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Web-Based Smart System for Mental Health Prediction to Educate the Community of Tangkahan Village in Supporting Healthy and Prosperous Living

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ABSTRACT

Mental health is crucial for individual well-being, enabling people to manage stress, work productively, and contribute to their communities. However, in Tangkahan Village, Namorambe District, Deliserdang Regency, mental health awareness remains low, with many villagers associating mental disorders with supernatural causes rather than seeking medical help. This community service project aims to address this gap by implementing a web-based smart system to predict mental health conditions and providing education on mental health issues. In collaboration with Angel Health Clinic, the project will include free health checks, socialization, and pre- and post-tests to evaluate the impact of the program on community knowledge. The goal is to promote healthier and more prosperous living through increased mental health awareness and early detection.

Keyword: Mental Health Education, Web-Based Smart System, Mental Health Prediction, Community Awareness, Tangkahan Village Mental Health



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1. Introduction

This Community Service activity will take place at Angel Health Clinic, located in Tangkahan Village, Namorambe District, Deliserdang Regency, North Sumatra Province. The distance from Universitas Sumatera Utara to Angel Health Clinic is 21 km, following the Sumatra Highway from Medan towards the Titi Kuning intersection. From there, a right turn leads to Delitua, passing through Kedai Durian Village, which borders Medan City and Deliserdang Regency. After traveling approximately 10 km to reach Delitua, a right turn leads to the Batu Penjemuran intersection, where a left turn will take you directly to Tangkahan Village.

Tangkahan Village, Namorambe District, has two health clinics, with significant distance between them. Angel Clinic is the first clinic established in the village. Many villagers, both BPJS and non-BPJS patients, rely on Angel Clinic for their healthcare, as the hospital is far, and most villagers have low-income levels [1]. The clinic provides not only general health check-ups but also child healthcare, maternity services, and more.

