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Using Motion-Graphic Media to Educate Higher Education Students About Depression: A Randomized Controlled Trial

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Abstract

Objective: This study aims to compare the effectiveness of motion graphics versus pamphlets for educating young adults about depression. *Methods:* A multicenter randomized controlled trial was conducted from April to June 2024; participants were randomly assigned to Group A (motion-graphic media) or Group B (pamphlets) in a 1:1 ratio. Pre- and post-intervention knowledge scores were collected, and satisfaction scores were collected after intervention from group A. *Findings:* A total of 78 participants with a median age of 19.0 years (IQR 2.0) and predominantly women (64.1%), completed pre- and post-intervention questionnaires. The median knowledge score for Group A increased from 15.0 (IQR 4.0) pre-intervention to 18.0 (IQR 3.0) post-intervention, while Group B's scores improved from 12.0 (IQR 4.0) to 16.0 (IQR 3.0). Post-intervention scores were significantly higher in Group A compared to Group B ($p = 0.002$). Participants in Group A also reported high satisfaction with the educational material. *Novelty:* This study highlights the potential of innovative media for patient education, particularly in addressing mental health issues. Long-term cohort studies are required to assess whether this approach can improve clinical outcomes and reduce the incidence of severe depression.

Keywords:

Multimedia;
Comprehension;
Depression;
Student.

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1- Introduction

Approximately 300 million people, an estimated 3.8% of the global population, have depression [1]. The highest prevalence of depression (27%) was reported in the Southeast Asia region [2]. In Thailand, the lifetime prevalence of major depressive episodes is 19.9% according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) [3]. The onset of the first episode of major depression typically occurs between mid-adolescence and the mid-40s. However, approximately 40% of individuals experience their first episode before age 20 [4]. In addition to concerns about depression among older people, an ongoing increase in the number of university students experiencing depression has raised concerns [5]. The weighted mean prevalence of depressive disorders in students (30.6%) is significantly higher than the rates reported in the general population. Thus, depression is a common mental health issue among university students [6]. Risk factors for a higher likelihood of developing depression include being female, belonging to an ethnic minority, identifying as non-heterosexual, using maladaptive coping mechanisms, and experiencing stressful life events [7].

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Depression is a disorder that develops from a combination of symptoms, leading to a syndrome that interferes with daily functioning. These symptoms can be divided into emotional, neurovegetative, and cognitive categories [4]. In at-risk individuals, the DSM-5 is a widely used diagnostic criteria for defining depression [8]. It is associated with poor academic achievement, diminished social interactions, and reduced work performance [9-11]. Additionally, 58.5% of patients with depression are at risk of suicide, and depression is associated with a 50% increase in mortality [12, 13]. Early identification is essential to effectively treat major depressive disorders as it can greatly enhance outcomes and mitigate the disorder's adverse effects [14]. However, several academics have been unaware of depression symptoms or failed to recognize their own experiences as such, which has led to denial or neglect and complicated their ability to seek help and treatment [15]. Rojtenberg et al. [16] found that among adult patients with depression, awareness rates were below 25%, and screening rates were under 10%. Similarly, until recently, depression had been significantly under-recognized in Thailand. The response to this health challenge has been hampered by limited access to standard care, a shortage of mental health professionals, and inadequate dissemination of knowledge [13].

Prevention efforts reduce the risk of depression by 21%, and these universal efforts begin with patient education [17]. Skre et al. [18] evaluated the effectiveness of a universal mental health literacy program that incorporated individual and group tasks alongside educational videos. This non-randomized, cluster-controlled trial involved 1,070 adolescents in Norway. At baseline, 34.6% of the intervention group and 21.9% of the control group correctly identified depression symptoms ($p < 0.0001$). Post-intervention, the percentage increased to 61.5% in the intervention group, while the control group remained at 21.9% ($p < 0.0001$). Perry et al. [19] conducted a cluster randomized controlled trial (RCT) in Australia involving 380 students to assess the effectiveness of a classroom-based educational program using a booklet and slideshow to improve mental health literacy. The intervention group showed a statistically significant greater increase in Depression Literacy Scale (D-Lit) scores (2.19) compared to the control group (1.39) ($p < 0.05$). Swartz et al. [20] examined the effectiveness of the Adolescent Depression Awareness Program (ADAP) in improving depression literacy among 6,679 secondary school students in the United States using an RCT design. The intervention included videos, film, homework, group activities, and interactive lectures. In the 6-week post-test, students who participated in ADAP demonstrated significantly higher levels of depression literacy compared to the control group (adjusted odds ratio = 3.1; $p < 0.001$; 95% confidence interval = 2.0, 5.0). Durán et al. [21] assessed the effectiveness of a digital audiovisual psychoeducational intervention, consisting of 23 short videos, to improve depression literacy among Portuguese university students. Without a control group, the study found that prior to the intervention, 5 out of 12 students reported knowing what depression was; this number increased to 9 out of 12 students after the intervention.

Studies comparing the effectiveness of patient education using digital media versus paper-based resources are limited. Digital media combine visual, audio, and textual elements to create an engaging educational environment, while reducing reproduction and distribution costs and enabling rapid, widespread content dissemination [22]. We hypothesized that patient education through digital media may result in greater knowledge acquisition than through paper-based resources. Therefore, this study aimed to compare the effectiveness of motion-graphic media in educating higher education students in Thailand about depression, as well as their satisfaction with this method compared to traditional pamphlets.

2- Material and Methods

2-1- Study Design and Population

An RCT was conducted between April 2024 and June 2024, involving six centers representing leading universities across different regions of Thailand: Walailak University, Hatyai University, Khon Kaen University, Chulalongkorn University, Chiang Mai University, Kasetsart University, Prince of Songkla University, Mahasarakham University, Thammasat University, Mae Fah Luang University, Srinakharinwirot University, and Burapha University. This study was approved by the ethics committee identified as WUEC-24-152-01. Written informed consent was obtained from all participants after a full explanation of the study. This clinical trial was registered with the Thai Clinical Trials Registry (TCTR20240420001). Participants were recruited through flyers posted at the universities that served as the study sites. Participants who met the inclusion criteria were provided with detailed information about the study. Those interested in participating were invited to voluntarily sign up and provide informed consent prior to enrollment. Participation was entirely voluntary, and participants were informed that they could withdraw from the study at any time without penalty. The inclusion criteria were male or female students aged 18 years or older, currently enrolled as full-time students in higher education at a university in Thailand. All participants were required to provide informed consent prior to participation. The exclusion criteria included students who were unwilling to participate, those with special learning needs, and participants who failed to complete the study or did not fully fill out the questionnaire. The participants were divided into two groups using a simple random allocation method with Microsoft Excel 2019 (Microsoft Corp., Seattle, WA, USA): Group A (motion-graphic media) and Group B (pamphlets). The coding sequence was carefully stored in opaque sealed envelopes by non-medical staff not directly involved in the intervention. Figure 1 shows the flowchart of participants in the RCT.

