

The Influence of Family-Based Social Support on Intrinsic Motivation and Diabetic Foot Care Behavior Among Patients with Diabetes Mellitus in Pekanbaru, Indonesia

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ABSTRACT

Background: Diabetes mellitus (DM) patients are at risk of developing diabetic foot syndrome, which can lead to amputation. Family support is essential in enhancing intrinsic motivation and promoting diabetic foot care behavior among DM patients. This study aimed to examine the effect of family-based social support on intrinsic motivation and diabetic foot care behavior in DM patients in Pekanbaru, Indonesia.

Method: This quasi-experimental study used a non-equivalent control group design involving 118 participants, divided into an intervention group (n = 59) with family participation and a control group (n = 59) without family involvement. Data collection employed sociodemographic questionnaires, the APGAR Family Questionnaire, the Treatment Self-Regulation Questionnaire for intrinsic motivation, the Nottingham Assessment of Functional Footcare (NAFF), and a modified family social support questionnaire. Data analysis was conducted using the Wilcoxon Signed-Rank Test and path analysis with SmartPLS.

Result: The study demonstrated that family-based social support significantly improved intrinsic motivation and diabetic foot care behaviors in the intervention group compared to the control group.

Conclusion: Family-based social support has a positive effect on intrinsic motivation and diabetic foot care behavior in DM patients. These findings emphasize the need for integrating family-based social support programs into community health initiatives to prevent diabetic foot complications.

Keywords: Diabetes mellitus, family-based support, intrinsic motivation, diabetic foot care behavior

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1. INTRODUCTION

Diabetes mellitus (DM) is a heterogeneous disease characterized by hyperglycemia resulting from impaired insulin secretion, insulin action, or a combination of both [1]. DM is marked by elevated blood glucose levels due to the body's inability to produce and utilize insulin effectively [2]. In both type 1 and type 2 DM, various genetic and environmental factors contribute to an increased risk of chronic complications [3]. Among these, diabetic peripheral neuropathy (DPN) is the most common complication, caused by metabolic and microvascular changes associated with chronic hyperglycemia [4]. This condition affects peripheral sensory nerves (both large and small fibers) and motor nerves, leading to sensory impairment and reduced muscle morphology and function [5]. Such neuropathic alterations result in diminished ankle reflexes, muscle weakness, foot deformities, and sensory loss, which significantly contribute to ulceration and infection, often culminating in amputation [6].

Epidemiological data indicate that neuropathy accounts for approximately 50% of diabetic foot syndrome (DFS) cases. This occurs due to increased plantar pressure combined with systemic factors such as impaired cellular wound healing,

leading to chronic foot lesions. DFS is a severe complication of diabetes primarily caused by diabetic sensorimotor polyneuropathy. It is categorized into two types: diabetic foot without ulceration and diabetic foot with ulceration [7],[8]. Foot ulceration typically develops from a combination of neuropathy and angiopathy. Ischemic and neuropathic dystrophic tissues are highly susceptible to injury and infection [7]. Data reveal that approximately 56,200 individuals with diabetes undergo lower-limb amputation annually [9]. However, diabetic foot complications can be prevented through consistent diabetic foot care before the onset of these complications. Recommended preventive measures include regular foot inspection, wearing appropriate footwear, maintaining foot hygiene and moisture, trimming toenails properly, and avoiding the use of heating pads or hot water bottles to warm the feet [10].

