

Prototype of Integrated Health Service System for Diabetes Mellitus Prevention: Indonesian Population

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Abstract. The low knowledge about Diabetes Mellitus health service systems in other countries causes Indonesian migrant workers and students to choose not to be checked when they feel sick. The aims of this study to design a prototype of an integrated health service system for foreign in Taiwan. This study using Action Research method with two cycles, the first cycle was to designing prototype framework and the second cycle was to socialization of the prototype that has been developed. This study was conducted on February 2024 at Taiwan city with 85 participants. The findings of this study indicate that the integrated health service system prototype can provide assistance to Indonesian population to understand the operation of the health system, how to access the health services available in Taiwan, and help them understand their rights as patients and health insurance claims procedures. Effective socialization about the integrated healthcare system provides significant benefits, including helping to overcome barriers faced by Indonesian population in accessing healthcare services in Taiwan. It also assists them in enhancing their skills in managing their personal health and improve their quality of life by managing their health conditions more effectively and taking appropriate preventive measures.

1 Introduction

Non-Communicable Diseases (NCDs) are a metabolic disease that causes serious problems. Diabetes mellitus (DM) is one of the NCDs whose numbers continue to increase. Diabetes mellitus (DM) is caused by damage to pancreatic beta cells and insulin resistance due to unhealthy lifestyle behavior. DM does not only occur in the elderly, but has also affected adults and adolescents, including children. Consuming instant food and lack of physical activity increases the risk of developing DM more quickly. This disease attacks slowly and usually people with DM come to health services late [1].

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Based on data from the International Diabetes Federation (IDF), on 2021 it is estimated that 537 million people worldwide will suffer from DM, and it is projected to reach 783 million people on 2045 [2]. Data from the International Diabetes Federation (IDF) reports that on 2021 the prevalence of DM in Indonesia was ranked 5th after China, India, Pakistan, and the United States at 19.5 million people. The main cause of the high prevalence of DM in Indonesia is unhealthy behavior and lifestyle over a long period. There is a need for community-based healthy living behavior interventions.

The low level of knowledge and compliance of people with DM to seek treatment at primary and advanced level health facilities causes the progression of DM to become increasingly rapid. This condition causes an increase in complications due to DM. Neuropathy, kidney failure, retinopathy and coronary heart disease are complications that often occur due to DM [3]. The low knowledge about DM health service systems in other countries also causes Indonesian Migrant Workers and Indonesian students to choose not to be checked when they feel sick. Apart from that, the long waiting time for services means that people with DM do not want to go to health facilities [4]. The long distance between home and health facilities as well as the lack of support system from family or friends also causes low motivation and awareness to implement healthy living behavior. One effort to increase the knowledge and compliance of DM sufferers in using health facilities is by providing an integrated service system.

An integrated health service system is needed, because people can easily access services, including DM screening. The integrated DM Personnel Service System (SPPDM-Integrated) requires support from the government as a policy maker. Integrated health services start from the role of the community to the patient referral system to the hospital. This concept is expected to be able to make society more independent in improving their health status. An integrated service system is a procedure for health services that involves all related resources. This integrated system can reduce the death rate due to DM [5]. The integrated service system is carried out starting from maximizing the role of the community through empowerment. Community empowerment is an effort to increase community motivation and awareness [6]. The role of the community with its knowledge and behavior can help increase public knowledge about preventing DM. Behavior that is based on knowledge will be better than behavior that is not based on knowledge [7]. The aims of this study to design a prototype of an integrated health service system for foreign in Taiwan.

2 Methodology

This study using the Action Research Method which involves 3 cycles (Figure 1). This method was chosen because it can increase opportunities for identifying problems and problem-solving solutions, as well as allowing the author to continuously improve and develop actions based on the learning obtained from each cycle.

