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REVIEW ARTICLES

A Social-Ecological Approach to Determine Barriers of DMSM Practice For Patients with Type 2 Diabetes Mellitus: A literature review

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Abstract

Diabetes mellitus is one of the global problems the world. Since the complexity of the patient's tasks is required in the diabetes care, the consistency to engage this various health behavior for addressing the glycemic control target is difficult to achieve. Failure management may reflect by patient, family, inadequate intervention strategies by health care provider as well as organization factor. Three databases used such as PubMed, MIDLINE, and CINAHL to address patient's barriers, family's barriers, and provider's barriers as well as organization barriers for diabetes management. Patient's attitudes and belief, knowledge, culture, and ethnicity, self-efficacy, financial resources and economic status, lack of Social Support Perceived, and lack of time may influence the diabetes self-management. Family factors lead to patients' diabetes self-management such as lack of knowledge and skill to support patients in diabetes management and quality of the relationship between patients-family. Health care providers factors included beliefs, attitudes, knowledge and skill and patient-family-provider interaction and communication. Other factors lead to diabetes self-management and health care provider performance to provide the intervention from organization level such as integrated health system sufficiency health insurance to support resources. A deeper understanding of the barriers in diabetes management is necessary to improve the diabetes care and quality of health care services for patients with diabetes. Further research needs to consider these barriers before designing the effective, sensitive interventions and problem solving for diabetes care.

Keyword: type 2 diabetes, barriers to diabetes management, self-management

1. Introduction

Diabetes mellitus is one of the global problems the world. The American Diabetes Association (ADA) (2014) represented approximately 422 million people are living with diabetes mellitus(1). Of this total diabetes patients, 85.7% fail to meet target goals of glycemic control as measured by Hemoglobin A1c (HbA1c) level (2).

Diabetes develops 5 to 10 years earlier and is associated with serious complications and death in this population (3). Several complications are linked with the principle causes of premature heart attack and death, including constriction of blood

vessels, nephropathy and retinopathy, peripheral neuropathy, and problems of the cardiovascular system (4).

Managing of diabetes such as pharmacological and non-pharmacological strategies is potentially foundation to reduce the incidence of death related diabetes complication. These strategies are integrated with diabetes guidelines and patient's commitment to adhere to a diabetic diet, exercise and medical therapy, supporting and monitoring from family and health care provider (5).

Management of diabetes included healthy diet, regularly physical activity, adherence in medication taking were proved to reduce the 53–63% complications and a 46% reduction in mortality (6). However, diabetes management has remained as a poor glycemic control because only 14.3% of the total diabetes patients could meet the target goals for good glycemic control (2).

The complexity of the patient's tasks is required to manage and control the glycemic level. They have to attend medical appointments regularly, adhere to medication regimens and engage in diabetes self-management behaviors including keeping the healthy diet, self-monitoring blood glucose (SMBG), increased physical activity, managing the stress and monitoring the diabetes complication (2, 7). However, it is often difficult for patients to achieve and consistently engage in this various health behaviors for meeting the glycemic control target. One reason is that management in diabetes is complex and becomes barriers for patients, family members and as well as the healthcare provider.

A better understanding of the barriers in diabetes management from patients, families and healthcare provider could clarify the ways to help the patients for designing the effective, sensitive interventions and problem-solving for diabetes care.

2. Objective

The study aimed to describe barriers of DMSM practice based on the social-ecological approach for patients with T2DM

3. Methods

This review used the PRISMA statement to describe the barriers of managing DM from patients, families, health care providers, and organization level.

3.1 Eligibility Criteria

We included the various studies including qualitative studies that used either interview or focus group discussion as well as the mixed method to describe the barriers of diabetes management from patients, families, providers, and organization level. Quantitative studies including quasi-experiment and randomized control trial study also were investigated in this review.

3.2 Search strategy

We conducted the search strategy to find the relevant articles related to barriers of patients, families, and providers in T2DM management. The search strategies, including “patient's barriers” “families' barriers,” “Provider's barriers,” and “diabetes management,” “type 2 diabetes,” “self-management.” Available title and abstract of articles were reviewed by systematically searching to obtain the relevant articles.

3.3 Study selection

Three databases including PubMed, MIDLINE, and CINAHL were included in this study. We investigated the relevant articles published in English versions.