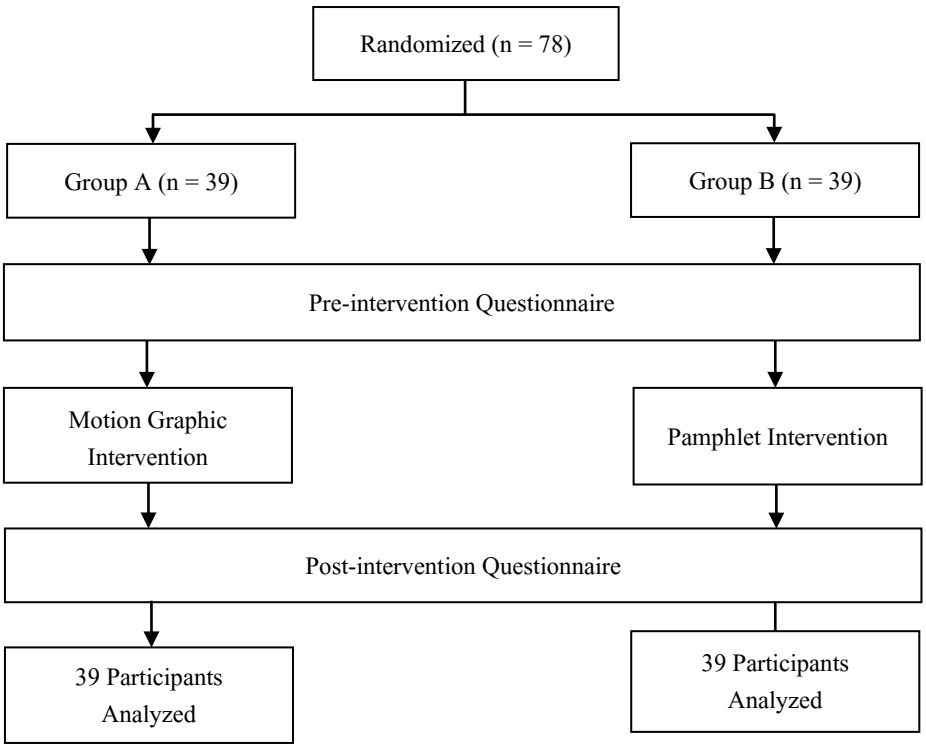

Figure 1. Flowchart of participants in the randomized controlled trial

2-2- Study Interventions

In Group A, participants were asked to watch a 3:30-minute motion-graphic video. The video included key topics related to depression, such as epidemiology, etiology, morbidities and mortality, symptoms, risk factors, common misunderstandings about depression, diagnosis, principles of management, self-care and prevention, as well as how to seek help. The content was developed under the supervision of a board-certified psychiatrist (P.P.), in collaboration with a video creator (V.B.) and two media developers (N.C. & D.M.) (*link: https://youtu.be/TzPf8yaav7Q?si=owTXLRi0ox_OQ8v4*), ensuring both medical accuracy and audience engagement. It was designed to be compatible with participants' smartphones. In Group B, participants were given a pamphlet produced by the Department of Mental Health, Thailand (*https://shorturl.at/cBHI7*), which took approximately three minutes to read. Written informed consent was obtained from all participants after a thorough explanation of the study. A pre-test was conducted before the intervention, and both groups were scheduled for a post-test one week later. The questionnaire is provided in the Appendix I section of the article.

2-3- Evaluation Measures

All participants completed a questionnaire before the intervention and again one week later. The survey had two main sections. The first section, which was completed only once before the intervention, collected baseline characteristics such as gender, age, university year, study major, religion, marital status, parental status, daily study time, extracurricular activities after class, available consulting options, stress management strategies, and current information retrieval about depression. The second section, which assessed knowledge of depression, was completed both before the intervention and one week later. Currently, no standardized method exists for determining the overall level of depression. We developed 20 questions, each with three possible answers (*true*, *false*, and *do not know*), addressing factors, etiology, clinical presentations, and prevention options. One point was given for each correctly answered question, whereas incorrect answers or "do not know" responses received zero points. Additionally, the participants in Group A were asked to complete questionnaires about satisfaction with the educational motion-graphic media at the end of the study, rating it from 1 (*extremely unsatisfied*) to 5 (*extremely satisfied*). The questionnaires used in this study were thoroughly reviewed and validated by a board-certified psychiatrist (P.P.) and two educational specialists (N.C. and S.K.) using an item objective congruence (IOC) index. An IOC score exceeding 0.5 confirmed the questionnaire's content validity [23]. Before the study began, the initial questionnaires were pilot-tested on 30 adult volunteers at Walailak University and revised for unclear language. Internal consistency was measured using Cronbach's alpha coefficient, where an alpha of 0.70 or higher was deemed acceptable [24].

2-4- Statistical Methods

The sample size of 78 participants (39 per group) was determined based on a power analysis conducted using G*Power [25]. This analysis was informed by the results of a previous study [26], which reported an effect size of 1.01.

We set an alpha level of 0.01 and a desired power of 0.9 to ensure a 90% probability of detecting significant differences between the groups, if such differences exist. The initial calculation indicated that 62 participants (31 per group) would be sufficient. However, to account for an anticipated 25% loss during follow-up, the sample size was increased to 78 participants (39 per group), ensuring adequate power throughout the study. Continuous data were displayed as means with standard deviations or as medians with interquartile ranges (IQR). Categorical data were presented as frequencies and percentages. The paired t-test or Mann-Whitney U test was used to evaluate differences in continuous variables between two groups, while the Kruskal-Wallis test was employed to assess differences among three or more groups. Fisher's exact test was used to identify significant relationships between categorical variables. Pearson's correlation was applied to evaluate the relationship between continuous interval data. Additionally, multiple linear regression analysis was used to evaluate the association between knowledge scores and sociodemographic data. All tests were two-tailed, with statistical significance set at a p-value of less than 0.05. Statistical analyses were conducted using the SPSS software version 18 (SPSS Inc., Chicago, IL, USA).

