ORIGINAL ARTICLE

A preliminary evaluation of normative and realistic needs for prosthetic treatment among frail elderly patients in Serbia

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Abstract *Background/purpose:* Common to all frail elderly patients in Serbia is the fact that only little or no attention is given to their dental care. A normative need for prosthetic treatment exists for all partially edentulous and edentulous patients who lack adequate prosthetic devices. The realistic need for treatment means the opportunity to perform the treatment that will be beneficial for each patient individually. The goal of this study was to determine the normative and realistic needs for prosthetic treatment among frail elderly patients in Serbia.
Materials and methods: The study involved 117 elderly and frail patients provided service at the Geriatrics Institute in Belgrade, and among families in suburban municipalities. We determined the patients' dental status, cognitive status, general health condition, and desire for treatment.
Results: Results showed that 82.9% of patients had normative need for prosthetic treatment. Realistic need for prosthetic treatment was significantly lower—that is 19.7% to 28.2% of patients can be provided appropriate prosthetic treatment in order to improve their oral functionality and quality of life.
Conclusion: Although realistic need for prosthetic treatment is significantly lower than normative need, treatment shouldn't be denied to patients who can receive it, especially when the treatment recommended is less invasive.
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Introduction

Frail elderly patients are unable to live independently and perform day-to-day activities, and so are dependent on other people's care. They are accommodated in private households, hospitals, and institutions for long-term care, making up about 5% of the population over 65 years of age.[1] In Serbia, there are no current valid data on the number of frail elderly people, but it is known that this number is constantly increasing due to the aging population and inadequate health care. According to the data obtained, the majority of frail elderly people in Serbia are taken care of at home by family members. This is primarily a result of the poor economic situation and inability to provide long-term institutional care.

What is common to all types of care available for bed-ridden patients in Serbia is that little or no attention is given to their dental care. This can further undermine their general health and cause many complications, such as malnutrition. Even if some kind of prosthetic dental treatment is feasible, it may be complicated due to the patients' dependence on others and compromised general health condition.[2] Therefore, the basic principle in establishing recommendations for these patients is making a distinction between a normative (theoretical) need and a realistic need for treatment. All partially and completely edentulous patients without adequate prosthetic devices have a normative need for such treatment. Realistic need refers to the opportunity for such patients to receive adequately beneficial treatment as individuals.[1,3]

In practice, determining realistic need implies that a patient desires treatment, has partially or completely preserved mental status, and has a general state of health that allows prosthetic treatment. Mental health and cognitive functions are relevant in the sense that proper communication must be established with the patient, and he/she must, to some extent, understand the basics of a prosthetic treatment.[4] Desire for treatment is essential for better adaptation to dentures, which is the case with independent patients as well.[3]

Treatment feasibility in frail elderly patients depends on their psychophysical condition, and ranges from emergency and palliative treatments intended to numb pain and reduce risk of serious dental complications, to comprehensive prosthetic treatment for patients who are fully mentally and medically capable of receiving the treatment.[3,5] For frail elderly patients, comprehensive prosthetic treatment should generally be reduced to minimally invasive treatments, such as making complete and partial dentures and overdentures.

Since there is very little information on the condition of dental care for frail elderly patients in Serbia, it is necessary to first determine the normative needs for prosthetic treatment as a basis to create a strategy for providing systematic care. It is also necessary to assess realistic possibilities for care taking into account circumstances which could compromise the outcome of dental treatment and patients' adaptation to a prosthetic device. The aim of this study was therefore to determine both normative and realistic needs for prosthetic treatment among frail elderly patients in Serbia.

Materials and methods

This study involved a total of 117 patients who were frail and elderly. It was conducted in the Geriatrics Institute of the Zvezdara Hospital Center in Belgrade with 52 patients participating, and in three Belgrade suburban municipalities with the participation of 65 patients living with families. In the Geriatrics Institute, patients were selected consecutively by the admission date; at the beginning of the study, a total of 58 patients were receiving care at the Institute, but only 52 participated in the study. The rest of them were suffering from severe general health complications and were being treated in the intensive care unit. The patients living in their homes were also selected consecutively from the data provided by the Belgrade Gerontology Center responsible for three suburban municipalities in Belgrade. Data showed 80 patients, but only 65 agreed to participate in the research. Both parts of the research were conducted over the same period, with three visits made between January and October 2009. Informed consent for participation was signed by the patients or a member of their family, depending on the patient's mental status. Approval for research methods was obtained from the Ethics Committee of the University of Belgrade, and all participants signed informed consent forms. The Geriatric Institute of the Zvezdara Hospital Center was chosen as the only relevant institution providing long-term care for elderly patients in Serbia. Patients living with their families participated in the research to obtain information about their need for dental treatment. The majority of frail elderly patients are accommodated in their own homes; nursing homes are rare in Serbia and are not registered as health centers.

