FACTORS INFLUENCING HEALTH BEHAVIOR AMONG TYPE 2 DIABETES MELLITUS PATIENTS: AN INTEGRATIVE REVIEW

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ABSTRACT

Objective: This integrative review aims to summarize and identify the current literature related to health behavior among Type 2 Diabetes Mellitus (T2DM) Patients and its factors.

Methods: An integrative review was undertaken using literature published between 2000 and 2013, based on CINAHL, Springer link, PubMed, Science Direct and Google Scholar.

Results: Twenty-two articles were selected based on inclusion and exclusion criteria. This review indicated a wide range of factors influencing health behavior among T2DM patients including predisposing factors (socioeconomic, knowledge, stress management, and health belief), reinforcing factor (family support), and enabling factor (health service).

Conclusion: Family support, socioeconomic and knowledge are the significant major factors of health behavior among T2DM patients. However, the others factors such as stress management, health belief and health service are also the important factors for T2DM patient's health behaviors. Therefore, these factors should be considered for development of appropriate interventions to promote health behavior among T2DM patients at community.

Key words: health behavior, type 2 diabetes mellitus, literature review

INTRODUCTION

Health behaviors are defined as an individual response related to health that can be observed in certain situations on a given target.[1] According to Green and Kreuter, health behaviors can be influenced by two factors, among other individual and environmental factors.[2]

They also state that these two factors are interrelated with each other. For patients with chronic diseases, health behaviors can affect their quality of life.[3] In other words, if someone is suffering from a chronic disease and they do not have good health behaviors, then it can degrade their quality of life. For example, for those with T2DM,

one of the chronic diseases, health behaviors are very important in order to maintain the quality of life of sufferers. There are many factors that can influence health behaviors among T2DM patients, including individual factors (belief, knowledge, socioeconomic, lifestyle, intelligence, perception, values, attitudes, emotion, etc.), and environmental factors (culture, social support, policies, laws, programs, availability and accessibility of resources, etc.).

METHODS

Research design
This paper used an integrative review to explore the factors influencing health behavior among T2DM patients. The authors use a guideline created by Whittemore and Knafl to identify literature relating to phenomenon analysis and health problems.[4] It allows the inclusion of both experimental and non-experimental research. Studies indicate that a well-done integrative review can present a state of science and potential to play a significant role in evidence-based practice to nursing science and practice, and to contribute towards theory development.[4] The integrative review has been identified as a robust tool for synthesizing available literature on a given topic. This approach combines data from theoretical and empirical literature, and allows for a full understanding of the topic under investigation.[5]

Data extraction/Sample
To explore the factors that influence health behaviors among T2DM patients, the authors collected data from the published literature through electronic databases. The information derived from the literature includes opinions, theoretical, research-qualitative and quantitative research, in addition to integrative and systematic reviews. For identifying and selecting

from a variety of literature that is used as a review, the author broaden the search to include factors related to health behaviors among Patients with diabetes mellitus type 2, which included the aspects of the patient, family and other factors originating from the service system.

Inclusion and exclusion criteria
In the literature review, the authors included some inclusion criteria and exclusion criteria in the search of electronic databases. The inclusion criteria included, among others, (1) published in English, (2) published between 1980 and 2015; and (3) focused on factors and health behaviors among T2DM patients. Exclusion criteria included in the search databases were studies that did not focus on the factors that influenced the behavior health among T2DM patients, which is unclear or the research design was of poor quality and arguments in the literature was not well reasoned or was unclear.

Search strategies
The following electronic databases were searched for relevant research articles: Springer-link, CINAHL, PubMed, Science-Direct, and Google Scholar. The literature search was carried out by using keywords "health behavior", "health behavior factors" and "T2DM patients".