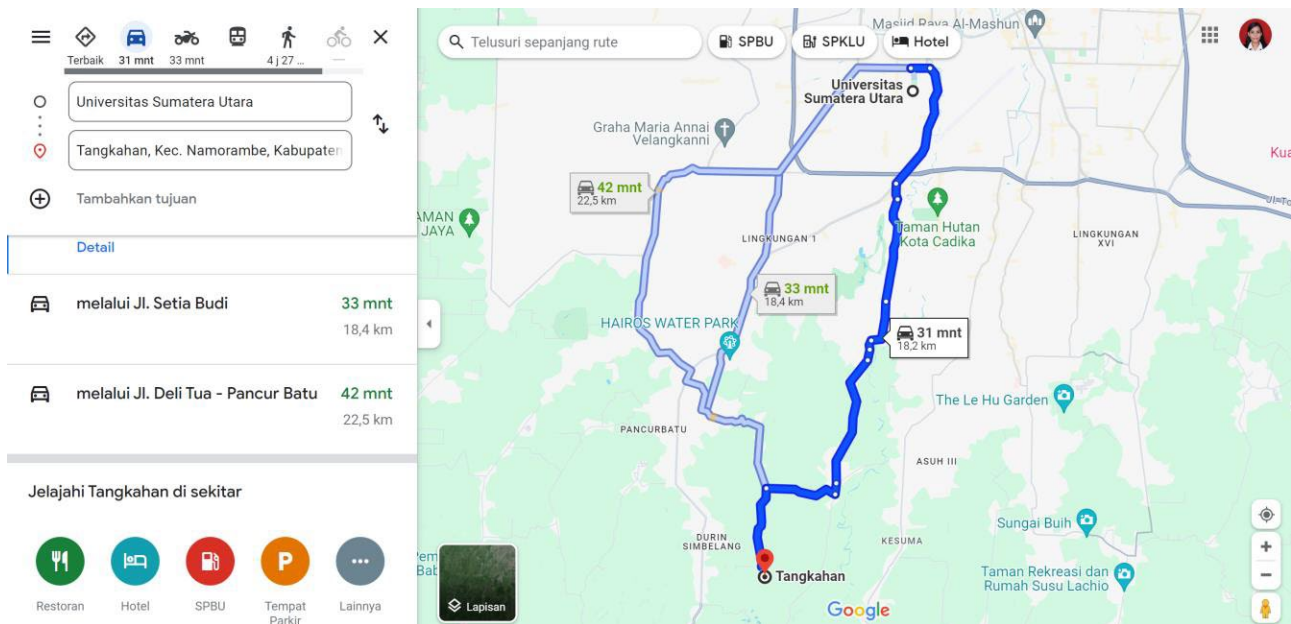


Figure 1. Map of the Service Location from USU to Tangkahan Village

Given the importance of mental health education for the villagers, Angel Clinic hopes to offer mental health services and free counseling. The community service team plans to partner with Angel Clinic to educate the villagers about mental health. This is essential as the villagers often misinterpret mental health issues as supernatural events [2]. Improving mental health awareness will contribute to a peaceful, safe, and comfortable village [3].

Obsessive-Compulsive Disorder (OCD) is a psychological disorder consisting of two main components: obsession and compulsion. Obsession refers to recurring thoughts and attitudes that dominate individuals, while compulsion is the irresistible urge to perform certain actions. Explains that anxiety and emotional distress caused by obsessions often lead sufferers to seek strategies [4], such as compulsions or rituals, to alleviate their distress [5,6].

Over 100 years ago, Obsessive-Compulsive Personality Disorder (OCPD) was first described. In 1952, with the publication of the first Diagnostic and Statistical Manual of Mental Disorders (DSM), OCPD became a diagnosable mental disorder [7,8]. It has been included in all subsequent DSM revisions, including DSM-5. The disorder is characterized by eight personality traits: preoccupation with details, perfectionism, excessive devotion to work, over-cautiousness, inability to discard worthless objects, difficulty delegating tasks, frugality, and rigidity. OCPD is the most common personality disorder in the general population, associated with moderate psychosocial dysfunction, reduced quality of life, and a significant economic burden [9,10].

1.2. Problem Formulation of the Partner

Angel Health Clinic in Tangkahan Village, Namorambe District, Deliserdang Regency, is part of a resilient village that has creative work programs to help educate and raise awareness among villagers about maintaining health and accessing accurate health information, including mental health. This aligns with the third goal of the Sustainable Development Goals (SDGs), ensuring healthy lives and promoting well-being for all [11].

Mental health is often neglected by the villagers, as it is frequently misinterpreted as a spiritual issue. In reality, mental health can be addressed and consulted with healthcare professionals. A mentally healthy community contributes to a safer and more comfortable village environment. The lack of mental health education in Tangkahan Village has led the community service team to collaborate with Angel Clinic, a trusted healthcare provider in the village [12]. The team will also develop a web-based smart system for mental health prediction, to be used by Angel Clinic and the team to conduct physical and mental health check-ups for the villagers.

1.3. Benefits of the Activity

Upon completion of this activity, it is expected that: a. Angel Health Clinic in Tangkahan Village will continue to provide mental health services and education to support a safe and peaceful village. b. The villagers of Tangkahan will become aware of the importance of mental health and understand its symptoms and negative impacts. c. The villagers will be educated that mental disorders are not always linked to possession.

1.4. Target Audience

- The villagers of Tangkahan
- The owners and staff of Angel Health Clinic

2. Methods

This activity will be conducted from June to November, providing education, socialization, and free physical and mental health checks using medical tools and the mental health prediction smart system for the villagers of Tangkahan. The community service team will collaborate with Angel Health Clinic in Tangkahan Village to offer free physical and mental health checks. Angel Clinic will provide physical health checks, including uric acid, blood sugar, cholesterol, and blood pressure tests, while the community service team will offer mental health assessments using the smart system for mental disorder prediction. The collaboration between the community service team and the partner is outlined in the following table, detailing the agreed contributions from each party:

Table 1. Contributions from the Partner and Community Service Team

USU Community Service Team	a. Provide a web-based smart system for mental disorder prediction. b. Deliver education and socialization on mental health by inviting mental health experts. c. Distribute nutritious food packages and vitamins to the villagers of Tangkahan.
Angel Health Clinic Partner	a. Offer free health checks for uric acid, blood sugar, cholesterol, and blood pressure to the villagers of Tangkahan. b. Provide the venue for the community service activities.

