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Applying the Family Functioning Model to Explore Positive Support in Diabetes Self-Management: A Qualitative Study

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ABSTRACT

Introduction: Family members play a vital role in helping and undermining diabetes mellitus self-management practice.

Methods: A qualitative study design to describe and explore the potentially key family function in diabetes self-management (DMSM) practice. In-depth interview strategy and focus group discussion (FGD) were conducted at Community health centre. An open-ended approach was applied to elicit an answer from participants. A total of twenty-two participants were involved in this study. All interview and FGD processes were audiotaped and transcribed verbatim.

Results: The results found that positive function of family to support DMSM practice such as 1) positive encouragement and emotional support; 2) acknowledge responsibility for shared management; and 3) console, encourage and remind to maintain behaviours, regular blood glucose and medication adherence. the positive function of affective involvement such as 4) Be partners and work together in goal setting, action plan, and problem solving; and 5) accompanying for medical appointment and medical check-ups. Positive function in communication and problem solving such as 6) talking nicely and taking time to listen every compliance; and 7) partners recognize the needs of helping in crisis situation.

Conclusion: Our findings provide insights regarding how family function may influence the adoption and maintenance of healthy behaviours. As the health providers look for approaches to improve the DMSM practice, this valuable finding was essential to understand how the family function can improve and empower patients in DMSM practice. The findings of this study recommend that community health center should involve the family members to maintain the self-management implementation. The component of family function based should be consider for program development among diabetes patients.

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INTRODUCTION

Uncontrolled type 2 diabetes mellitus (T2DM) has become the major challenges for the public health system in Indonesia. More than 10 million people were reported to live with T2DM, and most of them had not been met with the target goals of glycaemic control, which can cause diabetes complications (1).

Diabetes self-management (DSM) is a critical aspect of healthcare in Indonesia. Self-management practices are required to control the health behaviours and prevent severe complications among uncontrolled T2DM (2). Diabetes mellitus self-management (DMSM) requires patients able to reconcile their resources, value, and preferences with the healthy diet, actively in physical activity, avoiding the smoking cessation and alcohol intake, adherence to medication taking, blood glucose monitoring, and prevent from a complication (3). Effective self-management practices are essential to control blood glucose levels and prevent complications associated with diabetes.

However, current challenges in diabetes self-management encountered such as uncontrolled diabetes rates leads to severe complications such as neuropathy, nephropathy, and cardiovascular diseases4. Another challenges was family dynamics often complicate self-management efforts; conflicts may arise over dietary choices, and family members may inadvertently sabotage patients' efforts by not supporting healthy eating habits (4,5). Despite the family member is important to support in diabetes self-management

Family members can play a vital role in helping and undermining self-management practice (6). The functioning of family is a fundamental concept to provide appropriate tasks, improve the capacity of patients and their family members, prevent misinterpretation and emotional responses, as well as maintain the DMSM behaviours (7).

Family support plays a vital role in DMSM, especially in Indonesian culture where family ties are strong. Despite the importance of family support, there is still a gap in knowledge about how family functioning influences DMSM practices in Indonesian communities. This gap hinders the development of culturally sensitive interventions.

Family function and family relationship are not homogeneous. They can be complex based on the family members' participation in promoting the self-management practice (8,9). To reach the positive effect of the family members to support diabetic management, family members should be functioned to achieve the demands of care for T2DM patients (10). A better understanding of family function could clarify the ways to help both T2DM patients and their family members for maintaining the balance in diabetes management (11). However, there are still a few studies in Indonesia described the best way in which family members should support the DMSM practice (12). Family members are necessary for DMSM practice especially in lifestyle changed (13,14) and improve an effort to manage a chronic condition such as T2DM (15). However, limited study conducted in Indonesia to explore role of family functioning in Indonesia. Therefore, this study would focus the key family functioning in diabetes self-management (DMSM) practice qualitatively.

