behavioural theory-based health education intervention allows an understanding of human behaviour. Based on this view, the IMB theory was utilized to guide the development of the intervention as it suits the components of the mental health literacy framework. Adopting the IMB theory for health education intervention foresees an increase in mental health literacy and ultimately, help-seeking behaviour (Bohon et al., 2016).

Malaysia is one of the low- and middle-income countries (LMICs). About 80% of the burden of mental health problems occurs in these countries. However, it was reported that 73-93% of people with depression and 85-95% of people with anxiety were not covered by treatment in LMICs (Fu et al., 2020). Unfortunately, interventional studies on mental health are still scarce. In addition, the stigma towards mental health problems is high, which may lead to poor help-seeking (Berry et al., 2020). Multifactorial explanations of mental health issues with a dominance of supernatural and religious aetiologies widely occur in Malaysia (Munawar et al., 2022). Thus, this study aims to develop, implement, and evaluate the effect of an intervention named 'KUAT', on mental health literacy among foundation students in a public university in Malaysia. A randomized controlled trial was conducted to evaluate the effect of the intervention module.

Method

Study Design

A two-arm randomized controlled trial (RCT) was conducted among foundation students at Universiti Putra Malaysia (UPM). The research protocol for this study was registered at the Thai Clinical Trials Registry (TCTR20210705006) and published (Zulkipli et al., 2023).

Population and sample size

The participants were the foundation students of a public university, located in Selangor, Malaysia. The foundation program is a pre-university programme required for entering a bachelor's degree programme attended by school leavers in Malaysia, typically aged 18 to 19 years old. Although, the university is in Selangor, however, the participants came from all over Malaysia, and reside in the dormitory within the university campus.

The sample size was computed using the two-population mean formula for hypothesis testing (Lemeshow et al., 1990). The mean was taken from a study of the effectiveness of a website intervention study among young people, with an effect size of 0.54 obtained from the study. To detect this effect with 80% power at a 0.05 significance level (one-tailed), the total sample size needed in each group (n_1) in this study is 41. After considering the 50% loss to follow-up due to the expected higher attrition rate in a digital intervention study, a final sample size of 122 (61 respondents per arm) has been determined to be sufficient for this study.

Procedure

Participants were recruited through the messaging platform WhatsApp (25), whose contacts were given by the administrative office of the university. A systematic random sampling using a sampling interval of 2 was used to select participants to be recruited in this study. A single blinding method

was adopted, whereby, the participants were not aware of the randomization group. Participants were briefed on the objectives of the study and the activities required if agreed to join the study. After participants consented, they were randomized to either the intervention or control group.

Intervention group

Participants in the intervention group were given the 'KUAT' intervention. The content of the website was developed by the authors and guided by the information motivation behavioural (IMB) skill theory. The content was then validated by three content experts including psychiatrist and public health medicine specialist. The development of the website was then outsourced to a company. The interventions had five modules. Module 1 focuses on mental disorders among young people; Module 2 focuses on the epidemiology and risk factors of mental disorders; Module 3 focuses on signs and symptoms of anxiety and depression, as well as screening tools for anxiety and depression; Module 4 focuses on available mental health care services in Malaysia, as well as treatment for anxiety and depression and Module 5 focuses on self-help strategies in managing stress.

Participants were given the link to the website, with their respective encrypted usernames. The intervention was conducted for two weeks. Participants were required to complete all modules before receiving the link post-test. Participants that have not completed the module in two weeks, were reminded via 'WhatsApp'.

Control group

The control group did not receive any intervention during the study and is waitlisted. They were given the link to the website after data collection was completed.

Measures

Mental health literacy is measured by several variables which are depression and anxiety literacy, stigma, and help-seeking attitude. All participants were taken baseline measurements including, sociodemographic data, depression and anxiety literacy, stigma, and help-seeking attitude questionnaire. The same questionnaire on depression and anxiety literacy, stigma, and help-seeking attitude was also given at 2 weeks post-intervention and 1-month follow-up. The measurements were assessed via 'Google form'.

