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Socialization of water activity therapy to stabilize blood sugar levels for people with diabetes mellitus

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ABSTRACT

The prevalence of Diabetes Mellitus is still high in society, and in its therapy, there are 5 main pillars, namely diet, medicine, education, regular monitoring of blood sugar, and exercise. The purpose of this community service is to provide socialization of water activity therapy to stabilize blood sugar levels. The method is carried out by providing socialization with 2 stages, including socialization by practicing on land and the second stage of practicing in the swimming pool, then an evaluation is carried out. The results of people with diabetes Mellitus in Persadia are very enthusiastic, the exercise can be done lightly without having to be able to swim and have a positive impact on health, especially being able to stabilize blood sugar levels, and the knowledge of people with diabetes mellitus (DM) increases. Conclusion water activity therapy is a new sport that gives the benefit of stabilizing blood sugar vessels. The implication of this program is that water activity therapy when carried out in institutions or groups that accommodate people with DM routinely controlled blood sugar, and people with DM life can be better.

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1. INTRODUCTION

Diabetes mellitus is characterized by hyperglycemia and disturbances of carbohydrate, fat and protein metabolism associated with absolute or relative deficiencies in insulin action (Fatimah, 2015). Often referred to as the silent killer, diabetes mellitus (DM) sufferer initially feels healthy while unexpectedly turns out to be suffering from DM, even in the complication phase (American Diabetes Association, 2010). One indicator of DM disease is blood sugar levels, so DM sufferers must be able to control their blood sugar levels whenever possible.

Based on Basic Health Research (Riskesdas) by Kemenkes RI (2018) showed a significant increase in the prevalence rate of diabetes, from 6.9% in 2013 to 8.5% in 2018. The Central Java Provincial Health Profile states that the incidence of DM in 2016 was 16.42% of the total population of Central Java. The prevalence of DM in 2017 in Surakarta City according to the 2017 Surakarta City Health Profile data was 5,470 per 100,000.

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Data from the Association of Diabetes Mellitus Sufferers (PERSADIA) RSUD Moewardi unit has 40 DM sufferers. DM sufferers from all walks of life, from low to high economic levels, low education (no schooling) to higher education, children to the elderly, are all at risk of developing DM if they have an unhealthy lifestyle. One indicator of DM disease is when the blood sugar level is above normal. Uncontrolled fasting blood sugar levels can cause several risks of diseases such as hypertension, coronary heart disease and kidney failure.

DM therapy aims to achieve normal glucose levels. Management of diabetes mellitus consists of 5 main pillars, namely: diet, medication, education, regular monitoring of blood sugar, and exercise. The results of other studies explain that the management of the 5 pillars is significant in controlling blood sugar levels and the quality of life of DM (Suciana & Arifianto, 2019). From all the pillars mentioned, physical exercise therapy is the best control in increasing insulin sensitivity and glycemic levels (Bird & Hawley, 2017). Regular physical exercise has been shown to have beneficial effects in the prevention and treatment of hypertension, insulin resistance, diabetes, dyslipidemia and obesity (Ciolac & Guimarães, 2004) Based on research from Haida et al. (2013), shows that there is a relationship between exercise and the average blood sugar level. Exercise used in this community service by doing water activity therapy. Water sports are more beneficial than sports on land, because the nature of water tends to cool and supports the body so that almost all risks of muscle, joint and bone injury can be eliminated, minimizing collisions (Kurniawati, 2015).

Exercise for DM sufferers at Persadia Unit RSUD Dr Moewardi so far has been gymnastics on land, but there has never been gymnastics in water or water activity therapy. Many DM sufferers have unstable blood sugar levels, so water activity therapy to control blood sugar levels could be introduced as a better option to exercise.

The general objective of implementing a community service program is through socializing water activity therapy to stabilize blood sugar levels at PERSADIA Unit from RSUD Moewardi Surakarta. Research by Hartono et al (2022), demonstrated that water activity therapy resulted in normal and controlled blood sugar. Water activity therapy is carried out with three movements, namely heating, core movements, and cooling. The water activity therapy that has been done does not pose much risk of muscle injury, making them happier because of the support from the cold water and the movements that are carried out are not too strenuous but break up large calories so that more metabolism occurs and reduces the accumulation of calories, with this movement it stimulates insulin production which will neutralize sugar in the blood. This is supported by other studies that mention exercise in diabetes consists of warming up, core movements and cooling down (Ikhsania, 2019).