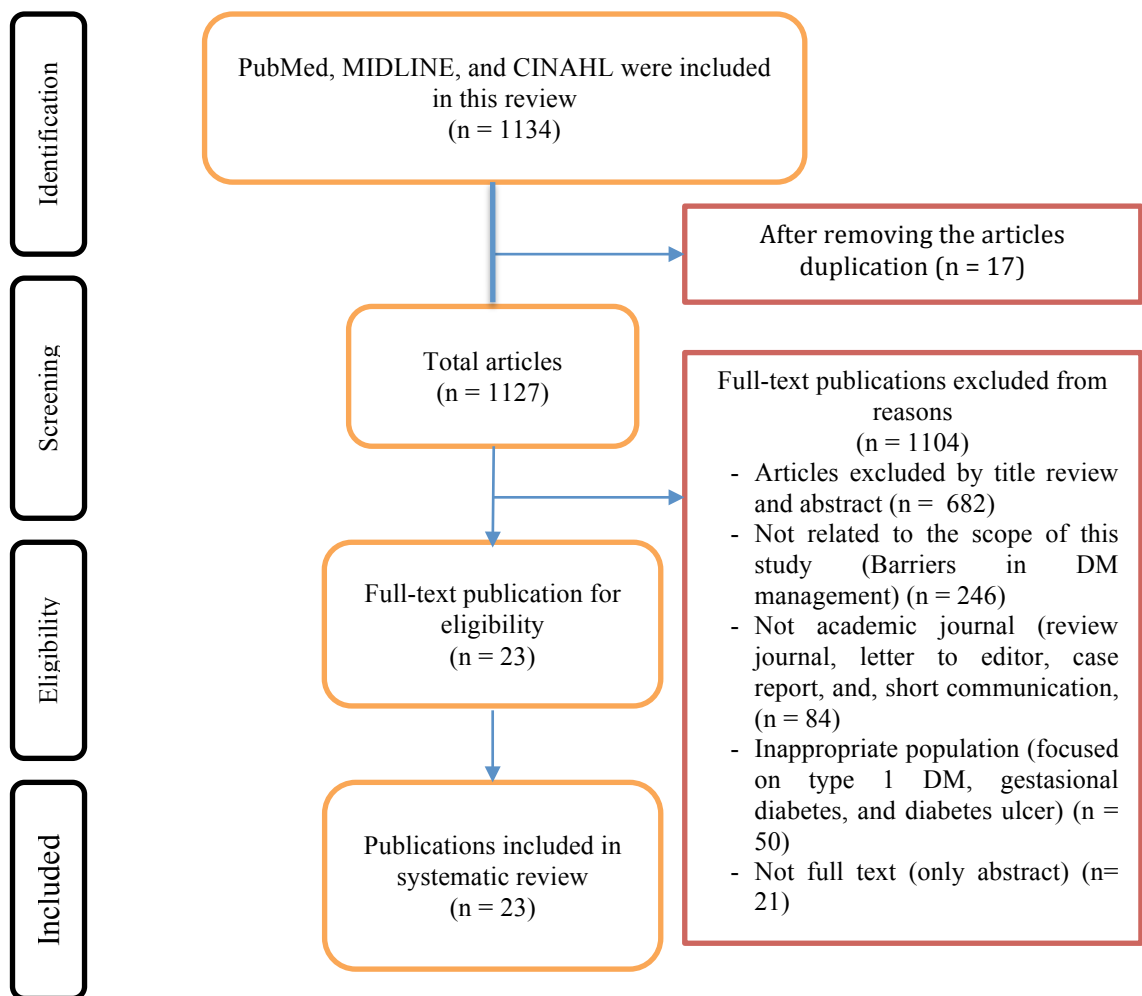
After removing the articles duplication, the proper articles of relevant abstracts were also retrieved.

3.4 Data Extraction

Initially, a single reviewer reviewed articles for eligibility based on the title and abstract. Two reviewers extracted the specific study characteristics including the method, country of origin, study-design, sample size, and detail of the barriers in-patient, family, provider, and organization (see table 1).