Several factors influence an individual's adherence to diabetic foot care, among which family involvement and attention play a crucial role as a form of social support that enhances patients' motivation to recover from their illness [11]. Social support aims to provide comfort, a sense of care, self-esteem, and assistance in accepting others' opinions [12]. Adequate social support positively impacts individuals by improving their problem-solving strategies [13]. Family social support may take various forms, including instrumental, informational, appraisal, and emotional support [14]. Such support can be demonstrated by encouraging patients to practice foot care, praising them for positive behaviors to prevent diabetic ulcers, and responding positively to patients' opinions [15]. Optimal family support can enhance patients' adaptive capacity and cognitive abilities, as well as increase optimism in managing diabetes. The higher the quality of family support whether instrumental, emotional, appraisal, or informational the greater the patient's motivation to adhere to treatment and self-care regimens. Scarbec (2006) reported that family involvement strongly correlates with patients' health status, as those with maximum family support are more likely to exhibit both extrinsic and intrinsic motivation to engage in health-promoting activities [16]. Intrinsic motivation refers to motivation arising from within the individual [17]. Internal factors influencing intrinsic motivation include needs, attitudes, and beliefs [12]. Therefore, the family plays a pivotal role in fostering patients' intrinsic motivation. One active form of family participation in supporting patients is commonly referred to as family empowerment.

Family empowerment is a nursing intervention employed by nurses to assist families in caring for and supporting members suffering from chronic illnesses. Research by Abrar et al. (2019) indicates that knowledge transfer involving families can enhance self-care management among patients with diabetes [18]. Family support can serve as the primary caretaker, replacing the role of healthcare professionals at home by providing supervision, assisting in self-care management, facilitating adherence to self-care behaviors, and offering emotional support to improve the quality of life of patients with diabetes [19]. Proper foot care behavior plays a vital role in preventing complications such as diabetic foot ulceration [20]. However, the implementation of nursing interventions focused on family empowerment to strengthen caregiving abilities remains limited. This is partly because most studies on family empowerment emphasize improving knowledge and attitudes rather than developing hands-on caregiving skills. Family empowerment through social support is expected to encourage and sustain intrinsic motivation within the family, thereby ensuring that patients with diabetes remain committed to practicing foot care, which is essential for preventing diabetic foot complications. This study aims to analyze the impact of family-based social support on enhancing intrinsic motivation and diabetic foot care behavior among patients with diabetes in Pekanbaru. The novelty of this research is the use of family-based social support, with the addition of one aspect, namely spiritual support. This way, the social support provided by the family is more integrated.

2. LITERATURE REVIEW

In this study, we developed a family-based social support intervention aimed at enhancing intrinsic motivation and diabetic foot care behaviors. This approach is grounded in Orem's Nursing Theory, particularly its application to family nursing care, along with relevant literature. Orem's theory emphasizes the importance of family support, communication, and collaboration in providing holistic care to improve health maintenance and achieve well-being [21]. Optimal family social support significantly influences intrinsic motivation in individuals with diabetes and promotes adherence to diabetic foot care practices. Several previous studies have demonstrated that family involvement enhances patients' motivation and diabetic foot care behaviors.

Family social support encompasses emotional, instrumental, informational, and appraisal support provided to family members, fostering a sense of attention, care, and affection, which positively impacts the well-being of the patient [22]. Such support has also been shown to improve the health status of patients with diabetes [23]. Family assistance and involvement are essential in managing care and preventing diabetes-related complications [24]. Insufficient family support negatively affects patients' motivation to perform self-care, including foot care [25]. High levels of intrinsic motivation strongly influence patients' consistency and adherence to diabetic foot care practices, resulting in more intensive and regular foot care to prevent diabetic foot complications [26]. Previous research indicates that, in addition to healthcare professionals' roles, motivation is a dominant factor affecting preventive behaviors for diabetic foot ulcers [27]. Foot care is a critical component of diabetes self-management, and regular foot care behaviors can significantly reduce the risk of developing diabetic foot syndrome [25].

3. METHODS

Study Design

This study employed a quasi-experimental design with a non-equivalent control group approach. Pretest measurements were conducted before the intervention, and posttest measurements were performed afterward in both experimental and control groups. Participants were not randomly assigned. The experimental group received education involving family participation, while the control group received the same educational content without family involvement.

