Nutritional information access and dietary behavior among people with diabetes during Covid-19 pandemic

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Abstract. The Covid-19 pandemic limiting physical contact. People with diabetes are associated with higher severity and mortality than people without diabetes due to Covid-19. People with diabetes still need access to nutritional information that can help to maintain glycemic control. This study aims to describe access to nutritional information for diabetics and their dietary behavior during the covid-19 pandemic. The survey was conducted on 72 people with Diabetes Mellitus. This study used the Dietary Behavior Questionnaire (DBQ) and Nutritional Information Access Questionnaire via Google Form and phone call. The majority of respondents (74%) can't visit dietitians or nutritionists at healthcare providers to get nutrition counseling or education during the Covid-19 pandemic. Respondents get the nutrition information 42.9% by virtual media, 29.2% from health workers, 10% from family, 7.14% from friends, and 9.29% others did not get nutritional information. The most reliable source of information is from health workers, both delivered virtually or face to face. Most of them had difficulty recognizing the amount of energy needed, selecting a healthy diet, arranging meal plans, and managing dietary behavior challenges. It the important to construct nutritional education media that can help dietitians or nutritionists providing virtual education during a pandemic when people with diabetes can’t visit a healthcare provider.

1. Introduction

Coronavirus disease (COVID-19) is a disease caused by a newly discovered coronavirus [1]. In March 2020, WHO declared COVID-19 as a global pandemic due to its increasing spread and severity [2]. Most people infected with COVID-19 will experience mild to moderate respiratory problems and will recover without requiring special treatment. However, elderly people and people with certain medical problems such as diabetes, heart disease, respiratory disease, are a particularly vulnerable group who are at greater risk of developing severe or critical illness if infected [1]. One of the things that are recommended for people with diabetes is to maintain good glycemic control to boost the innate immune system and reduce the severity [3]. Covid-19 impacts people with diabetes by risk for unhealthy diets and delay care-seeking for the healthcare provider. Health systems should seek to meet the needs of people with diabetes during the pandemic to avoid poor health consequences by support via telephone, video, or even home visits [4].

Diabetes mellitus type 2 is a chronic metabolic disorder whose prevalence continues to increase worldwide [5]. The results of Indonesian Basic Health Research (2018) show that the prevalence of Diabetes Mellitus based on blood tests in people aged ≥ 15 years has increased from 6.9% in 2013 to
8.5% in 2018 [6]. Type 2 Diabetes Mellitus was previously known as “Non-Insulin-Dependent Diabetes Mellitus (NIDDM), or “adult-onset diabetes”, which accounts for 90-95% of all diabetes cases [7].

People with diabetes are associated with higher rates of severity and mortality from COVID-19 than people without diabetes [8]. The covid-19 pandemic has many consequences to people with diabetes e.g. increased snacking, consumption of calorie-dense food and decreased antihyperglycemic drug, and restriction to visits physician [9]. Uncontrolled hyperglycemia is one of the things that may play a role in the relationship between diabetes and COVID-19. A retrospective study in China showed that good glycemic control during hospitalization was associated with lower mortality rates in COVID-19 people with diabetes [10].

Various steps have been taken in response to the pandemic, including a policy lockdown, recommendations for physical distancing from each other, isolation or self-quarantine, and carrying out activities from home [11]. The impact of these recommendations may worsen glycemic control in diabetes. One of the reasons is because people with diabetes cannot visit health facilities or doctors to monitor their disease [12]. Policies related to health facilities are also implemented in Indonesia, including that health facilities can only be accessed for emergencies [13]. Online education through internet-based has positive impacts on diabetes patients in this technology era [14]. Few nutrition information source providers were from nutrition professionals [15]. Therefore, research is needed to describe access to nutritional information for people with diabetes mellitus and how their dietary behavior. The results of the survey will be used to construct nutrition education media for people with diabetes provided by a registered dietitian that can be accessed online.

