Assessment of Enteral Nutrition Product Support and Quality of Life in Underweight Young Adults

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Abstract

Introduction: Nutrition is important to prevent diseases caused by insufficient nutrition and favors quality of life by enhancing functionality. Nutrition and diet were considered as components of quality of life definition in the past.

Objective: In this study, we aimed to assess effects of enteral product support on quality of life in underweight adults.

Methods: The study was conducted at Internal Medicine Department of our hospital. The study included 40 patients (aged 18-35) who presented with underweight and had body mass index (BMI)<18.5 between October, 2017 and March, 2018. All patients, sociodemographic characteristics were recorded and they completed SF-12 test for quality of life. Laboratory tests were ordered for etiology of underweight. Standard enteral product was prescribed to patients without organic pathology and patients were re-assessed on 3rd month. Bioelectric impedance analyses (BIA) were performed at baseline and after treatment. The relation between age, BMI, BIA parameters and SF-12 test scores were evaluated.

Results: The study was conducted on 40 patients including 32 women (80%) and 8 men (20%). Mean age was 22.8 ± 4.3 years (range: 18-35). Significant differences were detected in both physical (PCS12) and mental health (MCS12) components measured at 1 and 3 month. The difference was 6 points in PCS12 and 13 points in MCS12. The SF-12 can be a valid marker to assess and monitor health status. According to our study findings, nutritional support in young adults with BMI<18.5 has a positive effect on quality of life.

Keywords: SF-12; Nutrition; Quality of life

Introduction

Body mass index is defined as body weight (kg) divided by square of height (m²). It is widely used to classify underweight in the adults aged ≥ 20 years. According to World Health Organization (WHO) classification, individuals with BMI<18.5 are considered as underweight [1]. Underweight is also an important problem which is common such as overweight in the community. Both underweight and overweight are associated to increased morbidity and mortality and increases risk for non-infectious disorders [2].

In the latest WHO update in 2017, the underweight prevalence is about 8% worldwide. The prevalence rate is approximately 11% in Africa, 1.7% in USA, 1.3% in Europe and 20% in South Asia [3,4]. Underweight can be described as an imbalance between metabolic needs and nutrient intakes (protein, energy and other nutrients). This may cause loss of body mass and organ dysfunction. Traditionally, underweight attributes to protein and/or calorie (protein-energy) malnutrition [5].

Underweight patients have some same characteristics that make them more vulnerable including risk for higher acceptance by community or energy loss affecting functional and psychological state. Thus, it was shown that subjective methods of assessment are helpful to assess functional health of an individual or population. Such data can also be used to determine healthcare and source requirement and to improve health-related outcomes [6].

The goal of surveys assessing quality of life is to develop reliable and valid tools for various populations. There are many surveys used to measure unique or multiple health conditions [7-9]. The most striking one is Short Form-36 (SF-36) which includes 36 items and can measure 8 different functions. The SF-36 enables to assess data regarding physical functionality, mental health, emotional role, physical role, social functionality, body pain, vitality and general health data [6]. A shorter form (SF-12) was developed to decrease burden and time needed for management of questionnaire, which includes 12 items and can be used in both adults and adolescents to assess different aspects of functionality. In the SF-12, 8 health-related concepts are assessed by grouping in 2 subsets: physical health and mental health. Physical health (PCS-12) includes physical functionality, limitations caused by physical health issues, body pain and general health. Mental health (MCS-12) includes vitality (energy/fatigue), social functionality, limitations caused by emotional issues and mental health [10,11].

The aim of this study was to assess and compare physical and mental health as rated by SF-12 before and after enteral nutrition product support in patients with BMI<18.5.

Methods

The study was conducted at our hospital. This is a prospective study, included 40 patients without comorbid condition (aged 18-35) years who presented with underweight and had BMI<18.5 between October, 2017 and March, 2018. In all patients, physical examination, blood tests and anthropometric measurements (body weight and height) were performed. All patients completed SF-12 test for quality of life by face-to-face interview. Standard enteral product was prescribed to patients

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who were re-assessed on 3rd month. Bioelectric impedance analyses (BIA) were performed at baseline and after treatment. The correlations between data obtained and SF-12 summary scores were evaluated.