Partnership is done with PERSADIA unit from RSUD Moewardi, as an association that accommodates DM sufferers who live around RSUD Moewardi. The secretariat is in the RSUD Moewardi, which held monthly blood sugar check program, routine meetings and DM exercises every Sunday morning, has 80 registered members but around 40 are active, has 1 secretariat room, 1 open space (field) shared with RSUD Moewardi, 2 exercise instructors, volunteer nurses, and doctors. The socialization of water activity therapy is carried out to contribute new knowledge about health and can be applied to DM sufferers so that sugar levels are stable and health status increases.

2. METHODS

Socialization

The first stage of socialization was by means of presentations using power point media, pocket books, and water activity therapy videos. The presentation contained the definition of water activity therapy, goals, procedures before doing water activity therapy, and explained that there were 3 stages of

movement, namely warm-up, core movements and cool-down, then continued by showing a video and explaining the checklist of self-exercise cards contained in the pocket book.

Pocket Books

The use of the pocket book in this training is intended to be used as a reference for participants to find out the objectives, procedures, movements and there is a checklist of water activity therapy exercise cards independently. Then the pocket book is processed by IPR and has received an IPR certificate with No. EC00202251659. The pocket book describes the procedures before carrying out water activity therapy, namely carrying out medical tests, especially checking blood sugar levels, measuring pulse, eating and drinking before water activity therapy, and advice regarding blood sugar levels after 2 hours of eating should not be more than 200 mg /dl, this is according to the guide by Soelistijo (2021). A physical activity is very important to pay attention to the pulse, the results of the study show that there is an effect of physical activity on the frequency / number of pulses. As the intensity of physical activity increases, the exercise pulse frequency also increases (Sandi, 2016). Therefore, in water activity therapy activities, the number of pulses is calculated, the pulse is calculated before exercise, during the exercise zone and after exercise. Normally, the pulse before exercise is 60 to 100 beats/minute (Komariah, 2017).

Water Activity Therapy Video Reference

This reference video was made to make it easier for participants to understand some of the water activity therapy movements audiovisually. The video is put on YouTube and after the community service is disseminated it is opened to the public (link: https://youtu.be/NuipfMITiQc). Video has obtained IPR with No. EC00202202742.

Evaluation Plan

The benchmark for the success of implementing activities is to carry out activities according to the time and number of meetings that have been determined so that there is a need for good cooperation between implementers and participants. Measuring success from the participants, among others, is that cognitively the participants have an increase in ability. Psychomotorically, the participants were able to re-practice the water activity therapy movements that had been described. The measure of success from the implementer is being able to provide explanations, provide assistance to participants who experience difficulties in practicing water activity therapy movements, the formation of good cooperation with PERSADIA, and the activity process runs smoothly with the availability of tools such as LCD, projector screens, sound systems, books pockets, facilities for uniforms to increase the enthusiasm of the participants and a microphone is available.

3. RESULTS AND DISCUSSION

Results

This community service is carried out in several stages. The first stage is to make preparations by conducting assessments, the team obtaining permits, and coordinating with the PERSADIA person in charge in this case involving instructors from the PERSADIA Unit from RSUD Moewardi, shown in Figures 1 and 2.


Figure 1 Coordination with PERSADIA
Figure 2 Coordination of community service activities agreements

Based on Figures 1 and 2, the results of the coordination are: Explaining plans for community service activities to socialize water activity therapy for DM sufferers including: (1) Discussing the criteria and the number of DM sufferers who are included in socialization; (2) Followed by 50 people including 40 DM sufferers, 4 community service assistants, 3 instructors, 3 community service teams; (3) Discussed the timing of the socialization twice, on 24 June 2022 and 28 June 2022. (4) Discussed where the socialization activities were carried out twice, in PERSADIA Surakarta Unit Palur Branch, and at the Tirtomoyo Manahan Surakarta swimming pool. The next stage of the implementation of activities is carried out using 2 stages, on 24 June 2022 at the secretariat of RSUD DR Moewardi Surakarta and 26 June 2022 at the Tirtomoyo Manahan swimming pool Surakarta. At the evaluation stage, a question-and-answer session was carried out to find out the level of knowledge and satisfaction of several PERSADIA members and the satisfaction of the participants.

Implementation stages

Water activity therapy presentation

The presentation is in the form of explanations of definitions, implementation procedures, and water activity therapy movements which include warm-up, core movements, and cool-down movements. The presentation also showed a video of water activity therapy movements and explained the exercise cards independently in the pocket book that had been given.


