ORIGINAL ARTICLE

Physical Activity and Psychosocial of Adolescents with Diabetes Mellitus Type 2: A Qualitative Study

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ABSTRACT

Introduction: The goal of this study was to describe physical activities and psychosocial aspects of adolescence with Diabetes Mellitus (DM) Type 2. **Methods:** The research method used a qualitative design with a phenomenological approach; data were collected using in-depth interviews. Participants were three adolescents with DM type 2 in Subang. Data were analyzed using thematic content. **Results:** The study's finding identified five themes: anxiety, stress, low self-esteem, support system, and less activity in physical activity. The results showed that in diabetes mellitus, it is necessary to provide management to maintain aspects of the physical and psychosocial activity in adolescents with type 2 diabetes mellitus. **Conclusion:** DM has several negative implications for physical activity and psychosocial factors of adolescence with DM type 2. Nurses need to give nursing care related to physical activity and psychosocial needed.

Keywords: Physical activity, Psychosocial, Adolescent, Diabetes mellitus type 2

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INTRODUCTION

Diabetes mellitus occurs in adults and adolescents. The cause can occur due to two factors, namely genetic factors and lifestyle factors. Diabetes mellitus in adolescents mainly occurs in obese adolescents, but not infrequently; it also occurs in adolescents with an average Body Mass Index (1). One of the causes of death in children is insulin deficiency due to type 2 diabetes mellitus. However, the patient's life expectancy and quality of life can increase with technological advances in current insulin therapy programs and diabetes management. (2). The increasing prevalence of obesity in children is a phenomenon that can become a severe problem (3). Diabetes mellitus is a condition when blood sugar levels are above average values (standard normal: 60 mg/dl to 145 mg/dl) (4 p.1200). so that diabetes mellitus gets worse and results in complications that interfere with psychological and social conditions. Psychological disorders that arise are fear, sadness, and disappointment with diabetes mellitus, causing social problems resulting in physical activity (5).

In determining the correct insulin dose for the patient, must continuously monitor the three parameters of physical activity, disease, and stress levels. Regular exercise and a controlled diet can maintain the glycemic value so that the patient gets better. However, if the behavior does not change, it is related to poor management and control (2). Diabetic patients should always do physical exercise, diet, and insulin therapy, which is the primary management in managing and controlling glycemic values. Consistent with the results of several studies showing that physical activity can increase insulin sensitivity, reduce insulin doses, increase the process of glucose absorption, and have a positive effect on blood sugar control. Regular exercise can reduce the risk of cardiovascular disease, reduce and prevent obesity, and improve metabolism. (6). Some essential effects on diabetes-related vascular complications may often occur, thus discouraging patients from participating in

sports activities (6,7). "Lifestyle management", such as "physical activities, diet, medicine, and checking and blood sugar control", is an effort strategy to reduce the risk of further complications in people with diabetes mellitus (4 p.1201).

Physical activity and maintenance of health in children with diabetes mellitus or prediabetes to control the state of blood sugar is an important focus. Prevention measures and recommendations for diabetes management programs follow the circumstances and the individual's health status. This Statement of Position provides a clinically oriented review and evidence-based recommendations regarding physical activity and exercise in people with type 1 diabetes, type 2 diabetes, gestational diabetes mellitus, and prediabetes (8–10). Adolescents can understand the problem from multiple angles and respond to various steps; this is the result of thoughts from experience during suffering from diabetes mellitus (11).

Research and Development Agency for Health, Ministry of Health, Republic of Indonesia (2018) informing that data in 2018 is estimated that 382,000,000 people have suffered from diabetes mellitus worldwide. This number is expected to increase to more than 580,000,000 people by 2035. Indonesia ranks seventh in the list of 10 countries with the most significant number of diabetes mellitus sufferers globally. The prevalence of diabetes mellitus in Indonesia is 2.1% (12). The increasing number of diabetes mellitus is influenced by the high prevalence of obesity in adolescents (1). obesity aged 13-15 years in West Java is 9.7%. In Subang Regency, the prevalence of obesity in children aged 5-12 years is 21.7% (13).