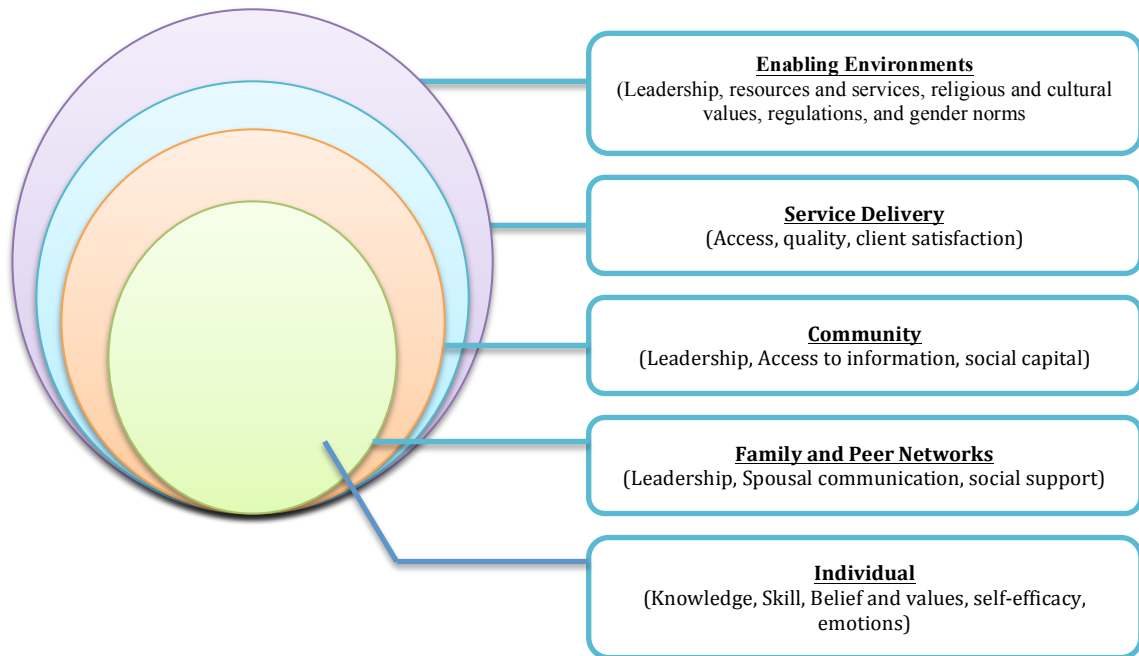
3.5 Synthesis of Results

The findings of this review described and explained about the Barriers of the patients, families, providers, and organization factors narratively in diabetes management.



4. Social-Ecological Approach

This study used the social ecological model to describe the understand determinant factors related to the DMSM practice



5. Results

5.1 Description of the studies

Figure 1 described the process of the study selection. Three electronic databases provided 743 references. Seventen studies were removed based on the studies duplication and about 726 were screened based on the titles and abstracts. Twenty three full-text studies for eligibility were included in our review (see Figure 1).

5.2 Study characteristics

Table 1 reported the characteristics of all eligible studies. Twenty-three studies described the barriers to diabetes management were included in this review. Fourteen studies were conducted in qualitative design (8-21), four cross-sectional studies (22-25), three studies also are taken with survey technique (26-28), and one prospective study (29) and one mix method study (30). The description of review articles has been summarized in table 1.

5.3 Setting for study conducted

Various studies described in the different region of research conducted in this review including, USA (9, 10, 14, 21, 28, 30), UK (8), Australia (15), Portugal (16), Finland (18), Netherland (19), Chicago (11), Boston (29), Arab Saudi (13), Oman (24), Kuwait (17), Iran (12, 23). Other studies conducted in Asia region such as China (20, 25), and India (22). One study project was conducted in some countries at the same time (27).

Various undertaking research showed a different culture and personal characteristics of the population that were associated with perceived barriers in diabetes management. Previous studies reported that there was association for

culture and personal characteristics with perceived barriers in diabetes management (8, 25)

5.4 Barriers and Challenges toward Diabetes Management based on the social-ecological approach

According to the social-ecological approach, review barriers of DMSM practice would be categorized into individual factors, family and peer network factors, community factors, and services delivery factors. Detailed of factors are described as follows:

5.4.1 Individual Factors

Attitudes and belief

Attitudes become the important factor to successfully adhere the diabetes treatment. Patients who hold the positive attitude and belief could influence the decision on their diabetes management. A prospective study was conducted at Boston described that most of the diabetes patients expressed the negative attitude to diabetes treatment, less flexibility and feeling failure in managing diabetes. This condition was associated with non-adherence on medication taking and fear of insulin injection (29).

Similarly, findings were showed in the study conducted by Peyrot et al (27). Negative attitude and belief were associated with the intention to take medications regularly. Most of the respondents have difficulties to take insulin at the prescribed time or with meals every day, follow the healthcare professional instruction, change the timing of insulin to meet daily needs.

Knowledge

Lack of knowledge is the issue across aspects of diabetes and was considered as the barrier in the management of diabetes. Language barriers also are preference factors of lacking the health information.

Along with lack of knowledge, there was misconception within diabetes management. The barriers are commonly found including misconceptions of insulin risk (26), understanding of target blood glucose and blood pressure (9), Barriers myths, doubts and knowledge gaps regarding specific types of foods (16), misunderstanding on what foods are appropriate for consuming and how to prepare the healthy food (30).

