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IMPLEMENTATION OF FAMILY EDUCATION TO IMPROVE MEDICATION ADHERENCE AMONG CLIENTS WITH TYPE 2 DIABETES MELLITUS IN THE SRONDOL HEALTH CENTER AREA

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A B S T R A C T

Type 2 diabetes mellitus is a chronic condition requiring long-term therapy, which often leads to medication non-adherence. This situation highlights the need for family involvement, particularly through structured educational support, to enhance treatment management. Family education aims to provide essential information, shape adaptive attitudes, and promote the use of appropriate learning strategies. This study aimed to implement family education to improve medication adherence among clients with type 2 diabetes mellitus in the Srondol Health Centre area. This case study employed a descriptive approach and involved two subjects who met the inclusion criteria: receiving treatment at the primary health centre for ≥1 year, aged 18–75 years, willing to participate, living with family, able to communicate effectively, having low medication adherence (MMAS-8 score 0–5), and low family knowledge levels (DKQ-24 score <55). The instruments used were the Morisky Medication Adherence Scale (MMAS-8) and the Diabetes Knowledge Questionnaire (DKQ-24). The intervention was conducted over six days, with each session lasting 60 minutes. The results showed that after the implementation of family education, Subject I's medication adherence improved from a score of 3 (low) to 7 (moderate), while family knowledge increased from 54 (poor) to 83 (good). Subject II's medication adherence improved from a score of 4 (low) to 7 (moderate), and family knowledge increased from 45 (poor) to 74 (adequate). In conclusion, the application of family education effectively improved medication adherence among clients and enhanced family knowledge. Therefore, integrating family education into routine services at primary health centre is strongly recommended.

INTRODUCTION

A family is a group of individuals united by marriage, blood relations, or adoption, who interact and communicate within their respective social roles—such as husband and wife, mother and father, and siblings—while creating and maintaining a shared culture.[1] One of the health problems that may affect families is diabetes mellitus. Families with unhealthy lifestyles are at higher risk of developing diabetes mellitus.[2]

Type 2 diabetes mellitus is a metabolic disorder characterized by elevated blood glucose levels resulting from decreased insulin secretion by pancreatic β-cells and/or impaired insulin function (insulin resistance).[3] Type 2 diabetes mellitus is classified as non–insulin-dependent diabetes mellitus and is more prevalent among women than men.[4]

If diabetes mellitus is not managed properly, it may lead to serious and progressive complications. Many patients struggle with self-care, particularly in adhering to medication regimens, which can hinder their ability to prevent complications and perform daily activities normally.[5]

Support from healthcare professionals, particularly through structured education, is essential in improving treatment adherence. Healthcare providers are often the first to understand a patient's health condition and therefore play a crucial role in delivering appropriate information.[6] When educational interventions involve the family, it is expected that adherence to diabetes self-management will improve, ultimately enhancing the patient's quality of life.[7]

Adherence to medication is necessary to achieve therapeutic goals, prevent complications, and improve quality of life. Levels of adherence are strongly associated with blood glucose control; low adherence often results in elevated glucose levels above normal.[8]

The problem statement of this case study is: How can the implementation of family education improve medication adherence among clients with type 2 diabetes mellitus?

The objective of this case study is to describe the implementation of family education as a strategy to increase medication adherence among clients with type 2 diabetes mellitus.

METHODS

This study employed a case study design with a descriptive approach. The case study involved two respondents who met the following inclusion criteria: diagnosed with type 2 diabetes mellitus and undergoing outpatient treatment at Srondol Community Health Center (Puskesmas Srondol) in Semarang; receiving therapy or medication for ≥1 year; aged 18–75 years; willing to participate as study respondents; living with family members; having low medication adherence (score 0–5); having family members with low levels of diabetes-related knowledge (score <55); and having no hearing impairments. The primary focus of this case study was the implementation of family education to improve medication adherence among clients with type 2 diabetes mellitus. The instruments used in this study were the Morisky Medication Adherence Scale (MMAS-8) to assess clients' medication adherence and the Diabetes Knowledge Questionnaire (DKQ-24) to evaluate family members' knowledge. Educational interventions were delivered using leaflets and booklets.