The following procedures were used for determining the need for prosthetic treatment:

- Analysis of dental status and determination of the presence and functionality of existing prosthetic devices
- Determination of cognitive status through the Mini-Mental State Examination (MMSE)
- Analysis of general health condition
- Determination of the patient's desire for treatment

The analysis of dental status was used as a method for determining normative prosthetic need. The analysis of cognitive status, general health condition, and patient's desire for dental treatment were methods used to determine realistic need for treatment.[1,6]

The dental status analysis was done using a wooden spatula to examine the frail elderly patients under daylight, upon the recommendation of the World Health Organization.[7] To analyze prosthetic status, we determined the presence of dental restorations and their functionality, in terms of retention, stabilization, and the presence of stable or relatively stable occlusion.[6] We interviewed patients to determine whether and how often they use prosthetic devices.

We used the MMSE to determine the cognitive status and the extent of possible cognitive damage.[8] This test is suitable for routine use, because it gives a quick overview of

possible cognitive damage without telling anything about the kind of impairment. It tests five areas of cognitive function: orientation, perception, attention and calculation, memory, and language (Table 1). Each area accounts for a certain number of points, and the maximum score is 30. Any score under 23 indicates cognitive impairment.[8,9]

Specialists from the Geriatric Institute Zvezdara helped conduct analysis of the patients' general health condition. They recorded data that could have direct or indirect impact on the prosthetic treatment outcome, such as patients' capacity for independent movement, capacity to satisfy physiological needs without help, pain, and the possibility of reducing pain with drugs. Based on the results, we separated patients into three categories (Table 2). Table 2 contains description of patients' condition relevant to prosthetic treatment and corresponding ASA (American Society of Anesthesiologists) score.[10]

After the previously described examinations, each patient was asked if he or she would like a prosthetic device, or if they had dentures that were partially effective, to have them corrected. We identified normative need for treatment in all partially and completely edentulous patients without appropriate prosthetic devices, as well as

Table 2 Three categories of patients based on their general health condition.

Category	
0 points	A patient gets up, eats, and satisfies physiological needs without assistance and rarely or occasionally feels pain in the body. Symptoms can be relieved by medicines (ASA score 2).
1 point	A patient is unable to walk, eat and satisfy physiological needs without assistance. Often feels pain, symptoms cannot always be relieved by medicines (ASA score 3).
2 points	A patient is not able to move/walk, eat, and satisfy physiological needs without assistance. Often or permanently feels pain, pain cannot always be relieved by medicines (ASA score 4).

those not using prosthetic devices due to the pain or discomfort they caused. A realistic need for treatment was noted with patients who met the following conditions: normative need for treatment, mini-mental test score of 23 or higher, general health condition rated 0 or 1, and desire for treatment.[1,3]

We performed data analysis using the SPSS programme (Statistical Package for the Social Sciences, version 14.0; SPSS Inc., Chicago, IL, USA). All data were qualitative. We produced descriptive statistics as percentages and compared data using the Fisher's excat test or Pearson chi-square where apropriate. All reported P values were two-sided; differences were considered significant when the P value was <0.05.

Results

Patients' characteristics are shown in Table 3. The analysis showed no statistically significant differences in dental health status related to gender, or between patients accommodated at the Geriatrics Institute and those residing at home.

The normative need for treatment analysis based on dental care status and functionality of existing prosthetic devices is presented in Fig. 1. Results show that 97 patients (82.9%) had normative need for prosthetic treatment, a significant difference in comparison to the number of patients without such need (P = 0.000). This number encompasses all patients with normative need for treatment, regardless of whether there was a complete lack of a needed device or a device that needed to be readapted. Regarding place of residence, there was a somewhat higher number of patients with normative need for treatment living at home (45.3% compared to 37.6% who are institutionalized), but the difference was not statistically significant. There was a statistically larger number of female respondents (P = 0.01).

Results pertaining to criteria for realistic need calculation (cognitive status analysis, general health condition and desire for treatment) are presented in Table 4. The scores

Table 1 Mini-Mental State Examination.
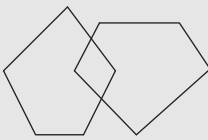
Patient_____ Examiner
_____ Date_____

Orientation

5 ( ) What is the (year) (season) (date) (day) (month)?

5 ( ) Where are we (state) (country) (town) (hospital) (floor)?

Registration

3 ( ) Name 3 objects: 1 second to say each. Then ask the patient

all 3 after you have said them. Give 1 point for each correct answer.

