Effect of DSME on Diabetes Mellitus

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Effectiveness of Cell Management Education for Patients with Diabetes Mellitus: A Systematic Review

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REVIEW ARTICLE

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Abstract

Background: Diabetes mellitus is a chronic disease that ranks as the fourth leading cause of death in developing countries. The main pillars in the management of type 2 Diabetes Mellitus (T2DM) are education, nutritional therapy, physical training, and pharmacological interventions. The provision of education that has had a positive impact on DM patients is the Diabetes Self-Management Education (DSME). Method: The purpose of this study was to evaluate the effectiveness of the application and web-based Diabetes Self-Management Education (DSME) method in patients with type 2 DM. This study used a systematic literature review design. Articles were collected through PubMed and Google Scholar databases using the keywords DSME Web Application, DSME Smartphone. The criteria for articles used were those published from 2014-2020. Results: the literature review show that the application-based DSME method is more effective in improving self-management of type 2 DM sufferers. Search for articles related to 9 sources that fall within the criteria. Conclusion: is that the application-based DSME method is more effective because it does not require a lot of money and a long time compared to doing direct control to health facilities, the application can also always be accessed whenever we want so that it can help improve self-management in people with Diabetes Mellitus.

Keywords: web application, smartphone, diabetes self-management education

Introduction:

Diabetes is a serious chronic disease that occurs when the pancreas does not produce enough insulin (a hormone that regulates blood sugar or glucose), or when the body cannot effectively use the insulin it does produce [1]. In 2016, diabetes mellitus was the direct cause of 1.6 million deaths worldwide Indonesia is ranked 7th in the world after Mexico with a percentage of diabetes mellitus reaching 10.7 million (11.5%) and is expected to continue to increase until 2030, reaching 13.7 million (14.9%) and in 2045 reaching 16.6 million (18.2%) (IDF, 2021) [2] Type 2 diabetes mellitus (T2DM) accounts for approximately 90% of all diabetes cases. In T2DM, the response to insulin is reduced, and this is defined as insulin resistance. During this state, insulin is ineffective and
is initially compensated by increased insulin production to maintain glucose homeostasis, but over time, insulin production decreases, resulting in T2DM [3].

T2DM is most commonly seen in people older than 45 years old. However, it is increasingly seen in children, adolescents, and younger adults due to the increasing rates of obesity, physical activity due to increasing levels of obesity, physical inactivity [4]. One of the reasons for not routinely taking insulin was 9% with the reason that feel healthy and do not seek treatment at health care facilities, take traditional medicine, often forget traditional medicine, often forget, can't stand the side effects of drugs, can't afford to buy regular medicine regularly, medicine is not available at health care facilities. About 30% of people with DM are not aware of their disease and when the diagnosis is made diagnosis is made about 25% have already had complications. Whereas self-management for proper control can minimize the occurrence of complications [1]

Diabetes self management education (DSME) is a process of providing knowledge to people with DM about self-care strategies to optimize metabolic control, prevent complications, and to improve the quality of life of people with DM. The purpose of DSME is to support decision making, self-care behavior, problem solving and active collaboration with the health team to improve clinical outcomes, health status, and quality of life [5].

Education is the promotion of healthy living that needs to be done. Education is part of prevention efforts and is very important for the holistic management of diabetes mellitus, including education about diet, physical activity patterns, regularity in taking OAD / insulin and foot care. Efforts made to prevent complications are highly dependent on the patient's knowledge about their disease, the patient's knowledge is influenced by several factors, such as age, education, occupation, experience, information, socio-culture and economy [6]

Ineffectiveness in education is related to the dominant structured education model, namely group-based sessions, which last half a day or all day or in regular sessions over several weeks.

Methods
This research design is a Systematic Literature Review (SLR) or literature review. Literature review study is a way of collecting references which have previously been researched by other researchers. A description that contains theories and findings about other research can be used as a reference to become the basis for conducting research.

This literature review was compiled through searching for published research articles. Articles were collected through the PubMed and Google Scholar databases using the keywords DSME Application, Web, DSME Smartphone. The criteria for articles used are those published from 2014-2020 which are accessed fulltext in pdf format.

Results
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Figure 1. PRISMA Flow Diagram

In searching for articles, after selection based on criteria, 6 articles were obtained which were then analyzed. Below are the 6 articles extracted in the form of Table 1 and figure 1.