The author uses four-steps in the process of selecting literature originating from electronic databases before obtaining the articles as the final sample of this literature review. First step, authors generally did a search and found 351.487 article. Then from these articles did a screening to find articles that were really relevant and could be used as material for the literature review. From the screening results obtained 2.249 articles were considered relevant for use. The third stage, based on titles and abstracts that had been considered relevant were re-screened

by including inclusion and exclusion criteria as well as avoiding duplication of the same title. One hundred twenty-five articles were obtained from this screening. The final step, of 125 articles, the authors chose 22 articles that were considered attractive for use as a literature review (Figure 1).
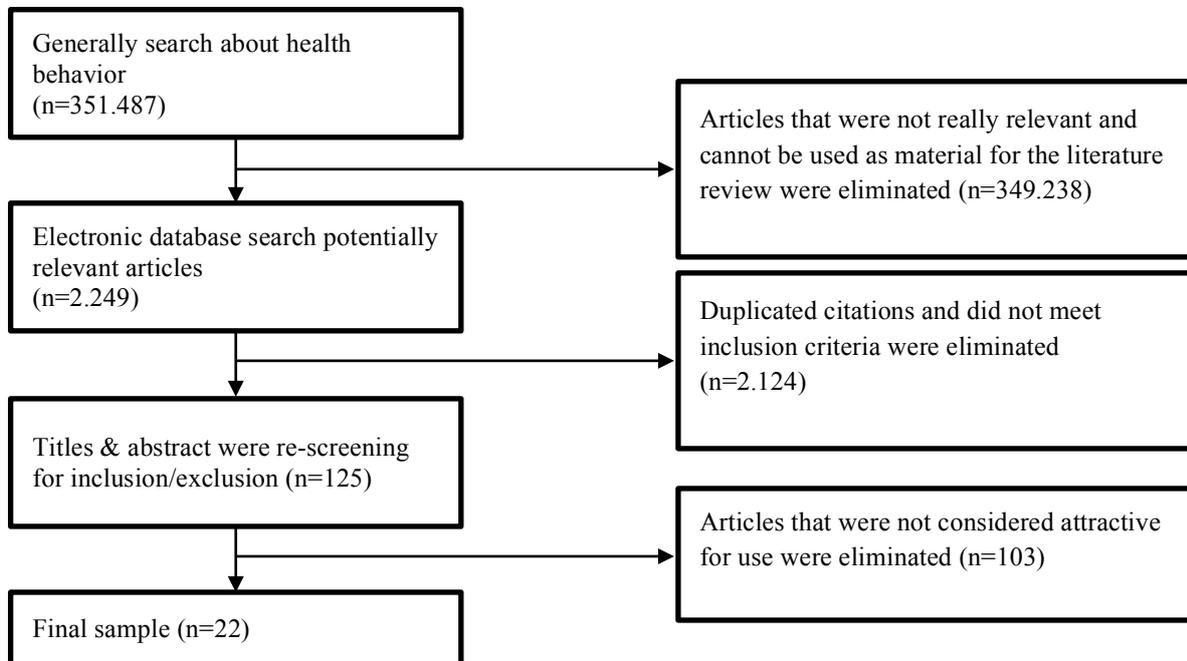
Figure 1. Flow diagram of the search and extraction process for the literature review.

Data analysis
Data analysis in research reviews requires that the data from primary sources are ordered, coded, categorized, and summarized into a unified and integrated conclusion about the research problem.[6] In this case, the authenticity, methodological quality, informational value, and representativeness of available primary sources is considered and discussed in the final report.[7] The data from this review was complex and difficult to analyze because it allowed the combination of diverse data sources for a full understanding of phenomenon of interest.[4] However, in order to reach the aim of this study which was to determine the state of art and knowledge gaps related to health behavior among T2DM patients, the author used framework developed by Green and Kreuter as guidance. The articles were read four times to determine the patterns, directions, similarities, and differences. Using a constant comparison method to group similar data that was compared which furthered the analysis and synthesis process to accomplish the aim of this review.

RESULTS
The results of this review consisted of the factors influencing health behavior among T2DM patients, including predisposing factors (socioeconomic, knowledge, stress management, and health belief), reinforcing factors (family support), and enabling factors (health service). Figure 2 shows a diagram that illustrates a diagram of the model adaptation that is used as the

identification of factors influencing health behaviors among T2DM patients.