Tiedt et al, conducted a qualitative study with 10 T2DM patients showed the communication barriers and inappropriate culturally teaching methods influence the misconception of diabetes plan intervention, and distrust within patients and health care providers (14).

Another study examined whether knowing about the HbA1c test result is associated with controlling diabetes and better self-care self-efficacy, and behaviors related to glycemic control (31). The findings showed that patients with T2DM have a better understanding of diabetes self-management and how to control the blood glucose level. However, increasing knowledge on HbA1 and diabetes care did not sufficiently increase their self-efficacy that necessary for diabetes management. Thereby, knowledge is not always consistent with the disease outcomes but knowledge is intermittent to support the patients understanding.

Culture, and ethnicity

Cultural and ethnicity are considered as the factors preference to diabetes management. A deeper understanding of the local culture and personal belief are the key foundation to successful diabetes management.

A study was conducted with Kuwait ethnicity described the association for spiritual belief and God-center locus of control with adherence to medications or other diabetes self-care behaviors(17). The respondents believe that God is a center of curing the diseases. This influence the attitude and God-centered locus of control, which might influence adherence to medications or self-care behaviors. This issue also was described in a review study of spirituality and diabetes self-management in African Americans ethnicity(32). The result showed that spirituality has been deeply embedded in the cultural tradition and is affected to daily life aspects including health and illness belief.

Islam et al. also introduced the unique cultural for diabetes prevention among Bangladeshi people which are called as “nivom”. The societies have a cultural commitment to engaging in positive healthy behaviors when the health care provider included their value of diabetes management process. They believe that traditional Bengali foods could influence the health, religious activity such 5 times prayer for Muslim tradition was considered as the physical activity performing. In addition, overconsumption of high-fat traditional food such as *biryani rice with meat* is common to serve them at social gatherings (30).

Therefore, deeper understanding the health issues related to culture and personal belief should be incorporated into diabetes management in order to be applicable across all subgroup ethnicities.

Self-efficacy

Self-efficacy is the concept to influence the capabilities of patients' confidence to perform their behaviors. The results of the previous studies reported that self-efficacy in diabetes management is inconsistent. A survey study involved 248 low-SES, Hispanic men, and women. The results showed that women that have less self-efficacy were consistently correlated with more barriers and low level of self-care adherence (28). Another study also showed the negative effect of low self-efficacy on subject failure initiates prescribed insulin and manage the self-management (26), and had no appropriate self-efficacy in receiving the healthy nutrition program (33).

However, many studies also showed that self-efficacy could influence the self-care behaviors. Bas and Donmez showed that there are positive relationship and direct effect between self-efficacy with behavior and restrained eating in relation to weight control (34).

Financial resources and economic status

Financial resources and economic status are significant barriers for low economic status. It might be related to cost of treatment and no health coverage. A qualitative study showed that economic status associated with adaptation processes on living with diabetes. This has a difficulty to provide the medical facilities and health services. Whereas, the high economic standard is easy to meet the therapeutic needs (12). Another study was conducted in France also reported that diabetes patients with low economic

level undertake the diagnose at the later stage with suffering more complication and report being less empowered (35). In addition, health insurance againsts diabetic patients with lower economic status also obtained quality of care and have poorer outcomes, and inequalities for other chronic health conditions(36-38).

Lack of Social Support Perceived

Lack of social support could affect the perceived barriers to self-care among patients with diabetes(39). Some studies showed that after receiving inappropriate support, patients feel criticized, and uncomfortable and even guilt(40). Another barrier to self-management also found when the family wants to eat a different foods with the patients (41).

A study was conducted in the Arab population showed that limited resources of support become a key challenge to availability and quality of culturally diabetes self-management resources that associated with lack of understanding of the diseases and the way how to perform the diabetes self-management. In addition, lack of support also contributed to the barriers for making health promotion choice and cause patients to withdraw from meaningful social activities (13).

Lack of Times

Physical activity, is one of the most of neglected aspect of the treatment. Lack of times was associated with barriers to perform the diabetes self-management behaviors. A study conducted to address the barriers included the time constraints as the issues in the diabetes care and self-care in general practice(42). The enjoyment to perform the exercise, social relationship, and efficacy on weight control was strongly contributed to increasing the exercise. However, lack of times has negatively affected patients that are trying to maintain the behaviors (43).

