Effectiveness of Web-Based Self-Management Program in Patient with Type 2 Diabetes Mellitus

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ABSTRACT

Introduction

Diabetes Mellitus (DM) is a chronic disease that increase morbidity and mortality in the world. There are 10% of people in the world lived with DM and 90% of them have type 2 DM in 2014. Considering to this era of internet, web could be used in caring for patients in chronic care model. The paper aimed to describe the effectiveness of web-based self-management program in patient with type 2 DM.

Methods

This review was conducted by searching many literatures from Science direct, ProQuest, PubMed, and google scholar focused on web-based self-management program in patient with type 2 DM. It included original articles published over the period of 2008-2018. Selection process was carried out using Prisma flow chart.

Results

6 from 30 eligible articles was reviewed based on inclusion criteria outlined. Interestingly, Web-based self-management program can be used to improve patients' knowledge, behavior of healthy life style, glycemic controlling, self-efficacy in self-care, and decrease distress in patient with type 2 DM.

Conclusion

Web-based self-management program has positive impacts on physiological, behavior and psychological aspects that could decrease complication in patient with type 2 DM. Health practitioner including nurses should consider many aspects and apply this intervention in caring for patient with type 2 DM in community.

Keywords

Web-Based Self-Management; Diabetes Mellitus

BACKGROUND

Diabetes Mellitus (DM) is one of many chronic diseases that always increase every year. DM is a metabolic disease which characterized by hyperglycemia caused of insulin secretion, insulin process disorder, or both of them. There are many types of DM such as type 1, type 2, gestational or other types of DM (1). But, the most type of DM that suffered by people with

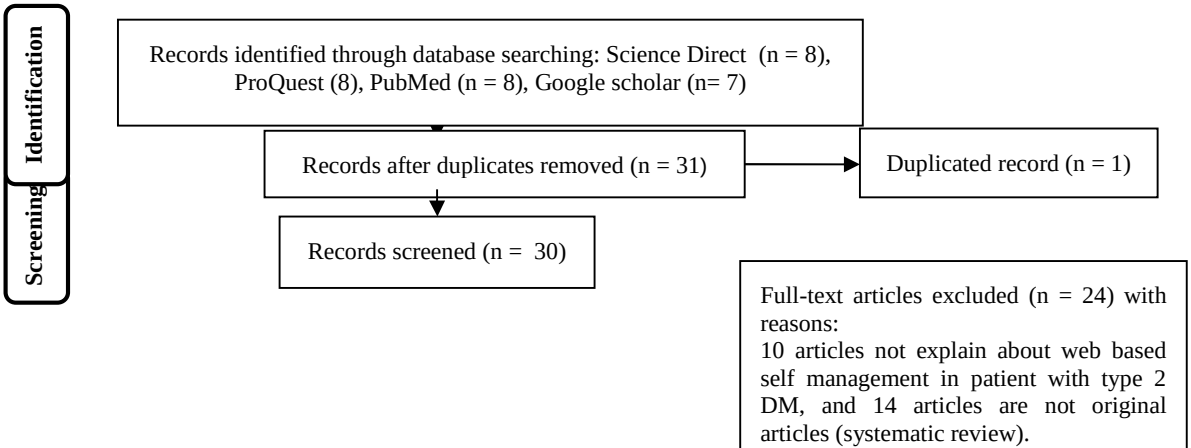
DM in the world is Type 2 DM. 10% of people in the world lived with DM and 90% of them had type 2 DM in 2014 (2). While in Indonesia, DM is also as the seventh causes of morbidity about 7.6 million or 4.8% include type 1 and type 2 DM suffered by diabetic patients in 2012 (3).

DM as one of chronic diseases increased morbidity and mortality rates should be addressed by minimizing many complications such as blindness, amputation, renal failure or others. Because of those impacts, DM is one of disease that makes such a burden for society or economy. One of the way to minimize complication and mortality is by improving patients' self managements. Self management is needed to help addressing psychological such stress or depression that more often be suffered by people that live with DM than other population. Anxiety, stress or deprresion related DM could affect the behavioral of patient especially glycemic control. Considering to these problems, self management must be improved to achieve good self care and better outcome in patients. Web based self management has been developed to help addressing many obstacles in providing care for patients such as limited time or communication between health practitioners and patients, and others. Some trial and evidence showed that web self management program is feasible and acceptable and has potential to improve clinical behavior, psychological or psychososial outcome. Web self management program that based on Social Cognitive Theory (SCT) could provide guideline for DM management for patients include encouraging patients or self efficacy, monitoring outcome or self evaluation, and instructions as education for patients. Even some trial can not guarantee the validity of the program (4).

