DIGITAL TRAUMA HEALING ADHERENCE INTERVENTION USING EXPERT SYSTEM METHOD AND SOCIAL MEDIA PARTICIPATION WITH TRAUMA SCALE LEVEL-BASED ANALYSIS AND HOBBY ANALYSIS TO IMPROVE SELF-EFFICACY

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ABSTRACT

Purpose: The purpose of this study was to help survivors have access to self-care and control over the digital intervention process by utilizing mobile system technology to increase their self-efficacy scores.

Methods: Using the validated IES-R questionnaire scoring system, the level of trauma was determined initially. Later, the knowledge base for the expert system was built using hobby analysis and social media approaches combined with expert analysis. Next, efficacy scores were calculated using the General Self-Efficacy Scale (GSES) technique, which compares the survivor's self-efficacy rating before and after treatment.

Results and Conclusion: 40 respondents who experienced the trauma of the Mount Sinabung eruption in North Sumatra Province and the earthquake in Maluku Province, Indonesia, participated in the application testing. At the 5% significance level, the findings were significant. This shows how effective "DITRAHEAL" is in helping survivors of disaster trauma in the Maluku and Tanah Karo regions.

Research implications: It is possible to explore the possibility of establishing screening techniques that work effectively with technology so that digital medicine can reach a wider audience.

Originality/value: This research provides a digital trauma healing intervention called the "DITRAHEAL" system. The expert system is used to determine the best treatment according to the Research and Development method being developed.

Keywords: Trauma Healing, Digital Adherence Intervention, Trauma Level Score, Expert System, Self-Efficacy.

INTERVENÇÃO DE ADERÊNCIA DE CURA DE TRAUMA DIGITAL USANDO MÉTODO DE SISTEMA ESPECIALIZADO E PARTICIPAÇÃO EM MÍDIAS SOCIAIS COM ANÁLISE BASEADA EM NÍVEL DE ESCALA DE TRAUMA E ANÁLISE DE HOBBY PARA MELHORAR A AUTOEFICÁCIA

RESUMO

Objetivo: O objetivo deste estudo foi ajudar os sobreviventes a ter acesso ao autoatendimento e controle sobre o processo de intervenção digital, utilizando a tecnologia de sistemas móveis para aumentar suas pontuações de autoeficácia.

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Métodos: Utilizando el sistema validado de puntuación del cuestionario IES-R, se determinó inicialmente el nivel de traumatismo. Más tarde, la base de conocimientos para el sistema de expertos se construyó utilizando el análisis de hobby y enfoques de redes sociales combinados con análisis de expertos. A continuación, se calcularon las puntuaciones de eficacia utilizando la técnica de la Escala General de Autoeficacia (GSES), que compara la calificación de autoeficacia del sobreviviente antes y después del tratamiento.

Resultados y Conclusión: 40 encuestados que experimentaron el trauma de la erupción del Monte Sinabung en la provincia de Sumatra del Norte y el terremoto en la provincia de Molucas, Indonesia, participaron en las pruebas de aplicación. En el nivel de significancia del 5%, los hallazgos fueron significativos. Esto demuestra que "DITRAHEAL" para ayudar a los sobrevivientes del trauma del desastre en las regiones de Maluku y Tanah Karo.

Implicaciones de la investigación: Es posible explorar la posibilidad de establecer técnicas de detección que funcionen eficazmente con la tecnología para que la medicina digital pueda llegar a una audiencia más amplia.

Originalidad/valor: Esta investigación proporciona una intervención digital de curación del trauma llamada "DITRAHEAL". El sistema experto se utiliza para determinar el mejor tratamiento de acuerdo con el método de Investigación y Desarrollo que se está desarrollando.

Palabras clave: Curación de Traumas, Intervención de Adherencia Digital, Puntuación de Nivel de Trauma, Sistema Experto, Autoeficacia.