5.4.2 Family Factors

Lack of knowledge and skill to support patients

Diabetes self-management education (DSME) is the essential component of care for patients with diabetes mellitus(7). The family has larger roles in diseases management since this context in which the majority of disease management occurs. However, a family member can be potentially harmful. Lack of knowledge and skill of the family members are noted as barriers. Family members might sabotage patients' self-care efforts by planning unhealthy meals, tempting patients to eat unhealthy foods, or questioning the need for medications (16, 44, 45). A study was conducted in Iran reported that the major barriers of the family members are lack of knowledge on patient's condition. As facilitators, they could not help the patients for managing behavior and live in harmony(12). On the other hand, family members sometimes argue with patients in decision making (44)

Assessing the knowledge and skill to support in diabetes care is necessary endpoints for managing diabetes. Increasing knowledge about the diseases, strategy to alter family routines and optimal ways to solve the emotional issues have a positive effect to influence the patient health behavior(46) and reduce the interpersonal barriers (stress and relationship) (15). In addition, low support, negative reinforcements and discouraged to a

healthful diet or participate exercise also become the main barriers in this study(28).

Quality of relationship between patients-family

Successful diabetes management requires teamwork between patients, families, and healthcare providers. Effective interaction between patients, family members, and healthcare provider have a positive effect on patient satisfaction, adherence of medication, and health outcomes (47). This situation also impacted on continuing of care, a mutual understanding of roles and tasks (48), and self-confidence and trust between patients, family, and health care provider (49). In opposite, an absence of the relationship between patients, families, and healthcare providers have a negative effect on health outcomes and influence misconception on diabetes care (15). This empirical study suggested that the quality of relationship is more important than just the mere presence of individuals within a patient's network of support.

5.4.3 Health Care Provider Factors

Beliefs, attitudes, knowledge and skill

Healthcare provider has essential roles in diabetes management to provide adequate health literacy. A review described that clinicians' beliefs, attitudes, and knowledge could improve the patients' adherence to the diabetes management(50).

Karter et al. Studied about the failure to initiate prescribed insulin. The findings showed that inadequate health literacy and lack of understanding of risks/benefits of insulin treatment and limited insulin self-management training for health care provider.(26). This also supports by Jha's study explained that low knowledge and skill of health care provider impact to fear injection or fear of pain during injection(21)

A qualitative study of 25 Delaware physician also described the barriers to diabetes management in primary care. The main obstacles to the health care provider inability to provide proactive, population-based patient management and low ability to provide adequate self-management education. Therefore, this study suggested reforming the primary care by supporting the health care providers especially those in small practices, to overcome these barriers(10). Some studies described the barriers of health care provider related to the inappropriate teaching method to deliver the education and in availability and quality of culturally appropriate DSM (13, 14).

Patient-family-provider interaction and communication

Regardless of the interaction between patient-family-provider, communication skill is needed to diabetes care. Health care provider is required to have a good communication skill and relationship with patients in order to be able providing the support in an appropriate way. Good communication between patients and provider could influence in diabetes care and improve the diabetes outcomes(51). Unfortunately, many patients confirmed that there are some barriers in collaborative diabetes management, which in turn affects adherence(52)

A study to explore the experience of facilitators and barriers adaptation to diabetes management found that the most common barriers include lack of language between physician and patient that impact to low understanding of

patient's condition and lack of direction for advising the management of the diseases. This situation also leads to continuing problems with living with the disease(53) Limited language and communication also was associated with a misconception of the way how to control and prevent of the diseases, navigate the health care system, and lack of trustworthy information on diabetes self-management (20, 30).

5.4.4 Organization Factors

Insufficiency health insurance

Health insurance has an important role in accessing the medical services for patients with type 2 DM especially drug which is not covered by insurance. A study was conducted at Netherland confirmed that the health care system could establish the multidiscipline collaboration professional groups between nurses practitioners and another healthcare provider in providing the health care services. However, bundled payment system and limit to insurers become the major barriers within this system that impact the implementation the program (19).

A study was conducted in China described the restriction of reimbursement regulation becomes a barriers to diabetes self-management. It could lead to quality of health care services among older community dwellers and lack of trustworthy information sources of patients(20).