Then repeat them until he/she learns all 3. Count trials and record.

Trials _____

Attention and Calculation

5 ( ) Serial 7's. 1 point for each correct answer. Stop after 5 answers.

Alternatively spell "world" backward.

Recall

3 ( ) Ask for the 3 objects repeated above. Give 1 point for each correct answer.

Language

2 ( ) Name a pencil and watch.

1 ( ) Repeat the following "No ifs, ands, or buts"

3 ( ) Follow a 3-stage command:

"Take a paper in your hand, fold it in half, and put it on the floor."

1 ( ) Read and obey the following: CLOSE YOUR EYES

1 ( ) Write a sentence.

1 ( ) Copy the design shown.

_____ Total Score

Table 3 Patients' characteristics presented by gender and residence.

			Statistical significance
Gender	Male	41 (35.0%)	P = 0.001
	Female	76 (65.0%)	
Institution	Geriatric Institute	52 (44.4%)	P = 0.229
	Homes	65 (55.6%)	

on the MMSE were notably low. There was a statistically significantly larger number of patients with cognitive impairment compared to those with preserved cognitive functions. The prevalence of cognitive impairment was almost the same as in females as in males; 34 men and 36 women had a score under 23. Among the topics constituting the MMSE, the worst results were related to speaking ability (e.g., showing an object to the patient and asking them to name it); none of the patients achieved a maximum score in this area. Patients achieved the best results in perception: 106 patients (90.6%) had the maximum points in this area. There was not even distribution of patients with general health condition rated as "0", "1", and "2", and that difference was statistically significant. The health condition of most of the patients was rated as 1. A large proportion of the patients desired prosthetic treatment, a statistically significant difference.

Realistic need for treatment was assessed on the basis of the following criteria, so the patients were classified into three categories:

- Twenty-three patients had absolute realistic need for treatment (19.7%).
- Sixty-four patients did not have realistic need for treatment (54.7%).
- Ten patients with an extended realistic need for treatment (8.5%).

Absolute realistic need for treatment means that all criteria are met: mini-mental test score of 23 or over, desire for treatment, and general health status allowing implementation of a prosthetic treatment (0 or 1 points). Patients without realistic need for treatment did not meet at least two of three criteria, so that the prosthetic treatment definitely could not be performed. Based on the generally poor results of the MMSE, a new category of patients with an extended realistic need for treatment was created: those who scored 18 points or higher on the test and met the other two criteria for realistic need. We concluded they were among those able to receive minimally invasive prosthetic treatment. Based on these results, the realistic need for prosthetic treatment in this population is in the range of 19.7–28.2% of patients who can receive appropriate prosthetic treatment in order to improve their dental functionality and quality of life (Fig. 2).

The majority of patients did not have realistic need for treatment. This group of patients was larger than the group of patients with absolute realistic need for treatment (P = 0.000) and the group with extended realistic need for treatment (P = 0.000).

The proportion of patients with normative and realistic need for treatment was nearly the same whether patients resided in institutions or living with families (P = 0.942). A somewhat higher percentage of female patients had a realistic need for treatment compared to male patients (31.6% compared to 21.9%), but the difference was not statistically significant (P = 0.531).

Discussion

Although the results of the conducted dental examinations suggested that oral health in frail elderly people was better in female patients, the analysis shows that female patients had greater normative need for prosthetic treatment, reaching a level of statistical significance. The reason for this may be attributed to the greater number of female participants included in this study.

Although we expected a contrast between normative and realistic need for prosthetic treatment, there was an especially big discrepancy between these two values. The
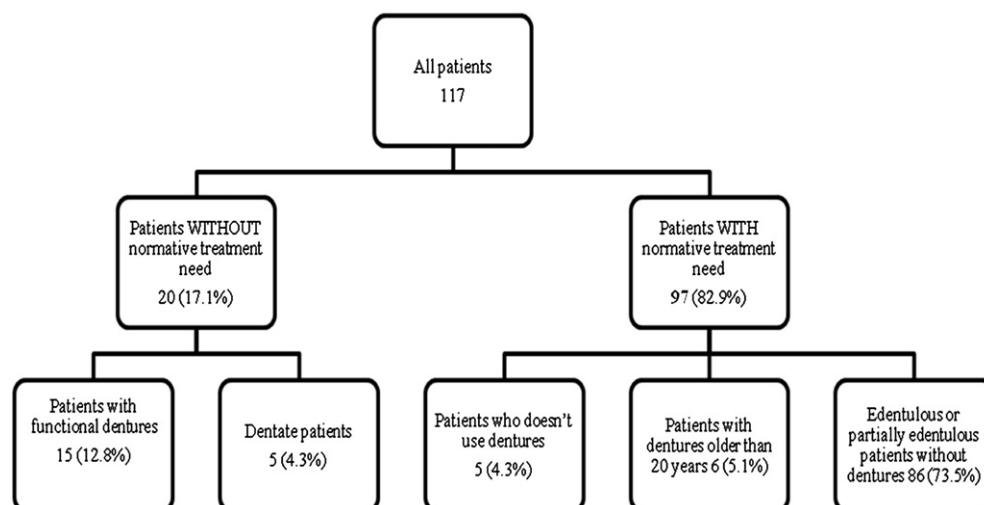

Figure 1 Calculation of normative need for treatment.

