Dietary Regulation As A Factor Predicting Quality of Life in Diabetic Peripheral Neuropathy Patients

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ABSTRACT

Diabetic peripheral neuropathy is a complication of diabetes mellitus with the number of sufferers continuing to increase from time to time. A decrease in quality of life occurs as this disease progresses, both in physical, mental, and social aspects. Controlling risk factors for declining quality of life needs to be done early, one of the risk factors for declining quality of life is diet. The aim of this research is to analyze dietary regulation as a predictive factor for quality of life in diabetic peripheral neuropathy sufferers. The type of research used is quantitative research with a cross-sectional approach. The respondents in the study were 210 diabetic peripheral neuropathy sufferers who were selected using consecutive sampling techniques. Data collection uses a questionnaire that meets the existing validity and reliability criteria. The data analysis used in this research is SEM PLS analysis. The results show that dietary regulation has a positive influence on quality of life (r=0.236, p=0.0001). Dietary regulation has an effect size on quality of life (f square = 0.095) and also has the ability to predict quality of life well (Q square = 0.232). Dietary regulation is also feasible and suitable in explaining interactions between variables (NFI = 0.540; SRMR = 0.99). The conclusion is dietary regulation can be a good predictive factor for quality of life, so that by improving the diet of diabetic peripheral neuropathy sufferers it will be possible to improve their quality of life.

Keywords: Predictive Factors, Diabetic Peripheral Neuropathy, Dietary Management, Quality of Life

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INTRODUCTION

Diabetic peripheral neuropathy (DPN) is one of the complications of diabetes mellitus with the highest number of sufferers among other complications. At least 50% of people with diabetes mellitus will develop diabetic neuropathy. Controlling blood glucose levels is important to prevent this complication. At the global level, the prevalence of DPN ranges between 16% and 87% of diabetes mellitus sufferers. The same thing also happens in Indonesia, where the prevalence is 58% of all diabetes mellitus sufferers.₂,³

DPN causes a decrease in the quality of life for sufferers. An increased risk of falls, the appearance of pain and a decrease in quality of
life are the main problems in DPN. This decrease in quality of life will not stop at just decreasing the quality of life but can also increase the risk of death in DPN sufferers.

The reduction in the quality of life of DPN suffers requires holistic and comprehensive treatment and must be done early. For this reason, it is necessary to analyze each risk factor that has a significant effect on the sufferer's quality of life. There are several risk factors for decreasing quality of life in DPN sufferers collected from various studies. These factors can be categorized into lifestyle factors consisting of diet, smoking, lack of physical activity and regularity of treatment. Characteristic factors of sufferers such as age, length of time suffering from DM, blood sugar levels, lipid levels. Comorbid disease factors such as hypertension.

Among these factors, lifestyle factors are the factors with the most potential to be used as predictors of the quality of life of DPN sufferers. This is because lifestyle factors are one of the risk factors for DPN that can be modified. Lifestyle factors are also one of the main causes of diabetes mellitus and its complications. Lifestyle factors are also one of the main management factors in managing diabetes mellitus itself.

One of the lifestyle factors that is very dominant in DPN sufferers is diet. Diet can be an important key in controlling blood sugar. A good diet can not only maintain blood sugar levels within normal limits but can also provide sufficient nutritional intake that the body needs for metabolism. So that the disease does not worsen and ultimately the sufferer's quality of life can be maintained as optimally as possible.

Early prevention of decreased quality of life in DPN sufferers needs to be done. Assessment of predictive factors for decreased quality of life can be studied further by building a prediction model. Predictive models are the process of uncovering relationships between variables to predict some desired outcome. According to Kalechofsky (2016) and Shmueli (2010), this prediction model generally uses statistical techniques to predict future behavior.

Dietary regulation as a predictive factor for quality of life will make an important contribution to the management of diabetic peripheral neuropathy sufferers. Where these sufferers will be able to maintain their general quality of life while also being able to prevent the occurrence of diabetic ulcers which will ultimately reduce the risk of amputation or even death. Based on the explanation above, researchers are interested in conducting research related to dietary regulation as a predictive factor for quality of life in sufferers of diabetic peripheral neuropathy.