Sampling

A total of 118 DM patients were recruited using purposive sampling from three public health centers: Simpang Tiga, Harapan Raya, and Sidomulyo in Pekanbaru, Indonesia. Inclusion criteria included patients diagnosed with DM who had not developed diabetic foot ulcers. The sample size was calculated using the formula for proportion estimation based on the prevalence of DM in Pekanbaru (3.74%) in 2022.

$$n = Z_{1-\alpha/2} \times \sqrt{P(1-P)/d^2} \quad n = Z_{1-\alpha/2} \times \sqrt{P(1-P)/d^2}$$

Notation explanation:

n = Sample size

$Z_{1-\alpha/2}$ = Z-score corresponding to the desired confidence level (e.g., 1.96 for 95%)

P = Estimated proportion of the population with the characteristic of interest

d = Margin of error (precision)

A minimum of 54 respondents was required per group. To account for potential attrition, the final sample size was adjusted to 59 participants in each group, totaling 118 respondents.

Ethical Considerations

Ethical approval was obtained from the Health Research Ethics Committee of Universitas Prima Indonesia (No. 031/KEPK/UNPRI/IX/2024). Subsequently, research permission was granted by the Pekanbaru City Health Office. All participants provided written informed consent prior to participation.

Research Instruments

Data were collected using the following instruments:

1. **Sociodemographic Questionnaire**
2. **Supporting Data Sheet**
3. **Intrinsic Motivation:** Measured using the Treatment Self-Regulation Questionnaire (TSRQ) (Butler, 2002), adapted and modified by Zycinkca (2012) and validated in this study. The instrument consisted of 12 items across five components: personal goals and expectations, satisfaction and personal values, engagement and activities, social support, and emotional state. Scores ranged from 12 to 48 and were categorized as good (>70% or >33.6) or poor (<70% or <33.6) [28].
4. **Diabetic Foot Care Behavior:** Assessed using the Nottingham Assessment of Functional Footcare (NAFF) questionnaire [29], which includes 16 items on foot inspection, hygiene, nail care, use of moisturizers, and footwear selection. Responses were rated on a 4-point Likert scale, with total scores ranging from 16 to 64. Scores >44.8 indicated good behavior, while scores <44.8 were categorized as poor [30].
5. **Family-Based Social Support:** Measured using a modified questionnaire including instrumental, informational, emotional, appraisal, and spiritual support [14].

Data Collection Procedure

Data collection occurred over two weeks in four sessions:

1. Week 1:

- a) *Phase 1 (Professional-Dominated):* Establish rapport, administer baseline questionnaires (TSRQ, NAFF, and family support), and provide education on diabetic foot prevention and care.
- b) *Phase 2 (Participatory):* Deliver education on foot care using leaflets and engage patients and families in discussions.
- c) *Phase 3 (Challenging):* Conduct demonstrations on foot care practices involving family participation.

2. Week 2:

Collaborative Phase: Evaluate family involvement and reinforce education. In the control group, discussions focused on self-motivation and foot care practices. Posttest questionnaires were administered to both groups. Each educational session lasted approximately 100 minutes, incorporating lectures, discussions, and demonstrations.

Data Analysis

Statistical analysis in this study was conducted to examine the effect of family-based social support empowerment on intrinsic motivation and diabetic foot care among patients with Diabetes Mellitus. Socio-demographic data of respondents were analyzed descriptively to describe the distribution of sample characteristics. To test the effect of family-based social support empowerment on intrinsic motivation and diabetic foot care, the Wilcoxon Signed Rank Test was applied to pretest and posttest data. This non-parametric test was used to determine significant differences between pretest and posttest scores in both experimental and control groups [31]. Additionally, path analysis was performed to assess the relationship between intrinsic motivation, diabetic foot care behavior, and influencing factors. The results of path coefficients were presented for both the experimental and control groups. To measure the extent to which family-based social support empowerment influenced intrinsic motivation and diabetic foot care, the R Square value was used, representing the proportion of variance explained by the model [32].