According to the importance of self management of patient with DM and also there are still some trials of web based program effect that could be given for patient with DM, so author would like to review some articles about this topic. This review aims to explain about effectiveness of web-based self management program in patient with type 2 diabetes mellitus.

METHODS

This systematic review was conducted by searching many literatures from Science direct, ProQuest, PubMed, and google scholar about web self management in patient with type 2 Diabetes Mellitus. Criterias for the literatures are 1) Explain related to the topic about web self management in patient with type 2 Diabetes Mellitus, 2) Articles exist in 10 years recently (2008-2018), 3) Original articles. The process of searching was conducted on June to July 2018, by using keywords such as: web program, internet based self management, web self management, and type 2 diabates mellitus. Finally, 6 original articles was used in this review. The process of searching literature is described by using Prisma Chart on chart 1.



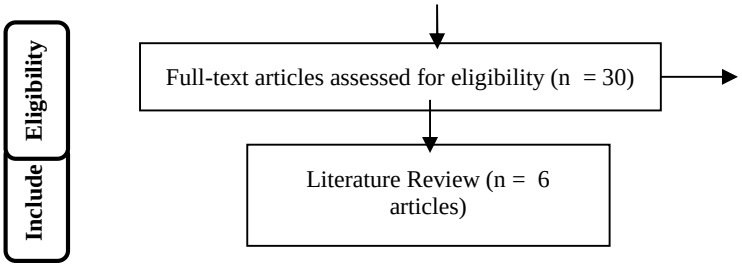


Chart 1. *Flow chart* of literature searching and selection

RESULTS

The results of searching about thirty articles about web based self management in patient with type 2 Diabetes Mellitus were found, but only 7 original articles from Science Direct, PubMed, and google Science Direct, PubMed, and google scholar are used in this review after screening, eligibility and include processing. The articles are resumed on table 1.

DISCUSSION

Diabetes melitus (DM) is one of many chronic diseases. Diabetes meiltus is a metabolic disease that characterized by hyperglychemia as a result of destruction in insulin secretion, action or both. Type 2 DM is one of DM types and accounted about 90-95% of other types. Type 2 DM also referred as non insulin dependent DM because it is predominantly insulin resisten and have relative insulin deficiency, but the etiology is unknown (5). As a part of chronic diseases, many problems could occur such physical and psychological problems. Therefore, to help addressing those problems, self management is needed as an important intervention that should provided by healthcare providers to patients. Self management in chronic diseases included DM is defined as an patients' ability to manage symptoms, physical and psychological impacts or problems, and also treatment for the disease and their behavior in life styles. It also manage social and role when living with the chronic disease (6).

Self management education and support as part of regular care of patients are needed to improve self management. Patients with good self management might especially with well controlled would get more benefit in maintaining their cardiometabolic control such as glucose or lipid levels, and blood pressure. Web based or internet based program in self management provide such an oppurtunity for patients to practice self management in their homes and in comfortable time. By using this program, health care providers might spend less time to visit patients but they should consider to patients' differents of ethnics, sex, or other aspects related that would affect their quality of life (7).

Table 1. Resume of articles about web-based self-management support patients with type 2 DM

No.	Author and Year	Purpose	Method	Summary
1.	Heinrich, *et.al.*	Evaluate a web-based type 2 DM self	Randomized controlled trial	Effect of Web based sel manamagement education program is

	(2012)	management education program in improving knowledge, encouraging participation and providing supportive self management tools.	with pre and post test	significant (p<0.01) on knowledge, credibility and the user feel high satisfy with the content, and user friendliness.
2.	Hofmann, *et.al.* (2016)	Assessing impact of self-management (Healthy Living for people with type 2 Diabetes/HeLP diabetes) on psychological well-being on adults withtype 2 DM	Mix method cohort	HeLP diabetes self management acces decrease distress caused of diabetes in patients who access this program (p=0.04)
3.	Murray, *et.al.* (2017)	Investigate effectiveness of web based self management program to improve glycaemic control and reduce distress in patient with DM	Individually two arm randomized controlled trial	Patients in intervention group get more beneficial impact from the program (p=0.004). HeLP diabetes program access improve glycaemic control over 12 months. HbA1C get lower in intervention group after 12 months than control goup (p=0.014).
4.	Vugt, *et.al.* (2013)	Test hypotesis that web-based self-management with couching in patients' clinical behavior and outcome compared than a web-based self-management without choaching	Randomized controlled trial	The intervention support self management of patients with type 2 and get more benefit in outcome and self care
5.	Hart, *et.al.* (2017)	Determine the reach and feasibility of an internet-based self management support for patient with well-controlled DM	Real life study	Patients felt more satisfy with their treatments by using internet based self management program (p=0.05)
6.	Nobis, *et.al.* (2015)	Evaluate efficacy of web based intervention in reducing depression in patients with type1and2 DM	Randomized controlled trial	Patients in ntervention group have significantly less depresive symptoms post treatment based on Intent to Treat (ITT) (*d*= 0.89) and per protocol (PP) basis (*d*=1.00), and diabetes related emotional distress decrease larger (*d*=0.58, ITT)