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1 INTRODUCTION

Indonesia is in the Pacific Ring of Fire, an area prone to natural disasters, including earthquakes and volcanic eruptions. (Firdaus et al., 2023). In eastern Indonesia, the main plates that cause high seismicity are the Australian plate, moving northeastward relative to Eurasia, and the Pacific plate, moving westward relative to Australia (DeMets et al., 2010). The westward movement of the Pacific Plate is the main driving force for a series of left-lateral displacements in the northern part of eastern Indonesia, including the Yapen Fault Zone (YFZ), Sorong Fault Zone (SFZ), Kawa Shear Zone (KSZ), as well as the Matano Fault and Palu-Koro Fault (in Sulawesi, except the insert map) (Bock, 2003; Watkinson & Hall, 2017). Earthquakes are among the most destructive natural disasters responsible for some of the world's highest mortality rates. They usually occur suddenly, so the ability to utilize resources reduces casualties quickly and effectively. Earthquake trauma is often multifaceted, but many victims suffer injuries from being struck by collapsing buildings. In contrast, non-earthquake trauma typically does not include crush injuries (Chu et al., 2011). Disasters can result in trauma, a term for the psychological suffering experienced by survivors (Lee et al., 2020). Trauma is the emotional suffering that a person experiences due to a disaster (Maynard et al., 2019; Mayer et al., 2020). Traumatic events can cause a prolonged negative impact on a person's mental health and ability to carry out daily activities (Velazquez & Hernandez, 2019; Coventry et al., 2020). A person will try to recover from the trauma they have experienced (Kleber, 2019).

According to Forde & Duvvury (2021), a survivor is someone who is temporarily recovering from the trauma they have experienced. Trauma healing is vital for survivors to return to normal life (Davidson, 2018). Thus, appropriate trauma treatment is needed to improve the level of self-efficacy of trauma survivors affected by disasters (Murray, 2021). Traumatic conditions caused by disasters can impact the level of self-efficacy. Bandura defines self-efficacy as an individual's understanding that one can control situations and obtain positive outcomes (Bandura, 1978). Self-efficacy can predict a person's psychological strength due to the important role of self-efficacy in individual psychological and social adjustment (Corbu et al., 2021; Di Maio et al., 2021). Therefore, appropriate trauma management is needed to increase the level of self-efficacy of trauma survivors affected by disasters.

Trauma survivor research was conducted in two disaster-affected areas. The first area was trauma survivors of the volcanic eruption of Mount Sinabung in Tanah Karo, North Sumatra, Indonesia. In 2010, an eruption occurred and then sustained, which had widespread...
impacts on the community and economy in the area. On September 14, 2013, and several months after, there was an increase in the seismicity of earthquakes, and the volume of smoke and lava was seen at the top of the mountain. Another eruption occurred on September 15, 2014, with ash plumes and ashfall in cities up to 50 km from the volcano (Pallister et al., 2019). Sinabung volcano is estimated to have been dormant for around 400 years. Therefore, it is categorized as a type B volcano. It is amazing; Sinabung erupted on August 27, 2010, in November 2013, in May to June 2015, May 2016, and February - April 2018. Sinabung is now the world's most active volcano (Kusumayudha et al., 2018). Residents affected by the disaster were relocated, especially those living in the red zone (Haney, 2019).

The second research location was with survivors of the Ambon earthquake trauma. On September 26, 2019, an earthquake with a magnitude of Mw 6.5 occurred 23 km northeast of Ambon City, Indonesia, followed by a series of aftershocks related to the reactivation of a complex fault network in the Ambon and Seram regions (Baskara et al., 2023). The earthquake caused damage to various building areas. According to the National Disaster Management Agency, in 2020, the total damage reached 85 houses with severe damage, 135 with medium damage, and 221 with minor damage. In addition, damage to public and social facilities reached 87 units (Lasaiba & Arfa, 2022). The Maluku seismic earthquake caused a stress drop of 0.81 MPa with reverse faulting. This phenomenon is caused by differences in rock structure and fault mechanism as well as differences. It is very important to know the amount of stress released from earthquakes that have a huge impact, such as disaster mitigation measures (Yuliatmoko & Kurniawan, 2019).