4. RESULT AND DISCUSSION

The findings of this study indicate that family social support has a significant influence on intrinsic motivation and diabetic foot care behaviors among patients with diabetes mellitus. The following section presents the demographic characteristics of respondents, the results of the association analysis between family social support and both intrinsic motivation and diabetic foot care behavior, as well as the outer model results from Smart PLS, which illustrate the effect of family social support on intrinsic motivation and diabetic foot care behaviors

Table 1. Sociodemographic Characteristics of Respondents

Category	Intervention group		Control group	
Age	F	%	F	%
Adult	1	1,7	0	0
Pre elderly	40	67,8	48	81,4
Elderly	18	30,5	11	18,6
Total	59	100	59	100
Education				
Elementary School	9	15,3	13	22
Junior Hugh School	15	25,4	28	47,5
Senior Hugh School	27	45,8	15	25,4
Bachelor's degree	8	13,6	3	5,1
Total	59	100	59	100
Occupation				
House Wife	31	52,5	33	55,9
Civil Servant	5	8,5	3	5,1
Unemployed	3	5,1	3	5,1
Entrepreneur	2	3,4	2	3,4
Laborer	5	8,5	13	22
Private employed	10	16,9	4	6,8

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Retired	3	5,1	1	1,7
Total	59	100	59	100

Gender

Male	23	39	19	32,2
Female	36	61	40	67,8
Total	59	100	59	100

Duration Of Diabetes

≥ 4 years	55	93,2	50	84,7
< 4 years	4	6,8	9	15,3
Total	59	100	59	100

The majority of respondents were in the pre-elderly age group, with 40 individuals (67.8%) in the intervention group and 48 individuals (81.4%) in the control group. Regarding educational level, most respondents had completed junior or senior high school. In the intervention group, the majority had a senior high school education (27 respondents; 45.8%), whereas in the control group, most had a junior high school education (28 respondents; 47.5%)

Table 2. The Influence of Family-Based Social Support on Intrinsic Motivation and Diabetic Foot Care Behavior Among Patients with Diabetes Mellitus in Pekanbaru City

Category	Z	P value
Intrinsic motivation		
Intervention group	-7.319	0.001
Control group	-6.844	0.006
Diabetic foot care behavior		
Intervention group	-6,950	0,000
Control group	-6.733	0.057

Table 2 presents the results of the analysis examining the effect of family-based social support on intrinsic motivation and diabetic foot care behavior, which showed a significant effect in the intervention group. This is indicated by the Z-score and p-value for intrinsic motivation in the intervention group ($Z = -7.7319$, $p < 0.005$), compared to the control group ($Z = -6.844$, $p > 0.0005$). Similarly, the Z-score and p-value for diabetic foot care behavior were significant in the intervention group ($Z = -6.950$, $p < 0.005$), whereas the control group showed ($Z = -6.733$, $p > 0.005$)