Health System

Health system is an essential component for high-quality care among diabetes patients in which consisted of delivery system redesign, decision support, and clinical information. A study confirmed that the main barriers at health care system level including, lack remuneration for diabetes management, lack coordination between setting and deficiency access the services. This lack of remuneration could lead to stunt in practice development and low a sense of apathy among healthcare providers(54)

Other issues in the healthcare system level related to the integration between setting and professionals as a resource. This condition leads to a sense of ambiguity around the patients' care pathway and waiting times for the patients in the healthcare services(54). In addition, no provision of supportive health services with lack of access to health care services and few alternatives to patients (13), inadequate to access the services and inequalities of medication supply and service also were noted at the health care system level(17)

6. Discussion

Diabetes self-management becomes challenges to the patient and healthcare provider. Several factors contributed to diabetes self-management such as patients factors including attitudes and belief, knowledge, culture, and ethnicity, self-efficacy, financial resources and economic status, lack of Social Support Perceived, and lack of time may influence the diabetes self-management. Other factors may influence diabetes management including family knowledge and skill to support diabetes management and quality of the relationship between patients-family. Beliefs, attitudes, knowledge, and skill of provider and the way provider to interact and communicate also was associated with diabetes management as well as integrated health system with sufficiency health insurance.

Greater understanding the patient's factors are important to design the sensitive intervention for diabetes patients. Intervention in knowledge alone is not necessary because other barriers still exist. The patient's belief and attitude, self-confidence in diabetes self-management as well as financial resources and economic status need to consider before designing the program. The previous review confirmed that the personal factor was associated with improving the quality of diabetes care and health outcomes (7, 52)

Cultural is a critical factor may influence the diabetes self-management. This review suggested the bilingual language that matches with patient's language and culturally appropriate diabetes self-management to solve the cultural and language barrier during interaction with local society. In addition, spirituality-focused diseases management should be considered in providing diabetes care to the specific population such as Arab and Iran ethnic. Role of family among Asian ethnic need to explore for more understanding the family culture in order to design the culturally appropriate intervention for diabetes patients. Different culture can describe the barriers to diabetes management. Therefore, further research is needed to know the role of culture and its significant effect on a diabetes care.

The failure to care adequately for diabetic patients may be led to family factors. This review emphasized the importance of family as a support source to perform diabetes management behaviors. Prior research has described that even the educational has been offered, behavioral change may not be sustained without support from family. Thereby, behavioral change will not only occur when education has been provided but we need a central concept interconnecting with patient-family and health care provider. An adequate knowledge and skill as well, as good quality of the relationship between patients-family, is needed to assist patients to decision making, problem-solving when facing the problem, and prevent conflict and misconception within the family during implementing the program.

The review findings also illustrated the dynamic interplay of patient, provider and systemic factor in a diabetes management. Providers beliefs, attitudes, knowledge, and skill on diabetes management may influence the quality of healthcare services the primary care. Another issue related to access to health care services, lack of resources, inequalities of medication supply and service, and insufficiency of insurance. This funding issue impact on both patient and provider in the form of adequate coverage and remuneration. Thereby, the universal health care coverage, as well as support prevention strategies in general practice which includes comprehensive care, is required for patients with type 2 DM. Therefore, a model of diabetes management needs to include patients and key players in the healthcare system.

Strength and Limitations

In this study, we review many studies to explore the barriers of the diabetes patients to perform diabetes self-management. The findings provide the valuable information to improve the diabetes intervention in type 2 diabetes. However, some limitations were encountered including the findings were described in narrative form rather than a meta-analysis because the variability of study design did not allow to pool the data for describing the effect size of each study. Some studies related to barriers to diabetes management might be unidentified even though the researchers created this review by hand-tracking

Conclusion

This study highlights the complex challenges to managing patients with diabetes. Several barriers are noted from patient, family, provider as well as organization level. Further research need to consider these barriers before developing the interventions in individual with type 2 diabetes mellitus.

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Table. 1. Barriers to Diabetes Self-Management