Interview techniques were conducted with several victims (related residents and village heads) regarding the difficulties experienced by survivors in carrying out trauma management treatment for the disasters they experienced. Interviews were conducted using semi-structured techniques to explore survivors' trauma healing experiences (O'Dowd et al., 2018). The results of the interviews are summarized as follows: 1) Disaster survivors often do not realize what is happening to them, even though they experience anxiety, doubt, and irrational fear; 2) Survivors tend to hide their trauma due to feelings of shame, inferiority, and fear of being judged as unable to handle the trauma; 3) Reluctance and discomfort to share the traumatic experience with others, both to other people and professionals (therapists, counselors, etc.); 4) Lack of professional psychology personnel or trauma healing teams at the disaster site or near survivors for a long period.
To overcome the problem of the need for an appropriate trauma management system that is not limited by time and space, a digital mobile intervention with a user-friendly concept was designed with treatment based on expert analysis of trauma healing called "DITRAHEAL. "The advantage of this system is that the treatment process is designed through an expert system based on the level of trauma survivor scale, hobby analysis, and social media involvement so that the treatment provided is based on the condition and personality of the survivor.

Expert systems have been widely used to diagnose disease (Oguoma et al., 2020). The development of an expert system can cover the shortcomings of the previous system (Perifanis & Kitsios, 2023). The advantage of this method is that trauma treatment is designed based on an expert system developed based on the severity of the trauma survivor so that the treatment is appropriate according to the survivor's condition. The Impact of Even Scale-Revised (IES-R) questionnaire determines the severity of the trauma used in developing the survivor scale. In 1997, Daniel Weiss and Charles Marmar used a questionnaire created using a standardized list of questions according to the IES-R. Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV screening instrument criteria were used in the questionnaire (American Psychological Association, 2015). This questionnaire is reliable and frequently used.

The instrument was also designed to incorporate social media analysis; in addition to being a forum for exchanging personal stories and experiences, social media was also the basis for grouping concepts and selecting appropriate treatments. Mobile technology opens up a wide range of social contact opportunities, enabling the establishment of online communities that work together to address specific problems; in this situation, a social networking platform for trauma survivors to participate and interact is needed (Abdelraheem & Ahmed, 2018; Ahmed et al., 2019). The research concept will involve users directly, namely groups of trauma survivors. This research focuses on the adolescent and adult population in the active age range of social media and mobile device users. According to recent research, social media analysis is often used in disaster management. Social media analytics can be developed for trauma survivors to create interventions for trauma healing (Zhao et al., 2019; Saroj & Pal, 2020).

Technology in the trauma healing process can be used with interventions in the digital field (Smoktunowicz et al., 2020). The use of technology in the form of digital interventions is a significant advance in helping trauma survivors who are hesitant to seek psychotherapy or counselors. It is also a way to be part of the digitalization era (Merlo, 2018). Based on the results of the classification of trauma levels and the analysis of social media as a means of healing trauma, the intervention in this context refers to digital technology interventions involving
social groups. To help a person perform treatment intervention to heal trauma, digital intervention was developed as a mobile-based device or application that carries a user-friendly concept based on professional guidelines designed in the system. Treatment progress comes from better application of effective treatments. Accessibility and sustainability, two major challenges in getting support after a large-scale disaster, can also be addressed with technology-based interventions (Saltzman et al., 2017).

Examining changes in survivors' self-efficacy scores will evaluate the effectiveness of digital adherence treatment for trauma survivors. A pre-experimental design with one group pre-test and post-test was used to determine the results before and after the treatment intervention. The General Self-efficacy Scale (GSES) was used in this study to measure self-efficacy. Schwarzer & Jerusalem (1995) developed the General Self-efficacy Scale (GSES), a comprehensive self-efficacy assessment instrument in various situations. The GSES is an evolution of the Self-Efficacy Survey (SES) based on Bandura's socio-cognitive theory of perceived self-efficacy. The GSES can be used to assess perceptions of self-efficacy as it relates to adaptability and adjustment scales to stressful events and daily activities (Luszczynska et al., 2005).