Predisposing Factors
Socioeconomic

In the lower socioeconomic groups, poor economic conditions will result in a lower level of education and increase the risk factors (smoking, physical activity, and diet quality) that can lead to increased incidence of T2DM.[8] Someone who has greater income and higher subjective social status will be more confident and have a slight tendency to the existence of barriers to exercise behavior, exercise more regularly in the scheduling behavior of each month and have the intention to do so.[9] Murray's statement on the level of income will affect a person's intention to perform health behaviors reinforced by studies of Mark Conner et al. stated that the intention-health behavior relationship can be attenuated in the lower socio-economic status (SES) samples.[10] In low-income communities often found factors that cause diabetes mellitus associated with the cost of healthy foods, stress-related eating inappropriate, and the desire to eat unhealthy food.[11] With low-income level and living in the SES environments would affect one's perception of health, which causes health disparities.[12] The type of work and the ability to pay for treatment often causes a gap in the process of health care services that will affect a person's perception of care and result in health behaviors to get good care to maintain their health.[13]

Knowledge

Serrano-Gil and Jacob stated that to achieve the best health condition T2DM patients should have knowledge of their health so that they are involved in the control and management of their condition.[14] Education levels and limitations in the process of learning (cognitive factors) does not affect a persons ability to obtain knowledge of health so that they are still able to change their health behaviors.[15] Alavi et al. stated that the experience of T2DM patients in managing their health should still be balanced with the right knowledge so that they can take informed decisions on their health condition and know when to consult their doctor.[16] T2DM patients are expected to remain informed and more critical in assessing the information about their condition leading to motivate them to change behavior generated by learning.[17]

Stress management

Emotional distress is common in diabetes. Emotional stress can affect the mindset of DM patients to health behaviors associated with DM that can affect their quality of life.[18] The statement of Polonsky is reinforced by the statement of Lustman, Penckofer, and Clouse who stated that conditions of stress experienced by T2DM patients can affect insulin sensitivity resulting in a sustained reduction in HbA1c.[19] The T2DM patients often have to know about their illness, but they often fail in managing their treatment because they are not able to manage the stress in themselves so that they have difficulty in establishing health behavior patterns, especially on the issue of diet and exercise therapy.[20] The patients with chronic diseases, such as T2DM, which is able to regulate their emotions with a rational approach, they were able to solve the problem in a routine and stressful circumstances. Instead, they will have difficulty in solving problems, especially in terms of health behavior change, when they are not able to regulate their emotions and thinking rationally.[21]

Health belief

Health beliefs related to DM patient compliance and their motivation to

perform health behaviors. This is evidenced in the research conducted by Kathy A. Cerkoney Bloom and Laura K. Hart who state that as many as 25% of the research results indicate that the motivation of health beliefs in T2DM patients can affect the patient's adherence to the treatment regimen and health behavior.[22] Health beliefs in DM patients is predicted to affect the intention to maintain health at first, and it will then be able to affect the patient to perform a behavior in order to maintain her health to stay healthy.[23]
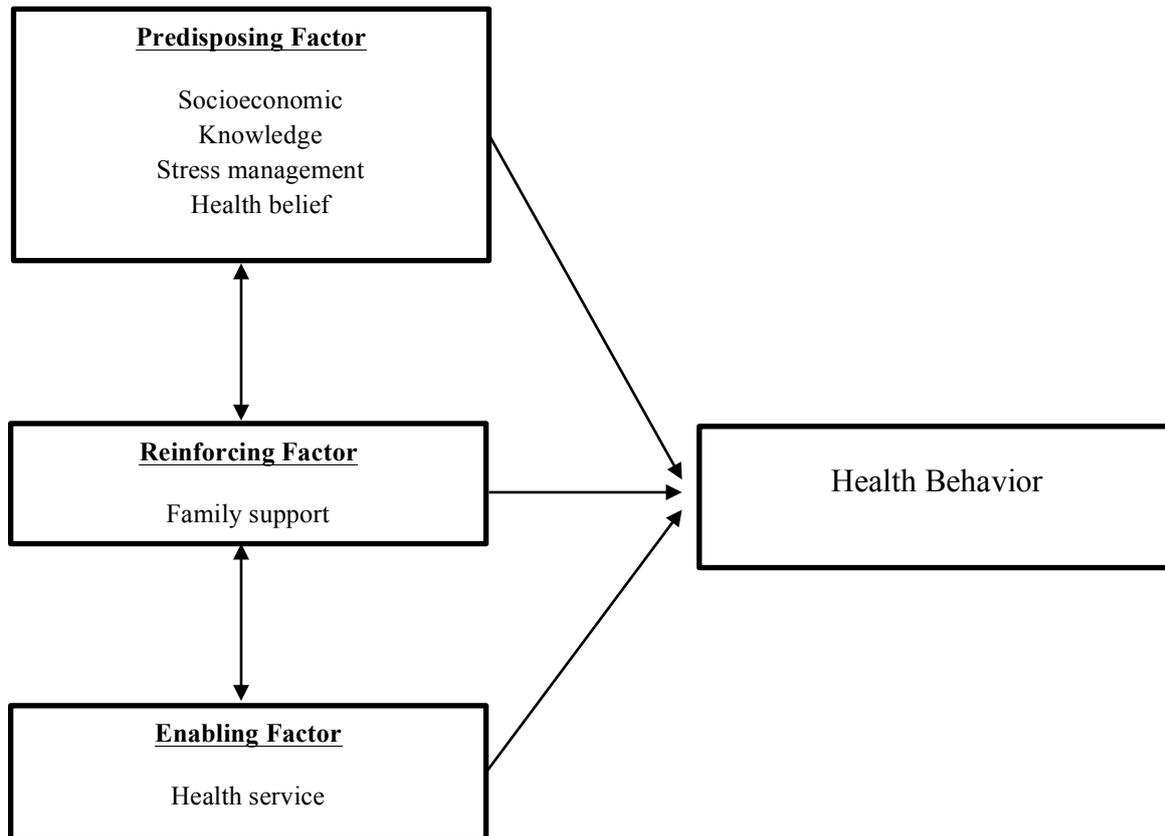
Figure 2. Factors influencing health behaviors among patients with diabetes mellitus type 2

