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Evaluation of dental health of the adult population of Kazakhstan and solutions for improving removable prosthetics

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ABSTRACT

Screening studies on dental morbidity of elderly people in the urban and rural population of the Republic of Kazakhstan were conducted. Three age groups were investigated in the districts of Almaty and Almaty oblast: middle-aged (45–59 years old), elderly (60–79 years old) and the oldest (80 years and above). A high loss of teeth was revealed, which was 79.3% in the urban and 90.6% in the rural population of the Republic of Kazakhstan, respectively. Complete absence of teeth on the upper jaw was most common in rural and city dwellers in the oldest and elderly age groups. A high frequency of complete absence of teeth was revealed in elderly rural residents (44.9%). The production of removable prostheses with a double layer base improves the quality thereof. Indications for these prostheses have been determined. In conclusion, the need for orthopedic dental care was the highest in rural areas. Complete absence of teeth on the upper jaw was most common in the oldest and elderly age groups among rural and urban dwellers. A high frequency of complete absence of teeth was revealed among elderly rural residents (44.9%). Orthopedic treatment of persons with complete absence of teeth requires improvement of this assistance. The use of removable prostheses with a two-layer base improved the quality of manufactured prostheses, providing comfort

and functional efficiency for patients. Indications for the manufacture of soft-lined prostheses have been determined and clarified.

Keywords: *dental health; dental care; Kazakhstan; orthopedic care; removable prosthetics*

INTRODUCTION

In modern dentistry, orthopedic dental treatment is carried out mainly in the adult population and has tangible success in ensuring the comfort and functional effectiveness of dentures. In recent decades, there has been an increase in the absolute number and relative share of the elderly population in the developed countries of the world.[1–4] Contemporary demography of Kazakhstan shows an increase in the proportion of elderly people in society.[1,2,5,6]

According to the classification of the Polish demographer "Rosset", in Kazakhstan, 11.6% of people over 60 years of age is classified as "proper aging."[7]

UN experts classify Kazakhstan as a state with an accelerated rate of aging; according to their forecasts, 25% of elderly people are expected in the country by 2050.[7] According to the Strategic Development Plan of the Republic of Kazakhstan, approved by the Presidential Decree in February 01, 2010 (No.922), life expectancy in the country will increase to 75.7 years by 2030, which is one of the main directions in achieving the strategic objectives of the country, including its competitiveness.[2] Therefore, the study of the dental status of the middle-aged population of Kazakhstan and the provision of high-quality dental care are of high relevance.

The purpose of this study was to determine the dental morbidity among the adult population, considering residence in urban and rural areas, as well as identifying problematic issues of dental prosthetics.

MATERIAL AND METHODS

The research program was carried out in Almaty and Almaty oblast of the Republic of Kazakhstan. Based on outpatient polyclinic organizations, a mass screening examination was conducted, and the contingent and the analysis of the state of the dental and maxillofacial system of the adult population of the Republic of Kazakhstan were determined. The clinical methods of the study were performed on specially developed WHO outpatient charts.

Target groups

Those examined were categorized into the following age groups: 45–59 years under the middle-aged group, 60–79 years in the elderly, and 80 years and above under the oldest group. The total population examined for the epidemiological study was 526 people.

To identify the problems with dental prosthetics, 104 patients were selected and underwent orthopedic dental treatment.

A total of 218 adults were examined in Almaty. 208 respondents were selected for detailed analysis, of which 34.1% (71) were men and 65.9% (137) were women.

In the age aspect, 59 people (28.4%) examined were in the middle-aged group of 45–59 years, 124 people (59.6%) were aged 60–79 years, and 25 people (12.0%) were aged 80 years or above.

A total of 318 people were examined in Almaty oblast, 75.0% of them were women and 25.0% were men. The majority (217, 68.0%) were middle-aged people, followed by elderly (98, 31.0%), and old people (3, 1.0%) were the lowest.

RESULTS

The medical examination found that most of those investigated were women, both in urban and

rural areas (65.9 and 75.0%, respectively). An analysis of the investigations by age showed that the rural population was dominated by older people (68.0%), while in urban areas more elderly people (59.6%) participated in the medical examination. We conducted an analysis of dental morbidity in the adult population of the Republic of Kazakhstan (Table 1).

The results of the study showed that there was no significant difference in the prevalence of the carious process in the rural and urban residents. The number of carious lesions during the examination included only those who had carious cavities in their teeth and required a dental treatment.