Adolescence is critical; good nutrition promotes healthy physical and emotional growth and prevents adverse developments, such as obesity (14). Considerable evidence indicates that inadequate physical activity harms physiological and psychological health and can trigger chronic diseases such as diabetes and obesity among children and adolescents (15). Type 2 diabetes mellitus in adolescence has previously discussed various problems, such as psychosocial problems (16).

The increase and height of the number of type 2 DM patients can explain that the disease is still a threat, so it is necessary to do management effectively, not to become more complex. Feelings of pain were identified in several studies as a significant influence on care practice self, psychological stress, and health impacts others among people with type two diabetes (17). The objective of this study is to explore how DM type 2 impact physical activities and psychosocial in adolescents.

MATERIALS AND METHODS

The research method in this research uses a qualitative design through a phenomenological approach. This research has passed ethics at the Indonesian Education University with the number B-1075/UN40.LP/PJ.00.00/2021 and the implementation process was from March to May 2019 at the UPTD RSUD Subang. This study uses an in-depth interview technique. Respondents are the primary source of information; in this qualitative research is a statement from the interviewee.

Participants

Participants were informants of data sources; in this study, there were three adolescents with two women and one man with type 2 diabetes mellitus, aged 10-19 years.

Sampling procedures

A consecutive sampling technique was done by selecting participants who came to visit UPTD Regional Hospital Subang Regency The researcher identified all participants who had met the requirements as respondents. They signed the consent form and were willing to participate in the interview process using questions based on written information needs. Researchers conducted interviews several times if they still needed information until the information was saturated.

Procedures

The way the researchers collected data used in-depth interviews with three phases:

Orientation Phase. Researchers observed the environment and participant behavior before conducting interviews, arranged place settings for participants 1 and 3 to be carried out in the living room while participant 2 was carried out on the home page; this was in accordance with the wishes of the participants, creating a comfortable atmosphere by sitting opposite and open posture, talking in a low tone of voice, conveying the contract that has been agreed upon, and asking participants' readiness to conduct the interview. In addition, the researchers reminded the purpose of the study and the protection of participant data confidentiality. The researcher also prepared a note and turned on the voice recorder to record the conversation among the researcher and the participants. Researchers put the voice recorder close to the participant's mouth, a distance of less than 50 cm between the researcher and the participants. The orientation phase is carried out for 30 minutes.

Implementation Phase. The researcher begins the interview by asking questions to get a general picture of the participants. Researchers develop questions to answer

the research objectives. Interviews with each participant were conducted once, with an entire interview for each participant for 15 minutes. In this study, one visit was conducted for all participants within 1 hour for each visit. During the interview, the participants were very open in answering the questions given and open in expressing their feelings, very cooperative, and seemed calm. The interview was conducted in the living room for participants 1 and 3, while participant 2 was conducted on the home page according to the participants' wishes.

Termination Phase. Termination is "carried out at the end of each interview" by evaluating the participants' feelings after the interview, making a contract for the meeting if the data is incomplete, and saying thanks. Participants told all the experiences they had experienced, and then we conducted in-depth interviews. After validating the results of the interviews, the participants agreed to the research process. The researcher then dismissed the participants if the results of the interviews were bored and then thanked the participants in this study as a closing sentence. Perform the termination stage for 15 minutes.

Sampling procedures

Researchers in this design, according to Bracketing, are intuition, analysis and description, and interpretation (18). Bracketing is a process by researchers in maintaining all assumptions, knowledge, and beliefs they have in studying so that information comes from participants without being influenced by the researcher's knowledge, beliefs, and assumptions. Intuition is the state in which the researcher recognizes and understands the results of the research. In this process, the researcher does not give opinions, evaluations, and condemnation so that researchers do not lose concentration on respondent information. The analysis is the process of analysing information or collected data. The analysis process uses the steps of reading the collected data, selecting keywords, identifying the meaning of keywords, grouping several categories into themes, writing patterns of relationships between themes in a brief narrative, validating narratives to participants, making descriptions of the final validation results and writing in narratives. Result research and discussion of phenomena under study is described or interpreted by the researcher to submit the final research results to the reader in a written description of the phenomenon under study.