Context of Family Functioning in Indonesia

Family functions play a critical role in the self-management of Diabetes Mellitus (DM), particularly in Type 2 Diabetes Mellitus (T2DM). This concept is grounded in the understanding that diabetes management is not solely the responsibility of the individual but is significantly influenced by familial support and dynamics. The family unit serves as the primary source of support, care, and emotional stability for individuals facing health challenges. The dynamics of family functioning can significantly impact the recovery process and overall well-being of sick family members.

Indonesian culture places a high value on familial ties and collective responsibility. This cultural context encourages family members to actively participate in the care of sick relatives. The concept of "gotong royong," or mutual assistance, is prevalent, fostering a communal approach to health care where families work together to support their sick members (16).

Families in Indonesia often take on the role of primary caregivers, providing essential emotional, informational, and instrumental support. This includes assisting with daily activities, managing medical appointments, and ensuring adherence to treatment plans. Therefore, educating family members about the illness and its management is crucial. When families are informed about the medical condition, they can provide better support,

recognize warning signs, and encourage adherence to treatment protocols. This education often comes from healthcare providers but can also be facilitated through community health programs (17).

However, economic factors can pose challenges that affect the level of care provided. Therefore, enhancing family functioning through targeted interventions and education is crucial for improving health outcomes in Indonesian families dealing with illness

METHOD

Study design and setting

A qualitative study was conducted by both in-depth interviews and focus group discussion (FGDs). The in-depth interview was conduct to explore the participants' perspective and experiences in detail on diabetes self-management practice and how family members support individually in DMSM practice. Whereas, the FGDs was use to offer a broader view of group perspective on barriers and experience in community health center for DMSM practice. The study took place at community health centres and basic health facilities which is focusing on health promotion and prevention program. all participant was explained the aims of this study and asked to sign the informed consent form to allow tape recording during the in-depth interview and FGD process.

Samples recruitments

Twenty-two participants were recruited using a purposive sampling technique including; uncontrolled T2DM patients (n = 8), family caretaker (n = 8), and health care providers (HCPs; n = 6) and who were directly involved in sharing their experiences and viewpoints on role of family functioning to support Diabetes Mellitus Self-Management (DMSM) practice

Diabetes patients were recruited from the prolanis members program at community health centers. Eligibility of patients including uncontrolled T2DM with HbA1c $\geq$ 6.5%, aged more than 35 years old, has been living with T2DM within two years, be able to communicate in Indonesia language, and willing to be interviewed. Participants were excluded if they had visible diabetes-related severe complications, such as blindness or amputated limbs.

The families care taker wife, husband, daughter or son who responsible for patients' health and living with patients were included in this study. Family members were excluded if they had no experience in taking care of patients with diabetes mellitus, not willingness to participate in this study, and separately living with patients

Eligible HCPs were those having a role in diabetes care in the community health centres and had worked in this area for at least one year's experience. We recruited those HCPs from six different community health centres.

Table 1. Description of samples based on triangulation method

Participants	Size	Method	Purpose
Uncontrolled T2DM patients	8	In-depth interview	- Daily DMSM practice - Perceived family function in DMSM practice
Family care taker	8	In-depth interview	- Family function to support on DMSM practice - Experience of family roles in DMSM practice
HCPs	6	Focus group discussion (FGD)	- Implementation of existing services of DMSM practice at community - Experience of HCPs to support diabetes patients in DMSM practice

Data collection procedure

The researchers drafted and three experts checked and validated the semi-structured interview guideline. Following themes of interview guide included "background information of respondents", "perceived family function of patients", "family function practice on DMSM", "existing DMSM practice at community health centres".

Two strategies of data collection such as in-depth interview and focus group discussion (FGD), with open-ended questions were applied in this qualitative study. Each interview took place in one private room at community health centres for approximately 45 to 60 minutes. FGD was conducted for HCPs in six different community health centres. We conducted this activity in a private room at community health centres for approximately 60-90 minutes.