2 METHODS

2.1 RESEARCH DESIGN

This research involves several methods in analyzing, designing, and evaluating the treatment results. The full conceptual framework is described in Figure 1.
There were four stages in developing the Digital Trauma Healing (DITRAHEAL) digital compliance system. The first phase was the pre-processing phase, which included survivor identification, IES-R questionnaire data analysis, hobby identification, and pre-test to determine the initial survivor efficacy score. The second phase was expert analysis as the basis of knowledge and initial survivor efficacy scores. The third phase was a digital intervention, treatment tailored to the level of trauma and hobbies, involving social media in the treatment process, and the last phase was evaluating the level of treatment compliance using a checklist evaluation system.

2.2 POPULATION AND SAMPLE

Data were collected using questionnaires, interviews, and observations. Data collection was conducted in two different areas on 100 respondents. There were 40 data points collected and analyzed from respondents spread across 17 women and 23 men with an age range of 15 to 64 years. Data source locations were also identified, particularly victims of the Ambon City earthquake and volcanic eruption in Sinabung, Karo highlands, and North Sumatra, who needed trauma-related treatment. Tulehu Village, East Seram Regency, and Ambon City were among the Ambon earthquake data collection locations affected by the event. For Tanah Karo, data was collected in the Berastagi area, Susuk Village, Kabanjahe, and areas affected by the eruption of Mount Sinabung.
2.3 LEARNING INSTRUMENTS

2.3.1 IER-S Questionnaire

The research instrument was developed as a questionnaire data collection instrument using the IES-R questionnaire instrument, which has been evaluated for validity and reliability. The IES-R measurement is a self-administered questionnaire to assess *Post-Traumatic Stress Disorder* (PTSD) symptoms after a traumatic event (Kragh et al., 2019; Aljaberi et al., 2022). The scale consists of 22 items with three factors, including "intrusion" (difficulty staying asleep, dissociative experiences, similar to flashbacks) with a total of eight items, "avoidance" (tendency to avoid thoughts or reminders of the event) with a total of eight items, and "hyperarousal" (feelings of upset, anger, sleeplessness) with a total of six items (Sharif Nia et al., 2021). Data sets have also been generated based on literature reviews and recommendations from professionals in trauma healing. *The Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, published by the *American Psychiatric Association* (APA), was used as a screening instrument for the *Impact of Even Scale-Revised* (IES-R), the instrument used in this study to measure PTSD survivors. In a previous study by Mevissen et al., the IES-R was modified and translated into Dutch to evaluate post-traumatic stress disorder in adults. The IES-R had good results in that study (Mevissen et al., 2020).

2.3.2 General Self-Efficacy Scale (GSES)

*The General Self-Efficacy Scale* (GSES) developed from *The General Self-Efficacy Scale* (GSE) was used to calculate efficacy scores. This scale was developed to evaluate the general understanding of perceived self-efficacy to predict and overcome daily challenges and adjustment strategies after going through various stressful experiences. This procedure is advised not to be tested on children under 12, as the scale is designed for adults and adolescents. *Cronbach's alpha has* varied from 0.76 to 0.90 in previous studies with a sample of 23 countries, with the majority being at 0.80, and criterion validity has been confirmed in several correlation analyses. For twenty years, this measurement technique has been successfully applied worldwide (Mayer et al., 2020; Leontiou et al., 2021). This method was deemed suitable for implementation as it can be used to estimate adaptation following life changes and is suitable as a long-term measurement of quality of life.
2.3.3 Expert team

The expert team assists in developing and supervising the treatment plan based on the survivor's level of trauma and hobbies. The expert team also determines the optimal treatment duration and the maximum duration that can be assessed as a success value. The first member of the Expert Team is a psychologist from Udayana University who is also a trauma expert. He has worked with trauma situations in several Indonesian disaster zones affected by earthquakes and volcanic eruptions. The second expert is a member of Pattimura University's trauma healing team in Ambon. He worked directly with Ambon earthquake victims to address trauma healing.