3- Results and Discussion

All volunteer participants were recruited according to the inclusion criteria, and all completed the study without any dropouts. The final analysis included 78 participants from various universities: Walailak University (n = 12), Hatyai University (n = 3), Khon Kaen University (n = 7), Chulalongkorn University (n = 6), Chiang Mai University (n = 8), Kasetsart University (n = 11), Prince of Songkla University (n = 10), Mahasarakham University (n = 6), Thammasat University (n = 6), Mae Fah Luang University (n = 4), Srinakharinwirot University (n = 3), and Burapha University (n = 2). The median age was 19.0 years (IQR 2.0 years). Most participants were women (n = 50, 64.1%), followed by men (n = 24, 30.8%) and others with space for specification (n = 4, 5.1%). They were studying in the first year (n = 46, 59.0%), second year (n = 4, 5.1%), third year (n = 22, 28.2%), and fourth year (n = 6, 7.7%). The fields of study included the humanities and social sciences (n = 49, 62.8%), natural sciences and technology (n = 26, 33.3%), and health sciences (n = 3, 3.9%). Regarding religion, the participants were identified as Buddhists (n = 68, 87.2%), Muslims (n = 4, 5.1%), Christians (n = 1, 1.3%), and atheists (n = 5, 6.4%). The median pre-intervention knowledge score was 13.0 (IQR, 4.0). Table 1 presents the characteristics of the participants in both groups.

Table 1. Participants' characteristics

Characteristics	Group A	Group B	p-value
Age, median years (IQR)	18.0 (2.0)	20.0 (2.0)	0.048
Gender			
Female, n (%)	25 (64.1)	25 (64.1)	1.000
Male, n (%)	12 (30.8)	12 (30.8)	
Other, n (%)	2 (5.1)	2 (5.1)	
Year of Study			
First year, n (%)	29 (74.7)	17 (43.6)	0.028
Second year, n (%)	2 (5.1)	2 (5.1)	
Third year, n (%)	6 (15.4)	16 (41.0)	
Fourth year, n (%)	2 (5.1)	4 (10.3)	
Field of study			
Humanities and social sciences, n (%)	21 (53.9)	28 (71.8)	0.354
Natural sciences and technology, n (%)	16 (41.0)	10 (25.6)	
Health sciences, n (%)	2 (5.1)	1 (2.6)	
Religion			
Buddhism, n (%)	36 (92.3)	32 (82.1)	0.371
Muslim, n (%)	2 (5.1)	2 (5.1)	
Christian, n (%)	0 (0.0)	1 (2.6)	
Atheist, n (%)	1 (2.6)	4 (10.2)	
Relationship status			
Single, n (%)	36 (92.3)	38 (97.4)	0.615
In a relationship, n (%)	3 (7.7)	1 (2.6)	
Parental status			
Cohabiting, n (%)	34 (87.1)	21 (53.8)	0.002
Divorced, n (%)	4 (10.3)	16 (41.0)	
Father deceased, n (%)	1 (2.6)	2 (5.1)	

Daily study duration			
3–4 hours, n (%)	9 (23.1)	7 (17.9)	0.690
5–6 hours, n (%)	21 (53.8)	20 (51.3)	
7–8 hours, n (%)	9 (23.1)	12 (30.8)	
Support sources for stress			
Friends, n (%)	36 (92.3)	27 (69.2)	0.019
Parents, n (%)	25 (64.1)	24 (61.5)	1.000
Teachers, n (%)	10 (25.6)	9 (23.1)	1.000
Partners, n (%)	13 (33.3)	14 (35.9)	1.000
Psychiatric physician, n (%)	7 (17.9)	7 (17.9)	1.000
Psychiatric nurse, n (%)	5 (12.8)	3 (7.7)	0.711
Therapist, n (%)	6 (15.4)	5 (12.8)	1.000
Website (https://checkin.dmh.go.th/), n (%)	5 (12.8)	6 (15.4)	1.000
Hotline 1323, n (%)	3 (7.7)	0 (0.0)	0.240
Social media, n (%)	16 (41.0)	16 (41.0)	1.000
Stress Management			
Exercise, n (%)	26 (66.7)	13 (33.3)	0.006
Meditation, n (%)	13 (33.3)	6 (15.4)	0.112
Watching movies/listening to music, n (%)	38 (97.4)	35 (89.7)	0.358
Thinking positively, n (%)	38 (97.4)	24 (61.1)	<0.001
Hobbies, n (%)	39 (100.0)	31 (79.5)	0.003
Talking with others, n (%)	27 (69.2)	17 (43.6)	0.039
Analyzing stress and planning relief, n (%)	29 (74.4)	17 (43.6)	0.011
Eating, n (%)	24 (61.5)	20 (51.3)	0.494
Sleeping early and regularly, n (%)	13 (33.3)	12 (30.8)	1.000
Taking breaks from screens, n (%)	19 (48.7)	22 (56.4)	0.650
Depression information sources (last six months)			
Television			0.166
None	14 (35.9)	15 (38.5)	
At least once a month	21 (53.8)	13 (33.3)	
At least once a week	3 (7.7)	8 (20.5)	
At least once a day	1 (2.6)	3 (7.7)	
Radio			1.000
None	29 (74.3)	30 (76.9)	
At least once a month	9 (23.1)	9 (23.1)	
At least once a week	1 (2.6)	0 (0.0)	
At least once a day	0 (0.0)	0 (0.0)	
Pamphlets			0.346
None	22 (56.4)	19 (48.7)	
At least once a month	15 (38.5)	13 (33.3)	
At least once a week	2 (5.1)	6 (15.4)	
At least once a day	0 (0.0)	1 (2.6)	
Posters			0.485
None	14 (35.9)	10 (25.6)	
At least once a month	18 (46.2)	18 (46.2)	
At least once a week	7 (17.9)	9 (23.1)	
At least once a day	0 (0.0)	2 (5.1)	
Videos			0.089
None	9 (23.1)	2 (5.1)	
At least once a month	10 (25.6)	12 (30.8)	
At least once a week	16 (41.0)	16 (41.0)	
At least once a day	4 (10.3)	9 (23.1)	

Motion graphics			0.700
None	10 (25.6)	9 (23.1)	
At least once a month	11 (28.2)	15 (38.5)	
At least once a week	16 (41.0)	12 (30.8)	
At least once a day	2 (5.1)	3 (7.7)	
Websites			0.302
None	4 (10.3)	3 (7.7)	
At least once a month	16 (41.0)	9 (23.1)	
At least once a week	14 (35.9)	18 (46.2)	
At least once a day	5 (12.8)	9 (23.1)	
Facebook			0.202
None	8 (20.5)	2 (5.1)	
At least once a month	11 (28.2)	10 (25.6)	
At least once a week	13 (33.3)	17 (43.6)	
At least once a day	7 (17.9)	10 (25.6)	
Line application			0.251
None	18 (46.2)	16 (41.0)	
At least once a month	17 (43.6)	12 (30.8)	
At least once a week	3 (7.7)	7 (17.9)	
At least once a day	1 (2.6)	4 (10.3)	
YouTube			0.931
None	5 (12.8)	6 (15.4)	
At least once a month	17 (43.6)	15 (38.5)	
At least once a week	9 (23.1)	8 (20.5)	
At least once a day	8 (20.5)	10 (25.6)	
Instagram			0.899
None	8 (20.5)	7 (17.9)	
At least once a month	12 (30.8)	12 (30.8)	
At least once a week	13 (33.3)	11 (28.2)	
At least once a day	6 (15.4)	9 (23.1)	

Note: IQR, interquartile range; Group A (motion-graphic media); Group B (pamphlets).

