ASSESSMENT OF QUALITY OF LIFE IN PATIENTS AFTER LOWER LIMB AMPUTATION

PROCENA KVALITETA ŽIVOTA PACIJENATA NAKON AMPUTACIJE DONJIH EKSTREMITETA

Aleksandar KNEŽEVIĆ1, Tatjana SALAMON2, Miroslav MILANKOV2,3, Srdan NINKOVIĆ2,3, Milica JEREMIĆ KNEŽEVIĆ2 and Snežana TOMAŠEVIĆ TODOROVIĆ1,2

Summary

Introduction. Lower extremity amputation is a surgical procedure resulting in important anatomical, functional, psychological, and social consequences that can influence the quality of life of these patients. The aim of this research was to compare the quality of life of patients with lower extremity amputation and people without amputation taking into account gender differences as well as the amputation level. Material and Methods. The study was designed as a cross-sectional study which included 56 subjects. The patients from the experimental group underwent prosthetic rehabilitation treatment at the Department of Medical Rehabilitation, Clinical Centre of Vojvodina. The experimental group included 28 patients (21 male, 7 female) with lower extremity amputation, their average age being 65.36±13.64. The control group consisted of 28 age and gender matching subjects without amputation. Research ANd De- ve-lopment (RAND) 36 – Item Health Survey 1.0 (SF – 36) was used to measure the quality of life. Results. The results showed that patients with lower extremity amputation scored lower than the control group on all SF-36 variables (p<0.05). None of the SF-36 variables differed between the genders (p>0.05). Seventeen (61%) patients were with transfemoral, and 11 (39%) with transibial level of amputation. The patients with transibial amputations scored higher on physical functioning and general health status variables (p<0.05). Conclusion. The patients with lower extremity amputations have numerous limitations compared to the control group, regardless of gender, while the patients with lower level of amputation have a higher level of physical functioning. Key words: Quality of Life; Lower Extremity; Amputation; Questionnaires; Sex Characteristics; Motor Activity; Adaptation, Psychological

Introduction

Amputation is a surgical method by which a part or the whole extremity is being removed. Anatomical loss is also manifested by the consequential loss of the function, change of the distribution of body mass, coordination disorder and psychosocial dis-orders. The most common causes of surgical amputations are the complications caused by diabetes (diabetic foot) including a number of vascular complications in the form of ischemia and peripheral artery disease [1–3]. Different types of prostheses and good training to use them properly enable the
lower extremity amputees to walk normally and carry out their daily activities independently.

The World Health Organization defines the quality of life as one’s own perception of their own life in the context of the culture and value systems in which they live, but also in relation to their own goals, expectations, standards and interests. The quality of life is a broad concept and consists of physical, mental and social health of an individual, his/her financial independence, i.e. level of independence and the personal attitude towards important developments in the society [4–7]. The highest number of lower extremity amputations is performed due to complications caused by a vascular disease in the old age, often followed by more comorbidities which further complicate the rehabilitation treatment and impede the normal functioning of a patient [8]. Additional problems that amputees are faced with are phantom pain, stump pain and numerous infections [9]. Proper personal hygiene, every day activities, getting in and out of cars and normal functioning are often difficult or impossible because the patients are faced with the loss of independence and need to depend on others, which considerably contributes to a poor physical, psychological, social and financial aspect of their lives [10]. The aim of this study is to assess the quality of the life of the patients with lower extremity amputation in relation to the control group, as well as to examine their quality of life, depending on the gender and the level of amputation.