2. Research Methods

An observational study was conducted by an online survey, followed by a phone call to 72 respondents from May until September 2020. The sampling technique was carried out by purposive sampling methods. Respondent recruitment by research brochures promotion through social media platforms such as Instagram, Facebook, and WhatsApp.

Data were collected via google form and telephone. The assessment was carried out using the Characteristics of Respondents Questionnaire, Nutrition Information Access Questionnaire, and Dietary Behavior Questionnaire (DBQ) via Google Form. The DBQ was modified from Primanda’s research [16], to assess dietary behavior among people with diabetes. Inclusion criteria were male or female aged ≥ 18 years old, people with type-2 diabetes mellitus based on a doctor's diagnosis, good communication, have internet access, willingness to be a respondent by signing informed consent and following the research procedure until it’s finished. Exclusion criteria were suffering from chronic kidney disease, heart disease, and stroke and are currently pregnant or breastfeeding. Descriptive statistics were used in this study by STATA version 16. This research has received ethical clearance from the Health Research Ethics Commission of Faculty of Health Sciences Jenderal Soedirman University with EC number: 0131 / EC / KEPK / VII / 2020.

3. Results and Discussion

The results of the survey on access to nutritional information were obtained in the form of accessible information sources, informants who conveyed the accuracy of information sources, and recommendations for educational media that were most easily accepted by respondents during the Covid-19 pandemic.

In general (Table 1.), this study involved 72 people with type-2 diabetes in the territory of Indonesia who came from Central Java (50%), West Java (23.6%), and the rest from 9 other provinces. The majority of respondents were women (61.1%) where most of them worked as housewives (36.1%). The majority of the respondent's last education was tertiary education (38.9%) and had a history of diabetes from family (56.9%). The average respondent was 53 years old with an average of 7 years of diabetes. Based on Body Mass Index (BMI) on average respondents have a normal
nutritional status (24.66 kg/m²) to the Ministry of Health in 2013. Figure 1 below illustrates the results of research in the form of the percentage of respondents who can access nutrition information during a pandemic Covid-19.

| Variable (n=72) | n (%)   | Mean  |
|-----------------|---------|-------|
| **Sex**         |         |       |
| Male            | 28 (38.90%) |       |
| Female          | 44 (61.10%) |       |
| **Occupation**  |         |       |
| No work         | 1 (1.40%) |       |
| Retired         | 6 (8.30%) |       |
| Housewife       | 26 (36.10%) |     |
| Labor           | 5 (6.90%) |       |
| General employee| 9 (12.50%) |     |
| Entrepreneur    | 16 (22.20%) |     |
| Government employees | 9 (12.50%) |       |
| **Highest educational qualification** |         |       |
| Elementary High School | 18 (25.00%) |     |
| Junior High School | 10 (13.90%) |     |
| Senior High School | 16 (22.22%) |     |
| Diploma/Bachelor/Master | 28 (38.90%) |     |
| **Family history** |         |       |
| Yes             | 41 (56.90%) |     |
| No              | 31 (43.10%) |     |
| **Age (years)** |         | 52.97 |
| **BMI (kg/m²)** |         | 24.66 |
| **Diabetes duration (years)** | | 7     |

**Figure 1.** Percentage of access to counseling or nutritional education during the last 2 months

Based on Figure 1, most respondents (74%) were unable to visit nutritionists at health facilities to get counseling or nutrition education related to diabetes during the last 2 months in the covid-19 pandemic era. There is a lower frequency of clinical visits during covid-19 among people with diabetes mellitus [17]. Face-to-face consultations are difficult due to physical distancing and restrictions on patient mobility. Telemedicine is proposed to be the future counseling method during the crisis to managing diabetic patients' care [9].

Due to the difficulty to seek nutrition information from a nutritionist, respondents are active in seeking information through other sources. The survey shows various nutrition information was
accessed by people with diabetes. Various sources of information accessed by respondents can be seen in Figure 2, as follows.

