

Analysis of selected factors determining quality of life in patients after lower limb amputation- a review article

Authors' Contribution:

A – Study Design
B – Data Collection
C – Statistical Analysis
D – Data Interpretation
E – Manuscript Preparation
F – Literature Search
G – Funds Collection

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Article history: Received: 08.02.2016 Accepted: 03.03.2017 Published: 30.04.2017

ABSTRACT:

The amputation of the lower limb is a crippling procedure, which impairs both physical and mental aspect of the patient's life and therefore, it is important to provide these patients with comprehensive health care. Patients and their families must change their lives and reorganize them, which is undoubtedly associated with a decrease in the quality of life.

The aim of this study was to analyze various determinants of quality of life in patients after lower limb amputation and their impact on the physical, mental and social aspect of life.

Based on the available literature, this paper discusses certain factors determining quality of life, including the presence of phantom pain and stump pain, the way patients move, independence in daily activity, occupational activity, and access to rehabilitation.

Analysis of the impact of particular factors on quality of life in people after lower limb amputation may contribute to the improvement and introduction of new paradigms regarding care provided for amputees.

KEYWORDS:

amputation, lower limb, quality of life

Lower limb amputations had already been performed by ancient surgeons. At the beginning of the 19th century, the number of amputations increased due to inventing and popularization of firearms and therefore, it became the most common procedure in military medicine. Despite the progress in medicine, the number of amputations gradually increases. In Poland between 2008 and 2011, 6.000 to 10.000 amputations were performed whereas, only in 2012 the amputation count amounted to 12.000. In-hospital mortality rate related to major limb amputation amounts to approximately 10-20%, whereas in older patients after amputation above the knee joint it may even reach 30% [1].

Lower limb amputation is performed only as a necessity, when the surgeon decided that no other treatment method is possible. Urgent amputation may be the only chance to save lives of patients in serious condition with infection spreading from necrotic tissues. This surgery is performed for various reasons. However, in 90% of cases, amputations are carried out due to vascular causes. Necrosis caused by insufficient blood supply resulting from progressing atherosclerosis or diabetic changes are among the most common indications for this procedure. Amputations are also often performed due to trauma or its consequences. Neoplasms are another reason for amputation, especially osteosarcoma. Furthermore, it may also be performed due to life-threatening soft tissue or bone inflammation. Congenital malformations and lower limb defects may also be an indication for amputation [2,3].

Limb amputation is a crippling procedure, which results in permanent damage to the motor organ, as well as mental trauma [4]. It forces the patient to reorganize his or her lifestyle, change work or even entirely quit working. People after amputations are not entirely independent anymore and must rely on other people. The postoperative period is

very difficult to them, because they need to cope with this new situation and accept their appearance.

Amputation may also improve the patient's quality of life and daily functioning. Chronic and progressive lower limb ischemia or chronic limb infection often cause severe pain, movement restriction, and disabilities in everyday tasks, so in these cases amputation is a procedure which actually decreases the disability level [4]. It is important to amputate the limb as low as possible to enable wound healing and to spare the knee joint. Then, walking with prosthesis is easier and consumes less energy [1].

After amputation it is very important to start active rehabilitation, which includes physical therapy and occupational therapy, encouraging the patient to use prosthesis and return to his routine social activities [5]. Many problems after amputation are caused by treatment-resistant phantom pains, which may last long [1,5]. The World Health Organization (WHO) defines quality of life as an individual perception of a person's life position in the context of culture, value system, and regarding the tasks, expectations and standards set by environmental conditions [6]. Quality of life depends on many factors and refers to many aspects of human life such as the physical, mental, spiritual and social aspects [7].

The aim of this study is to present the impact of individual factors on the quality of life in patients who underwent lower limb amputation, based on research conducted around the world.

Van der Schans et al. used GQPLA (The Groningen Questionnaire Problems Leg Amputation) and RAND-36 to compare quality of life in patients after amputation with and without phantom pains. The

authors recorded significant differences between these two groups in terms of various aspects. Quality of life of patients with phantom pains after amputation is significantly lower. Stump pain and walking distance proved to be the most significant determinants of quality of life. People with phantom pains could walk only 100-500 m, whereas patients without these symptoms covered 500-1000 m. Phantom pain and decreased walking distance are related to a decrease in the quality of life of patients after limb amputation [8]. Stump pains may also have a negative impact on quality of life, and may be perceived as more important for assessment of quality of life than phantom pains. Authors of this work, as well as authors of the previous studies found a significant relationship also between phantom pains and emotional problems (stress) [9].

Pain undoubtedly affects general functioning of people. However, Whyte et al. report that not only somatic symptoms such as pain have a negative influence on patients after amputation but also social dysfunction, insomnia, and anxiety. The authors used Beck Depression Inventory (BDI), which evaluates not only cognitive and affective symptoms, but also somatic and autonomic ones. According to the studies, a significant number of people after amputation do not report symptoms of depression or these symptoms are weak [10].