Mental health literacy was analyzed through pre-intervention knowledge scores, revealing an inverse correlation with age (r = -0.50, $p < 0.001$), where younger participants had higher scores. No significant differences in mental health literacy were found based on gender ($p = 0.268$). However, significant differences were observed across academic years: first year (14.5, IQR 4.0), second year (13.0, IQR 1.5), third year (12.0, IQR 3.0), and fourth year (11.0, IQR 3.0), $p < 0.001$. Specifically, first-year participants had significantly higher mental health literacy scores than those in the fourth ($p = 0.004$) and third ($p < 0.001$) years. Mental health literacy scores showed no significant differences based on field of study ($p = 0.160$), religion ($p = 0.124$), relationship status ($p = 0.939$), parental status ($p = 0.261$), or daily study duration ($p = 0.630$). Multiple linear regression analysis evaluates the association between various sociodemographic factors and pre-test knowledge scores, as shown in Table 2. We found that two variables were statistically significant. Year of study showed a significant positive association with knowledge scores (B = 2.768, $p < 0.001$), indicating that students in higher study years have better knowledge scores. Similarly, religion was significantly associated with higher knowledge scores (B = 1.972, $p = 0.041$). Other variables, including gender, field of study, relationship status, parental status, and daily study duration, did not show statistically significant associations with knowledge scores ($p > 0.05$).

Table 2. Multiple linear regression analysis evaluating the association between knowledge scores

Variable	B Coefficient	Standard Error	Beta	t-value	p-value
(constant)	0.764	3.851	-	0.198	0.843
Gender (Reference: Female)	0.793	0.627	0.131	1.264	0.210
Year of study (Reference: 1st year)	2.768	0.663	0.468	4.174	< 0.001
Field of study (Reference: Humanities and social sciences)	-0.269	0.648	-0.045	-0.415	0.679
Religion (Reference: Buddhism)	1.972	0.949	0.226	2.077	0.041
Relationship status (Reference: Single)	0.661	1.383	0.050	0.478	0.634
Parental status (Reference: Cohabiting)	0.317	0.669	0.050	0.474	0.637
Daily study duration (Reference: 3–4 hours)	1.598	0.822	0.222	1.944	0.056

In Group A, the median pre-intervention knowledge score was 15.0 (IQR 4.0), and the post-intervention score was 18.0 (IQR 3.0); the increase in score was 3.0 (IQR, 4.0). In Group B, the median pre-intervention knowledge score was 12.0 (IQR 4.0), and the post-intervention score was 16.0 (IQR 3.0); the increase in score was 4.0 (IQR, 4.0). The pre- and post-intervention scores in Group A were significantly higher than those in Group B ($p < 0.001$ and $p = 0.002$, respectively). However, the median change in the scores between the two groups was not significantly different ($p = 0.090$). Figure 2 illustrates the median knowledge scores in Groups A and B before and after the interventions.

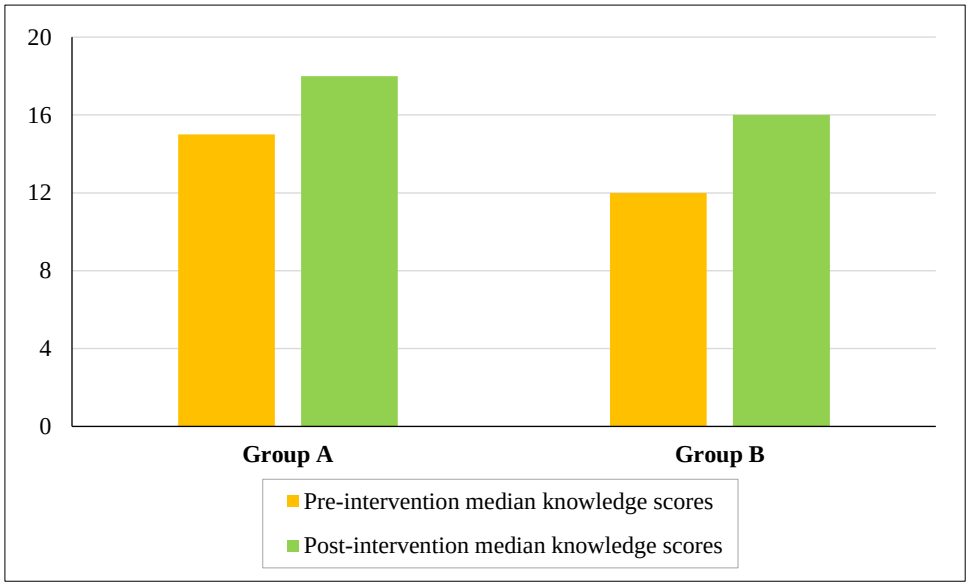

Figure 2. Median knowledge scores in Groups A and B before and after the interventions

Questionnaires regarding satisfaction with motion-graphic media were collected from Group A. Participants rated the appropriateness of the motion graphics, the usefulness in enhancing understanding of depression, and the engagement level of the presentation, with all median scores being 5.0 (IQR 0.0). Table 3 shows the details of the satisfaction scores.