Reinforcing Factor
Family support
Family support and good communication within the family creates a social environment that is feasible for the DM patients, especially in the treatment of medical professionals.[24] For example, in children with DM who have parents that have negative behavior will affect the metabolic control and the level of adherence to medication regimens.[25] Family support associated with treatment adherence, metabolic control, and quality of life. Pereira, Berg-Cross, Almeida, and Machado also stated that a family with good support will affect DM patients' compliance on medication management so that they can control their health status and improve their quality of life.[26]

Enabling Factor
Health service
The views of paramedics in providing health services to DM patients are influenced by the severity of the health problems faced and health management

process that has been followed by the patient.[27] The process of treatment of chronic diseases, such as diabetes mellitus, it is not enough just to provide medical treatment and drug therapy, but the need is for self-management. In the self-management, the need for the availability of the right information about the illness from health workers. Success in understanding the information by the patient depends on the communication processes and procedures in the provision of information by health workers. Communication carried out by health workers in the provision of information about the disease is more effective than the patient's participation in decision-making for the determination of self-management in the control condition of the DM patients.[28] Heisler et al. statement above, strengthens the statement of Lee, et al. stating that the procedure for granting the right information increases the DM patients empowerment in doing self-management and decision-making related to their health condition so that they are willing to modify lifestyle.[29]

DISCUSSION

This integrative review indicates major factors that influence health behavior of a socioeconomic, knowledge, stress management, health belief, family support, and health service. During its development, health behaviors are influenced by socio-economic, knowledge and family support. The lower socioeconomic level would result in lower levels of education so that it can increase risk factors (smoking, physical activity, and diet quality) which can lead to an increased incidence of diabetes mellitus type 2 and will affect one's intention to carry out health behaviors.[8-10] The low socioeconomic level also often results in gaps in the provision of health services, especially related to the ability to pay for treatment, which can lead to a person's perception of the health services become less good and they are reluctant to use health services in order to control the condition.[12,13] This will be compounded by the lack of support from family. Family support associated with treatment adherence, metabolic control, and quality of life. Higher family support affect the T2DM patients' compliance on medication management and controlling their health status that can improve their quality of life.[25,26] Two factors above should be a major concern for health workers in delivering health services.