**Material and Methods**

The study was designed as a cross sectional study and it included 56 subjects, aged 30 to 83 years. The experimental group consisted of 28 patients, their average age being 65.36 ± 13.64, with unilateral amputation of lower extremities, while the control group consisted of 28 people (average age 63 ± 13.74) with intact lower extremities. After amputation, the patients went through prosthetic rehabilitation phase at the Department of Medical Rehabilitation, Clinical Center of Vojvodina. The criteria for inclusion of the patients into the study were: unilateral transtibial or transfemoral amputation of lower extremities, the ability to walk with the help of prosthesis with or without aids, period of ≥ 6 months after the completion of rehabilitation treatment at the Department of Medical Rehabilitation to the time of questionnaire completion. The inclusion criteria for the control group included the presence of lower extremities, ability to walk independently, homogeneity in relation to age and gender in the experimental group and having two chronic diseases at most.

The quality of life was assessed with Research And Development (RAND) 36-Item Health Survey 1.0 (SF - 36) - the version translated into Serbian. The SF-36 version consists of 36 questions with multiple choice answers relating to 8 different domains (divided into two groups: the physical health and mental health component): physical functioning, limitations of their usual roles due to the physical health, pain, general health, limitations of their usual roles due to the emotional problems, energy/fatigue, emotional well-being and social functioning. The score for each scale ranges from 0 to 100, the higher score indicating a higher level of functioning or a higher level of well-being [11].

Statistical analysis of the data was performed by the statistical program STATISTICA 5.5. The results are presented using standard statistical measures of central tendency and range of results. T-test was used to test the statistical significance of independent samples.

**Results**

The conducted study included 28 patients: 21 (75%) men and 7 (25%) women with unilateral transtibial or transfemoral amputation of lower extremities. Seventeen patients (11 men and 6 women) had transfemoral and 11 patients (10 men and 1 woman) had transtibial amputation (Graph 1).

The control group consisted of 28 subjects without amputations, homogenous regarding gender and age 63 ± 13.74 with intact lower extremities. After the control group consisted of 28 people (average age 65.36 ± 13.64, with unilateral transtibial or transfemoral amputation of lower extremities, the ability to walk with the help of prosthesis with or without aids, period of ≥ 6 months after the completion of rehabilitation treatment at the Department of Medical Rehabilitation to the time of questionnaire completion.

### Table 1. The SF-36 questionnaire results (experimental and control group)

<table>
<thead>
<tr>
<th>SF-36 questionnaire/Group</th>
<th>Experimental group (Eksperimentalna grupa)</th>
<th>Control group (Kontrolna grupa)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical functioning/Fizičko funkcionisanje</td>
<td>40.18 ± 24.47</td>
<td>84.10 ± 17.9</td>
<td>-7.66</td>
<td>0.00</td>
</tr>
<tr>
<td>Role limitation due to physical health</td>
<td>25.89 ± 39.37</td>
<td>75.89 ± 35.01</td>
<td>-5.02</td>
<td>0.00</td>
</tr>
<tr>
<td>Ograničenje usled fizičkog zdravlja</td>
<td>49.46 ± 22.99</td>
<td>62.03 ± 14.63</td>
<td>-2.44</td>
<td>0.017</td>
</tr>
<tr>
<td>Pain/Bol</td>
<td>50.14 ± 23.89</td>
<td>69.28 ± 18.49</td>
<td>-3.53</td>
<td>0.001</td>
</tr>
<tr>
<td>Rolni omeđenje usled zdravstvenih stanja</td>
<td>38.08 ± 41.29</td>
<td>86.90 ± 31.87</td>
<td>-4.95</td>
<td>0.00</td>
</tr>
<tr>
<td>General health status/Opšte zdravstveno stanje</td>
<td>48.57 ± 23.37</td>
<td>70.71 ± 14.95</td>
<td>-4.22</td>
<td>0.00</td>
</tr>
<tr>
<td>Omeđenje usled emocionalnih problema</td>
<td>56.92 ± 26.43</td>
<td>76.60 ± 18.82</td>
<td>-3.34</td>
<td>0.001</td>
</tr>
<tr>
<td>Emotionality/Emocionalno blagostanje</td>
<td>62.05 ± 26.67</td>
<td>89.28 ± 18.23</td>
<td>-4.46</td>
<td>0.00</td>
</tr>
<tr>
<td>Social relations/Socijalno funkcionisanje</td>
<td>60.14 ± 23.89</td>
<td>75.89 ± 35.01</td>
<td>-5.02</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**Table 1. Rezultati SF-36 upitnika**

**Knežević A, et al. Quality of life after lower limb amputation**
age \((t = 0.809, \ p = 0.421)\) in relation to the experimental group.