METHOD

The type of research used was qualitative research with a cross sectional approach. This research was carried out in the work area of Puskesmas throughout Padangsidimpuan City for 5 months, namely from May 2022 to September 2022.

Respondents in this study were diabetic peripheral neuropathy sufferers who had been diagnosed by a doctor and had been assessed using the Diabetic Neuropathy Score (DNS) instrument with a total of 210 people. Respondents were selected using consecutive sampling technique. The sample inclusion criteria used in this research were not being anxious or depressed, not experiencing cognitive disorders, being able to communicate, being able to read and write and being willing to follow all research procedures.

The research instrument used is a research instrument that has been developed by the research team. This instrument has been tested for validity and reliability. Validity testing is carried out using face validity, content validity and construct validity. The reliability test used is internal consistency by paying attention to the Cronbach alpha value.

Data analysis in this research was SEM PLS using the SMART PLS application version 3.2.9. The research has obtained ethical approval from the Research Ethics Commission of the Faculty of Medicine, Andalas University with letter number 487/UN.16.2/KEP-FK/2021.

RESULTS

Table 1. Characteristics of Respondents

<table>
<thead>
<tr>
<th>No</th>
<th>Respondent Characteristics</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Man</td>
<td>99</td>
<td>47.1</td>
</tr>
<tr>
<td></td>
<td>Woman</td>
<td>111</td>
<td>52.9</td>
</tr>
<tr>
<td>2</td>
<td>Comorbidities</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>80</td>
<td>38.1</td>
</tr>
</tbody>
</table>
Table 2. Characteristics of Respondents Based on Age and Blood Glucose Levels

<table>
<thead>
<tr>
<th>No</th>
<th>Respondent Characteristics</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age</td>
<td>53.3</td>
<td>8.62</td>
<td>31</td>
<td>72</td>
</tr>
<tr>
<td>2</td>
<td>Blood Glucose Levels</td>
<td>228.7</td>
<td>83.36</td>
<td>65</td>
<td>456</td>
</tr>
</tbody>
</table>

Based on the table, the average age of respondents in this study was 53.31 years, while the average blood glucose level of respondents was 228.72 mg/dl.

Table 3. Frequency Distribution of Dietary Regulation and Quality of Life

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dietary Regulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bad</td>
<td>7</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td>Needs improvement</td>
<td>106</td>
<td>50.5</td>
</tr>
</tbody>
</table>

Table 4. Hypothesis Test Results, Path Coefficient Value, F² Value and Q² Value

<table>
<thead>
<tr>
<th></th>
<th>r</th>
<th>T</th>
<th>P</th>
<th>F²</th>
<th>Q²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietary regulation &gt;</td>
<td>0.236</td>
<td>3.947</td>
<td>0.000</td>
<td>0.095</td>
<td>0.232</td>
</tr>
<tr>
<td>Quality of life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the table, dietary regulation has a significant influence on quality of life. This influence is positive, which means that the better the diet, the better the quality of life (r= 0.236; t= 3.947; p= 0.000). This predictive factor has a good ability to predict quality of life and has an effect size on quality of life (Q Square = 0.095; F Square = 0.232).

Table 5. Model Feasibility Analysis Results

<table>
<thead>
<tr>
<th></th>
<th>Saturated Model</th>
<th>Estimated Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRMR</td>
<td>0.099</td>
<td>0.099</td>
</tr>
<tr>
<td>NFI</td>
<td>0.540</td>
<td>0.540</td>
</tr>
</tbody>
</table>

Based on the table, it can be concluded that the feasibility of the resulting model is at a moderate level (NFI value= 0.540), whereas according to the SRMR value this model is considered feasible or suitable in explaining the relationship between variables (SRMR value= 0.099).