Japanese researchers conclude that respondents with significant pain are less satisfied with work than other participants of the study. However, no relationship has been found between pain type, its severity, and the return to the normal work rhythm. The reason for amputation, type of procedure and time since surgery, had only little influence on the patient's satisfaction with work. Makoto et al. conclude that the severity of pain does not affect return to work of patients after amputation [11].

Sinha et al. proved that amputation has a significant impact on employment, which is confirmed by the fact that 82% of amputees lost their previous job. These authors used the SF-36 questionnaire to analyze factors determining quality of life of patients after lower limb amputation [12]. They studied the determinants influencing the physical and mental aspect of quality of life. The usage of prosthesis and concomitant diseases significantly influenced the physical aspect, whereas work type together with concomitant diseases constituted the main components of mental health. Phantom pain has a significantly worse influence on physical aspect, while concomitant diseases exert unfavorable effect on physical and mental performance of patients [12].

Knezevic et al. compared the quality of life of patients after amputation with quality of life of healthy individuals. People with intact limbs declared significantly better quality of life than patients after amputation. People after amputation below the knee joint present a better physical performance, and are in better general condition than patients, who underwent above-knee amputation and whose quality of life is even lower [13].

Studies of Muraczyńska et al. prove that regardless of the type and level of amputation, as well as the time since the procedure, social activity of the patients remains on an average level [8].

Mohammed et al. confirmed the fact that amputation of the lower limb impairs physical and mental health. Researchers observed that quality of life is significantly influenced by age, sex, place of amputation and marital status, whereas level of education, work type and housing conditions do not affect the quality of life of patients after amputation [14].

Adegoke et al. have a different opinion. They claim that amputation level, the time since the procedure, and patient's age do not affect general quality of life. However, the studies show, how important it is for patients after amputation to use prosthesis in terms of quality of life.

Fortington et al. conducted research on quality of life related to health status using the RAND-36 questionnaire [16]. They present the influence of amputation level on the patient's physical condition. Sihn et al. also confirmed that people, who underwent limb amputation on the level of the knee joint or above had a significantly lower quality of life. According to them, patients after thigh amputation report a worse quality of life in comparison to the general population [12]. Physical performance after limb amputation mostly depends on age, which was also proven by Sihn et al. People above 65 years of age presented lower physical performance than younger patients. However, no significant differences were detected in terms of mental performance, fulfilling social roles, economical status and somatic symptoms between these groups [16]. Schoppen et al. claim that the performance status of older patients after amputation is low [17]. Ability to walk and the walking distance played an important role in evaluation of quality of life. People able to walk better coped with social roles, as well as people who were able to walk longer distances [16].

Findings of Zidarov et al. showed that people who use prosthesis undertake more activities than people, who do not use an artificial limb. Satisfaction with the prosthesis depends on, how useful it is and on the presence of phantom pain, as well as other psychological factors such as acceptance of one's own appearance. In the course of the study, no disorders were noticed among the respondents regarding disorders in perception of one's own body. It was more difficult for women to accept their appearance than it was for men. Researchers observed that patients with phantom pains, or pain in the other limb reported lower quality of life [18].

The lack of limb is a huge problem, regardless of the causes of amputation. Studies conducted by Norlyk et al. present the need for comprehensive treatment for amputees and their appropriate preparation for life, as well as increasing the awareness of the people regarding mental and functional consequences of limb amputation. Patients after amputation are exposed to tremendous stress, pain and grief. However, they have a strong hope for regaining independence [19].

Clearly appropriate care and rehabilitation greatly contribute to improvement in performance in patients after limb amputation. Dillingham et al. believed that in-hospital care and rehabilitation positively influence patients after amputation in contrast to the people who were sent to the nursing homes or their homes during the postoperative period. Appropriate approach, meaning rehabilitation and care in a specialized facility decreases mortality and reamputation rate, as well as helps patients to become more stable and provides them with better skills in using a prosthesis [20].

Warmuz et al. presented how patients after amputation adapt to normal life due to rehabilitation. Most of the patients aged above 70 do not want to use rehabilitation, and therefore only 20% of them take advantage of specialized rehabilitation. Almost half of the respondents use prostheses. There is clearly not enough rehabilitation centers in Poland. A significant role was played by the patient's motivation to do physical activity and wearing prosthesis, which further resulted in better mood and increase in self-esteem [21].

Napieracz-Trzosek et al. conducted research on quality of life after amputation of lower limbs due to atherosclerosis using the SF 36 questionnaire [22]. The patients, who were using the prosthesis as well as those, who were occupationally active, presented significantly higher quality of life, whereas people with difficulties in walking and with stump pain assessed their quality of life as much lower. No differences were observed between these two groups in terms of emotional functioning. The study encompassed patients from Poland and Germany. German patients had a better quality of life. Lack of facilities for handicapped people did not result in decrease in quality of life among Polish respondents. Regardless of patient's nationality, accurate rehabilitation was considered to determine normal functioning in everyday life [22].