RESULT

The results of the thematic analysis identified in this study explained the five themes of the participants. The various psychological responses experienced by the participants identified two themes, namely feelings of excessive worry and stress that arose due to negative thoughts. Meanwhile, participants experienced a lack of self-confidence, socialized less actively, and received various kinds of support, which were social responses experienced by participants. Of the five themes obtained based on the results of interviews as follows:

Table I: Thematic data analysis

Category	Question	Statement	Sub Themes	Themes
Psychological Category	How did you feel when you learned about the disease?	*"... I'm afraid that my friends won't live long. I'm afraid of being shunned by my friends, I'm worried that it's too much that I just want to die..." (P1)*	Excessive feeling of worry	Anxiety
		"Yes.. so I feel worried about this disease, afraid that I won't be able to heal… " (P2)		
		"Worried, anxious, like to feel weak, then for example, if you meet friends you are also embarrassed.." (P3)		
		"..My mind becomes stressed and sometimes my body feels weak, I often have headaches, I often get angry, even fight my mother's words…." (P1)	Stress because you think too much about your illness and negative thougt	Stress
		"Since knowing the disease, Weh Teh, I feel dizzy thinking about it until my body is tired of tea, that's already 13 years when I know it becomes stressful a lot of thoughts..." (P2)		
		" ….stress because I know this disease from a long time ago, so I just got more stressed thinking about this disease, and I don't know how it is going forward, the problem is continuous treatment but it doesn't get better..." (P3)		
Social Category	Are there any changes that you have experienced in interacting with other people?	*"... the change from being thin, his body weight almost decreased drastically, so it was almost 30% more than before." (P1)*	Feeling ashamed or not confident when interacting with the environment and physical changes that occur.	Low self-esteem
		"yes right, so now I feel embarrassed when I meet people, because my gums like to bleed, so I'm embarrassed to talk to others..." (P2)		
		"...because I'm embarrassed when I go out, so I rarely interact with neighbors and friends..." (P3)		

CONTINUE

Table I: Thematic data analysis (CONT.)

Category	Question	Statement	Sub Themes	Themes
	How does the role of family and the environment respond to your current condition?	*"Sometimes they provide support and motivation, they say they have to keep up the spirit. " (P1)* *".. People in my environment support too, and provide support and often provide motivation." (P1)* *"Usually my mom asks me to go to the hospital if my illness recurs." (P2)* *"So mom gives me money for medical treatment, then sometimes when I am being treated I like to be visited by my neighbors..." (P2)* *"My family always supports me so that I can be more enthusiastic and try not to complain that even if I have this disease, my family always takes care of me. " (P3)* *"... yes, if I am hospitalized, my neighbors always visit me .." (P3)*	Get various supports from both family and environment.	Support System
Physical Activity Category	Are there any changes in physical activity that you experience?	*"...I couldn't do anything because at that time I couldn't walk, I could only sit down because at that time I was very weak." (P1)* *"...before I got sick I could still play with my friends but now I get tired out of the house quickly ..." (P2)* *"...when I was healthy I liked to play foot ball with my friends, but now I don't..." (P3)* *"now just take a walk around by the house..." (P1,P2,P3)*	Before getting sick, playing actively with friends was different from now after suffering from an illness.	Less physical activity

1.Psychological Category

Anxiety

Anxiety and negative thoughts emerged from the participants when the researcher asked, "*how did you feel when you knew about the disease?*". The participant's response illustrated from the interview results "*I am afraid that my age will not long, I am afraid of being ostracized by my friends, and I feel like ending my life*" (Participant 1). Participant 2 said, "*After knowing I have this disease, I am worried that I will not be able to heal,*" and Participant 3 said, "*I was shocked and worried, I felt weak when I met my friends, and I became embarrassed.*"