Table 3. Satisfaction level with motion-graphic media

	Topics	Median scores (IQR)
1.	The content is complete and sufficient.	5.0 (2.0)
2.	The information is accurate and reliable.	5.0 (1.0)
3.	The presentation of the content is sequential, making it easy to understand.	5.0 (1.0)
4.	The data and guidelines for disease prevention are clearly presented.	5.0 (1.0)
5.	The illustrations align with the content.	5.0 (1.0)
6.	The illustrations are clear.	5.0 (1.0)
7.	The size of the illustrations is appropriate.	5.0 (1.0)
8.	The accompanying sounds match the content.	5.0 (1.0)
9.	The narration is clear.	5.0 (0.0)
10.	The volume level is appropriate.	5.0 (0.0)
11.	Overall, the length of the motion graphics is appropriate.	5.0 (0.0)
12.	Overall, the content in the motion graphics is useful in enhancing the understanding of depression.	5.0 (0.0)
13.	Overall, presenting the content about depression through motion graphics makes it more engaging.	5.0 (0.0)

Early identification is essential to effectively treat major depressive disorders as it can greatly enhance treatment outcomes and mitigate the disorder's adverse effects [14]. However, depression has been significantly under-recognized, including in Thailand. Moreover, the response to this health challenge has been hampered by limited access to standard care, a shortage of mental health professionals, and inadequate dissemination of knowledge [13]. The use of videos for patient information and educational purposes is growing as the ease of filming and value of visual learning make videos an attractive alternative to patient information leaflets [27]. To the best of our knowledge, limited studies have evaluated the effectiveness of educational videos compared to paper-based resources in enhancing comprehension of depression. Overall, the median pre-intervention knowledge score of the study population was notably low. The motion graphic

intervention proved to be effective. At the end of the study, we found that the knowledge scores in Group A were significantly higher than those in Group B. Additionally, the participants in Group A reported a high level of satisfaction with motion-graphic media.

The effectiveness of using motion-graphic media to educate higher education students about depression can be attributed to several factors. First, multimedia learning theory suggests that learners develop a deeper understanding when information is presented through both text and visuals rather than through text alone [28]. According to multimedia learning theory, Mayer et al. proposed a cognitive theory based on three fundamental assumptions from cognitive science: dual channels, limited capacity, and active processing [28]. Deep learning occurs when learners engage in five cognitive processes: selecting words, selecting images, organizing words, organizing images, and integrating them. As a result, learners can develop a deeper understanding when explanations are provided using both words and images simultaneously. By engaging visual and auditory channels, multimedia help learners build coherent mental models and connect new knowledge to prior knowledge. However, the effectiveness of multimedia learning is influenced by the learner's prior knowledge as well as the material's complexity and pacing [29, 30]. Second, the participants in the study, being part of a generation accustomed to digital media, were more familiar with this format compared to traditional paper-based materials [31]. Digital media has become an integral part of daily life for people worldwide, offering a platform for sharing videos, images, text, and other multimedia content [32]. Young adults are the age group that engages with digital media most frequently, often using it multiple times a day [31]. Consequently, these online platforms may benefit patient education in this age group [33]. In contrast to traditional methods that depend heavily on printed materials, such as pamphlets, multimedia approaches for patient information and education are gaining popularity and growing rapidly [27, 34]. Third, motion-graphic media capture and sustain attention more effectively than static or text-based materials. The dynamic combination of movement, sound, and visuals in motion graphics engages learners' interest and helps them maintain focus, leading to their improved retention and comprehension of the information [22]. Consequently, it effectively enhances mental health awareness, dispels common misconceptions, provides essential information about mental illnesses, offers guidance on initial self-care strategies, and recommends appropriate times to seek professional assistance [35].

Educating patients through videos has a more positive impact than using traditional methods [36]. Notably, research involving animated videos or presentations as interventions has consistently shown improvements in short-term outcomes, including increased knowledge, reduced anxiety, and better comprehension of the information provided by healthcare teams. The interest in using motion graphics for patient education and skill enhancement in psychiatry is growing. Yaakob et al. demonstrated that participants recognized approximately 84% of stress warning signs [37]. After the motion graphic intervention, approximately 80% of participants indicated that they would encourage a potentially suicidal person to seek professional help. Our findings were consistent with previous studies. Skre et al. [18] assessed the effectiveness of a universal mental health literacy program that included individual and group tasks, educational videos, and lectures on mental health. This non-randomized cluster-controlled trial involved 1,070 adolescents in Norway. The intervention was delivered over three days and incorporated student tasks, video material, and mental health lectures. Data were collected at two time points: before the intervention (pre-test) and three months after the intervention (follow-up). At baseline, 34.6% of the intervention group and 21.9% of the control group correctly identified the symptoms of depression ($p < .0001$). After intervention, the percentage of correct identification rose to 61.5% in the intervention group, while the control group remained at 21.9% ($p < .0001$). Swartz et al. [20] evaluated the effectiveness of the ADAP, a universal, school-based depression education program, in improving depression literacy among 6,679 secondary school students in the United States through an RCT. The ADAP intervention consisted of a 3-hour curriculum delivered over two to three class periods and designed to educate students about adolescent depression and improve depression literacy. It used various teaching methods, including videos, films, homework, group activities, and interactive lectures, to cover topics such as recognizing depression symptoms, understanding mental health decision-making, identifying suicide risk, and highlighting the treatability of depression. At the 6-week post-test, students who participated in ADAP showed significantly higher levels of depression literacy compared to the control group (adjusted odds ratio = 3.1; $p < .001$; 95% CI = 2.0, 5.0). Additionally, Durán et al. [21] evaluated the effectiveness of a digital audiovisual psychoeducational intervention called DEEP to enhance depression literacy among Portuguese university students. The DEEP intervention consists of 23 short videos, each approximately 1.5 minutes long, portraying the story of a student experiencing depressive symptoms. Researchers used WhatsApp to share the intervention materials and data collection tools. Participants first completed a pre-intervention questionnaire to assess their baseline knowledge of depression. The 23 videos were distributed over six days, and on day eight, participants completed the same post-intervention questionnaire to evaluate changes in their depression literacy. Without a control group, the study found that prior to the intervention, 5 out of 12 students reported knowing what depression was, which increased to 9 out of 12 after the intervention.

We found relationships between age, year of study, religion, and knowledge scores. Pearson's correlation revealed an inverse relationship with age, where younger participants had higher knowledge scores. Multiple linear regression analysis showed that year of study and religion were significantly associated with higher knowledge scores. Other variables, including gender, field of study, relationship status, parental status, and daily study duration, did not show