Figure 2. Percentage of accessible nutrition information sources

| Source of Information | Percentage |
|-----------------------|------------|
| Health workers        | 29.29%     |
| Television            | 9.29%      |
| Youtube               | 7.14%      |
| Website               | 7.14%      |
| YouTube               | 7.14%      |
| Video                 | 0.71%      |
| Magazine              | 1.43%      |
| Health workers        | 9.29%      |
| Social media          | 10%        |
| Whatsapp Group        | 5.71%      |
| Family                | 10%        |
| Friend                | 10%        |
| No information        | 9.29%      |

Figure 2 shows that more respondents get nutrition information virtually than respondents who can meet directly with nutritionists. Respondents received nutritional information virtually through social media, WhatsApp groups, websites, YouTube, videos, and television by 42.9%, respondents who received nutritional information from health workers were 29.2%, respondents who received nutritional information from family were 10%, from friends 7.14% and the other 9.29% did not get nutritional information from anywhere. From several sources of information obtained, respondents were asked to state the accuracy of the nutritional information sources that were accessed.

Accuracy of information sources is important to determine the quality of nutritional information obtained. Reliable sources of information have a better relationship with respondents' nutritional knowledge [18]. 29.2% of people with diabetes in the study stated that they received nutritional information from health workers. As much as 74.7% of respondents who choose health worker’s consultation stated that they believed the information, 15.38% said the information was accurate, and 10.26% stated that they had enough confidence. In future practice, healthcare providers started to develop a digital solution to deliver healthcare to patients. Covid-19 pandemic will make changes in society so needs transformations to combine physical and virtual healthcare. It needs a combination between technology and healthcare for wider access and achieve a healthier nation [19].

Other sources of information that can be accessed by respondents in the last two months during the covid-19 pandemic are virtual nutrition information (42.9%) such as television, YouTube, websites, WhatsApp groups, and social media. Most people with diabetes who get nutritional information from television said that believed enough (53.85%). Respondents who get nutritional information from YouTube said that 57.14% believed it enough. Major of respondents who get nutritional information from websites said that they are 80% believe enough. 50% of people with diabetes who get nutritional information from the WhatsApp group said enough to believe and 50% said believed. Most respondents who get nutritional information from social media said 71.43% believed it enough. It is can be concluded that the most reliable source of information is from health workers, both delivered virtually or directly.
Nutritional information accessed from the above sources is provided by various sources (see Figure 3) Health workers remain the largest source, namely 50.7%. This shows that either directly or virtually a lot of messages were conveyed by health workers. Besides, respondents said that information was conveyed by nutritionists, namely 16.8%. Other respondents stated that the information was obtained from friends, relatives, and many did not know who submitted the information or were anonymous. Respondents who did not know who delivered the information, on average, obtained information from articles, or they were members of the diabetes community both in the WhatsApp and Facebook groups.

When seen in Figure 3, the percentage of nutritionists is only 16.9%, where the percentage is still far from other health workers. Nutritionists in their role of conveying information and providing nutrition education certainly need media as educational tools that are easier for people with diabetes to understand. In table 2, it can be seen that a total of 44% of respondents stated that videos from both YouTube and WhatsApp are the easiest media to accept to get nutritional education information. This is one of the reasons for the importance of making educational media capable of being a means for nutritionists to provide virtual education during a pandemic where respondents cannot visit health facilities.

In addition, this study also conducted a survey to describe dietary behavior as long as the respondent was unable to visit nutritionists at health facilities. Dietary behavior was obtained from 4 parts, recognizing the amount of energy needed, selecting a healthy diet, arranging meal plans, and managing dietary behavior challenges. The results of the univariate analysis of dietary behavior can be seen in the following table.