Figure 3. Socialization of water activity therapy
Figure 4. The end of the first stage of socialization

Based on Figures 3 and 4, the results explain that water activity therapy is running smoothly, complete equipment is available: LCD and projector screen, sound system, microphone. The number of participants who attended was 40 people. At the end of the presentation session, discussion and question-and-answer session were held with the participants.

Demonstration of water activity therapy movements in the Tirtomoyo Manahan swimming pool, Surakarta

Figure 5 and 6. Examples of warm-up movements

Figure 7 and 8. The core movement of water activity therapy

Figure 9 and 10. Some examples of cooling down moves
Figure 11. Evaluation and take photos together

Based on the pictures of the implementation of the therapy (Figure 5-11), water activities are carried out with the stages of preparation, implementation and socialization, namely socialization

on land and socialization in the swimming pool, then ending with evaluation activities. Details of the activities include: (1) Participants and the service team practice water activity therapy movements in the swimming pool; (2) Complete participants with a total of 40 people and 3 instructors from PERSADIA; (3) Participants observe and follow the movements; (4) The activity ran smoothly with the assistance of 4 students; (5) Participants are enthusiastic and have no physical complaints. (6) Conduct an evaluation by providing opportunities for questions and answers related to water activity therapy.

Performing warm-up, core movement, and cool down

This warm-up is done with the aim of preventing muscle and joint injuries. This stretching exercise must be done correctly and with great care so that the benefits to be obtained can be achieved. Forms of stretching exercises that can be done are as follows:

The warm-up movement is carried out 8 times for each movement, the movements include: arm stretches, right-left side body stretches, leg stretches, hip stretches, lower back stretches. The core movement aims to stimulate insulin production which functions to control blood sugar levels. The core movements are carried out 8 times for each movement including: (1) jogging movements in the water; (2) jumping jack movement; (3) lung jump movement. Cooling Movement is done after exercising which aims to help restore muscle stiffness due to excess muscle contractions during exercise. The following is a cooling-down exercise after doing physical activity/water sports 8 times for each movement, including: (1) Stretching the legs; (2) Stretching the legs and body; (3) Right and left body stretching; (4) Pelvic Stretch

The implementation of the first day begins with filling out the attendance list and introducing the implementation team and the purpose of community service. On the first day in the morning, the socialization of water activity therapy was carried out on land with presentations, power point media, pocket books, and water activity therapy videos. In carrying out the equipment provided from the community service team and the place it was carried out in the PERSADIA area. The second stage of socialization was carried out at the Tirtomoyo Manahan Surakarta swimming pool, where previously a swimming pool rental permit was carried out. Participants get uniform shirts to use in the swimming pool as an identity from community service activities. Finally, an evaluation was carried out with a question-and-answer session.

The procedural principles that must be adhered to before carrying out water activity therapy are as follows: (1) Carry out a complete medical examination, especially a heart examination by measuring blood pressure and checking blood sugar levels. Take heart rate measurements before doing Water Activity Therapy Exercises. (2) Eat and drink beforehand with no less than 2 hours before doing physical activity/exercise. (3) Blood sugar levels after 2 hours of eating should not exceed 200 mg/dl.

In implementing water activity therapy, it is necessary to pay attention to the pulse, namely: (1) Pre-exercise pulse: is the pulse that is calculated before starting exercise, normal values: 60 to 100 times/ minute (Komariah, 2017). (2) Exercise pulse; is the pulse when doing work or exercise activities. The training pulse is the pulse that must be obeyed in training to achieve maximum training (50-70% of DNM). DNM = Maximum Pulse (Budiarti, 2006). (3) Recovery pulse rate is the number of pulses per minute measured after 5 minutes of rest from exercise. This measurement is needed to see how quickly a person's body can recover after strenuous activity.

The training zone is the limit for doing exercises that must be achieved with a pulse rate. The basis for calculating the Training Zone is the Maximum Pulse Rate (MPR) the formula MPR = 220 – Age. For example, for a person who is 50 years old, the MPR when he is exercising is 220-50 = 170. Then the number 170 is multiplied by 50 percent for the light limit and 70 percent for the upper limit, the result is

85-119. By knowing this pulse, a person aged 50 years must stop exercising for a while when his pulse has exceeded 119. If it is still forced, what happens is heart cramps that cause a heart attack. "Once again, it is necessary to pay attention to the condition of the heart rate when exercising, not to exceed the maximum limit which can harm the heart.