2.4 DATA ANALYSIS TECHNIQUES

Data analysis, especially the structured stage, began with the grouping of trauma survivors, social media analysis, collection of data sets and knowledge bases based on literature and expert analysis, system preparation, such as mobile-based trauma healing adherence interventions, and analysis to determine the level of efficacy before and after treatment. The system monitored the treatment progress so that it could be assessed thoroughly.

The compliance assessment formula is considered complete based on experts:

Compliance Complete IF Checklist Item $\geq 50\%$ and Day $\geq 60\%$

Notes: Low-level treatment duration: 4 weeks, moderate: 6 weeks, Severe: 8 weeks.

The next step was to conduct a post-test to compare the efficacy scores before and after treatment to determine whether the number of checklists meets the minimum value required in the formula.

2.4.1 Determination of trauma level

The level of trauma was determined using a clustering system based on analysis of the IES-R (Impact of Event Scale-Revised) questionnaire. Survivor data for trauma level clustering was collected through questionnaires completed by survivors (Ginting et al., 2021). The IES-R measurement will determine the level of trauma by providing a score as follows: 0: Never, 1: Rarely, 2: Sometimes, 3: Often, 4: Very Often. Trauma level categories were grouped based on the total score of the results, with scores below 26 categorized as mild, 26 to 43 categorized as moderate, and above 44 categorized as severe.
2.4.2 Hobby and social media analysis

A hobby is an activity done for one's enjoyment. A person's hobby is the deepest desire pursued by trying to fulfill their unmet needs (Sutherland, 2020). The emergence of new technologies and applications in today's social life supports social interactions using technology-based media (Lin & Kishore, 2021). Therefore, it is appropriate to support trauma survivors who have experienced similar disasters and similar hobbies in group treatment using social media.

2.4.3 Expert system

Expert systems utilize human expertise to be incorporated into a computer and used to solve problems. Thus, an expert system aims to translate information from a human expert into a set of coding rules that can be applied to input data to make intelligent decisions (Sarker et al., 2021). The inference process is carried out in expert systems in the Inference Engine module. This inference is a computer program that provides a methodology for reasoning information in a rule or knowledge base and for formulating conclusions (Sarker et al., 2021). The DITRAHEAL system adopts expert knowledge to help determine the right treatment based on the victim's condition and pleasure.

2.4.4 Evaluation of treatment outcomes through measurement of self-efficacy scores

The self-efficacy measurement method used in this study is the General Self-Efficacy Scale (GSES). After the digital intervention process, the fourth and final stage was evaluation. Participants used a 4-point Likert scale to rate how true each statement was: 1 = totally incorrect, 2 = almost incorrect, 3 = moderately correct, and 4 = totally correct. (Claréus et al., 2023). At this stage, a post-test was given to survivors who received the digital intervention to measure their level of self-efficacy. Finally, a comparative analysis of the initial and final efficacy scores was conducted to assess the differences before and after the intervention process carried out by trauma survivors. The results of the difference in efficacy scores can serve as a guideline for further research. According to experts, the presence or absence of differences in developing self-efficacy is not definitive proof that a treatment is effective or ineffective. It is an evaluation step for trauma healing efforts carried out through digital Ditreaheal Treatment.
3 RELATED RESEARCH WORKS

The use of technology in psychological treatment has been investigated by various researchers before. The IES-R was used in a study to determine earthquake exposure and Post-traumatic Stress among Nepalese mothers after the 2015 earthquake (Kvestad et al., 2019). Some studies show that hobbies are stress-relieving activities, stating that focusing on a hobby and connecting with others with the same interests can reduce anxiety and daily difficulties (Eden et al., 2020). Research Hu (2019) also states that online social support can help heal mental health. A trauma information system called the TIS Initiative has also been designed to address trauma and its symptoms (Loomis et al., 2019). The study by Olff et al. (2019) also addressed the topic of innovations in psychological treatment, medication, technological assistance, and the prospects of new fields related to trauma healing. Leite's study also concentrated on telemedicine, which provides a new method for developing and promoting remote clinical Treatment (Leite et al., 2020).