An audio recorder and basic note were used during the interview process. After the interview was conducted, the researcher wrote a summary report of the initial impression related to the topics of (a) experience of living with uncontrolled T2DM, (b) Diabetes self-management practice, and (c) functioning of the family in DMSM practice. The summary report was used to create the codes and used for data analysis. The triangulation with multiple data sources, researchers, or methods were conducted to cross-check findings. The standardized interview protocols also were applied to ensure consistency across participants. To ensure transparency of data collection and data analysis, the audit trial and negative case analysis were applied by actively seeking out and analyzing data that contradict emerging themes

Theoretical Framework

We applied a McMaster Model of Family Functioning proposed by Epstein et al. in 1978 to describe the positive and negative vibes of family function to support DMSM practice from patients, their families, HCPs, and VHVs. This model underscores the importance of a family's structure and organization in determining individual behaviours and overall family health consisted of problem solving, communication, roles, affective responsiveness, affective involvement, and behaviour control. The major step of the applying the McMaster Model of Family Functioning began by identifying patients' needs and family functioning to support DMSM practice. This information was explored from T2DM patients' and family members', perspectives. In terms of implementing DMSM practice, family support is a crucial component to maintain the behavioural change and blood glucose control.

Ethical Approval

We provided informed consent to all participants who were willingness to participate in this study. The Ethical Review Committee has approved this study for Human Research Faculty of Public Health, Mahidol University, number: MUPH 2018-173. The permission letter from Head of each community health centres also were obtained before conducting this study.

Data analysis

The data were transcribed and translated from audio-records. The second researcher reviewed and read each transcript. During transcript process, all data would be transcribed into textual form accurately and completely. Then identify the code into data such as words, phrase, or concept. The feedback would be done regarding the quality of the transcript. The summary of the transcript was scripted in the excel spreadsheet to track the different key theme. The excel spreadsheet was organized into three main themes derived from the interview guide. A thematic content analysis approach was used to analysed the key theme.

RESULTS

Demographic characteristics

We recruited and interviewed 8 uncontrolled T2DM patients. The average age of patients was 45 years. Out of 8 patients, 37.5% of participants are male while females are 62.5%. The education background included primary school (25%), secondary school (25%), high school (25%), and bachelor (25%). Most of the ethnic from Javanese (62.5%), while Mandarnese ethnic was 12.5% and Buginese ethnic was 25%. Participants had an average of 4 years living with T2DM since the first diagnosis. Patients mentioned that the majority of support received for DMSM practice in their household came from spouses and daughter.

Eight family members were involved in this study, out of which eight were female. The average age of participants was 42 years. The education background included primary school (12.5%), high school (50%), and bachelor (37.5%). Regarding the relationship between patients and family members, most of the family members whose responsibilities in diabetes care were spouse (62.5%).

Six HCPs also were involved in the focus group discussion (FGD) process to explore the functioning of family members in DMSM practice. Most of them were female with an education background from Diploma III of nursing. The have been responsible in diabetes management within four years.

Family functioning to explore the positive support in diabetes mellitus self-management (DMSM) practice: Indonesian communities' perspective

Following of positive family functioning in DMSM practice was systematically described in based on the theme's categories.

Positive encouragement and emotional support in behavioural changed

Positive encouragement and emotional support in behavioural changed has an essential functioning of family in DMSM practice. The effective responsiveness can be defined as the emotional response of the family members from outside stimuli. Family members have an essential role in uplifting patients' motivation, describing empathy, and reduction of feeling distress. In this situation some of patients described how their spouses were always by their side and positively encouraged to control blood glucose level. They also described how family members always encourage for adopting the new behaviours, discuss about diabetes and seeking the alternative management for controlling blood glucose level.

"*When I felt uncomfortable, He asked me to check up at Puskesmas* (Patient 1, Female, 48)

"He supports me to be healthy; he encourages me when I can control my blood glucose. He always help to find some information and support me very much when I am feeling discouragement" (Patient 2, Female, 41).