Websites as a part of telemedicine that used to give information or education to patients in order to improve health outcome. It could help overcome geographical barrier between patients and health care providers. It could give more effective management and decrease healthcare cost. In this case, type 2 DM is higher incident than other types of DM, about 90% patients of all diabetes patients live wity type 2 DM worldwide. Meanwhile the treatment for patients with type 2 DM is complex, include managing life styles especially in diet and exercise, medication using and blood glucose monitoring. One of strategies to achieve and improve glycemic control and outcome, website as telemedicine could be used to provide education, monitor or support in developing patients' self-management (8).

Furthermore, an investigation about internet-based education program for patients with type 2 DM also explained that this program could significatly increase patients' knowledge. Knowledge is important for patients by education, to help them to understand and concern in good health behavior to implement self care plan and also help them to make decision for their condition in order to achieve better outcome. Most of participant in the program said that they felt satisfy and almost of them revisit the program. Web based program is efficient for both patients and health care providers in extending medical information or education, and also improve communication and self-management of patients (9). Another research article showed that internet-based self-management intervention in adults wity type 2 DM, by using HeLP program could signficantly decreasing Problem Areas in Diabetes (PAID) scale and diabetes related distress. In their mix methods study, patients also said that web site program assist them to change their habit in diet and exercise to lose body weight. They also feel more aware and supported about diabetes care, take it more seriously, and improve self efficacy and mood. But some of them felt frustration about technical aspects in program (10).
Contrastly, another study showed that there were no significant difference in PAID scale between intervention group and control group after 12 months follow up. But, there were significant difference between both groups in HbA1C which got lower in intervention group than control group after 12 months follow up. Systolic blood pressure also decreased. HeLP diabetes help patients in improving glycemic control at 12 months than simple information in website. They also said that decrease 1% of HbA1C would reduce 21% of death related diabetes risk and 37% of microvascular complications. Eventhough in their research there were no significant impact of intervention on diabetes related distress, but they explained that some evidences show that HeLP could assist in reducing distress in recently diagnosed patient. Diabetes related distress should be paid more attention by health care provider because 40% patients DM with distress will get negative impact on quality of life (2).
Furthermore, a research proposal that web-based self-management support program with coaching that conducted by professional master health science would help remind, encourage, and help them to evaluate their behavior and outcome (11). In addition, internet-based self-management would support patients with type 2 DM in managing their self, disease, and care for DM. Internet-based self-management replace regular care especially for patient who can not visit primary care or health care providers for controlling their condition. By this program, patients could monitor their self and condition without visit health care and would not disturb their activities such work and other activities. By using this internet-based self-management program would help reducing practical visit and burden in health care system, but assist patient to achieve well control (7). Eventhough in their research there were no significant imroving of self-management after 2 months intervention, but web-based support by mobile phone help reduce depression in patient with DM (12).

Study Limitation

This review has a limitation in finding related original article. There were still rare research that explain about web-based self-management program in patients with type 2 DM in recent 10 years.

CONCLUSIONS

Patients that live with DM especially type 2 DM will get many diabetes related problems, whether physical or psychological impact and have to follow complex treatment. As a result of this cronic disease also diabetes related distress syndrome will burden them in their lives. So, health practitioners include nurse should understand about diabetes melitus, patients' need and choose more effective and efficient strategy to help them addressing their needs. Web-based or internet-based intervention could be a good option to help them while there is a limit time that also could reduce health cost. Eventhough there are many pro and contra in benefit or effectiveness of web-based self-management intervention, but some research showed that web-based program could help patient in maintaining well glycemic controll, feeling supported to follow diabetes diet and exercise, managing self management and health behavior, and also reducing diabetes related distress syndrom.

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