4 SYSTEM ANALYSIS

4.1 SYSTEM DESCRIPTION

The description of the trauma healing compliance intervention system can be seen in the flowchart below.

Figure 2
Flowchart of the DITRAHEAL System
In Figure 2 above, the sequence of the system running is explained, starting from inputting survivor data, then filling out the IES-R questionnaire to determine the level of trauma, and filling out the hobby form. Then, the survivor will take the pre-test to determine the initial efficacy score. The results will be processed in the Inference Engine to determine the treatment survivors will follow personally and in groups connected to social media. If the treatment has been completed, the survivor will take the post-test to compare the efficacy value before and after the treatment runs. In this case, the questions on the Pre and Post-Test Efficacy questionnaires are the same. However, suppose the survivor needs to complete the Treatment process. In that case, the User / Survivor will be directed directly to the final section without taking the Post Test, and there is no comparison of the efficacy value.

4.2 RULE BASE SYSTEM ANALYSIS

In preparing the Rule Base, the expert will provide input on the survivor's treatment according to his criteria. From the expert analysis, an example of a treatment table for trauma healing is obtained as follows below:

4.2.1 Personalized Treatment by Trauma Level

The treatment carried out was grouped based on the level of trauma of the survivor, consisting of Treatment for mild level trauma (Code-TLR), Treatment for moderate level trauma (Code-TLS), and treatment for severe level trauma (Code-TLT).

4.2.2 Personal Treatment by Hobby

_Treatment_ based on Hobbies was grouped when the survivor entered hobby data when filling in the Survivor Data. The four hobby categories are music, sports, reading and watching, and art.

4.3 INFERENCE ENGINE

The inference engine uses IF-THEN production rules and the forward Chaining reasoning method. Here are the rules for the inference treatment model.
Table 1

Treatment definition

<table>
<thead>
<tr>
<th>Treatment Code</th>
<th>Treatment definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODEL I</td>
<td>(Treatment Code_TLR + Code_HM) &gt;= 50% and Day &gt;= 60%</td>
</tr>
<tr>
<td>MODEL II</td>
<td>(Treatment Code_TLR + Code_TRS + Code_HM) &gt;= 50% and Day &gt;= 60%</td>
</tr>
<tr>
<td>MODEL III</td>
<td>(Treatment Code_TLR + Code_TRS + Code_TLT + Code_HM) &gt;= 50% and Day &gt;= 60%</td>
</tr>
<tr>
<td>MODEL IV</td>
<td>(Treatment Code_TLR + Code_HOR) &gt;= 50% and Day &gt;= 60%</td>
</tr>
<tr>
<td>MODEL V</td>
<td>(Treatment Code_TLR + Code_TLS + Code_HOR) &gt;= 50% and Day &gt;= 60%</td>
</tr>
<tr>
<td>MODEL VI</td>
<td>(Treatment Code_TLR + Code_TLS + Code_TLT + Code_HOR) &gt;= 50% and Day &gt;= 60%</td>
</tr>
<tr>
<td>MODEL VII</td>
<td>(Treatment Code_TLR + Code_HAS) &gt;= 50% and Day &gt;= 60%</td>
</tr>
<tr>
<td>MODEL VIII</td>
<td>(Treatment Code_TLR + Code_TLS + Code_HAS) &gt;= 50% and Day &gt;= 60%</td>
</tr>
<tr>
<td>MODEL IX</td>
<td>(Treatment Code_TLR + Code_TLS + Code_TLT + Code_HAS) &gt;= 50% and Day &gt;= 60%</td>
</tr>
<tr>
<td>MODEL X</td>
<td>(Treatment Code_TLR + Code_TLS + Code_HMM) &gt;= 50% and Day &gt;= 60%</td>
</tr>
<tr>
<td>MODEL XI</td>
<td>(Treatment Code_TLR + Code_TLS + Code_HMM) &gt;= 50% and Day &gt;= 60%</td>
</tr>
<tr>
<td>MODEL XII</td>
<td>(Treatment Code_TLR + Code_TLS + Code_TLT + Code_HMM) &gt;= 50% and Day &gt;= 60%</td>
</tr>
</tbody>
</table>