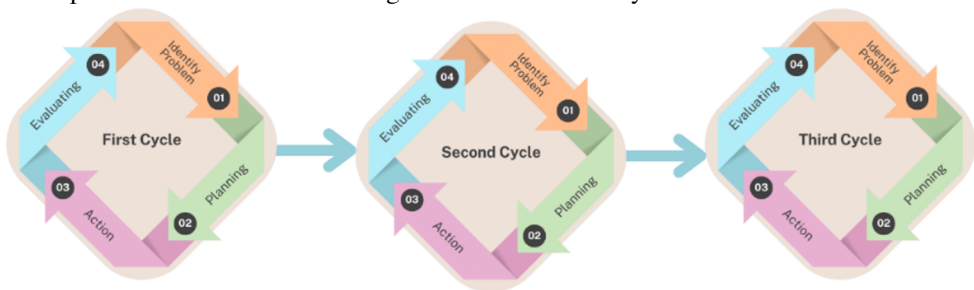


Fig. 1. Action Research Method.

2.1 First Cycle

2.1.1 Identify Problem

The author conducted a preliminary study by interviewing the Chairman of the PCIM and observing Indonesian migrant worker, Indonesian student, and foreigners in Taiwan regarding the integrated Diabetes Mellitus healthcare system there.

2.1.2 Planning

The author planned to design a prototype of an integrated healthcare DM service system for foreigners in Taiwan. This prototype would include information on accessing healthcare services available in Taiwan for foreigners with DM from community until hospital settings.

2.1.3 Action

The author investigated information, processes, and regulations related to healthcare services accessible to foreigners in Taiwan.

2.1.4 Evaluating

The author evaluated the prototype design by seeking feedback from experts. In this process, feedback was sought from experienced healthcare professionals in diabetes management and integrated healthcare systems.

2.2 Second Cycle

2.2.1 Identify Problem

This stage aimed to identify new problems or issues that still require further resolution regarding DM management in Taiwan.

2.2.2 Planning

The author plans to introduce a prototype of an integrated healthcare system for DM in Taiwan that has been developed previously. The goal is to enhance understanding and awareness of the healthcare service process for foreign in Taiwan.

2.2.3 Action

The campaign of the integrated DM healthcare service system prototype for foreigners in Taiwan was carried out at Asia University, National Chin-Yi University of Technology, and Taichung Mosque.

2.2.4 Evaluating

The evaluation will be conducted through observation and question and answer sessions.

2.3 Third Cycle

2.3.1 Identify Problem

Interviews during the campaign revealed that most foreigners had not undergone health screenings for DM due to high work pressure, lack of time to visit healthcare facilities, and a lack of understanding of healthcare rights under Taiwan's healthcare system.

2.3.2 Planning

The author plans to conduct a free health check-up program and DM screening as part of the implementation of the prototype awareness campaign developed in the previous cycle.

2.3.3 Action

The free health check-up and DM screening program were conducted at Asia University, National Chin-Yi University of Technology, and Taichung Mosque.

2.3.4 Evaluating

Through observations by the PCIM Taiwan team, it was found that foreigners began to have awareness about health check-ups and utilized healthcare facilities in Taiwan. This finding indicates that health awareness has had a positive impact on the foreign community in Taiwan. Active involvement of local organizations or communities in promoting and supporting health awareness has also had a positive influence on foreigners in Taiwan.

3 Results and Discussion

3.1 First Cycle

3.1.1 Identify Problem

Based on interviewing of the Chairman of the PCIM and observing Indonesian migrant worker, Indonesian student, and foreigners in Taiwan, it was found that there was no integrated model for managing patients with DM, especially for foreigners in Taiwan.

3.1.2 Planning

The author designing a prototype of an integrated healthcare DM service system for foreigners in Taiwan. This prototype would include information on accessing healthcare services available in Taiwan for foreigners with DM from community until hospital settings.

3.1.3 Action

The author investigating information, processes, and regulations related to healthcare services accessible to foreigners in Taiwan. This investigated was conducted through literature reviews of journals and official publications, as well as visits to the official websites

of the Taiwan Ministry of Health and related agencies to gather information on health policies and regulations. The author also conducted a thorough examination of official documents that might provide guidance on healthcare access procedures and service flow.

3.1.4 Evaluating

The author have some evaluation from the experts, this evaluation ensured that the resulting prototype met the needs and standards required to provide effective and accessible healthcare services to foreigners with diabetes in Taiwan.