Periodontal disease was detected among urban residents almost more than twice as often as in rural residents. The analysis of the number of defects in the dentition showed that 79.3% (165) of the examined patients in the urban population had a partial defect of the dentition, and in rural residents, it was detected in 90.6% (288) of the examined patients. Thus, the presence of a high number of defects in the dentition required a large and serious orthopedic dental treatment. A complex defect of the dentition was the complete absence of teeth on one or both jaws. This condition required a complete restoration of the articulator joints of the dentition. This is a complex and time-consuming process. Therefore, we analyzed the data of people with complete absence of teeth (Table 2).

The analysis of the medical examination results showed that the complete absence of teeth in the upper jaw was more common when compared to the data of the lower jaw in all the examined age groups. The number of people with complete absence of teeth increased in accordance with age: in the urban population above the age of 80, it was 48.0%. According to our research, the total loss of teeth in the elderly age group was twice as less than in the oldest age group.

Further, the data of those with a total lack of teeth in the rural areas examined were also analyzed (Table 3).

In the middle-aged group, the total loss of teeth was 13.8%, which was significantly more than the indicators of the urban population (8.5%). In the elderly, this indicator was 44.9%, or almost half of

TABLE 1. Results of dental examination in the urban and rural population of the Republic of Kazakhstan (%).

No.	Nosological forms of the disease	Urban population	Rural population
1	Carious lesion	25.0	22.6
2	Periodontal diseases	51.4	24.8
3	Defects of the dentition	79.3	90.6

TABLE 2. The number of people with complete absence of teeth in different age groups of the urban population.

No.	Examined group	Age groups (in %)		
		Middle-aged	Elderly	Older
1	Complete absence of teeth on the upper jaw	80.0	36.7	33.3
2	Complete absence of teeth on the lower jaw	20.0	13.3	25.0
3	Complete absence of forelocks on both jaws	–	50.0	41.7
4	Total	8.5 (100%)	24.2 (100%)	48.0 (100%)

TABLE 3. The number of persons with complete absence of teeth in different age groups of the rural population of Kazakhstan.

No.	Examined group	Age groups in %		
		Middle-aged	Elderly	Older
1	Complete absence of teeth on the upper jaw	56.7	45.4	33.3
2	Complete absence of teeth on the lower jaw	16.7	9.2	–
3	Complete absence of teeth in both jaws	26.6	45.4	66.7
4	Total	13.8 (100%)	44.9 (100%)	100 (100%)

the surveyed had a complete absence of teeth, which was about twice as higher than the indicators of this age group of the urban population. These data are an alarming fact for the entire dental service of the Republic. In all the studied villagers under the elderly and the oldest age groups, the complete absence of teeth on the upper jaw was more common when compared to the absence of teeth on the lower jaw. Thus, the number of people with complete absence of teeth prevailed among the villagers in comparison with the data of the urban population in all age groups. This was a serious problem, and the dental service should take these factors into account when organizing orthopedic dental care.

Among the examined urban population, 38.0% had increased dental abrasion. This nosological form was most often found in the elderly (43.5%), and slightly less in the middle-aged group (32.2%).

The results of the survey of rural residents showed that increased tooth abrasion was found in 27.0% of the examined, including the middle-aged group (72.1%) and the elderly (26.7%).

The results were compared with the findings of the study conducted in Russia,[8,9] which observed a complete loss of teeth at the age of 60–70 years in 27% of people,[10,11] in the Republic of Kazakhstan, this indicator was 24% for urban residents and 44.9% for rural residents. According to the WHO standards, the proportion of elderly people with complete absence of teeth older than 60 years is allowed to 1%, and in our case, these indicators were much higher.

The results of a further study of 104 patients selected and analyzed for orthopedic treatment with removable prostheses were as follows:

The most common complaints were poor fixation, impaired chewing, and impaired speech and aesthetic issues. Most of the patients could not estimate the condition of their prostheses objectively. For example, there were patients who used prostheses for 10 years or more and considered the prostheses to be of high quality. Only with an objective examination, it was possible to correctly assess the condition of the prosthesis and recommend their replacement.

Complaints of speech disorders were often observed among patients who began to use a removable prosthesis for the first time. The greatest number of complaints about speech disorders was among patients with complete atrophy of the alveolar processes on the upper and lower jaws. This is quite reasonable and understandable.

As a result of an objective study, it was found that 55.3% of the surveyed complained of a violation of the act of chewing and poor fixation of prostheses on the upper and lower jaws, depending on the degree of atrophy of the alveolar processes.