statistically significant associations. The relationships between sociodemographic factors and mental health literacy vary across studies. Salloum et al. [38] conducted a cross-sectional study with 153 international postgraduate students in Malaysia, examining factors influencing Mental Health Literacy Scale (MHLS) scores. Female students (B = -0.318, $p < 0.05$) and those who had sought help from a mental health professional (B = -0.285, $p < 0.05$) had significantly higher MHLS scores. We found no significant associations with age, cultural region, income, psychology-related studies, or previous experience with mental illness. Singh et al. [39] conducted a cross-sectional study of 1,400 Malaysian students, identifying key determinants of Mental Health Literacy (MHL). Female adolescents were more likely to recognize depression (adjusted odds ratio = 1.74), seek help (adjusted odds ratio = 1.42), and have adequate overall MHL (adjusted odds ratio = 1.68). Older adolescents (14 vs. 13 years) and non-smokers also demonstrated higher MHL across these areas. Similarly, adolescents who abstained from alcohol and those who did not feel lonely had higher MHL. Variables such as ethnicity, bullying, parental marital status, and income were not significantly associated with MHL. Lee [40] conducted a cross-sectional study in South Korea with 505 participants through face-to-face interviews, identifying significant predictors of Depression Literacy (DL) scores. Women (B = 2.10, $p < 0.001$), individuals with higher education (college: B = 2.19, $p < 0.001$; master's or higher: B = 3.32, $p < 0.001$), and employed participants (B = 1.32, $p = 0.004$) had higher DL scores. Age, marital status, income, BMI, chronic disease, smoking, heavy drinking, and exercise were not significantly associated with DL scores (all $p > 0.05$). BinDhim et al. [41] conducted a cross-sectional study in Saudi Arabia with 4,547 participants through computer-aided telephone interviews. The study found that marital status, healthcare job, gender, education level, and proximity to individuals with mental illness significantly influenced Mental Health Literacy Scale (MHLS) scores. Being married was linked to lower scores (B = -1.801, $p < 0.001$), while working in healthcare (B = 3.533, $p < 0.001$), being female (B = 4.418, $p < 0.001$), having a bachelor's degree (B = 3.465, $p < 0.001$), and knowing someone with mental illness increased scores. Income and personal mental health history were not significant predictors. Mideksa et al. [42] conducted a cross-sectional study in Ethiopia with 310 traditional healers, identifying key factors influencing mental health literacy (MHL). Age was negatively associated with MHL (B = -0.052, $p < 0.001$), while education, years of experience, and seeking professional help positively influenced MHL. Healers with informal education had lower MHL (B = -1.664, $p < 0.001$) compared to those with higher education. Media-based mental health information (B = 0.941, $p = 0.002$), training (B = 2.213, $p < 0.001$), experience treating mental illness (B = 1.676, $p < 0.001$), and family history of mental illness (B = 1.452, $p = 0.002$) were also significant factors. According to the data, findings vary across studies, which indicates the need for a meta-analysis to confirm and strengthen the findings. Moreover, large sample size studies are necessary to evaluate whether these sociodemographic factors affect the learning process and outcomes.

This study has several limitations. First, we acknowledge that recognizing symptoms and understanding they signal a health issue is crucial for initiating self-care and seeking professional help [43, 44]. While motion-graphic media have proven effective in increasing knowledge about depression, we have not yet established the cutoff scores that define sufficient impact for behavioral change. Therefore, further long-term studies are required to evaluate the effectiveness of motion graphics by assessing retained knowledge, the development of skills for self-identifying depressive symptoms, the adoption of habitual lifestyle practices to prevent or alleviate depression, and the ability to seek help when necessary. Moreover, monitoring the incidence of major depression and its complications is essential to validate the effectiveness of motion-graphic media. Second, the generalizability to other age groups is limited because this study focused on young adults. Therefore, RCTs must confirm its effectiveness in different age groups, particularly older people. Third, the age of the participants in Group A was significantly lower than that of participants in Group B. This age disparity could potentially influence the outcomes and confound the results as age-related factors might impact the effectiveness of the interventions differently. Future studies should aim to better match the participants' age. Fourth, this study focuses on quantitative data, and we recognize the added value that integrating qualitative data could bring. By incorporating qualitative insights, we can gain a deeper understanding of how motion-graphic media engage participants, capturing their experiences, perceptions, and emotions in a way that enhances the richness of the findings. Moving forward, a mixed-method study should be conducted to comprehensively evaluate the effectiveness of motion-graphic media, providing a more holistic view of their impact.

4- Conclusion

This study aimed to compare the effectiveness of motion-graphic media in educating higher education students in Thailand about depression, as well as their satisfaction with this method compared to traditional pamphlets. The results showed that motion-graphic media significantly improved students' knowledge of depression. Specifically, the median knowledge score in the motion-graphic media group increased significantly after the intervention, while the pamphlet group also indicated improvement, albeit to a lesser extent. Post-intervention, the scores in the motion-graphic media group were significantly higher than those in the pamphlet group. Additionally, participants in the motion-graphic media group reported greater satisfaction with the educational material. These findings suggest that motion-graphic media are more effective than traditional pamphlets in enhancing knowledge about depression. The engaging and visually appealing format may have contributed to better understanding and retention of information. Given its potential to disseminate knowledge efficiently—especially in areas with limited mental health resources—this method could play a crucial role in raising awareness, promoting early detection, and preventing severe depressive complications.

However, longer-term follow-up studies are necessary to confirm the retention of knowledge over time and assess whether this increased awareness leads to better recognition of depressive symptoms and help-seeking behavior. Additionally, monitoring the incidence of major depression and its complications is essential to validate the long-term effectiveness of motion-graphic media. This study highlights the potential of innovative media, such as motion graphics, for patient education, particularly in addressing mental health issues. This approach may offer a valuable tool in increasing depression awareness and improving early intervention efforts.

5- Declarations

5-1- Author Contributions

Conceptualization, N.C.; research design, N.C. and D.M.; methodology, N.C., A.W., and D.M.; formal analysis, N.C., A.W., D.M., and S.K.; validation, A.W., D.M., W.T., and S.K.; investigation, D.M., W.T., and S.K.; resources, W.T., V.B., and P.P.; data curation, A.W., D.M., W.T., S.K., and V.B.; writing—original draft preparation, W.T.; writing—review and editing, N.C., A.W., D.M., and W.T.; visualization, V.B. and P.P.; supervision, P.P.; project administration, N.C.; funding acquisition, N.C. All authors have read and agreed to the published version of the manuscript.

5-2- Data Availability Statement

The data presented in this study are available on request from the corresponding author.

5-3- Funding

This research was funded by the Informatics Innovation Center of Excellence at Walailak University.

5-4- Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and approved by the Walailak University Ethics Committee (protocol code WUEC-24-152-01) on 17 April 2024.

5-5- Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

5-6- Conflicts of Interest

The authors declare that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

6- References

[1] W.H.O. (2023). Depressive disorder (depression). World Health Organization (WHO), Geneva, Switzerland. Available online: https://www.who.int/news-room/fact-sheets/detail/depression (accessed on December 2024).

[2] Vashisht, E., Singh, G., Vats, V., Dhiman, A., & Singla, C. (2020). An update on epidemiology of depression: A major concern. Annals of the Romanian Society for Cell Biology, 616-624.

[3] Chiu, E. (2004). Epidemiology of depression in the Asia Pacific region. Australasian Psychiatry, 12, S4–S10. doi:10.1111/j.1039-8562.2004.02097.x-i1.