DISCUSSION

Based on the results of this research, it was found that diet is a predictive factor that has a direct influence on quality of life. The predictor value resulting from this variable is 0.236, which means that for every 1 unit increase in diet, the quality of life will increase by 23.6%. The results of the research show that the better the diet of type 2 DM sufferers with peripheral neuropathy, the better their quality of life. The dimensions assessed in this eating pattern consist of the amount of food, regularity and type of food.
Controlling diet in type 2 DM sufferers with peripheral neuropathy is a lifestyle intervention that has been proven to be effective in improving the sufferer’s health status. This improved health status can take the form of good blood sugar control, more stable body weight, reduced pain and can also improve quality of life. This is in accordance with the results of research conducted by Bunner (2015) and Storz & Kuster (2020) which stated that regulating a diet with plant-based ingredients can control body weight, control blood sugar levels and reduce the pain scale in diabetic neuropathy sufferers.\textsuperscript{19,20}

The application of dietary regulation for each person can be measured based on the amount of food, the regularity of eating and the type of eating. Amount of food means how much food is consumed at each meal, both main meals and snacks. Eating regularity means the frequency of main meals 3 times a day and can also be accompanied by snacks 2 times a day. Type of food means the content and composition of the food consumed at each meal.

Setting a healthy eating pattern will help maintain ideal body weight. Food intake has a strong correlation with obesity. The occurrence of obesity is not only related to the amount and frequency of food, but the type of food also plays an important role in the occurrence of obesity.\textsuperscript{21}

Dietary management is the main management for diabetes mellitus sufferers. The aim of this food management is to achieve and maintain ideal body weight, achieve normal glycemic levels, prevent worsening of diabetes mellitus, meet nutritional needs and also maintain the sufferer's sense of comfort. The final result of this eating management is the achievement of an optimal quality of life.\textsuperscript{22–24}

Managing diet by regulating the composition and frequency of meals is often a problem for people with diabetes mellitus. Diabetes mellitus sufferers' old habits of eating large amounts often become a problem when they are asked to adjust their eating to new existing rules. This can trigger a decline in the quality of life of diabetes mellitus sufferers and it is not uncommon for these sufferers to refuse to follow this rule. This is in accordance with the opinion of Chong (2017) who states that most diabetes mellitus sufferers will return to their original lifestyle after 2 years of suffering from diabetes mellitus.\textsuperscript{25)

However, if the diet is acceptable. So this eating pattern has a significant relationship with quality of life. As stated by Purwandari and Susanti (2017), adherence to dietary patterns has a positive relationship with the quality of life of diabetes mellitus sufferers with moderate relationship quality. On the other hand, if you eat too much, it will reduce your quality of life. As stated by Nilsson (2012), a diet containing more red meat is a negative factor in the quality of life in type 2 DM sufferers.\textsuperscript{26,27}

Diet will also be related to weight gain in DM sufferers. Where an increase in body weight of 5 kg more often results in a decrease in quality of life compared to a decrease in body weight of 5 kg.\textsuperscript{28}

The same thing also applies to type 2 DM sufferers with peripheral neuropathy, that adjusting their diet can improve their quality of life. However, the application of dietary regulation is still difficult to implement well in type 2 DM sufferers with peripheral neuropathy. Dietary management in type 2 DM sufferers with peripheral neuropathy is worse than in type 2 DM sufferers without peripheral neuropathy.\textsuperscript{29}

CONCLUSIONS

Diet is a good predictor variable for quality of life. The predictor value resulting from this variable is 0.236, which means that for every 1 unit increase in diet, the quality of life will increase by 23.6%. Dietary regulation is important to maintain properly in type 2 DM sufferers with peripheral neuropathy. So that the sufferer's quality of life can be maintained in an optimal condition for as long as possible. The role of various parties such as health workers, care givers and families is needed so that type 2 DM sufferers with peripheral neuropathy are still able and willing to maintain their diet.

ACKNOWLEDMENT

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REFERENCES