Authors	Methods	Setting	Sample size	Barriers to Diabetes Management		
				Patient	Families	Provider/ Organization
Larkin et al. (2008)(29)	Prospective study	Boston	100	<ul style="list-style-type: none"> - Negative attitude of hypoglycemia, permanent need for insulin therapy, less flexibility, and feeling of failure in diabetes management - Fear of injection 	-	-
Karter et al. (2010)(26)	Survey study		169	<ul style="list-style-type: none"> - Misconceptions regarding insulin risk - Sense of personal failure on management, low self-efficacy and phobia in injection, and hypoglycemia concerns - Negative attitude that impact form social life and job 	-	<ul style="list-style-type: none"> - Inadequate of health care provider for explaining risks/benefits of the intervention - Limited insulin self-management training for health care proider
Jha et al. (2015)(22)	Cross-sectional study	India	198	<ul style="list-style-type: none"> - Fear of injection or fear of pain during injection, and fear of hypoglycemia during intervention - Social stigma on serious diseases and lack of education 	-	<ul style="list-style-type: none"> - Insufficiently literate for patients about diabetes management - Low skill of healthcare staff about diabetes management
Singh et al. (2012)(8)	Qualitative study	UK	20	<ul style="list-style-type: none"> - Understanding of diet management and social stigma related to diabetes 	<ul style="list-style-type: none"> - Cultural family pressure on diases management - Low family support on diabetes management 	-
Onwudiwe et al. (2011)(9)	Qualitative study	US	31	<ul style="list-style-type: none"> - Lack of knowledge of target blood glucose and blood pressure - Attitudes, perceptions and behaviors surrounding diabetes and self-management 	-	<ul style="list-style-type: none"> - The limited health literacy from health care provider
Peyrot et al. (2012) (27)	Survey	Multi country	1250 physicians 1530 patients	<ul style="list-style-type: none"> - Negative perceptions about insulin treatment - Negative attitudes of insulin treatment and inadequate control hypoglycemia 	-	<ul style="list-style-type: none"> - Difficulty to manage efficacy and safety and Physician beliefs about insulin treatmen

Table. 1. Continue

Authors	Methods	Setting	Sample size	Barriers to Diabetes Management		
				Patient	Families	Provider/ Organization
Elliott (2011)(10)	Qualitative study	US	25 physicians	- Persistent orientation toward acute care	- Lack of public health support such as family and environment	- Inability to provide proactive, population-based patient management - Inability to provide adequate self-management education - Poor integration of payer-driven disease management activities - Lack of universally available clinical information
Mansyur (2015) (28)	Survey study	US	248	- Lower self-efficacy (SE) and self-care adherence (SCA) - Dietary norms, and diet discouraged	- Family discouraged to a healthful diet or participate exercise - Lack of family support perceived - Negative reinforcements of diabetes management	-
Halali (2016) (23)	Cross-sectional study	Iran	146	- Situational barriers/difficulty resisting temptation - Stress-related eating disorder/cost - Has difficulty with meal and snack plans	- Lack of palatability/family support in dietary management	-
Yee et al. (2015)(11)	Qualitative study	Chicago	10	- Feeling overwhelmed on diet by the unfamiliar sing and decod- ing nutrition labels - Managing nutrition choices and seeking control in the setting of food insecurity - Experiencing lack of control and motivation and limited self-efficacy - Balancing recommendations with taste preferences and cultural food norms - Difficult to maintain a healthy eating schedule	- Accommodating diabetes in family and social life	-

Table. 1. Continue

Authors	Methods	Setting	Sample size	Barriers to Diabetes Management		
				Patient	Families	Provider/ Organization
Moonaghi et al. (2014) (12)	Qualitative study	Iran	15	<ul style="list-style-type: none"> - Beliefs about illness - Personal background (Economic status, Type of treatment) 	<ul style="list-style-type: none"> - Previous experience of illness in the family - Understanding of family members on patient's condition - Low family support system 	<ul style="list-style-type: none"> - Leisure facilities and Insufficiency health insurance - The lack of communication between doctor and patient - Lack of understanding of the patient's condition by the doctor - Lack of clear direction for advice about some of the privacy problems
Fritz et al. (2016) (13)	Qualitative study	Arab	8 providers 23 patients	<ul style="list-style-type: none"> - Cultural stigma and personal belief of the patients about treatment - Lack of support perceived - Patient-provider communication and clinical relationships - Inavailability and quality of culturally appropriate DSM 	<ul style="list-style-type: none"> - Low family support on diabetes management - Family stress on daily diabetes management 	<ul style="list-style-type: none"> - Lack of linguistically and culturally appropriate DSM educational materials - No provision of supportive health services - Lacked access to such resources and had few alternatives
Tiedt. Et al. (2015) (14)	Qualitative study	US	10 patients	<ul style="list-style-type: none"> - Communication barriers (miscommunication on diabetes plan intervention, distrust misunderstanding, and educational methods) 	-	<ul style="list-style-type: none"> - Teaching/Learning Methods were not culturally acceptable - Low quality of care and access issues
Jones et al. (2014) (15)	Qualitative study	Australia	18 participants	<ul style="list-style-type: none"> - Denial of the illness and lack of motivation - Lack of knowledge and skills on diabetes management - Lack of time to manage the behavior 	<ul style="list-style-type: none"> - Stress from family situations, financial stress and work-related stress - Absence of relationship between patients, families and health care providers - Lack of support for single parents, lack of financial resources and unemployment 	<ul style="list-style-type: none"> - Access to recommended foods - Lack of transport and exercise options for diabetes management - Limited number of health professionals
Alghafri et al. (2017) (24)	Cross-sectional study	Oman	305	<ul style="list-style-type: none"> - Lack of willpower - Fear from injury - Religious barriers 	<ul style="list-style-type: none"> - Lack of social support - Environmental barriers 	<ul style="list-style-type: none"> - Lack of resources - Lack of knowledge and skill