The data collection procedures included obtaining research approval, selecting potential subjects based on predetermined inclusion criteria, preparing questionnaires and intervention materials, and contacting respondents to request participation and arrange meetings with their families. The researcher explained the study objectives, duration, and expected benefits to both clients and their families. Respondents who agreed to participate were asked to sign an informed consent form. In Session 1 (Day 1), the researcher conducted a pre-test assessment of family knowledge and client medication adherence. The DKQ-24 was administered to family members, while the MMAS-8 was administered to clients with diabetes. Session 2 (Day 3) involved a 60-minute family education session delivered to both clients and their families using leaflets and booklets. The session followed a structured format: a 5-minute opening phase, a 40-minute core session involving material delivery and interaction, and a 15-minute closing phase that included evaluation of the day's material. In Session 3 (Day 6), the researcher conducted a post-test using the DKQ-24 for family members and the MMAS-8 for clients. The collected data were then analyzed by comparing pre- and post-intervention scores to assess changes in family knowledge and client medication adherence. The results are presented in tabular form.

RESULT AND DISCUSSION

Result

1.1 Description of the Case Study Setting

This case study was conducted in the working area of the Srondol Community Health Centre (Puskesmas Srondol), Semarang City, located at Jl. Setiabudi No. 209, Srondol Kulon, Banyumanik District, Semarang, Central Java. Based on data from SIRANDU (Integrated Service Reporting System) of the Semarang City Health Office from January 1, 2023, to the present, there were 417 recorded cases of type 2 diabetes mellitus in the Srondol Health Center area. These include 64 cases in Srondol Kulon, 218 cases in Srondol Wetan, and 135 cases in Banyumanik. Data collected by local health cadres in RW 12 of Srondol Kulon indicated that among 85 older adults, 12 were identified as having a history of type 2 diabetes mellitus.

1.2 Description of Case Study Subjects

Two subjects who met the inclusion criteria were selected for this case study.

Subject I, Mrs. S, is a 51-year-old woman, Muslim, with a high school education, living with her mother, husband, child and spouse, and grandchild. She has had diabetes mellitus for approximately five years and routinely takes metformin 500 mg and glibenclamide 5 mg twice daily (07:00 and 19:00 WIB). Her pre-test MMAS-8 score was 3 (low adherence). Additional assessments showed a random blood glucose level of 322 mg/dL, a BMI of 24 (normal), and a pre-test DKQ-24 score of 54 (poor knowledge). Family assessment revealed that although her family understood the general concept and symptoms of diabetes, they lacked awareness of the importance of regular medication adherence and had never attempted to modify or assist with her medication schedule. Her family's independence level was categorized as level II.

Subject II, Mrs. R, is a 58-year-old woman, Muslim, with an elementary school education, living with her child, daughter-in-law, and grandchild. She has had diabetes mellitus for approximately five years and has been taking medication for about two years. She takes metformin 500 mg three times daily. Her pre-test MMAS-8 score was 4 (low adherence). Further assessments showed a random blood glucose level of 434 mg/dL, a BMI of 21 (normal), and a DKQ-24 score of 45 (poor knowledge). The family understood the symptoms and definition of type 2 diabetes mellitus but did not recognize the importance of regular medication adherence. The family had also never attempted to modify or assist with the client's medication management. This family also fell under independence level II.

1.3 Description of Case Study Implementation

Following the nursing process, the first step was assessment. Initial assessment was conducted during Session 1 (Day 1), during which the MMAS-8 and DKQ-24 questionnaires were administered to determine clients' medication adherence and families' diabetes knowledge.

In Session 2 (Day 3), the researcher provided education to clients and their families regarding medication adherence and diabetes mellitus. Follow-up reinforcement of the material was conducted during Sessions 3 and 4. Each educational session lasted 60 minutes and involved active participation from family members.

Post-test assessments were conducted in Session 3 (Day 6) using the MMAS-8 for clients and the DKQ-24 for families to measure the impact of the intervention.

1.4 Case Study Outcomes

Table 1. Pre-Test Medication Adherence Prior to Family Education

Subject	Adherence Score	Category
I	3	Low Adherence
II	4	Low Adherence

Both subjects demonstrated low medication adherence prior to the intervention.

Table 2. Pre-Test Diabetes Knowledge Prior to Family Education

Subject	Knowledge Score	Category
I	54	Poor
II	45	Poor

Both subjects' families demonstrated low levels of diabetes-related knowledge.

Table 3. Post-Test Medication Adherence After Family Education

Subject	Adherence Score	Category

I	7	Moderate
II	7	Moderate

Subject I's score improved by 4 points and Subject II's by 3 points, indicating an improvement from low to moderate adherence.