Stress

Participants illustrate the pressure or stress in the results of the interviews. Participant 1 said, "*I feel stressed with my current situation, so I have a headache and don't pay attention to what my mother says.*" The statement from participant 2, "*since I know the disease sometimes I feel dizzy when I remember my illness, so I feel stressed.*" While Participant 3 "*I feel stressed because this disease is difficult to cure, I often feel annoyed with this disease.*"

2. Social Category

Low Self-Esteem

Social and self-esteem have changes occurred before knowing about type 2 diabetes mellitus; this was evidenced by the results of interviews with the question "*Are there social changes that you have experienced in interacting with other people?*". Participant 1 said, "*I feel ashamed because after the illness I lost weight, but now I gain 30 percent of my previous weight*". Participant 2 revealed, "*I feel embarrassed when I meet and chat with other people because my gums like to bleed.*" Meanwhile, Participant 3 expressed his feelings "*I feel ashamed because I feel sick, so I don't want to meet other people.*"

Support System

Family support and the environment are pretty good, from the question "*how has the role of family and environment responded to your current condition?*".
All Participants said that "*my parent always give support, motivation, and encouragement.*" Participant 2 said, "*family always motivates them to go to the hospital for regular check-ups and take medication regularly.*" Participant 3 said, "T*he neighbours like to visit when I am sick.*"

3. Physical Activity Category

Physical Activities

the habit of physical activity after illness experienced by participants. The researcher asked, "*Are there any changes in your physical activity?*". Participant 1 and 2 revealed, "*I am not as active before sick. I was weak and could not do any activities weak. I could only see my friends playing, and I just sat in front of the house.*" Participant 3 revealed, "*Before I was sick, I liked to play with my friends, play football in a small field, but now I don't do that activity anymore.*"

DISCUSSION

Persons with diabetes mellitus have experienced many lifestyle changes. They experience this change; it can cause several physical and psychological reactions,

including changes in physical activity, anxiety, stress, and insecurity (19). The three participants, there are similarities, namely anxiety about their illness, stress when thinking about negative things about themselves since being diagnosed with diabetes mellitus, lack of confidence, and causing embarrassment when doing activities outside the home.

Psychological response

Anxiety. Anxiety is a feeling of discomfort or similar concern with an autonomic response (the source is often not specific or unknown to the individual), a feeling of fear caused by the anticipation of danger. It is a signal of alertness that warns individuals of danger and enables individuals to act against threats (19,20). After being diagnosed with diabetes mellitus, all participants expressed excessive worry because their disease did not heal. This is illustrated by participant 2 said "*After knowing I have this disease, I am worried that I will not be able to heal*".

Patients with diabetes mellitus experience many life changes. People with diabetes mellitus show several life changes that cause adverse psychological reactions or symptoms, including irritability, increased anxiety, and stress. Duration of treatment or duration of illness are factors that affect depression, anxiety, and stress in participants with type 2 diabetes mellitus. Participants experience anxiety about a disease that does not go away, especially if blood glucose levels are low or high, with slow recovery (21). The three participants expressed anxiety since suffering from diabetes mellitus; the participants felt afraid and felt weak.

Stress. The psychological response experienced by each participant was feeling stressed after being diagnosed with diabetes mellitus because they thought of a disease that did not heal. This is illustrated by participant 3 said "I feel stressed because this disease is difficult to cure, I often feel annoyed with this disease."

It made participants feel weak, dizzy, and angry. Stress can have a total impact on individuals, namely on physical, psychological, intellectual, social, spiritual, and stress can also threaten physiological balance (19,22). Stress increases the work of metabolism and increases the work of the pancreas; this will cause the pancreas to be easily damaged. Another study revealed and looked at the factors that influence depression, anxiety, and stress in participants who have type 2 diabetes mellitus, including treatment duration or illness duration. Participants during this period experienced concerns about illnesses that would not heal, especially if blood sugar levels were erratic. In addition, difficulty regulating and changing eating patterns is also a source of anxiety and stress. Psychological pressures and unhealthy lifestyles are very influential, coupled with increasingly rapid technological advances and various diseases that cause a person's condition and trigger stress (22).