Table. 1. Continue

Authors	Methods	Setting	Sample size	Barriers to Diabetes Management		
				Patient	Families	Provider/ Organization
Laranjo et al. (2015) (16)	Qualitative study	Portugal	26	<ul style="list-style-type: none"> - Lack of motivation, self-control and willpower as a huge barrier to implement behaviour changes - Cravings for particular types of foods - Cost of healthy foods and having to learn how to cook healthy recipes also becomes the barriers to improve the quality of the diet - Barriers myths, doubts and knowledge gaps regarding specific types of foods - Lack of motivation and willpower, and not having created the habit of exercising 	<ul style="list-style-type: none"> - Lack of family or friend support in certain aspects of self-management - Resembling sabotage of patient's efforts - Lack of knowledge and skill of the family 	<ul style="list-style-type: none"> - Lack of knowledge and skill on health care provider
Jeragh-Alhaddad et al. (2015) (17)	Qualitative study	Kuwait	20	<ul style="list-style-type: none"> - Lack of education/awareness about diabetes/ medications - Beliefs about medicines/diabetes - Spirituality and God-centered locus of control and attitudes toward diabetes - Perceptions of self-expertise with the disease and body awareness 	<ul style="list-style-type: none"> - Social stigma on diabetes diseases - Perceptions of social support 	<ul style="list-style-type: none"> - Perceptions of health care providers' attitudes toward patients - Health system-related factors, such as access difficulties and inequalities of medication supply and services
Cheng et al. (2016)(25)	Cross-sectional study	China	246	<ul style="list-style-type: none"> - Feeling of deprivation, eating away from home - Lower levels of diet knowledge - Lack of empowerment and negative appraisal 	-	-
Islam et al. (2012) (30)	Mix methods	USA	216	<ul style="list-style-type: none"> - Lack of motivation to engage in healthful behaviors - Lack of knowledge on diabetes care - The preparation and overconsumption of high-fat, traditionally “party foods” - Lacked time to cook healthy foods - Occupational barriers (e.g., low-wage, sedentary jobs) to diabetes control and management 	<ul style="list-style-type: none"> - Family members could be overzealous about enforcing dietary restrictions - Family led a conflict of diabetes management 	<ul style="list-style-type: none"> - Lack of accessing health care providers, including language and communication

Table. 1. Continue

Authors	Methods	Setting	Sample size	Barriers to Diabetes Management		
				Patient	Families	Provider/ Organization
Korkiakangas et al. (2011)(18)	Qualitative study	Finland	74	<ul style="list-style-type: none"> - Lack of time to perform self-management behaviors - Work-related factors and lack of interest - Weather/season 	-	-
Lieke GM Raaijmakers et al. (2013)(19)	Qualitative study	Netherland		<ul style="list-style-type: none"> - Lack of motivation and unaware of lifestyle programs and prevention initiatives 	-	<ul style="list-style-type: none"> - The bundled payment system for the funding of diabetes care - Lack expertise of health care provider in diabetes care - Lack of affinity in diabetes care
Shen et al. (2013)(20)	Qualitative study	China	2 patients 2 HP	<ul style="list-style-type: none"> - Overdependence on but dislike of western medicine 	<ul style="list-style-type: none"> - Family role expectations - Cuisine culture 	<ul style="list-style-type: none"> - Lack of trustworthy information sources - Deficits in communication between clients and health and health professional - Restriction of reimbursement regulations
Hu et al. (2013)(21)	Qualitative study	US	36 patients 37 family	<ul style="list-style-type: none"> - Suffering from diabetes (physical and emotional conditions) - Lack of knowledge and skill on diabetes care 	<ul style="list-style-type: none"> - Lack of knowledge and skill on diabetes care - Lack of family support 	<ul style="list-style-type: none"> - Lack of resources/support - Inappropriate intervention with local culture
McHugh et al. (2013) (54)	Qualitative study	Ireland	29 (GPs) 2 Nurses	-	-	<ul style="list-style-type: none"> - Lack of targeted remuneration for diabetes management that effect on quality of care - Lack of integration between settings and professionals - Support services: not enough of health care provider and too hard to access - Time, resources and workload emerged as barriers to providing optimal diabetes care in general practice.

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