[4] Malhi, G. S., & Mann, J. J. (2018). Depression. The Lancet, 392(10161), 2299–2312. doi:10.1016/s0140-6736(18)31948-2.

[5] Ceyhan, A. A., Ceyhan, E., & Kurtyılmaz, Y. (2009). Investigation of University Students' Depression. Eurasian Journal of Educational Research (EJER), (36).

[6] Ibrahim, A. K., Kelly, S. J., Adams, C. E., & Glazebrook, C. (2013). A systematic review of studies of depression prevalence in university students. Journal of Psychiatric Research, 47(3), 391–400. doi:10.1016/j.jpsychires.2012.11.015.

[7] Terrell, K. R., Stanton, B. R., Hamadi, H. Y., Merten, J. W., & Quinn, N. (2024). Exploring life stressors, depression, and coping strategies in college students. Journal of American College Health, 72(3), 923–932. doi:10.1080/07448481.2022.2061311.

[8] Vares, E. A., Salum, G. A., Spanemberg, L., Caldieraro, M. A., & Fleck, M. P. (2015). Depression dimensions: Integrating clinical signs and symptoms from the perspectives of clinicians and patients. PLoS ONE, 10(8), 136037. doi:10.1371/journal.pone.0136037.

[9] Awadalla, S., Davies, E. B., & Glazebrook, C. (2020). A longitudinal cohort study to explore the relationship between depression, anxiety and academic performance among Emirati university students. BMC Psychiatry, 20(1), 448. doi:10.1186/s12888-020-02854-z.

[10] Harvey, S. B., Glozier, N., Henderson, M., Allaway, S., Litchfield, P., Holland-Elliott, K., & Hotopf, M. (2011). Depression and work performance: An ecological study using web-based screening. Occupational Medicine, 61(3), 209–211. doi:10.1093/occmed/kqr020.

[11] Hysenbegasi, A., Hass, S. L., & Rowland, C. R. (2005). The impact of depression on the academic productivity of university students. Journal of Mental Health Policy and Economics, 8(3), 145.

[12] Cuijpers, P., Vogelzangs, N., Twisk, J., Kleiboer, A., Li, J., & Penninx, B. W. (2014). Comprehensive meta-analysis of excess mortality in depression in the general community versus patients with specific illnesses. American Journal of Psychiatry, 171(4), 453–462. doi:10.1176/appi.ajp.2013.13030325.

[13] Kongsuk, T., Supanya, S., Kenbubpha, K., Phimtra, S., Sukhawaha, S., & Leejongpermpoon, J. (2017). Services for depression and suicide in Thailand. WHO South-East Asia Journal of Public Health, 6(1), 34–38. doi:10.4103/2224-3151.206162.

[14] Cacheda, F., Fernandez, D., Novoa, F. J., & Carneiro, V. (2019). Early detection of depression: Social network analysis and random forest techniques. Journal of Medical Internet Research, 21(6), 12554. doi:10.2196/12554.

[15] Dlamini, P. I. (2024). Think on These Thing: The Effect of Depression on South African Academics in Higher Education Work Performance and Attendance. Open Journal of Depression, 13(03), 62–77. doi:10.4236/ojd.2024.133005.

[16] Rojtenberg, S., Mosca, D., Verdaguer, M. F., Martinez, M., & Elorza, P. M. (2023). The Winding Path of Depression in Argentina from Awareness to Functional Recovery. Current Psychiatry Research and Reviews, 20(3), 181–191. doi:10.2174/2666082219666230519102418.

[17] Balatif, R., & Mawadhani Sukma, A. A. (2023). Depression and Its Impact on Various Aspects of Life - A Narrative Review. Current Psychiatry Research and Reviews, 20(2), 83–93. doi:10.2174/2666082219666230518105004.

[18] Skre, I., Friborg, O., Breivik, C., Johnsen, L. I., Arnesen, Y., & Wang, C. E. A. (2013). A school intervention for mental health literacy in adolescents: Effects of a non-randomized cluster controlled trial. BMC Public Health, 13(1), 873. doi:10.1186/1471-2458-13-873.

[19] Perry, Y., Petrie, K., Buckley, H., Cavanagh, L., Clarke, D., Winslade, M., Hadzi-Pavlovic, D., Manicavasagar, V., & Christensen, H. (2014). Effects of a classroom-based educational resource on adolescent mental health literacy: A cluster randomised controlled trial. Journal of Adolescence, 37(7), 1143–1151. doi:10.1016/j.adolescence.2014.08.001.

[20] Swartz, K., Musci, R. J., Beaudry, M. B., Heley, K., Miller, L., Alfes, C., Townsend, L., Thornicroft, G., & Wilcox, H. C. (2017). School-based curriculum to improve depression literacy among US secondary school students: A randomized effectiveness trial. American Journal of Public Health, 107(12), 1970–1976. doi:10.2105/AJPH.2017.304088.

[21] Durán, L., Almeida, A. M., & Figueiredo-Braga, M. (2021). Digital audiovisual contents for literacy in depression: A pilot study with university students. Procedia Computer Science, 181, 239–246. doi:10.1016/j.procs.2021.01.140.

[22] Shakerinejad, G., Navak, T., Hatemzadeh, N., Haghi, M., & Haghigizadeh, M. H. (2023). Investigating the effect of multimedia education based on the health belief model in preventing COVID-19 in pregnant women. BMC Public Health, 23(1), 681. doi:10.1186/s12889-022-14965-1.

[23] Rovinelli, R. J., & Hambleton, R. K. (1976). On the use of content specialists in the assessment of criterion-referenced test item validity. Annual Meeting of the American Educational Research Association, 19-23 April, 1976, San Francisco, United States.

[24] Nunnally, J. C. (1975). Psychometric Theory— 25 Years Ago and Now. Educational Researcher, 4(10), 7–21. doi:10.3102/0013189x004010007.

[25] Kang, H. (2021). Sample size determination and power analysis using the G*Power software. Journal of Educational Evaluation for Health Professions, 18. doi:10.3352/JEEHP.2021.18.17.

[26] Ruble, A. E., Leon, P. J., Gilley-Hensley, L., Hess, S. G., & Swartz, K. L. (2013). Depression knowledge in high school students: Effectiveness of the adolescent depression awareness program. Journal of Affective Disorders, 150(3), 1025–1030. doi:10.1016/j.jad.2013.05.033.

[27] Chatterjee, A., Strong, G., Meinert, E., Milne-Ives, M., Halkes, M., & Wyatt-Haines, E. (2021). The use of video for patient information and education: A scoping review of the variability and effectiveness of interventions. Patient Education and Counseling, 104(9), 2189–2199. doi:10.1016/j.pec.2021.02.009.