Table 2

Rules for Modeling Treatment

IF Level_trauma = Low And Hobby = Music THEN Treatment: MODE I
IF Level_trauma = Medium And Hobby = Music THEN Treatment: MODE II
IF Level_trauma = High And Hobby = Music THEN Treatment: MODE III
IF Level_trauma = Low And Hobby = Sports THEN Treatment: MODE IV
IF Level_trauma = Medium And Hobby = Sports THEN Treatment: MODE V
IF Level_trauma = High And Hobby = Sports THEN Treatment: MODE VI
IF Level_trauma = Low And Hobby = Art THEN Treatment: MODE VII
IF Level_trauma = Medium And Hobby = Art THEN Treatment: MODE VIII
IF Level_trauma = High And Hobby = Art THEN Treatment: MODE IX
IF Level_trauma = Low And Hobby = Read/Watch THEN Treatment: MODE X
IF Level_trauma = Medium And Hobby = Read/Watch THEN Treatment: MODE XI
IF Level_trauma = High And Hobby = Read/Watch THEN Treatment: MODE XII

4.4 GROUP TREATMENT

Group treatment was carried out on social media. Survivors got a link to join the social media group based on their hobbies.
Table 3

Treatment Group

<table>
<thead>
<tr>
<th>No.</th>
<th>Group Treatment Duration 2-4-6 Weeks (2x Weekly Meetings)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introductions (Introduce yourself to your fellow group members)</td>
</tr>
<tr>
<td>2</td>
<td>Sharing experiences when a disaster occurs (telling each other what happened during the disaster)</td>
</tr>
<tr>
<td>3</td>
<td>Telling stories about the history of love for hobbies, things related to hobbies, and favorites (according to each survivor's hobby group)</td>
</tr>
<tr>
<td>4</td>
<td>Stories about a favorite character, someone important, family or spouse that relates to the topic (hobby)</td>
</tr>
<tr>
<td>5</td>
<td>New developments about the hobby, for example, the latest technology, the latest appearance, the latest publication or anything related to hobby updates</td>
</tr>
<tr>
<td>6</td>
<td>Give each other suggestions/ideas to fill free time based on hobbies or suggestions to think more and do positive activities.</td>
</tr>
<tr>
<td>7</td>
<td>Motivate each other</td>
</tr>
<tr>
<td>8</td>
<td>Open Community Chat group outside the group treatment compliance app</td>
</tr>
</tbody>
</table>

5 RESULTS

Taking a sample of users as trauma survivors, the following interface of DITRAHEAL has been designed. As the location of the research population is in an area of Indonesia affected by the earthquake and volcanic eruption of Mount Sinabung in Maluku Province, the system is implemented using Bahasa Indonesia.

Figure 3

*System is implemented using Bahasa Indonesia. a) bio content page, b) Fig 4. Hobbies Data, c) Trauma Level Questionnaire, d) Questionnaire to determine trauma level, e) Trauma level test and pre-efficacy score, f) Personal treatment compliance, g) Group treatment compliance, h) Treatment compliance result*
The screenshot of the application results shows the steps taken, starting with filling in the survivor's biodata, choosing a hobby, then filling in the trauma level questionnaire and pre-test to determine the level of self-efficacy. After that, the initial efficacy data and the number of traumas will be calculated and displayed. The treatment page will be displayed based on the trauma level evaluation and hobby analysis. To assess adherence to the system intervention, the survivors are instructed to adhere to a series of completed treatments and treatment checklists.

6 DISCUSSION

DITRAHEAL's mobile-based application has been distributed to 40 sample populations in earthquake-affected areas in Maluku and the Sinabung volcanic eruption in Tanah Karo.