3.2 Second Cycle

3.2.1 Identify Problem

Based on the interviews with foreigners in Taiwan revealed that they had low knowledge about the healthcare system, especially regarding DM management in Taiwan. This indicated a need to enhance information and understanding of healthcare services in Taiwan for foreigners.

3.2.2 Planning

The author introduce a prototype of an integrated healthcare system for DM in Taiwan that has been developed previously. The goal is to enhance understanding and awareness of the healthcare service process for foreign in Taiwan.

3.2.3 Action

The campaign of the integrated DM healthcare service system prototype for foreigners in Taiwan was carried out at Asia University, National Chin-Yi University of Technology, and Taichung Mosque. This included explanations of the healthcare system accessible to foreigners from community to hospital settings, the importance of regular health checks, and DM prevention.

3.2.4 Evaluating

Based on participant observations, attendees showed enthusiasm during these activities. Participants actively engaged in question-and-answer sessions and discussions related to the campaign. Participants welcomed the health screenings, this is indicating their concern for their health and the effectiveness of the campaign in providing beneficial knowledge.

3.3 Third Cycle

3.3.1 Identify Problem

Interviews during the campaign revealed that most foreigners had not undergone health screenings for DM due to high work pressure, lack of time to visit healthcare facilities, and a lack of understanding of healthcare rights under Taiwan's healthcare system.

3.3.2 Planning

The author conducted a free health check-up program and DM screening as part of the implementation of the prototype awareness campaign developed in the previous cycle.

3.3.3 Action

The free health check-up and DM screening program were conducted at Asia University, National Chin-Yi University of Technology, and Taichung Mosque with 85 participants. This included health consultations by general practitioners and obstetricians, DM screening using the DoScreen app, as well as blood pressure, fasting blood sugar, cholesterol, and uric acid checks.

3.3.4 Evaluating

Through observations by the PCIM Taiwan team, it was found that foreigners began to have awareness about health check-ups and utilized healthcare facilities in Taiwan. This finding indicates that health awareness has had a positive impact on the foreign community in Taiwan. Active involvement of local organizations or communities in promoting and supporting health awareness has also had a positive influence on foreigners in Taiwan.

Taiwan has implemented a comprehensive National Health Insurance (NHI) system, a government-managed social health insurance program aimed at providing equal access to medical and health services for all residents in situations involving illness, injury, or childbirth. The NHI is mandatory for all Taiwanese citizens and foreign residents who have lived in Taiwan for over six months. Its coverage is extensive, encompassing a wide range of health services including hospital stays, outpatient visits, prescription medications, dental care, traditional Chinese medicine treatments, mental health day care, and home-based medical services. NHI also covers high-cost medical procedures such as dialysis and organ transplants, ensuring that even the most expensive treatments are accessible to all insured individuals [8]. Based on the results of a literature review of journals, official publications, and visits to the official websites of the Taiwan Ministry of Health and related institutions, findings were obtained regarding the health service system that can be accessed by migrant workers and foreign nationals living in Taiwan. Through these findings, the author compiled a summary and designed it into a prototype of an integrated health service system in Taiwan (see Figure 2). This integrated health service system prototype can help Indonesian immigrants and other foreign citizens to better understand how to access health services in Taiwan. With an integrated health service system, information about health facilities, registration procedures, languages used, and patient rights and obligations are available more easily and clearly. This can reduce confusion and difficulty in navigating health systems that may differ from their country. Through an integrated health service system, the health check process becomes more structured, efficient, and can be accessed more easily by Indonesian migrant and students. This helps ensure that they can maintain their health regularly without experiencing administrative obstacles. Affordability and openness of information can also increase compliance with routine health checks or seeking treatment when sick, because the process becomes simpler and easier to access.