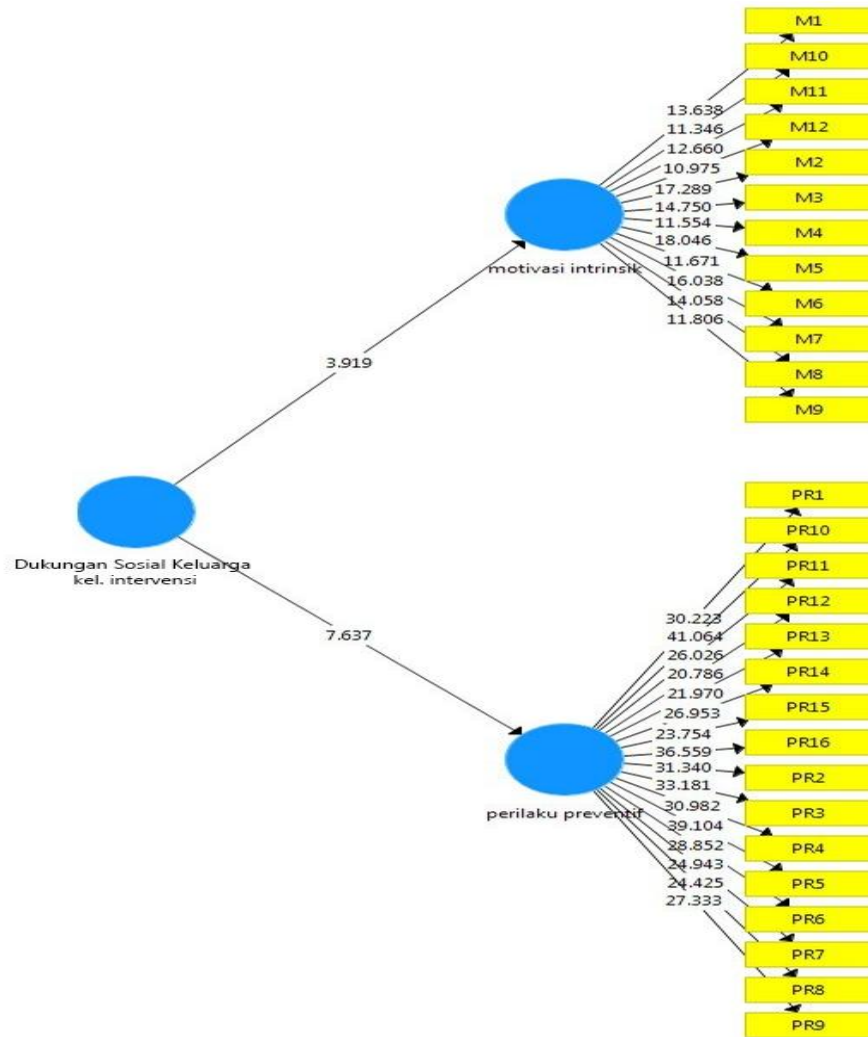


Figure 1. Model of Family-Based Social Support on Intrinsic Motivation and Diabetic Foot Care Behavior Among Patients with Diabetes Mellitus in the Intervention Group

As shown in Figure 1, family social support significantly influenced intrinsic motivation among respondents in the intervention group, with a t-statistic value of 3.919 (> 1.96). Furthermore, the effect of family social support on diabetic foot care behavior among patients with diabetes mellitus demonstrated a t-statistic value of 7.637 (> 1.96). These findings indicate that family social support exerts a significant and strong influence on both intrinsic motivation and diabetic foot care behavior among patients in the intervention group. As illustrated in the figure above, family-based social support in the control group showed a t-statistic value of 0.796 (< 1.96) for intrinsic motivation and 1.691 (< 1.96) for diabetic foot care behavior among patients with diabetes mellitus. These results indicate that family social support in the control group had no significant effect on intrinsic motivation and only a weak effect on diabetic foot care behavior.

Overall, the results of this study demonstrate a significant effect of the family-based empowerment model through family social support on intrinsic motivation and diabetic foot care behaviors among patients with diabetes mellitus. The increase in intrinsic motivation among patients to perform diabetic foot care aligns with existing literature, which emphasizes the critical role of family empowerment through social support in enhancing patients' motivation for diabetes self-management. Care, affection, emotional support, and family involvement during the course of illness can encourage patients to remain optimistic and adhere to diabetes care practices [33]. Both the intervention and control groups showed a significant increase in intrinsic motivation. This finding is consistent with studies stating that intrinsic motivation represents a psychological process reflecting attitudes, needs, perceptions, and self-driven decisions that encourage individuals to achieve their desired goals (Marquis & Huston, 2010 as cited in [34]. According Amin and Haryanti (2018), intrinsic motivation is considered the most appropriate form of motivation, as it arises from an individual's internal drive to achieve desired goals. However, intrinsic motivation can be further strengthened by external factors, such as family support, healthcare provider assistance, and other environmental influences (Rahmadanti et al., 2020). Social support provided by family serves as a motivating factor for patients to maintain their health. Similarly, Maryati et al. (2024) emphasize that

families can motivate ill family members by offering emotional support, providing information, and assisting in lifestyle modifications [36].