[28] Mayer, R. E. (2002). Multimedia learning. Psychology of Learning and Motivation - Advances in Research and Theory, 41, 85–139, Elsevier, Amsterdam, Netherlands. doi:10.1016/s0079-7421(02)80005-6.

[29] Naumann, J., Richter, T., Flender, J., Christmann, U., & Groeben, N. (2007). Signaling in Expository Hypertexts Compensates for Deficits in Reading Skill. Journal of Educational Psychology, 99(4), 791–807. doi:10.1037/0022-0663.99.4.791.

[30] Ginns, P., Martin, A. J., & Marsh, H. W. (2013). Designing Instructional Text in a Conversational Style: A Meta-analysis. Educational Psychology Review, 25(4), 445–472. doi:10.1007/s10648-013-9228-0.

[31] Hruska, J., & Maresova, P. (2020). Use of social media platforms among adults in the United States—Behavior on social media. Societies, 10(1), 27. doi:10.3390/soc10010027.

[32] Stellefson, M., Paige, S. R., Chaney, B. H., & Chaney, J. D. (2020). Evolving Role of Social Media in Health Promotion: Updated Responsibilities for Health Education Specialists. International Journal of Environmental Research and Public Health, 17(4), 1153. doi:10.3390/ijerph17041153.

[33] Jeyaraman, M., Ramasubramanian, S., Kumar, S., Jeyaraman, N., Selvaraj, P., Nallakumarasamy, A., Bondili, S. K., & Yadav, S. (2023). Multifaceted Role of Social Media in Healthcare: Opportunities, Challenges, and the Need for Quality Control. Cureus, 15(5), 39111. doi:10.7759/cureus.39111.

[34] Jeste, D. V., Dunn, L. B., Folsom, D. P., & Zisook, D. (2008). Multimedia educational aids for improving consumer knowledge about illness management and treatment decisions: A review of randomized controlled trials. Journal of Psychiatric Research, 42(1), 1–21. doi:10.1016/j.jpsychires.2006.10.004.

[35] Ameen, S., & Faye, A. (2024). Role of media – social, electronic, and print media – in mental health and wellbeing. Indian Journal of Psychiatry, 66(Suppl 2), S403–S413. doi:10.4103/indianjpsychiatry.indianjpsychiatry_611_23.

[36] Dahodwala, M., Geransar, R., Babion, J., de Grood, J., & Sargious, P. (2018). The impact of the use of video-based educational interventions on patient outcomes in hospital settings: A scoping review. Patient Education and Counseling, 101(12), 2116–2124. doi:10.1016/j.pec.2018.06.018.

[37] Yaakob, T. K. S. T., Azahari, N. A., Abdullah, S., Manaf, A. R. A., Mahamood, A. F., & Yusoff, N. I. K. M. (2021). Use of interactive video based on motion graphics to create awareness on handling stress. AIP Conference Proceedings, 2339(1), 0044958. doi:10.1063/5.0044958.

[38] Salloum, A., & Suriani, I. (2020). Factors associated with mental health literacy among international postgraduate students. International Journal of Public Health and Clinical Sciences, 7(6), 14-27.

[39] Singh, S., Zaki, R. A., Farid, N. D. N., & Kaur, K. (2022). The Determinants of Mental Health Literacy among Young Adolescents in Malaysia. International Journal of Environmental Research and Public Health, 19(6), 3242. doi:10.3390/ijerph19063242.

[40] Lee, Y. J. (2023). Depression Literacy, Associated Factors, and Correlation of Related Variables in Middle-Aged Korean Adults: A Cross-Sectional Study. International Journal of Environmental Research and Public Health, 20(11), 6021. doi:10.3390/ijerph20116021.

[41] Bindhim, N. F., Althumiri, N. A., Ad-Dab'bagh, Y., Alqahtani, M. M. J., Alshayea, A. K., Al-Luhaidan, S. M., Al-Duraihem, R. A., & Alhabeeb, A. A. (2024). Exploring Mental Health Literacy and Its Associated Factors: A National Cross-Sectional Study in Saudi Arabia, 2023. Risk Management and Healthcare Policy, 17, 355–363. doi:10.2147/RMHP.S442425.

[42] Mideksa, G., Tesfaye, E., Yitayih, Y., Sime, Y., Aliye, K., & Gizaw, A. T. (2024). Mental health literacy and associated factors among traditional healers of Jimma town, southwest, Ethiopia 2020: a community based, cross-sectional study. Frontiers in Psychiatry, 15, 1304454. doi:10.3389/fpsyt.2024.1304454.

[43] Olsson, D. P., & Kennedy, M. G. (2010). Mental health literacy among young people in a small US town: Recognition of disorders and hypothetical helping responses. Early Intervention in Psychiatry, 4(4), 291–298. doi:10.1111/j.1751-7893.2010.00196.x.

[44] Lien, Y. J., Chen, L., Cai, J., Wang, Y. H., & Liu, Y. Y. (2023). The Power of Knowledge: How Mental Health Literacy Can Overcome Barriers to Seeking Help. American Journal of Orthopsychiatry, 94(2), 127–147. doi:10.1037/ort0000708.

Appendix I

Table A1. Knowledge about depression questionnaire

No.	Statements	True	False	Don't know
1	The general population has a 5% prevalence of depression. (true)			
2	Depression is a common condition among adolescents. (false)			
3	Women are more at risk of depression than men. (true)			
4	Depression can be controlled by the mind. (false)			
5	Depression is caused by disappointment. (false)			
6	Feeling worthless is a symptom of depression. (true)			
7	Certain groups of the population are immune to depression. (false)			
8	Depression is a treatable condition. (true)			
9	Depressed patients must always feel sad. (false)			
10	Substance abuse can be a sign of depression. (true)			
11	Depression can be treated with medication and/or psychotherapy. (true)			
12	People experiencing severe stress (e.g., parental divorce) will always be depressed. (false)			
13	Depression can lead to suicide. (true)			
14	Changes in eating behavior that lead to substantial weight gain or loss do not qualify as depression. (false)			
15	Difficulty concentrating, thinking, and making decisions are symptoms of depression. (true)			
16	Increasing positive behaviors do not help reduce depression symptoms. (false)			
17	When depressed, one should drink alcohol to help sleep. (false)			
18	Exercise can help improve depression. (true)			
19	If feeling stressed or sad, one should suppress these emotions to avoid appearing weak. (false)			
20	If experiencing suicidal thoughts, contact the mental health hotline at 1323. (true)			