Discussion

Community service program activities by conducting socialization of water activity therapy have relevance to the need to improve health by doing sports for DM sufferers, with sports that are new innovations that increase the enthusiasm of DM sufferers to do sports, especially in water which they have never had before and have never carried out at PERSADIA, this water activity therapy aims to increase the knowledge of DM sufferers exercising in water, this movement still goes through 3 stages of movement, namely warming up, core movements, and cooling down.

This sport has many benefits in accordance with the results of the meta-analysis of Faíl et al., (2022), Water sports are increasingly recommended for healthy individuals or with special health conditions, water-based training is found to benefit strength, balance and cardiorespiratory fitness, disease Bones such as pain, balance, flexibility, and strength are also beneficial in conditions of hypertension, stroke, diabetes, multiple sclerosis, and Parkinson's disease. This sport can improve health and physical fitness in both healthy people and those with chronic diseases. Sports in water provide many benefits for diabetic conditions, this is supported by the theory which explains that exercise and physical activity are very important for increasing individual longevity and health, especially in the management of type 1 and 2 diabetes or prediabetes (a state of glucose intolerance), and diabetes prevention during pregnancy (Colberga et al., 2022; Riddell et al., 2020).

Table 1. Results of DM sufferers' understanding of water activity therapy

Score range	Pre-Test	Post-Test
E (0-59)	2	1
D (60-69)	13	8
C (70-79)	15	10
B (80-89)	10	14
A (90-100)	0	7
Total	40	40
Minimum score	53	53
Maximum score	87	100
Mean	72	80

Based on Table 1, the results show an increase in knowledge with an indicator value increasing at a maximum distribution of 100 and an average value increasing to 80. The socialization of water activity therapy was successfully identified and understood by the participants. Apart from being evaluated using a questionnaire, DM sufferers were able to demonstrate water activity therapy movements in the swimming pool, as well as verbal questioning with the results of DM sufferers and participants said they were very happy because they got new and fun sports and were able to improve physical and psychological health, enthusiastic participants, following from start to finish.

Based on the results of the evaluation by question and answer, it was found that participants had increased knowledge about water activity therapy, were able to demonstrate learned movements in the swimming pool, and participants said they were very happy because they got a new and fun sport and were able to improve physical and psychological health, enthusiastic participants, follow from start to finish. This is strongly supported by previous research, namely that we give this sport to DM sufferers and the majority of elderly participants, this is very good given according to research results Campos et al. (2021), found that aquatic physical exercise has positive results on the mental component, namely quality of life, mood, anxiety and internal health locus of control in the elderly (old age) and healthy. Recent research results Hartono et al. (2022) water activity therapy is able to control blood sugar levels in DM sufferers.

In the implementation of this community service there are supporting factors, namely (1) assistance provided by partners in providing facilities in the form of a meeting place for the first stage of socialization, the availability of sound system facilities, microphones and a team of gymnastic instructors; (2) the interest and enthusiasm of the participants during the activity , following from start to finish; (3) activities run smoothly; and (4) availability of consumption, transportation fee facilities for participants and uniforms during the activity.

In implementing this community service program there are inhibiting factors or obstacles, namely the community service team prepares transportation to go to the swimming pool and when they want to enter the swimming pool some participants are assisted to get down into the swimming pool and go up when the core movement is complete. The community service team during the activity process monitored the general condition of the participants and prepared tools for checking vital signs and first aid medicine.

4. CONCLUSION AND RECOMMENDATIONS

This community service program is carried out in partnership with the PERSADIA Unit of RSUD Moewardi. The purpose of this community service is to provide new knowledge to participants, namely DM sufferers. The target to be achieved in this program is for participants to increase their knowledge of sports in water. The implementation of this program is divided into 3 stages, namely the implementation on land, in the water, and the evaluation stage. The results achieved were in the form of increasing knowledge and being able to demonstrate in the swimming pool by participants about sports in water by doing water activity therapy movements.

There needs to be socialization and promotion of water activity therapy to the wider community, especially DM sufferers. Advice partners to include this water activity therapy in the activity program every month, in its implementation there is a need for continuous assistance and monitoring. It is better if this program can be followed up through collaboration with other partners or other parties outside the institution, in order to find out a wider response to the implementation of a community service program that has been carried out. Implication: The implication of this program is water activity therapy if it is carried out in institutions or groups that accommodate DM sufferers, blood sugar is controlled routinely, and DM sufferers can have a better life.

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