Based on Table 3, the average total score for dietary behavior is 47.99 with the lowest score 21 and the highest 81 from the range of supposed scores 0-99. The mean score of dietary behavior in part 1 recognizing the amount of energy needed is 4.42, part 2 selecting a healthy diet is 23.01, part 3 arranging meal plans is 11.4, and part 4 managing dietary behavior challenges, namely 9.15.
Table 3. The average of dietary behavior score

| Variable (n=72)                        | Score range | Minimum-Maximum | Mean ± SD  |
|---------------------------------------|-------------|-----------------|------------|
| Recognizing the amount of energy needed | 0-12        | 0-12            | 4.42 ± 2.72 |
| Selecting a healthy diet              | 0-48        | 9-40            | 23.01 ± 6.07 |
| Arranging meal plans                  | 0-18        | 3-18            | 11.4 ± 3.51  |
| Managing dietary behavior challenges  | 0-21        | 3-18            | 9.15 ± 3.82  |
| Total dietary behaviors               | 0-99        | 21-81           | 47.99 ± 13.38 |

Figure 4. The percentage of the average score against the supposed score

The dietary behaviors were classified into three categories based on a percentage of the average score against the supposed score: low (0-33.2%), moderate (33.3-66.6%), and high (66.7-100%). Figure 4 shows that most of the respondents have a moderate level of dietary behavior (48.5%). In line with the results of research which states that the level of behavior in people with diabetes is in the moderate category [20]. Knowledge or nutritional information related to diabetes obtained from health professionals such as nutritionists, either face-to-face or online, can influence dietary behavior. Nutrition education related to diabetes that is not obtained from the hospital is one of the main factors associated with poor dietary practices [21]. Patients who receive nutrition education will follow nutritionist advice and have better knowledge and understanding of the relationship between food and disease or dietary guidelines [22].

Considering the part of dietary behavior, recognizing the amount of energy needed is the lowest percentage (36.8%). This shows most of the respondents have difficulty in that part. Other studies suggest that the level of dietary behavior in this part is low [23]. Research in India, states that only 39% who visited a dietitian since diagnosed with diabetes and only 2% calculated daily energy intake. Perhaps attributable to the ease of access to family physicians rather than dietitians [24].

Managing dietary behavior challenges showed a percentage of 43.6% and selecting a healthy diet showed a percentage of 47.9%. These results are in line with other studies that state the level of dietary behavior in that two parts is classified as moderate [23]. Furthermore, arranging meal plans had the highest percentage (63.3%). This result is in line with research that states the level of dietary behavior in that part is classified as high [21]. Overall, the dietary behavior of people with diabetes is in the moderate category. So, there is still a need for collaboration between people with diabetes and professional healthcare such as dietitians and nutritionists to improve dietary behavior.

Online nutrition education is one of the alternatives to overcome the gap in limited access to nutrition education services with the increasing demand for nutrition education during the Covid-19
pandemic. Online nutrition education is effective in increasing the knowledge of people with diabetes in choosing types of food. Thus, it is necessary to construct an online nutrition education media that will be provided directly by nutritionists/dietitians according to client needs.

4. Conclusion

- Most of the respondents (74%) were unable to visit nutritionists in health facilities to receive diabetes-related nutrition counseling or education during the Covid-19 pandemic.
- The majority of respondents get nutrition information virtually compared to the percentage of respondents who can meet directly with health workers. Respondents get the nutrition information 42.9% virtually, 29.2% from health workers, 10% from family, 7.14% from friends, and 9.29% others did not get nutritional information.
- Most people with diabetes who get nutritional information believed enough nutrition information through television (53.85%). The percentages of the respondent that trust the media to provide true nutritional information were YouTube (57.14% believed enough), websites (80% believe enough), WhatsApp group (50% believe enough and 50% believed), social media (71.43% believed it enough). It is can be concluded that the most reliable source of information is from health workers, both delivered virtually or face to face.
- Most of the respondents have difficulty recognizing the amount of energy needed, managing dietary behavioral challenges, and choosing healthy foods, choosing healthy foods. Only a small proportion of respondents still have difficulty managing meal schedules or planning.
- It is necessary to construct an online nutrition education media that will be provided directly by nutritionists/dietitians according to client needs.

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