Aesthetics, speech, and pain under dentures were noted in 46.8% of the cases examined. 31.9% of the patients experienced a lack of stabilization, poor quality dentures, and the need to replace the old prosthesis with a new one.

Thus, practically all patients had some complaint about a removable denture. The nature and

frequency of complaints correspond to the degree of atrophy of the alveolar processes, the quality of the manufactured prostheses, and the hygiene of the oral cavity and prostheses.

The reasons for tooth loss and the frequency of dentures play an important role in the full function of dentures. We carried out a study in which it was found that 14.9% of patients had removable dentures for the first time, 5.0% of them had a total lack of teeth and 29.6% had a partial lack of teeth. Patients with complete absence of teeth used dentures in 95.0% of cases, and those with partial absence of teeth relied on dentures in 70.4% of the cases.

The main reason for tooth extraction in patients with complete and partial absence of teeth was a periodontal disease, which amounted to 87.0%. The complication of caries was the cause of tooth loss in 13.0% of the patients with partial absence of teeth and in 19.0% of the cases in patients with complete absence of teeth.

Complete atrophy of the alveolar process was common among patients with a complete lack of teeth in 50.0% of cases, while irregular atrophy was common in 25.0% of the cases.

The patients we examined mainly complained of poor fixation and pain under removable prostheses, and on objective examination, pain occurred when the rigid bases pressed on the sharp alveolar ridges, the inner oblique mandibular lines, the torus, and exocytosis.

Based on the results of the study, all patients in this group received orthopedic care in full in accordance with the treatment indicators. To all patients who made frequent complaints about poor fixation, poor chewing of food, and speech disorders, we made removable prostheses with a two-layer basis using soft linings of various companies (Mukopren, Germany; Fuji, Japan; GosSil, Russia). Two-layer bases were mainly made to reduce the pressure of the prosthesis on the low-yielding prosthetic areas. At the same time, the soft layer of the prosthesis allowed the base to be painlessly applied to the sharp bone protrusions of the alveolar ridge and ensured uniform immersion of the prosthesis into the tissues of the prosthetic saddle.[12,13] During our study, it was found that all of the examinees had dentures with a rigid base, and the doctors did not even offer soft-padded prostheses.

Our orthopedic dentistry clinic selected 104 patients who received soft-padded prostheses. A total of 119 prostheses were made in total, for absence of teeth.

Relink soft, Fudji GC (Japan) – 19 prostheses
Mucopren soft, Kettenbach – 17 prostheses
GosSil, MedSil (Russia) – 38 prostheses.

In case of a defect in the dentition, prostheses are made of:

Relink soft, Fudji GC (Japan) – 14 prostheses
Mucopren soft, Kettenbach – 9 prostheses
GosSil, MedSil (Russia) – 22 prostheses.

When using removable soft-padded plate prostheses, patients were anxiously awaiting the sensation of pain.[14] The improvement of functional qualities allowed patients to fully use prostheses right from the first days. There were complaints of pain in certain points under the prosthesis, which were easily eliminated. The patients fully performed the act of chewing and felt comfortable. After 3–10 days, the patients were fully adapted, successfully used the prostheses, and did not complain, noted the best fixation of the prostheses and the absence of pain under the prosthesis, but some remained alert to the appearance of pain or possible breakdowns of the prostheses. The follow-up lasted for 1–6.12 months and there were no complaints.

Using these prostheses with a double-layered base, the patients received a high-quality, functional, full-fledged prosthesis, which provided them with comfort and full mastication. At the same time, we have determined additional indications for two-layer bases. According to our data, the production of soft pads in prostheses is necessary for atrophy of

the alveolar processes of various degrees, as well as exospores, acute bone protrusions, and pronounced torus. This lining can be used for intolerance to acrylic plastic, diseases of the oral mucosa (lichen planus, leukoplakia).

Based on the above mentioned, we came to the following conclusions.

CONCLUSIONS

1. High dental loss was detected among the persons examined in Almaty and Almaty oblast, accounting for 79.3% of the urban and 90.6% of the rural populations of the Republic of Kazakhstan.
2. The need for orthopedic dental care was the highest in rural areas. Complete absence of teeth on the upper jaw was most common in the oldest and elderly age groups among rural and urban dwellers. A high frequency of complete absence of teeth was revealed among elderly rural residents (44.9%). Orthopedic treatment in persons with complete absence of teeth required improvement of this assistance.
3. The use of removable prostheses with a two-layer base improved the quality of manufactured prostheses, providing comfort and functional efficiency for patients. Indications for the manufacture of soft-lined prostheses have been determined and clarified.

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