Table 4. Post-Test Diabetes Knowledge After Family Education

Subject	Knowledge Score	Category
I	83	Good
II	74	Fair

Both subjects demonstrated substantial increases in diabetes knowledge, with Subject I improving by 29 points and Subject II by 29 points.

Discussion

Subject I and Subject II were both in the pre-elderly age range. Subject I was 51 years old, and Subject II was 58 years old. Age is associated with physiological decline, in which increasing age leads to reduced bodily functions, including decreased effectiveness of insulin activity, resulting in elevated blood glucose levels.[13] Nova Rita's study also indicated that sex is one of the contributing factors to diabetes mellitus. Her findings showed that the majority of diabetes mellitus cases among older adults occurred in females compared to males.[14] Similarly, research by Abdul Kosim demonstrated that the proportion of diabetes patients is higher among women. Women generally have a higher percentage of body fat compared to men, making them more prone to obesity, which is closely linked to diabetes risk.[13] Both Subject I and Subject II were female, indicating that they possessed a higher inherent risk.

The initial measurement of medication adherence showed that both subjects fell into the low-adherence category. One factor influencing their non-adherence was attitude. Limited mental readiness to commit to the medication regimen caused both subjects to underestimate the importance of adherence, resulting in frequent forgetfulness in taking their medication. Additional reasons for non-adherence included traveling and feeling that their health condition had improved. Subject I, for example, often forgot to bring medication when traveling. In such situations, the family could assist by preparing pre-packed medications in a pillbox before the subject left the house.

Subject I was prescribed metformin, while Subject II received metformin and *glibenclamide*. In accordance with PERKENI guidelines, as cited in Citri, Weny, and Deby, metformin is the first-line medication for patients with type 2 diabetes mellitus due to its primary mechanism of reducing hepatic glucose production.[15] Subject I took metformin 500 mg three times a day at 05.30, 13.00, and 17.00. Subject II took metformin 500 mg and *glibenclamide* 5 mg twice daily at 07.00 and 19.00.

The intervention in this study consisted of structured educational sessions designed to improve medication adherence in both subjects and was implemented in accordance with standard operating procedures. Family members were involved during the educational process—Subject I was accompanied by her husband, and Subject II by her child. Post-test results, obtained during the fifth meeting following the educational intervention, showed an improvement in both medication adherence and family knowledge levels.

Assessment of the five family health functions revealed that both subjects and their families had not fully implemented these functions, placing them at risk for potential complications of type 2 diabetes mellitus if medical management was not optimized. Ideally, families should actively participate in performing health care practices, including preventing health problems and providing care for sick family members.

Evaluation of family independence levels showed improvement after the intervention. Both families progressed from Independence Level II to Independence Level III. This improvement was demonstrated by the families' ability to accept health workers, receive nursing care according to the care plan, identify and articulate health problems, perform simple recommended actions, use available health services, and actively engage in preventive measures related to type 2 diabetes mellitus.

CONCLUSION

There was an improvement in the medication adherence level of Subject I, increasing from a score of 3 (low adherence) to a score of 6 (moderate adherence), and an improvement in knowledge level from a score of 54 (poor) to 83 (good) after the educational intervention.

Similarly, Subject II experienced an increase in medication adherence from a score of 4 (low adherence) to 7 (moderate adherence), and an increase in knowledge level from 45 (poor) to 74 (fair).

In addition, both families demonstrated an improvement in their level of independence, progressing from Independence Level II to Independence Level III. There was also an improvement in the implementation of the five family health functions. The family of Subject I demonstrated an understanding of the importance of consistent medication adherence, and following the intervention, the family of Subject II also showed improved awareness of the importance of taking medication regularly.

Recommendations

For Families

Families are encouraged to take a more active role in supporting medication adherence among clients with type 2 diabetes mellitus. Strong family support has been shown to improve adherence. Such support may include reminding clients to take their medication and helping to prepare medication in advance.

For the Community Health Centre (Puskesmas)

Health service availability at Puskesmas Srondol is expected to further enhance community satisfaction. It is recommended that additional programs, such as the *Kartu Menuju Sehat* (KMS) for older adults, be implemented. Increasing the number of elderly health cadres, particularly in RW 12, is also advised.

For the Development of Nursing Science and Nursing Technology

The findings of this case study may serve as baseline data for future case studies, particularly those focusing on family education aimed at improving medication adherence among clients with type 2 diabetes mellitus.

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