The improvement in diabetic foot care behavior among patients in the intervention group was greater compared to the control group. Posttest diabetic foot care behavior in the control group showed an R Square value of 0.105 and an Adjusted R Square of 0.094, indicating that only about 10.5% of the variance in behavior could be explained by the model a relatively low value. In contrast, the intervention group demonstrated an Adjusted R Square of 0.279, suggesting that approximately 28.8% of the variation in preventive diabetic foot care behavior in the posttest could be explained by the applied model, which represents a moderate effect size. These findings indicate that participants in the experimental group experienced greater improvements in diabetic foot care behavior compared to those in the control group. Several previous studies reported similar findings, noting that patients with diabetes tend to engage in better self-management behaviors when they perceive strong family support [37].

Aini, Anggorowati, and Puji (2021) reported that respondents who received family support demonstrated better health outcomes compared to those who did not receive such support [38]. Family social support plays a crucial role and is essential for patients in managing their illness. Family support refers to the positive feelings individuals experience when receiving assistance from family members. The dimensions of family social support include instrumental, emotional, informational, and appraisal support. Research by Kristaningrum and Budiyan (2011) also found that family social support has a positive effect on patients' treatment adherence [22].

Individual health behaviors are also influenced by self-motivation to engage in healthy practices and maintain well-being [36]. However, family social support remains critical for improving and sustaining diabetes management behaviors. Literature reviews indicate that patients with diabetes demonstrate better self-management when they perceive strong family support. [37], reported a significant positive correlation between diabetes management and family support ($p = 0.001$). Other studies have also shown that motivation influences diabetic care behaviors, with patients exhibiting low motivation tending to engage less in foot care practices [26]. Family-based empowerment interventions grounded in social support are essential and function as strategies for preventing stress among family members caring for ill patients, enabling patients with diabetes to feel valued and motivated to follow health recommendations [39]. Similarly, Antarini, Rasdini, and Triyani (2011) stated that family social support enhances patients' confidence and ability to perform self-care, including diabetic foot care. With adequate social support, patients with diabetes feel safe and comfortable, which fosters self-care awareness and strengthens their motivation for disease management [40]. These findings demonstrate that a family empowerment model based on social support effectively improves intrinsic motivation and diabetic foot care behavior among patients, leading to better adherence to health recommendations and improved health outcomes.

The researchers suggest that family social support should not only encompass the four commonly recognized dimensions instrumental, emotional, informational, and appraisal support but also integrate spiritual support. Providing comprehensive, integrated support can strengthen patients' motivation and confidence in managing diabetes, thereby enhancing their resilience in coping with the disease. This aligns with findings by Andrian (2023), which indicate that spirituality and faith serve as adaptive coping mechanisms. Individuals with strong spiritual beliefs are more motivated to face illness, as spirituality plays a key role in managing chronic conditions [41].

Family empowerment through social support plays a critical role in influencing patients' behavior in managing their illness, including diabetic foot care as a preventive measure against diabetic foot complications. Family empowerment can lead to changes in patients' attitudes and behaviors by providing assistance with care, thereby improving quality of life and promoting sustainable health outcomes [42]. Effective communication among family members and the attention given to patients often produce positive psychological effects, fostering patients' confidence and enabling them to maintain their health status over the long term.

5. LIMITATIONS

This study has several limitations. First, the use of purposive sampling may have introduced selection bias, potentially influencing intrinsic motivation and diabetic foot care behaviors among patients. Additionally, the relatively small sample size limits the generalizability of the findings and may have affected the statistical power to detect stronger associations

6. CONCLUSION AND IMPLICATIONS FOR NURSING PRACTICE

The family-based social support model demonstrated a significant effect in enhancing intrinsic motivation and diabetic foot care behavior among patients with diabetes mellitus in the intervention group. These findings underscore the importance of incorporating family-centered social support into nursing interventions to improve self-care behaviors and prevent complications in patients with chronic illnesses. Nevertheless, further research with larger sample sizes is warranted to confirm these findings and optimize the effectiveness of such interventions

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