Continuous variables were defined by using descriptive statistics (mean, standard deviation, minimum-maximum, median). Spearman’s Rho correlation coefficient was used to assess correlation between 2 continuous variables with skewed distribution. Wilcoxon test was used to compare 2 continuous variables with skewed distribution. A p value<0.05 was considered as statistically significant. All statistical analyses were performed by using MedCalc Statistical Software version 12.7.7 (MedCalc Software, bvba, Ostend, Belgium; www.medcalc.org; 2013).

Ethical statement
All participants provided written informed consent for participation in the study. The study was approved by Institutional Ethics Committee. All procedures were conducted in accordance with criteria of Ethic Standard Committee on Human Research and Declaration of Helsinki.

Results
The study was conducted on 40 patients including 32 women (80%) and 8 men (20%). Mean age was 22.8 ± 4.3 years ranging from 18 to 35 years (Table 1).

There were significant differences (p<0.05) in BIA parameters (weight, body fat, body mass index, fat free mass, fat free index and fat index) between baseline and 3rd month (Table 2).

There were also significant differences in physical and mental health summary scores of SF-12 between baseline and 3rd month (Wilcoxon; p<0.05; Table 3).

Table 1: Demographic and laboratory data.

<table>
<thead>
<tr>
<th>Gender, n (female%)</th>
<th>32 (80)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>22.8 ± 4.3 (18-35)</td>
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<tr>
<td>Height (cm)</td>
<td>162.23 ± 8.5 (148-182)</td>
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<tr>
<td>TSH (mIU/L)</td>
<td>2.1 ± 1.3 (0.5-6.8)</td>
</tr>
<tr>
<td>Glucose (mg/dL)</td>
<td>88 ± 6 (72-100)</td>
</tr>
<tr>
<td>Uric acid (mg/dL)</td>
<td>3.8 ± 1.1 (2-7.2)</td>
</tr>
<tr>
<td>Insulin (unit)</td>
<td>7.3 ± 5.2 (13.0-2.9)</td>
</tr>
</tbody>
</table>

Table 2: Distribution of BIA parameters at baseline and on 3rd month.

<table>
<thead>
<tr>
<th>Time</th>
<th>Mean ± SD</th>
<th>Min-Max</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>43.3 ± 5.3 (34-57.5)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Month 3</td>
<td>45.7 ± 5.1 (37.1-57.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>6.8 ± 3.7 (2.1-16.8)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Month 3</td>
<td>7.3 ± 4.4 (3.0-20.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>16.4 ± 1.0 (14.3-18.4)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Month 3</td>
<td>17.4 ± 1.2 (15.2-19.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>40.2 ± 5.0 (33-54.5)</td>
<td>&lt;0.001</td>
<td></td>
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<tr>
<td>Month 3</td>
<td>40.4 ± 3.8 (36-51.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>15.35 ± 0.90 (13.3-17.9)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Month 3</td>
<td>15.7 ± 1.7 (13.5-21.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>3.2 ± 1.8 (0.8-8.0)</td>
<td>&lt;0.003</td>
<td></td>
</tr>
<tr>
<td>Month 3</td>
<td>5.3 ± 2.3 (1.1-9.8)</td>
<td></td>
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</table>

*Wilcoxon Signed Rank test; BMI:Body Mass Index; FFM Index: Fat Free Mass Index

Discussion
In this study, we aimed to demonstrate effects of enteral product support on general health status in patients without stomach and intestinal disease, without hormonal disorder who presented to internal medicine outpatient clinic with complaint of underweight.

It hasn’t been fully elucidated how general population is affected from low BMI and whether this is changed during growth. It is known that underweight is an important risk factor for patients older than 65 years in general [12].

There is limited numbers of studies about effects of underweight on general health status in young adults. BMI itself affects all causes-related mortality and self-assessment of health independently from comorbidity, mental health, health attitudes and other biological risk factors [13,14]. It was found that being underweight is associated to increase in all causes-mortality when compared to other factors and that age has greater impact than other factors. It is known that weight gain is beneficial for mortality rate but it is not true for self-assessment of health. As there is a rapid reduction in self-assessment of health, one must be careful about underweight after 38 years of age [15].