"I always discuss with my daughter about my disease. She always encouraged me to adopt the new behaviours and responded to me with the positive way during feeling uncomfortable" (Patient 4, Female, 52)

Console, remind, acknowledge responsibility for share management

During interview processes, some of family's console and share management when patient were feeling distress, uncomfortable and hopeless because of challenges of DMSM practice, unstable blood glucose results, and diabetes prognosis. Families bring them out to release the boredom or accompanied patients for healthy check-up at community health centres. Some of families delivered positive responses by discussing, motivating, supporting and sharing experience about the diseases management and possibility strategies to control blood glucose. In certain conditions such as wedding ceremony, one of family member perform effective behaviours control in blood glucose monitoring, reminding to control diet strictly and avoid some fat food. Two patients described how family members helped them to control blood glucose, reminding the healthy food intake, and preparing food at home.

Two patients described how family members helped them to strictly control blood glucose level by preparing the healthy food at home, reminding on healthy intake food in certain condition, and avoiding to eat outside.

"I support and ask to calm down my wife when she feels stress because of her blood sugar levels. I also often discuss and sometimes invite him out to release the boredom" (Family 2, Husband, 43).

I support and ask to calm down my wife when she feels stress because of her blood sugar levels by sharing experience of diseases management to control blood glucose (Family 7, Wife, 45).

"I always give a positive response to my wife especially when she asked me something. I support her especially if she asks me to accompany her to a health centre for a check-up" (Family 1, Husband, 55).

"I just discuss with my mom with positive way about diabetes care. I motivate my mom to control her diet and blood glucose level" (Family 5, Daughter, 43).

"I always give a positive response to my mom especially when she can control the blood glucose well; I support and motivate her to perform well behaviours especially diet to control blood glucose" (P6, Daughter, 30).

Be partners and work together in goal setting, action plan and problem solving

Besides the emotional responsiveness, behaviours change required to engage relatives in the new routines. The affective engagement was how the patients and their family members work together to set goals; perform self-care behaviours, and implement the plan of actions in the patient's life. From this strategy, patients could share how family members engaged in diabetes management. Family members also could learn how diabetes management was approached and made efforts on patients' spirit for maintaining healthy behaviours. Three patients described how their family members always accompanied them during the medical appointment and medical check-up at Puskesmas. Another participant explained how her daughters encouraged her to include them in her new dietary habits

Family members reported that patients involved them in seeking the treatment as part of their efforts to engage in recommended DMSM practice. Other family members mentioned how she included her mom to food selection, medication taking, and ensure patients did not miss their medical appointment and controlling blood glucose.

> *"My wife involved me when deciding which treatment to choose for her disease. He also often communicates to me if she needs an alternative treatment for controlling her blood glucose"* (Family 1, Husband, 55).

> *"I involved my mom in deciding food selection and seeking the diabetes treatment especially for checking the blood glucose and medication taking as well as medication appointments"* (Family 6, Daughter, 30).

> *"I involve my mom to manage her diet because not all kind of food is appropriate for her "* (P4, Daughter, 38).

> *"I involve my mom to control the diet but difficult to do since I have to work every day and we always order food from a restaurant"* (P5, Daughter, 43)

Be partners and work together in goal setting, action plan and problem solving

> *I also accompany her to check the blood glucose at Puskesmas. Sometimes we also discuss the food selection"* (P4, Daughter, 38).

> *"I always involve my husband in diet control and manage blood glucose control. Sometimes I accompany my husband to check blood glucose at Puskesmas"* (P7, Wife, 45)

Talking nicely and talking time to listen every compliance

Communication can be defined as the process of discussion within family related to the DMSM practice. We found that four patients have constructed the effective communication with their family members in terms of diabetes and possibility of diabetes complication when uncontrolled behaviours, how to seek the diabetes information as well as discuss the best solution to solve DMSM problems. One of patient mentioned that she discusses with her family during family time while watching television to obtain some information of health. They talked nicely and took time to listen every compliance.

> *"I always discuss with my husband after getting the blood glucose results from Puskesmas, I discuss with him during family time and watching television together to obtain information about health"* (Patient 2, Female, 41).