The community service will be carried out in several phases:

1. Workshop: Education on the importance of maintaining a balance between physical and mental health.
2. Socialization: Introduction to the web-based smart system for mental disorder prediction.
3. Physical Health Checks: Assessment of uric acid, blood sugar, cholesterol, and blood pressure.
4. Mental Health Checks: Evaluation using the web-based smart system for mental disorder prediction.
5. Distribution: Provision of healthy food and vitamins to the villagers of Tangkahan.

The activities are expected to take place in August 2024, before the new academic year begins. The methodology for this community service includes several stages: Preparation, Implementation, Evaluation, and Reporting, as shown in the diagram below:

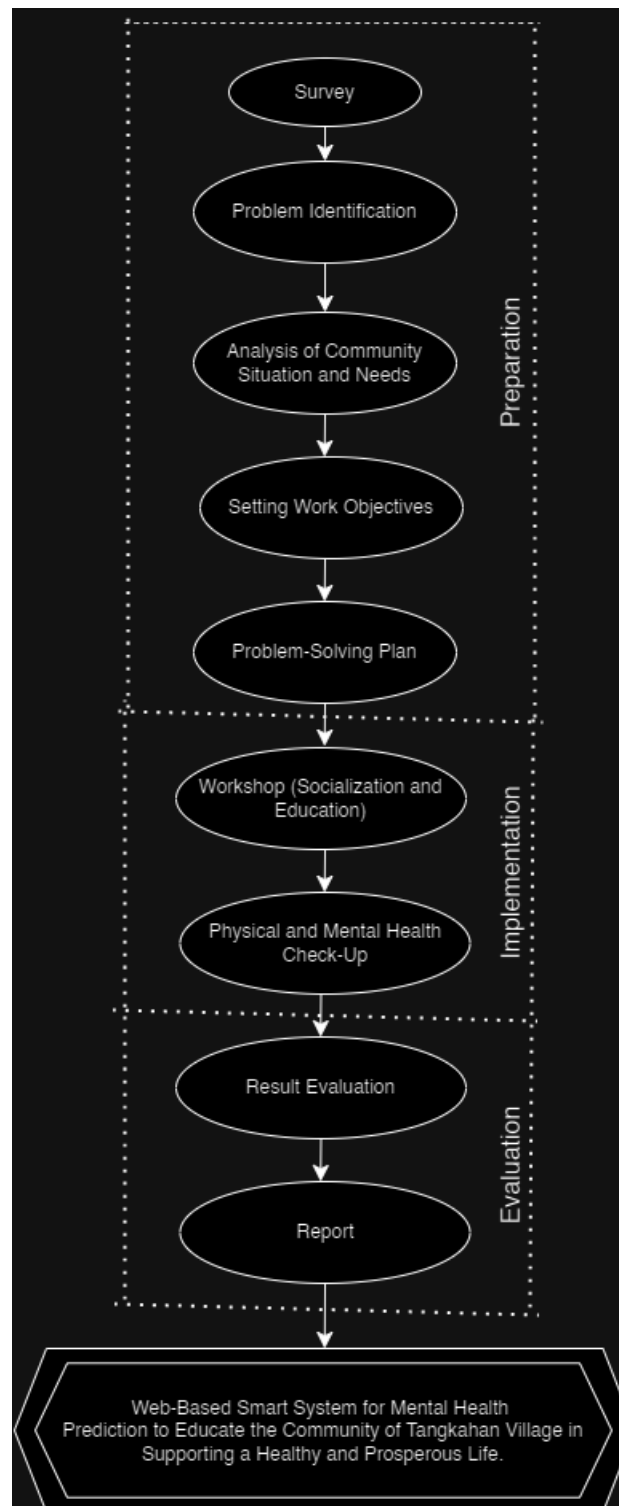


Figure 2. Methods

This stage involves conducting a survey, identifying problems, analyzing the situation and community needs, setting work objectives, and planning solutions. Initially, the team will hold discussions with the partner to understand the current issues or needs.