The youngest subjects in both groups were 30 and the oldest were 83 years old.

The obtained results have shown a statistically significant difference in the quality of life of the patients with lower extremity amputations compared to the quality of life of the control group, present in both domains of research: the physical component of quality of life consisting of questions about their physical state, activities and pain and the mental component of their quality of life, which is explicit regarding the social functioning, vitality and emotions of the subjects (Table 1).

When compared to the men, the women in the experimental group attained lower scores in all tested variables, except in the variable of physical functioning of SF-36 questionnaire. This difference, however, did not reach a statistical significance (Table 2).

The results of the SF-36 questionnaire pertaining to different levels of amputations are shown in Table 3. The patients with below-knee amputations have less limitations in physical functioning (52.27 ± 3.25) compared to the patients with above-knee amputations (32.35 ± 21.29) \((p < 0.05)\). A statistically significant difference is present in the domain of general health where below-knee amputees achieve better results when their physical functioning and their own perception of their health are taken into consideration (Table 3).

**Discussion**

Amputation brings a major change in an individual’s life, whose image of their own body is changed; movement activities and self-care are made more difficult; the psycho-social status of the patient’s life is changed as well and the performance of professional and other activities are significantly affected. The most affected function is walking, especially in different terrains and slopes [10].

Lower extremities amputations are more often done on men, usually at the age between their fifties and seventies [12, 13]. In our research, the experimental and control group did not differ demographically. There were more men than women (3 times more) in both groups, and the average age of the patients with amputation was 65 years.

The biggest difference in the obtained results of the SF-36 questionnaire was in the domain of physical functioning; however, the tested subjects achieved significantly lower scores of the SF-36 questionnaire in all tested variables when compared to the control group. These results could be expected, although some authors did not find that the patients with lower extremity amputations had such deteriorated quality of life [14]. The reason for this discrepancy can probably be found in the fact that transfemoral amputations in these studies are represented in a smaller number (16%), compared to our 61% [14]. It is very likely that the ability to move has the greatest impact on a group of variables related to physical health component. We must bear in mind that a large number of factors affect these people’s ability to move, as well as their overall quality of life [8, 15, 16]. Patients with lower extremity amputations usually have associated chronic diseases, such as diabetes and cardiovascular disease. The reason for such worse scores of the SF-36 questionnaire can be found in the limitations resulting from these diseases [17–23].
Table 3. Comparison of the SF-36 questionnaire results between transtibial and transfemoral amputation level

<table>
<thead>
<tr>
<th>SF-36 questionnaire/Level of amputation</th>
<th>Transtibial</th>
<th>Transfemoral</th>
<th>p</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF-36 upitnik/Nivo amputacije</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical functioning/Fizičko funkcionisanje</td>
<td>52.27 ± 25.03</td>
<td>32.35 ± 21.29</td>
<td>0.03</td>
<td>2.26</td>
</tr>
<tr>
<td>Role limitation due to physical health/Ograničenje usled fizičkog zdravlja</td>
<td>40.90 ± 47.79</td>
<td>16.17 ± 30.54</td>
<td>0.1</td>
<td>1.68</td>
</tr>
<tr>
<td>Pain/Bol/56.36 ± 29.94</td>
<td>43.53 ± 19.10</td>
<td>0.16</td>
<td>1.44</td>
<td></td>
</tr>
<tr>
<td>General health status/Opšte zdravstveno stanje</td>
<td>61.36 ± 25</td>
<td>42.88 ± 20.73</td>
<td>0.04</td>
<td>2.12</td>
</tr>
<tr>
<td>Role limitation due to emotional problems/Ograničenje usled emocionalnih problema</td>
<td>54.54 ± 45.39</td>
<td>27.43 ± 35.8</td>
<td>0.08</td>
<td>1.76</td>
</tr>
<tr>
<td>Vitality/Energija/umor</td>
<td>56.36 ± 29.94</td>
<td>43.53 ± 19.10</td>
<td>0.16</td>
<td>1.44</td>
</tr>
<tr>
<td>Emotional wellbeing/Emocionalno blagostanje</td>
<td>60.73 ± 29.05</td>
<td>54.29 ± 25.18</td>
<td>0.54</td>
<td>0.62</td>
</tr>
<tr>
<td>Social relations/Socijalno funkcionisanje</td>
<td>67.77 ± 30.52</td>
<td>60.29 ± 24.69</td>
<td>0.67</td>
<td>0.42</td>
</tr>
</tbody>
</table>