Table 4 Review of the results of criteria for the calculation of realistic need for treatment.

Criteria for a realistic need for treatment	Results		Statistical significance
Mini-mental test	Score under 23	70 (59.8%)	P = 0.033
	Score 23 and above	47 (40.1%)	
General health condition	0 points	30 (25.6%)	P = 0.071
	1 point	50 (42.7%)	
	2 points	37 (31.7%)	
Desire for treatment	Exists	86 (73.5%)	P = 0.000
	Does not exist	31 (26.5%)	

small percentage of patients with a realistic need for prosthetic devices is, above all, a consequence of the prevalence of cognitive insufficiency. Over half of the patients suffered cognitive impairment. The question then became whether the mental status of these frail elderly patients was really impaired to a certain extent, or if they found this type of examination unclear in some way. The poor results could also be the consequence of the examiner's inexperience in administering psychological tests, although one of the basic advantages of MMSE lies precisely in the possibility of its usage by medical staff inexperienced in neuropsychiatry.[11,12]

The establishment of the interval of a realistic need for treatment is logical for several reasons. Realistic need for prosthetic treatment is a hypothetical value, and more research is necessary in order to assess the extent of its achievability.[2,13] The cognitive score requirement was lowered, because we judged that where solid communication was achievable, even with some additional effort, prosthetic treatment was also possible, especially if it was less invasive. This raised the realistic need for treatment from 19.7% to 28.2%. Less invasive treatment means the treatment which is the least stressful and demanding of the patient's time, and includes readaptation of existing dentures, as well as production of partial acrylic, complete dentures, and overdentures. The percentage of patients with a realistic need for a prosthetic treatment could change significantly from the start of the therapy; however, a relatively stable general health condition could deteriorate rapidly, preventing the completion of therapy. On the other hand, good candidates for less invasive treatments could be those without cognitive impairment and with strong motivation for prosthetic rehabilitation, even if their general health is poor.
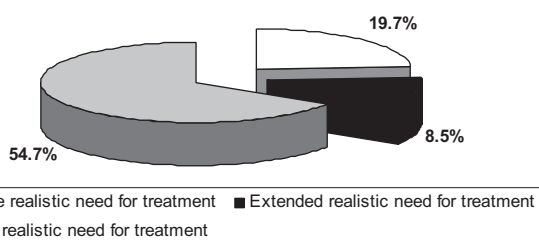
Although the dental health of frail elderly patients in Serbia is considered worse than those in developed European countries, the references in this paper show results similar levels to those obtained through our research. Mojon and McEntee[14] established that 83% of patients in long-term facilities in Canada have normative need for prosthetic treatment, but 17% of these patients would not benefit from prosthetic treatment due to serious alveolar ridge resorption. The initial investigation by Vigild et al[12] indicated that 68% of institutionalized patients in Denmark had a normative need for prosthetic treatment, 19% had a realistic need for treatment, but only a few had a realistic need for new dentures. If the possibility of uncompleted treatment is added to this calculation, the difference between the normative need and realistic need is even higher, producing findings similar to ours. Accordingly, Sabev et al[15]'s research was dedicated to measuring the degree to which realistic treatment plans could be accomplished in 3—5 months in 154 functionally dependent patients in long-term facilities. The planned treatment was carried out in 24% of patients, in 21% the treatment was planned but not achieved, while in 29% of patients the treatment was planned but only partially accomplished.[15]

Our research showed that a large number of frail elderly patients in Serbia had a normative need for a prosthetic treatment. However, due to their general health condition, cognitive impairment, or lack of desire for treatment, it was not possible to perform prosthetic treatment, so that realistic need was small. Nevertheless, treatment with dental prostheses should not be denied to patients who can receive it regardless of functional dependency, especially when the treatment recommended is less invasive.

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Realistic need for prosthetic treatment

19.7%

8.5%

54.7%

□ Absolute realistic need for treatment ■ Extended realistic need for treatment
▨ Without realistic need for treatment

Figure 2 Frequency of patients with absolute, extended, and no realistic need for treatment.

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