Kauzlaric et al. conducted a study among patients who underwent amputation due to neoplasm. They proved that appropriate rehabilitation increases the patient's performance and contributes to the return to family and social life [23].

As reported by Bragaru et al., doing sports also has a significant influence on functioning of patients after amputation. Physical activity has a positive effect on mobility of patients, as well as on mental and social functioning. The authors report that people after amputation, are often unaware of the possibility to use various objects, devices, and facilities. Therefore, they should be educated regarding the rehabilitation and physical activity after amputation, as well as encouraged to lead an active lifestyle in order to improve their comfort and self-esteem [24].

It is very difficult for patients after amputation to adjust to changes and a new lifestyle. Akarsu et al. compared the quality of life and functioning of patients after a unilateral and bilateral amputation of lower limbs. People who underwent bilateral amputation are significantly less physically fit, and report a depressed mood. The authors observed that the use of prosthesis significantly impacts patients' quality of life after amputation. The quality of life and patients' satisfaction increases, when they use prosthesis. The perception of one's own body and satisfaction with prosthesis did not differ in the context of amputation level [25].

The study conducted by Oaxford et al. was to assess patient's performance status after lower limb amputation. None of the respondents suffered from depression. Good coping and psychological growth regulate patient's mental condition after amputation [26].

Stutts and et al. conducted a study to determine the effect of individual factors on post-traumatic psychological growth. The engagement in activity of support groups had a significant impact on "patient's rise" after surgery. The time that passed since the procedure did not have a significant impact on post-traumatic growth, whereas patients' age did influence post-traumatic growth. Old people found it more difficult to regain mental balance than the young ones [27].

Phelps et al. examined depression symptoms, post-traumatic stress disorder (PTSD), and posttraumatic growth after 6 and 12 months following the amputation. The level of post-traumatic growth was reported to be relatively low. Six months after surgery, the patients presented negative cognitive processing, whereas 12 months after surgery cognitive processing was positive [28].

Hawkins et al. informed that lower limb amputation leads to serious

life changes. The authors studied the impact of social integration on life of patients who underwent amputation. People, who are less integrated with the society, cope less effectively with moving. In the group of people who are well socially integrated, over 70% of respondents walked with a fast gait, and only 10% did not walk at all. Social network influences quality of life. The stronger the bond with society, the higher the quality of life [29].

Tekin et al. compared the quality of life of amputees with the quality of life of patients after surgical reconstruction. People after lower limb amputation, despite the fact that it is a drastic procedure and it is performed only when there is no other option, presented higher quality of life and vitality, as well as less severe pain than patients, in whom a lower limb was preserved.

Eiser et al. also compared the quality of life of the patients after limb-preserving surgery with quality of life of those who underwent primary and secondary amputations. All respondents reported decreased quality of life, and believed that own perception of the body and everyday performance impact quality of life. Although no differences in quality of life were detected, patients with a preserved limb better cope with every-day life and less frequently need help while moving [31].

The studies conducted by Krans-Schreuder et al. show that amputation may also improve quality of life. Most respondents were patients after lower limb amputation. Patients report that their life improved, and pain as well as sleep problems decreased. People after amputations, who used prosthesis, say that they would decide to undergo amputation again [32].

Fiodorenko-Dumas et al. checked what is the impact of the amputation on sleep disorders. Majority of respondents experienced sleep problems simultaneously with the pain. The problem with self-acceptance was a significant factor contributing to sleep disorders.

Wegener et al. presented the impact of management of one's own health on changes in people's behavior in certain time intervals. This study was designed to test the acceptance level and communication skills of people after lower limb amputation, basing on management of one's own health. The researchers assumed that this will have better results than regular support groups. Respondents were subjected to special interventions. Persons assigned to the SM group (self-management) underwent nine, 90-minute group sessions led by qualified leaders. Respondents from this group demonstrated weaker depression, and lower functional limitations after 6 months. These individuals also had higher sense of self-efficacy. The interventions applied have a significant impact primarily on those who are less than 3 years after amputation and people under 65 years of age. Application of such interventions in people after amputation can considerably improve their functioning in the society [31].

In summary, lower limb amputation is a crippling procedure that permanently changes lives of patients. Therefore, it is crucial to provide comprehensive care to patients after amputation. Appropriate treatment and rehabilitation may improve patients' quality of life and enable to return to everyday life in the society. Analysis of the impact of particular factors on quality of life in people after lower limb amputation may contribute to the improvement and introduction of new paradigms regarding care provided for amputees.

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Word count: 2800

Page count: 5

Tables: –

Figures: –

References: 34

DOI: 10.5604/01.3001.0009.8980

Table of content: <http://ppch.pl/resources/html/articlesList?issuelid=9556>

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Competing interests: The authors declare that they have no competing interests.



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