This review also includes some studies of knowledge related to health behaviors in the DM patients. Knowledge is also one factor that plays an important role in improving a person's health behaviors. The level of education and the limitations of a person in the learning process will not affect the person's desire to acquire knowledge about their health so that they can change health behaviors in order to obtain the optimal quality of life.[14,15] The process of improving knowledge instead of just focusing on the T2DM patients (health behaviors and self-management) is also linked to the environment around them, especially for the family and the immediate environment for people with T2DM. With the increase of knowledge that focuses on the environment it is expected that their support system is good so that the T2DM patients can be in a controlled condition.[16]

There are many factors that can affect a person in improving health behaviors associated with the disease, especially chronic diseases such as diabetes mellitus. These factors include stress management, health belief and health service. The levels of distress in the T2DM patients are influenced by several factors, including age, HbA1C level, gender, employment, availability of

services nearby.[30] The level of stress affects a person in making the right decisions relating to the treatment process that is being run, thus the need for good stress management.[18,19,23]

T2DM Patients often have difficulty in establishing health behavior patterns because they do not have stress management and are coping less well.[20] As for the health beliefs, it is related to the compliance of patients with diabetes and their motivation to perform health behaviors. This is demonstrated in a study conducted by Cerkoney and Hart which states that health beliefs in patients with diabetes mellitus can affect patients' adherence to treatment regimens and health behaviors.[22] Health care services also influence the health behavior of patients with diabetes mellitus due to the information provided by health workers in the health service which may change the pattern of view of patients, especially in health behavior. The process of delivering the appropriate information or communications will affect T2DM Patients' understanding of the condition and treatment process that is run so that they can implement effective self-management and can take appropriate decisions related to their condition.[28,29]

CONCLUSION
The findings in this study indicated that there are several factors related to health behaviors among T2DM patients that include predisposing factors (socioeconomic, knowledge, stress management, and health belief), reinforcing factors (family support) and enabling factors (health service). Thus, developing an intervention for promoting health behaviors among T2DM patients in a community must consider the factors that may affect the achievement of the results of the implementation of health promotion and these factors can also be used as a benchmark for selecting interventions suitable for these patients. For the future researchers are expected to carryout research on interventions that can improve the perception of the multiple contexts of health behavior among patients with type 2 diabetes mellitus who live with family in the community because it is still rare.

REFERENCES
1. Ajzen I, Fishbein M. Theory of reasoned action-Theory of planned behavior. *University of South Florida.* 1988.
2. Green LW, Kreuter MW. Health program planning: An educational and ecological approach. 2005.
3. Stewart AL, Greenfield S, Hays RD, et al. Functional status and well-being of patients with chronic conditions: results from the Medical Outcomes Study. *Jama.* 1989;262(7):907-913.
4. Whittemore R, Knafl K. The integrative review: updated methodology. *Journal of advanced nursing.* 2005;52(5):546-553.
5. Souza MT, Silva MD, Carvalho R. Integrative review: what is it? How to do it? *Einstein (Sao Paulo, Brazil).* Mar 2010;8(1):102-106.
6. Cooper HM. *Synthesizing research: A guide for literature reviews.* Vol 2: Sage; 1998.
7. Kirkevold M. Integrative nursing research—an important strategy to further the development of nursing science and nursing practice. *Journal of advanced nursing.* 1997;25(5):977-984.
8. Williams ED, Tapp RJ, Magliano DJ, Shaw JE, Zimmet PZ, Oldenburg BF. Health behaviours, socioeconomic status and diabetes incidence: the Australian Diabetes Obesity and Lifestyle Study (AusDiab). *Diabetologia.* 2010;53(12):2538-2545.
9. Murray TC, Rodgers WM, Fraser SN. Exploring the relationship between socioeconomic status, control beliefs and exercise behavior: a multiple

mediator model. *Journal of behavioral medicine.* 2012;35(1):63-73.

10. Conner M, McEachan R, Jackson C, McMillan B, Woolridge M, Lawton R. Moderating effect of socioeconomic status on the relationship between health cognitions and behaviors. *Annals of Behavioral Medicine.* 2013;46(1):19-30.

11. Marcy TR, Britton ML, Harrison D. Identification of barriers to appropriate dietary behavior in low-income patients with type 2 diabetes mellitus. *Diabetes Therapy.* 2011;2(1):9-19.

12. Gallo LC, Smith TW, Cox CM. Socioeconomic status, psychosocial processes, and perceived health: An interpersonal perspective. *Annals of Behavioral Medicine.* 2006;31(2):109-119.