6.1 IMPLEMENTATION AND ANALYSIS

The DITRAHEAL program was installed on several survivors, and 40 survivors obeyed from filling in the initial data to the final stage of assessing the results of the self-efficacy test. This stage took quite a long time, depending on the survivor's level of trauma. In general, survivors were at a moderate level and a severe and mild level. Treatment that takes days makes some Survivors unable to carry out the treatment to completion. The author noted that not all Survivors feel it is important to heal their trauma. In addition, from the database obtained, women are generally more vulnerable to trauma, as seen in the database, which shows the average percentage of increase in efficacy scores:
Presentation of Increased Efficacy Score: \[ \frac{\text{average value}}{\text{total}} \times 100\% \], thus obtained:

- increased Efficacy Score in women: \[ \frac{5.7}{40} \times 100\% = 14.25\% \]
- increased Efficacy Score in women: \[ \frac{3.14}{40} \times 100\% = 7.85\% \]

6.2 COMPARISON CHART OF THE EFFICACY SCORES OF THE TWO DISASTER-AFFECTED AREAS

The results of comparing the value of self-efficacy in Trauma Survivors of Mount Sinabung eruption in the Karo region and Maluku Earthquake Trauma Survivors before and after treatment can be seen in Figure 4.

**Figure 4**

*Sinabung and Maluku Victim Efficacy Scores*

Of the 40 sample populations distributed, the results of the comparison of the average treatment scores are shown. In areas affected by the eruption of Mount Sinabung, the average survivor efficacy score before treatment was 22.74, and after treatment was 27.6. In areas affected by the Maluku Earthquake, the average survivor efficacy score before treatment was 16.5, and after treatment, it was 26.1.
6.3 NORMALITY TEST

The normality test was carried out on the research data using the Shapiro-Wilk test because the sample size was less than 50. The results of the normality test are presented in the following table.

Table 4

<table>
<thead>
<tr>
<th>Efficacy</th>
<th>Statistics</th>
<th>Shapiro Wilk (df)</th>
<th>sig</th>
</tr>
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<tbody>
<tr>
<td>Pre</td>
<td>0.956</td>
<td>40</td>
<td>0.118</td>
</tr>
<tr>
<td>The post</td>
<td>0.957</td>
<td>40</td>
<td>0.135</td>
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</tbody>
</table>

Based on the table above, the significance value of pre-efficacy is 0.118, and post-efficacy is 0.135. In addition, the data distribution of all data groups in this study obtained a significance value > 0.05, which indicates that the data is normally distributed (Gowda et al., 2019). The observation results showed that the self-efficacy value increased significantly, indicating that the treatment presented by the DITRAHEAL application worked effectively. Determining the trauma level before treatment has a different influence on the treatment results, especially on the efficacy value. This is evidenced by the difference in the average Sinabung efficacy score from 22.74 to 27.6. This difference is due to the different conditions of earthquake and volcanic eruption survivors. The average efficacy value of the Ambon Earthquake increased from 16.5 to 26.1. Based on the research results, the DITRAHEAL application can help traumatized disaster survivors in various regions of Indonesia.

7 CONCLUSIONS

The study's results on samples in two disaster-affected areas, namely the Maluku Earthquake and Mount Sinabung Eruption, showed significant results at the 5% significance level. The increase in efficacy scores before and after utilization of the DITRAHEAL App indicates that the application of DITRAHEAL, a digital intervention with treatment adherence monitoring, is highly effective in helping survivors of disaster trauma. The most common level of trauma among survivors was moderate, followed by severe and mild. In addition, women were more prone to trauma. The authors mention here that not all survivors believe that it is important to help survivors recover from their traumatic experiences. The DITRAHEAL digital trauma healing intervention system uses the IES-R trauma level determination expert system.
method, hobby analysis, social media approach, and comparison of efficacy scores with the GSES method. This combination of techniques is quite effective with a more personalized healing goal. It is expected to be used not only for disaster trauma healing but can also be further developed for other trauma healing. The limitation of this study is that the first screening is only limited to adolescents and adults who are believed to use mobile-based gadgets actively. Further research can be conducted to examine other possibilities to establish screening techniques that work effectively with technology so that digital treatments can reach a wider audience.
REFERENCES


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