Underweight can be either cause or consequence of any disorder as well as it is encountered as a chronic condition in healthy individuals, which can affect individuals in both social and psychological manner [16]. Being underweight makes individuals more vulnerable to acute diseases. Susceptibility to infections, delayed wound healing, impaired cardiac and pulmonary functions, decreased muscle strength and higher depression rate are seen in lean individuals. Such patients more frequently seek medical attention with frequent and longer hospital visits and they have higher complication and mortality rates. In underweight individuals, medical support and dietary interventions are recommended and nutritional support is given if they failed. To avoid malnutrition, improving diet and special food supplementation when needed are simple and inexpensive measures [17,18]. In general, nutritional support optimal for a given patient should be selected. In our study, consultation with a dietician was arranged after detailed history taking, physical examination and laboratory evaluations regarding underlying cause in patients presented with underweight. Standard enteral product support (600 kcal/400 ml) was prescribed to the patients.

Several questionnaires are used to assess health status in different patient populations. The SF-12 is one of these questionnaires, which is a multi-purpose, short form used to assess general health status. It is a reliable and valid questionnaire developed for use in general and special populations. It is increasingly used since it is short and not time-consuming [10,11].

Our results are consistent with the literature. The SF-12 has potential to discriminate severity of physical and mental health conditions with internal consistency. Our results supported that health status evolves to better condition after nutritional support in patients with BMI<18.5.

In addition, there are also other potential effects of using nutritional support in underweight individuals: firstly, feasibility is increased due

Table 3: Distribution and comparison of SF-12 scores.

<table>
<thead>
<tr>
<th>Physical Health</th>
<th>Time</th>
<th>Mean ± SD</th>
<th>Min-Max</th>
<th>p</th>
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<tbody>
<tr>
<td>Baseline</td>
<td>42.1 ± 10.2 (18-59.3)</td>
<td>&lt;0.001</td>
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<tr>
<td>Month 3</td>
<td>49.0 ± 6.3 (29.6-54.9)</td>
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</table>

<table>
<thead>
<tr>
<th>Mental Health</th>
<th>Time</th>
<th>Mean ± SD</th>
<th>Min-Max</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>39.4 ± 8.1 (23.3-57.5)</td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Month 3</td>
<td>53.2 ± 6.3 (33.8-59.1)</td>
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</tbody>
</table>

Table 3: Distribution and comparison of SF-12 scores.
to shorter course of treatment; secondary, it can be used in various environment; third, it can be used to monitor health status based on studies on test-retest reliability and fourth, there are comparative norms for MCS12 and PCS12 [19-21].

During this survey, patients considered their health status and were motivated to improve. Most patients expressed their concerns regarding health status and health issues were addressed after questionnaire. As there was no underlying cause, the decision regarding enteral product use or psychiatric or dietary support was made by discussing patients in an individualized manner.

There is a need for further studies in order to prove effectiveness of nutritional support in certain underweight patient populations. Future studies should focus to identify patients at risk, providing therapeutic options directing the patient and disease. Nutrition and diet are integral part of life; thus, active participation to this process is important [22]. Our study is valuable as it aimed a specific patient population.

Based on the results in this study, it was proven that enteral product support has positive effect on general health status. Significant differences were observed in physical and mental health scores before and after enteral product. However, there is no satisfactory explanation about improvement in physical and mental health by weight gain. It was seen that adequate dietary intake of nutrients such as energy, protein, polyunsaturated fatty acids, antioxidants, vitamins, iron, iodine and zinc have positive effects on cognitive development and functions. In our patient group, without underlying disease was detected; thus, it is reasonable to suggest that general health status was relatively poorer due to primary malnutrition (low dietary intake). Further studies are needed to investigate effects of nutrients on health status in this age group.

Limitations

There are some limitations in this study conducted on underweight patients: a) the reliability of tests used hasn’t been assessed sufficiently in lean patients; thus, further studies are needed; b) MSC12 wasn’t addressed directly; thus, confirmation studies should be performed regarding mental health; c) the cases included were assessed based on subjective self-reports in this study; thus, further studies are needed to support these data with objective markers; d) different populations should be assessed in further studies; and e) data obtained can alter based on mood as our study relies on patient self-reports [21,23].

Conclusion

Significant difference was found in the assessment with SF-12 after support with enteral products in underweight young adults. It was seen that enteral nutrition products can be helpful to improve quality of life and to restore physical and mental health status in underweight young adults.

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