Depression and Anxiety Literacy

To measure depression and anxiety literacy, the questionnaire was adapted from depression literacy (D-lit) and anxiety literacy. The attributes of D-Lit were knowledge of the psychological symptoms, knowledge about the effectiveness of available treatment methods, knowledge about cognitive-behavioural symptoms, knowledge about available medications and their side effects, and knowledge about the severity of the disease (Tehrani et al., 2022). The section consists of 15 items. The scale is measured by 'true', 'false', or 'don't know'. One point is given for each correct response, and a higher literacy is indicated by higher scores. The internal consistency of D-Lit and A-lit were reported to be $\alpha=0.70$ and $\alpha=0.76$, respectively (Gulliver et al., 2012). The internal consistency of D-lit among Malaysian adolescents was reported to be $\alpha=0.831$ (Ibrahim et al., 2019). In the present study, the Cronbach alpha was 0.723.

Stigma

To measure the stigma, the questionnaire was adapted from the Reported and Intended Behavioural Scale (RIBS). The items ask about intended behaviour within four different contexts, which are living with, working with, living nearby and continuing a relationship with someone with a mental health problem. This section contains 4 items. The scale is measured by 'strongly agree', 'slightly agree', 'strongly disagree', 'slightly disagree', and 'don't know'. The items were scored on an ordinal scale of one to five. Items marked as strongly agreed received 5 points, whereas items marked as strongly disagreed received 1 point. The total score was calculated by adding together the response values, and higher scores indicated lower stigma. The internal consistency of RIBS was reported to be $\alpha=0.85$ (Evans-Lacko et al., 2011). In the present study, the Cronbach alpha was 0.753.

Help-Seeking Attitude

To measure the help-seeking attitude, the questionnaire was adapted from the Attitudes Towards Seeking Professional Psychological Help Scale-Short Form (ATSPPH-SF). The attributes of ATSPPH-SF are 'openness to seeking professional help' and 'value in seeking professional help' (Elhai et al., 2008). The section contains 6 items. The scale is measured by 'strongly agree', 'slightly agree', 'strongly disagree', and 'slightly disagree'. The items were scored from one to three. Higher scores indicated a better help-seeking attitude. The internal consistency of ATSPPH-SF was reported to be $\alpha=0.77$ (Picco et al., 2016). In the present study, the Cronbach alpha was 0.701.

Analysis

All data analyses were performed using the SPSS Version 25.0 (IBM Corp, Chicago, IL, USA). Chi-Square analysis was used to compare socio-demographics and history of mental disorders between the intervention and control group at baseline. An independent t-test was used to compare depression and anxiety literacy, stigma and help-seeking attitude at baseline.

The Generalized Estimating Equation (GEE) model was used for evaluating the effectiveness of the 'KUAT' intervention on depression and anxiety literacy, stigma and help-seeking attitude, between the intervention and control groups across the timepoint, adjusted with covariates.

Intention-to-treat analysis (ITT) was used in the analysis to deal with the missing data. Missing data were examined to understand the pattern and degrees of the randomness of the missing values. Multiple imputation method was used to impute the missing data.

Ethical consideration

Ethical approval was received from Ethics Committee for Research Involving Human Subjects, Universiti Putra Malaysia (JKEUPM-2021-275). Informed consent was taken from each participant before participation. An outline informed consent was given, whereby, participants were required to tick on a checkbox if agreed to participate in the study. All participants were allowed to withdraw from the study.

Result

Response rate

Both participants in the intervention and control groups completed baseline and post-test assessments. However, there is a 15% and 11% attrition rate for the intervention and control groups, respectively at 1-month follow-up. The CONSORT Flowchart for this study can be found in Figure 1 below.

Figure 1 CONSORT Flowchart

Baseline characteristics

The overall mean age of participants was 18.03 ± 0.272 years. The mean age of the participants was 17.98 ± 0.021 years and 18.09 ± 0.051 years in the intervention and control groups respectively. The majority of the participants were Malay (77.7%), female (78.7%) and among the middle household income. Most participants had no prior history of mental disorders (97.9%), nor did they have experience using mental healthcare services (94.7%). Most of the participants also had no family history of mental disorders (92.6%). There were no significant differences in the baseline comparison of sociodemographic factors, history of mental disorder, depression and anxiety literacy and stigma score between intervention and control groups. However, the intervention group had a significantly higher help-seeking attitude at baseline compared to the control group. Table 1 below shows the baseline characteristics of the participants.