> *"I always discuss with my daughter about my disease, and she responds me with the positive way"* (Patient 4, Female, 52)

> *"I usually discuss with my daughter and my son about my diseases; she always advises me to control my diet"* (Patient 5, Female, 63)

"We always communicate and discuss the diabetes, sign and symptoms of diabetes and the possibility of diabetes complications" (Patient 6, Female, 52)

Partners recognize the needs of helping in crisis situation

Problem solving can be defined as the family capacity to solve the problem to maintain the effectiveness of family function in DMSM practice. Participants shared how family members helped them during facing the stress or feeling bored to perform the DMSM practice for an extended period. Family members reminded in controlling blood glucose. One participant described how her husband was always by her side and support when feeling stressed.

"My husband often helps me to get herbal medicines to control blood glucose. When *I feel stressed, my husband advise and try to calm me down"* (Patient 1, Female, 48)

"My daughter always helps me if I have a problem about my health" (Patient 4, Female, 52)

"When I feel bored and stress, she advised me and asked me to go somewhere to reduce my stress"(Patient 5, Female, 63).

"I always help and support my mom. I also always remind my mother to discuss something with me if she finds a problem such as those related to finance, treatment or emotional problems" (Family 4, Daughter, 38).

"I often helped and reminded my husband to control the diet because he has a problem to control the diet when far away from home" (Family 7, Daughter, 30).

Eleven participants reported having difficulties in maintaining their behaviours, especially when faced with the problem. Three patients mentioned that they lack optimal support and solve the problem by their self because their spouse did not understand about diabetes management. Family members also mentioned that they always conflict with patients while implementing the DMSM practice. Patients were angry when family member forbid them to avoid the food, reduce some unhealthy food, and to recognize the portion size.

"If I am feeling stressed and be difficult to sleep at night, my husband tried to support me but difficult to do " (Patient 2, Female, 41).

"My husband did not understand diabetes-related, so all of my decisions related to diabetes management were dependent on me" (P3, Female, 55)

"Sometimes we have conflict when she forbid me to avoid some foods such as meatball and soft drink" (Patient 8, Male, 55).

I fell stressed especially when my blood glucose increase. My family and I did not understand how to solve that problem (P6, Female, 52)

When I complain about my conditions, my wife does not know, what should she do so that she does nothing (Patient 7, Male, 53)

Sometimes my wife complained when she felt tired and dizzy, but I was confused about how to help him" (Family 1, Husband, 55)

"I have difficulty to help my wife when she felt stress because of increasing blood glucose. Sometimes she cannot sleep at night (Family 2, Husband, 43).

"I don't understand how to take care of diabetic patients, sometimes I just advise my wife, but everything decisions related to diabetes management were dependent on me" (Family 3, Husband, 63).

"Sometimes my mom is angry when I remind her to control her diet, so I allow her to eat some food with small portions but I still support her" (Family 5, Daughter, 43).

"I sometimes advise and help them to control the diet of my husband, but he always conflicts with me when I forbid him to reduce some foods. I did nothing when my husband angry to me" (Family 8, Wife, 50).

I fell stressed especially when my blood glucose increase. My family and I did not understand how to solve that problem (Family 6, Female, 52)

Based on the thematic analysis, we conclude the findings into positive function and negative function based on the McMaster Family Functioning Model. It was described in the table 2

McMaster Family Functioning Model	**Sub-themes categories**	
	Positive function	**Negative Function**
Affective responsiveness and family roles on Behavior control	- Positive encouragement and emotional support - Acknowledge responsibility for shared management - Console, remind and acknowledge responsibility for shared management	- Being silent, ignoring, and encouragement of patients - Spouse prepare unhealthy food and express irritation or doubt food choice
Affective involvement	- Be partners and work together in goal setting, action plan, and problem solving - Accompanying for medical appointment and medical check-ups	- Prefer to remain uninvolved in diabetes management
Communication	- Talking nicely and taking time to listen every compliance	- Partner refusing to share burden with spouse
Problem solving	- Partners recognize the needs of helping in crisis situation	- Focusing solely on problems