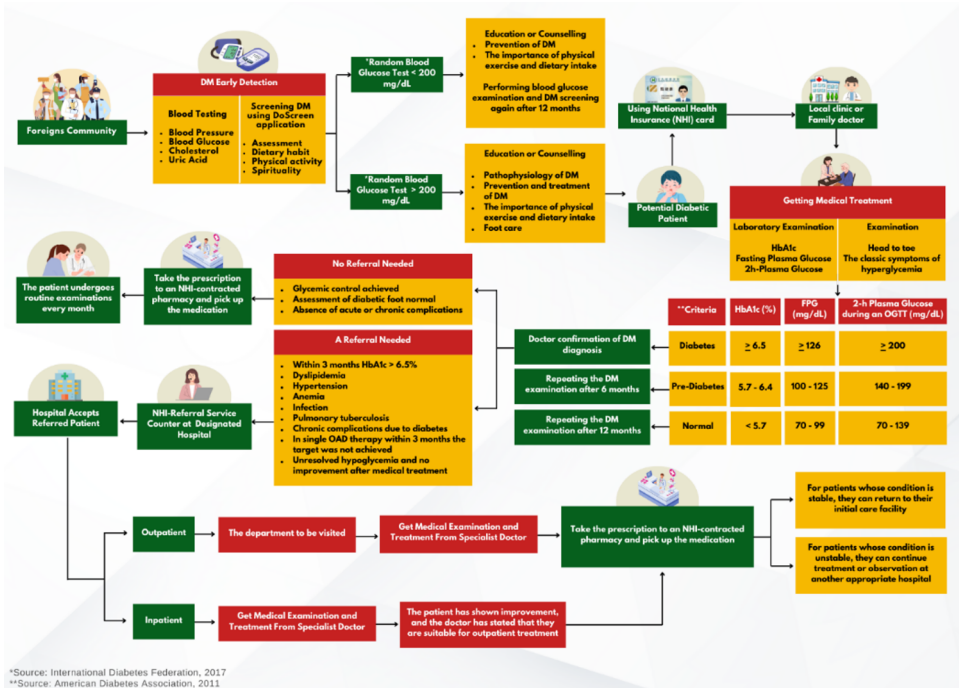


Fig. 2. Prototype Integrated Health Service System.

In Taiwan, migrant workers mostly come from Southeast Asia. According to data from the National Immigration Agency in 2019, Indonesia is the country with the largest number of immigrants in Taiwan (263,006 people) [9]. When migrants fall ill, they tend to prioritize hospital outpatient departments for their medical needs. However, these hospital visits come with significantly higher expenses compared to primary care clinics. Recognizing this, the National Health Insurance (NHI) system actively promotes the use of primary healthcare services as the initial point of contact for patients seeking medical attention. This approach aims to direct patients towards more cost-effective care options while potentially reducing the burden on hospital outpatient facilities [10]. Currently, special clinics for migrants are being piloted at Taipei Veterans General Hospital (north Taiwan), Changhua Cristian Hospital (central/west Taiwan), Hualien Tzu Chi Hospital (east Taiwan), and Kaohsiung Medical University Hospital (south Taiwan) [11]. With a referral system to appropriate health facilities, Indonesian migrant workers and students can make optimal use of health services in Taiwan. This allows them to undergo treatment procedures appropriately, so they have better access and a more positive experience in their health care.

After designing the integrated health system prototype, the author carried out health examination activities as an effort to detect disease early, provide health education about various aspects of health, and organize socialization of the prototype that has been designed. Participants involved in this activity were Indonesian migrants workers and students who were studying in Taiwan with a total of 85 participants. Based on the data in Table 1, it shows that the majority of participants were <35 years old (56.5%) and male (72.9%).

Table 1. Characteristic Participants.

Characteristic	(n)	(%)
Aged		
≤ 35 years old	48	56.5
> 35 years old	37	43.5
Gender		
Male	62	72.9
Female	23	27.1

Source: Primary Data 2024

Based on the results of the health examination (see table 2), the majority of participants had normal blood pressure (48.2%), normal cholesterol (74.1%), normal uric acid (91.8%), and normal blood glucose. (98.8%). However, most participants also had cholesterol (23.5%) and blood pressure (32.9%) values at the alert limit.