TABLE 1 Baseline Comparison of sociodemographics, history of mental disorder, depression and anxiety literacy and stigma between the intervention and control groups (N = 94)

Variable	Frequency n (%) / Mean \pm SD		X ² / t	p-value
	Intervention (n=47)	Control (n=47)		
Age	17.98 \pm 0.146	18.09 \pm 0.351		
Gender				
Male	12 (25.5%)	8 (17.0%)	1.016	0.450
Female	35 (74.5%)	39 (83.0%)		
Ethnicity				
Malay	33 (70.2%)	40 (85.1%)	6.116	0.106
Chinese	8 (17.0%)	1 (2.1%)		
Indian	5 (10.6%)	5 (10.6%)		
Others	1 (2.1%)	1 (2.1%)		
Household Income				
RM 2500-RM 4850	13 (27.7%)	12 (25.5%)	1.129	0.569
RM 4851-RM 10,970	21 (44.7%)	16 (34.0%)		
>RM 10,970	13 (27.7%)	16 (34.0%)		
Personal History of Mental Disorders				
Yes	1 (2.1%)	1 (2.1%)	0.000	1.000
No	46 (97.9%)	46 (97.9%)		

Family History of Mental Disorder				
Yes	5 (10.6)	2 (4.3%)	1.389	0.435
No	42 (89.4%)	45 (95.7%)		
Personal History of Mental Healthcare Service Usage				
Yes	3 (6.4%)	2 (4.3%)	0.211	1.000
No	44 (93.6%)	45 (95.7%)		
Depression and Anxiety Literacy	9.98 ± 2.279	10.51 ± 2.215	1.147	0.254
Stigma	12.17 ± 3.964	12.70 ± 3.563	0.684	0.496
Help-seeking Attitude	11.00 (4.00)	11.00 (5.00)	-2.753	0.006*

*Variable with $p < 0.05$

Effect of IMB-based website intervention on depression and anxiety literacy, stigma and help-seeking attitude

Depression and Anxiety Literacy

There was a significant difference in depression and anxiety literacy between the two groups at post-intervention ($\beta = 1.617$, 95% CI: 0.733, 2.501, p -value < 0.001) and 1-month follow-up (1.383, 95% CI: 0.440, 2.326, p -value = 0.004), after adjusting for the covariate. There is a medium effect size for depression and anxiety literacy ($d = 0.44$). Table 2 compares the effectiveness of IMB-based website intervention on depression and anxiety literacy, adjusted with covariates.

TABLE 2 Effect of IMB-based website intervention on depression and anxiety literacy across time points, adjusted with covariates

Variable	Adjusted coefficient	Standard error	95% CI for odds ratio		p-value
			Lower	Upper	
Intercept	14.470	0.8394			
Group					
Control	Ref				
Intervention	-0.583	0.4512	1.468	0.301	0.196
Timepoint					
Baseline	Ref				
Post-test	0.298	0.3183	-0.326	0.922	0.349
Follow-up	0.468	0.3533	-0.224	1.161	0.185
Interaction					
Control * baseline	Ref				

Intervention * posttest	1.617	-0.4511	0.733	2.501	<0.001*
Intervention * follow-up	1.383	0.481	0.440	2.326	0.004*

*Variable with $p < 0.05$

CI, Confidence Interval; Ref, Reference category

QIC = 1443 QICC = 1424, model adjusted with covariates: gender, race, personal history of mental disorder, family history of mental disorder, personal history of mental healthcare services

Stigma

There was no significant difference in the mean stigma score after adjusting for covariates at both post-intervention ($\beta = 0.340$, 95% CI: -0.659, 1.340, $p = 0.504$) and follow-up ($\beta = 1.128$, 95% CI: -0.083, 2.338, $p = 0.068$). There is a small effect size for stigma reduction ($d = 0.04$). Table 3 compares the effectiveness of IMB-based website intervention on stigma, adjusted with covariates.