This stage includes:

1. Workshop: Educating participants about the importance of maintaining a balance between physical and mental health.
2. Physical Health Checks: Assessing uric acid, blood sugar, cholesterol, and blood pressure.

3. Mental Health Checks: Using the web-based smart system for mental disorder prediction.

Following the health checks, healthy food and vitamins will be distributed to the participants, the villagers of Tangkahan.

This final stage involves evaluating results and reporting. Evaluation will include pre-tests and post-tests to measure the villagers' knowledge and understanding of maintaining a balance between physical and mental health. This will help in planning the sustainability of the health program in Tangkahan Village after the project concludes.

The community service will be supported by three students from the Computer Science and Information Technology program at Universitas Sumatera Utara:

- 1) Ivanny Putri Marianto (Computer Science Student / ID: 221401101)
- 2) Aurick Daffa Muhammad (Computer Science Student / ID: 211401022)
- 3) Annisa Cahyani (Information Technology Student / ID: 221402087)

3. Result and Discussion

The community service project will be executed in four main phases: Preparation, Implementation, Evaluation, and Reporting, over a period of six months. The initial three months are dedicated to preparation and implementation following the contract signing.

Preparation involved surveys and discussions with the Village Head and PKK Chair, revealing several key challenges in mental health education: a lack of understanding of mental health, negative stigma associating mental disorders with supernatural issues, and limited access to medical information and diagnostic technology. To address these issues, the team, in collaboration with Klinik Kesehatan Angel, outlined key activities for mental health education in Tangkahan Village. These included providing basic information about mental health and disorders such as OCD, explaining the impact of mental health on well-being, and teaching early identification of symptoms. They also introduced a web-based smart system prototype for mental health prediction, demonstrated its use, and administered pre- and post-event questionnaires to measure knowledge improvement.

Implementation took place at the village hall and Klinik Kesehatan Angel. Participants learned about mental health's importance, symptoms like OCD, and its impact on well-being. The team conducted interactive discussions and demonstrations of the smart system prototype to ensure effective usage. Initial and final questionnaires showed significant improvement in participants' understanding, reflecting the success of the educational efforts.

The training was held on Friday, July 19, 2024, at Klinik Kesehatan Angel, led by a team from Universitas Sumatera Utara, including Chair Dewi Sartika Br Ginting, S.Kom., M.Kom, Member Ade Sarah Huzaifah, S.Kom., M.Kom., and students Ivanny Putri Marianto (ID: 221401101), Aurick Daffa Muhammad (ID: 211401022), and Annisa Cahyani (ID: 221402087). The training, attended by 20 residents, adhered to health protocols including social distancing and mask-wearing. The team provided educational materials, a guide to the smart system, and evaluation questionnaires. Initial questionnaires assessed baseline knowledge, and post-event questionnaires evaluated educational effectiveness.

Dr. Ayu Citra Br Barus, a psychiatrist from Prof. Dr. M. Ildrem Provsu Mental Hospital, delivered a detailed presentation on mental health, focusing on disorders like OCD and the importance of proper treatment. Additionally, Ibu Dewi Sartika Br Ginting S.Kom., M.Kom. presented the smart system website design, explaining its functionality and how the community could use it to support their mental health.



Figure 3. Delivery of Material and Socialization of Website Design

4. Conclusion

The community service project on mental health in Tangkahan Village has achieved significant progress in enhancing the residents' knowledge about mental health and the use of technology for early diagnosis. The educational sessions held at the village hall and Klinik Kesehatan Angel, along with the introduction of the web-based smart system prototype, have successfully raised awareness about the importance of mental health and how to use technology to predict mental disorders. Questionnaire analysis indicates substantial improvement in participants' understanding, reduced negative stigma, and strengthened their skills in using the provided tools.

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