Table 2. Health Check Result

Checking Type	(n)	(%)
Blood Pressure		
Normal	41	48.2
Alert	28	32.9
Danger	16	18.8
Cholesterol		
Normal	63	74.1
Alert	20	23.5
Danger	2	2.4
Uric Acid		
Normal	78	91.8
Alert	7	8.2
Danger	0	0
Blood Glucose		
Normal	84	98.8
Alert	1	1.2
Danger	0	0

Source: Primary Data 2024

The results of this study, it was found that the majority of them had never had regular health checks and had a genetic history of DM. These findings can be concluded that awareness of the importance of maintaining health still needs to be increased among Indonesian people, especially those who are abroad. Culture greatly affects health understanding, through the culturally sensitive health education strategies may increase awareness of the condition to receive treatment [12]. Taiwan's healthcare system has been facing mounting pressure due to a growing demand for medical services and the necessity to accommodate an increasingly diverse patient population. The country's healthcare infrastructure has been particularly strained by these factors. In response to this challenge, and acknowledging the importance of providing a more inclusive and supportive healthcare environment for migrant communities, Taiwan's Ministry of Health and Welfare took action in 2016. They introduced the Multi-language Translation for Healthcare Service Initiative, a program designed to improve communication and accessibility in healthcare settings for non-native speakers. This initiative represents a significant step towards adapting the healthcare system to meet the needs of a more diverse society and ensure that linguistic barriers do not impede access to quality healthcare for migrant populations [11]. Under this initiative, around

225 medical instructions and consent forms frequently used in healthcare institutions have been translated into 20 different languages, including English, Japanese, Vietnamese, Indonesian, and Thai. Additionally, the Taiwan National Health Insurance Handbook and health education materials have been translated into five languages. This aligns with previous studies suggesting that offering health education in the local language of the community makes it easier for patients to understand the information being conveyed [13].

Medical institutions in Taiwan are also adopting the use of real-time remote translation services via computers and mobile applications. Currently, the service is being trialled at Taipei Veterans General Hospital, National Cheng-Kung University Hospital, Hualien Tzu Chi Hospital, and Far Eastern Memorial Hospital [14]. This is in line with previous study that indicate the use of technology has significant potential methods to increase awareness of the importance of health examinations. The use of technology for education, such as artificial intelligence for adaptive learning are highly likely to be essential components of the transformative change and the future of medical education [15]. Efforts to increase education about the importance of regular health checks as well as efforts to prevent DM are also needed for Indonesian migrant and students in Taiwan. A previous study showed that interactive education on non-communicable diseases (NCDs) significantly enhanced knowledge regarding general information, risk factors, prevention methods, healthy lifestyles, treatments, and complications associated with NCDs [16]. This highlights the need for educational programmes and awareness campaigns, lectures or brochures to address this knowledge gap [17].

Integrating health education about NCDs and other health issues into university curricula and workplace policy can be an innovative approach to improving healthy behaviour. Increased awareness of certain health issues can encourage them to increase their responsibility for their personal health, by adopting a healthy lifestyle as a preventive measure in reducing the risk of developing disease in the future [16]. To improve population health and achieve “health in all policies,” coordination and cooperation between related sectors are important. More effective mechanisms are needed to improve intersectoral coordination for health [18]. The community of Indonesian migrant workers and Indonesian students in Taiwan also has an important role. The community can provide social support to its members who are sick. It is because previous study indicated that poor social support is associated not only with an increase in mortality, morbidity and psychological distress but a decrease in overall general health and well-being [19]. Support is important in the health of individuals in the society, it can lead to increase health behaviors and then improved quality of life [20]. Community members can provide assistance when they need to go to the doctor, or provide other practical help. Communities can also coordinate with local health authorities to ensure that their members receive the necessary care and receive support from the authorities. Social support refers to social interactions that shape an individual's perception of being cared for, valued, and supported through effective communication and mutual relationships [21]. Trust building was important when starting programs in the community and engaging community members as program participants [22]. Community engagement should be a key priority when designing community programs. Approaches to engaging communities will differ depending on the level of involvement and collaboration the program seeks to accomplish. Some programs may focus on involving a few key stakeholders, while others may include community members in a more formal role [22].

4 Conclusions

Effective socialization about the integrated healthcare system provides significant benefits to society, including helping to overcome barriers faced by migrant workers and Indonesian students in accessing healthcare services in Taiwan. It also assists them in enhancing their skills

in managing their personal health. Easier access to medical care and broader knowledge about health, can improve their quality of life by managing their health conditions more effectively and taking appropriate preventive measures.

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