Table 1. Extraction Characteristic Study

<table>
<thead>
<tr>
<th>Title/Name</th>
<th>Country</th>
<th>Study Type</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile phone applications and their use in the self-management of Type 2 Diabetes Mellitus (Jeffrey, 2019) [7]</td>
<td>Australia</td>
<td>Qualitative study</td>
<td>Most app users found that the app improved their T2DM self-management and health</td>
</tr>
<tr>
<td>Diabetes' Four Pillars Management in Prolanis Participants (Laila, 2020) [8]</td>
<td>Indonesia</td>
<td>Quasi experiment</td>
<td>There were significant changes in diabetes-related knowledge (p=0.034), medical nutrition therapy (p=0.008) and physical exercise (0.014) between the intervention and control groups, and there were</td>
</tr>
<tr>
<td>Web-based self-management support for people with type 2 diabetes (HeLP-Diabetes) (Murray, 2017) [9]</td>
<td>UK</td>
<td>Clinical Trial</td>
<td>A pre-specified subgroup analysis of participants who had been more recently diagnosed with diabetes showed a favorable impact of the intervention in this group (p=0.004). No no harms were reported.</td>
</tr>
</tbody>
</table>

Discussions

Setting the right criteria in the method greatly affects the number of articles obtained. The articles obtained that match the desired criteria are ten articles. Articles with research methods Experimental, Randomized control trial, Survey, Cohort study, Trial design. The research year is above 2014.

Based on Hanifah's research (2019), it is stated that the Salam-Sehat application has a significant effect on the self-
management behavior of type 2 DM sufferers in Bengkulu city. This is supported by research by [13], showing that the use of mHealth applications has a significant impact on health-related behaviors, such as physical activity, dietary changes, adherence to medication or therapy, and increased knowledge related to clinical procedures. Most app users were satisfied with using mHealth apps to manage their health compared to conventional care users. However, certain groups, such as older adults, are most affected by the digital divide where they have lesser access to mHealth apps and are therefore unable to utilize these tools.

Various applications include various health interventions, especially education with the aim of improving health, which can be said to have positive benefits for improving quality of life [14]. This is supported by [15], that the DM-Calender application increases perceptions of self-efficacy and increases good self-management behavior, which can be seen from changes in controlled HbA1c levels, lipid profiles and insulin. This application contains three of the four pillars of DM, namely blood sugar control, educational programs, nutritional therapy, and physical activity. This application system works by reminding patients to carry out self-management programs in the form of notifications on their mobile phones. This is in line with Aminuddin's research (2019) which shows that smartphone applications, have been widely used as one of the methods of Diabetes Self-Management Education (DSME) and have effective results [16].

Furthermore, nutrition education is an effort to change thoughts and attitudes in accordance with the objectives to be achieved. One way to deliver nutrition education through nutrition counseling is by using the application, Diabetic Care. Respondents can evaluate the amount of their intake by using the daily food data feature. The Nutri Diabetic Care application has a notification to remind respondents of their meal schedule, this application also provides information about the types of foods that are recommended, restricted and not recommended on the diet menu number, schedule, and type (3J) and each type of food is given a special color to make it easier for respondents to remember and understand [17]. This research is supported by which shows that the intervention in the form of nutritional counseling using the Nutri Diabetic Care application media can increase respondents' knowledge about the 3J DM diet [18].

Suggested that in using popular apps for self-management of people with DM such as MySugr app and continuous glucositoring apps, such as Dexcom, Freestyle Libre and Xdrip+, the cumulative self-care behavior scores in both groups were significantly higher compared to non-users and the scores for three individual self-care components, namely blood glucose monitoring, general diet and physical activity were significantly higher among diabetes app users [19].

To maximize the care planning of people with diabetes, people with diabetes need access to good health information and education both in the hospital and when they return home [15]. Good health education in adults is determined by the learning process rather than the teaching process itself. This means that the method of delivering health education will determine the extent to which a person is able to understand and practice what has been learned [20].
Of the two educational methods of application and web-based education, 9 articles were obtained which showed that both methods were effective for improving self-management in people with diabetes mellitus. However, each of these methods has advantages and disadvantages. Of the two methods, the most effective for improving self-management of people with diabetes mellitus is the application method. Because it does not take a lot of money and a long time compared to doing direct control to health facilities, the application can also always be accessed whenever we want. In addition, almost everyone has a smartphone which is equipped with an application that makes it easy to download health applications according to needs.

Conclusion
Of the two methods are equally effective for improving self-management of patients with type 2 DM, but the application method is more effective for improving self-management based on the results of a review of some literature because there is ease of registration, availability of interaction space, there are reminder notifications for meal times and taking medication, besides that it does not cost a lot of money and a long time compared to doing direct control to health facilities, applications on smartphones can also always be accessed whenever we want so that it can help improve self-management in people with Diabetes Mellitus.

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Conflict of Interest Statement
The authors declared no conflict of interest.

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https://phcfm.org/index.php/phcfm/article/view/1762