TABLE 3 Effect of IMB-based website intervention on stigma across timepoint, adjusted with covariates

Variable	Adjusted coefficient	Standard error	95% CI for odds ratio		p-value
			Lower	Upper	
Intercept	20.226	0.9751			
Group					
Control	Ref				
Intervention	-0.713	0.7653	-2.213	0.787	0.352
Timepoint					
Baseline	Ref				
Post-test	0.745	0.3728	0.014	1.475	0.046*
Follow-up	1.021	0.3929	0.251	1.791	0.009*
Interaction					
Control * baseline	Ref				
Intervention * posttest	0.340	0.5100	-0.659	1.340	0.504
Intervention * follow-up	1.128	0.6177	-0.083	2.338	0.068

*Variable with $p < 0.05$

CI, Confidence Interval; Ref, Reference category

QIC = 3522, QICC = 3519, model adjusted with covariates: race, personal history of mental disorder, personal history of mental healthcare services

Help-seeking Attitude

There was no significant difference in the mean help-seeking attitude score after adjusting for covariates at both post-intervention ($\beta = -0.447$, 95% CI: -1.332, 0.438, $p = 0.322$) and follow-up ($\beta = -0.447$, 95% CI: -1.380, 0.486, $p = 0.348$). There is a moderate effect size for the help-seeking attitude ($d = 0.65$). Table 2 compares the effectiveness of IMB-based website intervention on help-seeking attitudes, adjusted with covariates.

TABLE 4 Effect of IMB-based website intervention on Help-seeking attitude across timepoint, adjusted with covariates

Variable	Adjusted coefficient	Standard error	95% CI for odds ratio		p-value
			Lower	Upper	

Intercept	11.972	0.9347			
Group					
Control	Ref				
Intervention	1.916	0.5065	0.923	2.908	<0.001*
Timepoint					
Baseline	Ref				
Post-test	1.085	0.2771	0.542	1.628	<0.001*
Follow-up	0.468	0.35	-0.234	1.170	0.192
Interaction					
Control * baseline	Ref				
Intervention * post-test	-0.447	0.4516	-1.332	0.438	0.322
Intervention * follow-up	-0.447	0.4761	-1.380	0.486	0.348

*Variable with $p < 0.05$

CI, Confidence Interval; Ref, Reference category

QIC = 1449, QICC = 1449, model adjusted with covariates: group, race, personal history of mental disorder, family history of mental disorder, personal history of mental healthcare service

Discussion

Mental health literacy is the key facilitator for help-seeking behaviour. This study aims to evaluate the effect of 'KUAT', an IMB-based website intervention on mental health literacy among university students. The attrition rate for this study was 13%. The causes for this dropout were the subjects being lost to follow-up and non-response. The attrition rate for this study was considered minimal compared to previous digital intervention studies. In view of there is minimal to no contact with the participants in a digital intervention, there is a higher chance of loss to follow-up. Two previous digital interventional studies reported an attrition rate of up to 60% (Durán et al., 2022; Reavley et al., 2014). Strategies have been taken to minimise the loss. Incentives were given for those who completed the intervention and reminders were given for those who have not completed the intervention.

The IMB-based website intervention, 'KUAT' significantly increased depression and anxiety literacy scores at post-intervention and follow-up, after controlling for covariates. A similar finding was reported in other digital intervention studies (Curran et al., 2023; Durán et al., 2022; Gulliver et al., 2012; Hassen et al., 2022; Kurki et al., 2021; Li et al., 2013; Tay et al., 2022). This could largely be contributed to the content of the intervention which is education on mental disorders. A systematic review of mental health promotion among young people reported that psychoeducation was the most effective intervention to improve mental health literacy (Salazar de Pablo et al., 2020). This is further supported by the finding from a game-based study whereby, the contact intervention without a didactic approach was reported to have non-significant findings on mental health literacy (Tuijnman et al., 2022). Another two studies that reported non-significant findings (Reupert et al., 2020; Taylor-Rodgers & Batterham, 2014) could be contributed to the high baseline of mental health literacy among the study participants. The study had children of parents with mental disorders as their study participants. A study that was delivered via social media platforms reported a non-significant effect on both depression and anxiety literacy at post-intervention and follow-up (Reavley et al., 2014). This could be contributed to the non-interactive mode of delivery.