13. Shawahna R, Ahmad M, Debray M, Declèves X, Yliperttula M, Blom M. Prescribers' perspectives of the socioeconomic status and important indicators affecting prescribing behavior in a developing country. *Central European Journal of Medicine.* 2012;7(1):129-136.

14. Serrano-Gil M, Jacob S. Engaging and empowering patients to manage their type 2 diabetes, Part I: a knowledge, attitude, and practice gap? *Advances in therapy.* 2010;27(6):321-333.

15. Mocan N, Altindag DT. Education, cognition, health knowledge, and health behavior. *The European Journal of Health Economics.* 2014;15(3):265-279.

16. Alavi NM, Alami L, Taefi S, Gharabagh GS. Factor analysis of self-treatment in diabetes mellitus: a cross-sectional study. *BMC public health.* 2011;11(1):761.

17. Hartayu TS, Mi MI, Suryawati S. Improving of type 2 diabetic patients' knowledge, attitude and practice towards diabetes self-care by implementing community-based interactive approach-diabetes mellitus strategy. *BMC research notes.* 2012;5(1):315.

18. Polonsky WH. Emotional and quality-of-life aspects of diabetes management. *Current diabetes reports.* 2002;2(2):153-159.

19. Lustman PJ, Penckofer SM, Clouse RE. Recent advances in understanding depression in adults with diabetes. *Current diabetes reports.* 2007;7(2):114-122.

20. Nomura M, Fujimoto K, Higashino A, et al. Stress and coping behavior in patients with diabetes mellitus. *Acta diabetologica.* 2000;37(2):61-64.

21. Elliott TR, Shewchuk RM, Miller DM, Richards JS. Profiles in problem solving: Psychological well-being and distress among persons with diabetes mellitus. *Journal of Clinical Psychology in Medical Settings.* 2001;8(4):283-291.

22. Cerkoney KAB, Hart LK. The relationship between the health belief model and compliance of persons with diabetes mellitus. *Diabetes care.* 1980;3(5):594-598.

23. Kaiser B, Razurel C, Jeannot E. Impact of health beliefs, social support and self-efficacy on physical activity and dietary habits during the post-partum period after gestational diabetes mellitus: study protocol. *BMC pregnancy and childbirth.* 2013;13(1):133.

24. Hara Y, Iwashita S, Ishii K, et al. The reliability and validity of the Japanese version of the diabetes family behavior checklist (DFBC) for assessing the relationship between type 2 diabetes mellitus patients and their families with respect to adherence to treatment regimen. *Diabetes research and clinical practice.* 2013;99(1):39-47.

25. Lewin AB, Geffken GR, Heidgerken AD, et al. The diabetes family behavior checklist: A psychometric evaluation. *Journal of Clinical Psychology in Medical Settings.* 2005;12(4):315-322.

26. Pereira MG, Berg-Cross L, Almeida P, Machado JC. Impact of family

environment and support on adherence, metabolic control, and quality of life in adolescents with diabetes. *International journal of behavioral medicine.* 2008;15(3):187-193.

27. Ou H-T, Mukherjee B, Erickson SR, Piette JD, Bagozzi RP, Balkrishnan R. Comparative performance of comorbidity indices in predicting health care-related behaviors and outcomes among Medicaid enrollees with type 2 diabetes. *Population health management.* 2012;15(4):220-229.

28. Heisler M, Bouknight RR, Hayward RA, Smith DM, Kerr EA. The relative importance of physician communication, participatory decision making, and patient understanding in diabetes self-management. *Journal of general internal medicine.* 2002;17(4):243-252.

29. Lee A, Siu C-F, Leung K-T, Lau LCH, Chan CCM, Wong K-K. General practice and social service partnership for better clinical outcomes, patient self efficacy and lifestyle behaviours of diabetic care: randomised control trial of a chronic care model. *Postgraduate medical journal.* 2011:pgmj. 2011.118885.

30. Ramkisson S, Joseph Pillay B, Sartorius B. Diabetes distress and related factors in South African adults with type 2 diabetes. *Journal of Endocrinology, Metabolism and Diabetes of South Africa.* 2016;21(2):35-39.