DISCUSSION

Through the results of this study, we can determine how family members have an essential role in DMSM practice and how they engage in behaviours changed, increase the communication skill, goal setting, and problem-solving, and influence the patients' effort. Affective responsiveness included the provision of emotional support empathy and support in diabetes-related distress. The appropriate emotional responses were required to find a full range of affective experiences. This affective responsiveness could facilitate the various aspects of task accomplishment and successfully role integration. Family roles in DMSM practice, which were applied in the provision of instrumental support, preparing healthy food and recognizing the portion size. Monitoring blood glucose, learning how to check, record and understand blood glucose level was also a crucial point for family roles in DMSM practice. A better understanding of family functioning could clarify the ways to help both patients and their family members for maintaining the DMSM practice and essential for effective program development.

Our findings provided valuable evidence regardless of the useful family functioning to support behaviours changed for T2DM self-management. Previous studies had been conducted in various aspects to describe family supportive and non-supportive actions for maintaining behaviours (14,18,19,20). We noted instances in which the help offered by family members as caretaker was not well taken by those with uncontrolled T2DM, especially regarding dietary restrictions, blood glucose monitoring and identify the risk of diabetes complications. Similar to another previous study reported that family members could be a supported system and obstructive in DMSM practice (21).

Family members who obstructive or harmful behaviours were associated with having the less adherence-related motivation (22), lack adherent to diet (23,24), medication taking (25) and unstable HbA1c level (23). Therefore, understanding of functioning family to support patients in DMSM practice was required for uncontrolled T2DM. Our study results also contribute to understanding the complexity of family function, an obstacle in DMSM practice as something that cannot be only seen as positive or negative, but rather that has to be understood in context and through the lens of the patient.

The potentially important aspect for leveraging family function to improve the DMSM practice by helping family members understand their roles in DMSM support including diet control, supporting in physical activity, medication taking, blood glucose monitoring, and prevention of diabetes risk complications as well as emotional support when facing the stress related to the diabetes prognosis. The crucial point of this study, family members, should clear which type of behaviours control need to helpful or not helpful in the management and understand the situation and context in DMSM practice. Public Health strategies promoting healthy need to consider for reducing T2DM incidence, alleviate healthcare burdens, and improve life quality for those at risk or living with diabetes (26).

The integration of family support into diabetes education program becomes a crucial aspect and needs to consider such as educating patients and their family members on how to manage diabetes, allowing patients to discuss the feeling and accompanying behavior change, facilitating self-esteem and assist patients and family members to overcome barriers, and developing supportive relationship among family members to maintain diabetes management over time. The systematically family counselling in diabetes management also need to be consider as the integration of family support into diabetes education program for effectively intervention.

CONCLUSION

Patients with uncontrolled T2DM received the support to manage and maintain the behaviours mainly from spouses and children. The forms of assistance varied including problem-solving, facilitate communication with health care providers, family role in DMSM practice, affective responsiveness, affective involvement, and behaviour control. A concept of family function provides appropriate roles and responsibilities of family members in the DMSM context. Therefore, this qualitative research provided a better understanding about the context of patients with uncontrolled T2DM before launching and developing the effective and sensitive intervention that promotes the growth of individual family members and family members unit as a whole.

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COMPLIANCE WITH ETHICAL STANDARD

The Ethical Review Committee has approved this study for Human Research Faculty of Public Health, Mahidol University, number: MUPH 2018-173. However, we declare no conflict of interest in this manuscript. The funding sponsors also had no role in writing the paper or the decision to publish this manuscript.

AUTHOR CONTRIBUTION STATEMENT

All the authors have contribution in this study: RAP and KC: Design the study. RAP, AMU, WS, and AR conducted the data collection. The wiriting and editing the manuscript was employed by RAP and KC.

CONFLICT OF INTEREST

We declared no conflict of interest in this manuscript. The funding sponsors also served no role in writing the manuscript or decision to conduct this manuscript

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