Compared to the control group, the patients with lower extremities amputations achieve significantly lower scores in the part of the SF-36 questionnaire pertaining to the pain variable. Such results are expected, given that the amputees experience phantom pain, pain in residual and intact extremities and back pain [9]. From this point of view, the study results of Kazemi et al. are very interesting as they found there was a greater degree of anxiety and depression in the patients with chronic pain than in the patients with phantom pain [24]. When we compared the values of variables SF-36 in the patients with lower extremity amputations in our study with the values of the same variables of the patients with rheumatoid arthritis or lumbar radiculopathy, we discovered some interesting facts [25, 26]. Some variables related to the physical component of the quality of life in our experimental group had higher values than the same variables in the patients with radiculopathy at the beginning of treatment [26]. The reason for this probably lies in the fact that these patients were examined in the acute phase of radicular disease when the symptoms (especially pain) are most prominent. Due to the existence of numerous emotional problems such as the feeling of guilt, anxiety and depressive behavior, patients with lower extremity amputations have numerous limitations caused by their emotional state [14, 27–29]. The results of the questionnaire SF-36 for assessing the quality of life in the domain of mental health indicate numerous emotional and social problems the amputees are faced with. Of these problems, the lack of energy and depression particularly stand out as they significantly contribute to the reduction in physical functioning besides the existing limitations caused by amputation [30, 31].

Literature offers scarce data concerning the differences between functional enabling of men and women after lower extremities amputation [32]. In our study, the women had lower scores of the SF-36 questionnaire in all tested variables (except the physical functioning), although this difference does not have a statistical significance. One of the possible reasons why the women in the experimental group had lower results may be a higher number of transfemoral amputations when compared to the men. Lafèbvre et al. also reported a higher number of transfemoral level of amputations in women in their research [33]. Hirsh et al. found no significant difference in the presence of pain between the genders in their study [13]. Frlan-Vrgoć et al. found no significant difference between men and women regarding their ability to walk, while Singh et al. found that the prosthetic rehabilitation was rarely successful in women when compared to men [32, 34].

The patients with transtibial amputation level are much more mobile than the patients with transfemoral amputation level [8, 35–37]. This is probably one of the reasons why the results of individual domains of the SF-36 had significantly higher values (in physical functioning and general health) in the people with transtibial amputations compared to the ones with transfemoral level of amputation. When compared to the people suffering from chronic rheumatic disease such as rheumatoid arthritis, the patients with above-knee amputations achieved lower functional status, while the patients with below-knee amputations were much more functional [25].

**Conclusion**

The quality of life of patients with lower extremity amputations is significantly reduced compared to the control group, despite quite successful and satisfactory restitution of walking function and relative independence in everyday activities. In the overall physical and mental function there is no significant difference between the genders, while the patients with different levels of amputation vary in the domain of physical function and general health. The patients with transtibial level of amputations are more functional and are of better general health compared to the patients with transfemoral amputation level.
References