Strategies to reduce mental illness stigma includes raising mental health awareness, social contact, advocacy by influential figures or groups and legislation of anti-discriminatory laws (Clay et al.,

2020; Shahwan et al., 2022). Although online interventions for stigma reduction is still in their infancy (Thomas et al., 2014), studies have reported a small effect size reduction in stigma in comparison to face-to-face, wait-list control or no intervention (Goh et al., 2021). Despite having an education on mental illnesses as our intervention, however, the IMB-based website intervention 'KUAT' did not significantly reduce stigma at both post-intervention and follow-up. Our finding is in line with previous digital interventional studies that also did not report a significant reduction in stigma (Kurki et al., 2021; Reavley et al., 2014; Taylor-Rodgers & Batterham, 2014). This could have contributed to the lack of contact as part of the intervention. Contact as part of an intervention is more effective in reducing stigma as the person living with a mental disorder would share the experience and struggles (Mehta et al., 2015). Contact intervention was reported to have a small to medium effect size (Mauder & White, 2019).

Although, a systematic review of help-seeking interventional studies reported that mental health literacy intervention was the most effective strategy in improving help-seeking attitudes (Gulliver et al., 2012). However, the IMB-based website intervention 'KUAT' did not significantly increase help-seeking attitude at both post-intervention and follow-up. This could be contributed by the high help-seeking attitude score at baseline. Previous studies that used a web-based mental health service navigation website, called 'Link' to increase help-seeking behaviour finding also reported no significant improvement in help-seeking among youth post-intervention. Despite using theoretical intervention based on the theory of planned behaviour, the result shows no difference in help-seeking behaviour (Kauer et al., 2017; Sanci et al., 2019). A study that used website psychoeducational intervention reported a significant increase in help-seeking attitudes and intentions (Taylor-Rodgers & Batterham, 2014)

Limitation

Firstly, as the study only used one site study location, the sample was homogenous, especially in terms of age and level of education. Thus, the findings of this study can only be generalized to the said population.

One of the limitations of this study is the small sample size. Despite the adequate number of participants reached for the required sample size, however, the small sample size could decrease the power to detect true differences and may increase the chance of type 1 error. Furthermore, there is missing data due to the loss of follow-up.

Another limitation is the short duration of follow-up. It is understood that the maintenance of behaviour needs a longer follow-up. However, due to time constraints, a longer follow-up time was not possible.

As the intervention for this study is fully online, the study was unable to capture the adherence of the participants to the intervention. A web-based recording may provide further insight into participant engagement.

Recommendation

Given the current study had a small sample size, a short duration of time (1-month follow-up), and a single-site study population. Thus, it is recommended that future studies include a larger sample size, with a variety of study sites to allow a better external validity of the result. It is also recommended that a longer follow-up duration is implemented to allow a better understanding of the effect. As the study is unable to capture adherence to the intervention, it is recommended that future studies integrate mechanisms to capture adherence to the digital intervention.

The intervention was unable to have a significant reduction in stigma. This could be due to a lack of contact intervention; thus, it is recommended that a contact intervention be included in the future study.

Given this, an engaging and interactive mode of delivery must be applied for digital intervention among young people. The study recommends that future study includes games, on top of videos and quizzes, as it is also proven to be effective in digital intervention among young people.

Conclusion

The IMB-based website intervention is effective in increasing depression and anxiety literacy, but not stigma and help-seeking attitudes among university students.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author Contributions

Rosliza Abdul Manaf contributes to the conceptualization, methodology, supervision and review. Siti Hafizah Zulkiply contributes to the conceptualization, data collection, analysis and writing of the original draft. Rahima Dahlan and Rahmat Dapari contribute to the methodology, especially in developing intervention and supervision. All authors reviewed the article and approved the submitted version.

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Supplementary Files

Figures

Consort Flowchart.