Social response

Low self-esteem. Situational low self-esteem is a negative self-evaluation or feeling that develops in response to the loss or change in self-care of someone who previously had a positive self-evaluation (22). Participants in this study were not confident in socializing. Participants stated that after being diagnosed with diabetes mellitus, they experienced physical changes. Participants felt ashamed to meet or interact with friends or other people and were not as active as before they contracted the disease (23). This is illustrated by participant 3 said "*I feel ashamed because I feel sick, so I don't want to meet other people.*"

Adolescents in a developmental period have prioritized their appearance when meeting someone of the same sex or the opposite sex (24). The characteristics of the developmental stage in adolescence are looking and feeling closer to peers, showing self-expression, looking for more selective peers, having an image (description, condition, role) of himself (25). In addition, the developmental tasks that adolescents should do are accepting their physicality, developing interpersonal communication skills and learning to get along with peers or other people both individually and in groups, and strengthening self-control ability to control themselves (26).

Support system. A positive social support system will help reduce stress in adolescents with DM. Family and friends are the closest support system for DM patients. Health information about DM is widely available in the mass media, this is very likely to be accessed by Adolescent, so they must have the right referral. Misinformation negatively affects self-care. Ensure that the information comes from a good source, is supported by scientific studies, and is up to date and relatively recent (27,28). The term we commonly use is non-compliance, which indicates a passive and obedient role for people with diabetes. In "*following the doctor's orders,*" often in contrast to the active role required in directing the patient's in planning therapy activities, monitoring the patient's condition, evaluating each activity and treatment, and solving problems involved in diabetes management. Implementing good management will help increase patients' perceptions of their ability, or self-efficacy, to manage diabetes independently because it is one of the psychosocial factors associated with improving diabetes self-management and treatment outcomes in diabetes (4 p. 1205). They should be a target of ongoing assessment and treatment planning (29).

Physical activity response

Less physical activity. The social response experienced by all participants in this study was a change in physical activity experienced after suffering from diabetes. Participants stated that before getting sick, actively

playing with friends was different from now after suffering from the disease. This illustrated by all participant "*I am not as active before sick. I was weak and could not do any activities weak.*" The limited mobility or activities in daily life and feelings of shame or insecurity in socializing lead to reduced social activities. In this case, social function refers to social activities and interactions with other people, such as family members, friends, and the environment.

Several studies show that there is a relationship between physical activity and self-efficacy. The study adopted the Social Cognitive Theory (SCT) theory which explains that patients with type two diabetes in carrying out physical activity play an essential role in lowering glucose levels (30). Lack of physical activity and visceral obesity is associated contributors to the global diabetes epidemic. In this study, although 95 percent of participants were overweight or obese, more than 63 percent were physically active. Physical activity is beneficial in the prevention of type 2 diabetes independent of weight loss (31). The results interview show that walking is one of the most preferred physical activities by participants, related to differences based on gender groups and habits in doing physical activity. SCT affects the environment and situation when carrying out the pattern of activity in management.

Physical activity is one of the diabetes mellitus management, must be carried out by a patient recently diagnosed with T2DM (10). Physical activity has an impact on insulin action in people who are at risk for diabetes mellitus. Lack of activity is one of the factors that contribute to insulin resistance in type II diabetes mellitus. Active individuals have better insulin and glucose profiles than inactive individuals, a mechanism of physical activity in preventing or inhibiting the development of type II diabetes mellitus (2,32). The purpose of physical exercise for people with DM includes getting a good metabolism, reducing weight, increasing physical capacity, improving the quality of life, improving cardiovascular function and dyslipidemia, improving sleep quality, and improve digestive function (33,34).

CONCLUSION

This study concludes that DM type 2 disease significantly impacts adolescents with type 2 diabetes mellitus on psychosocial aspects such as stress and anxiety. In the social aspect, participants tend to have lower self-esteem but have good social support. On the physical aspect, the participants stated that they did less physical activity than their peers.

CONFLICT OF INTEREST

During carrying out the research, the author declares that there is no conflict of interest.

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