ANNOTATION

Of dissertation work of Akbota Seitkali on the topic: “Assessment of the effectiveness of medical and organizational assistance for patients with tinnitus in the Republic of Kazakhstan” submitted for the degree of Doctor of Philosophy (PhD) in the according in the specialty 8D10101 – "Public Health"

Relevance:

Tinnitus, or ringing in the ears, refers to the perception of sound in the absence of an external stimulus [1–3]. Patients describe this noise in various ways, such as ringing, buzzing, humming, crackling, rustling, siren-like wailing, or ocean waves. The characteristics and intensity of tinnitus vary from person to person, manifesting either simultaneously or intermittently. The sound sensations may be localized to one ear, both ears, or perceived throughout the head. Due to the diversity of clinical presentations, patients with tinnitus require multidisciplinary care involving general practitioners, otolaryngologists (ENT specialists), neurophysiologists, neurologists, psychologists, and other specialists [4-6].

Chronic tinnitus affects approximately 8% of the global adult population. According to the German Tinnitus League (Deutsche Tinnitus-Liga), over three million people in Germany suffer from this condition [7-14]. In North America, around 36 million people experience tinnitus daily, with about 1% of the U.S. population seeking medical help due to the condition. More than half of American adults report occasional symptoms [15]. Epidemiological studies estimate tinnitus prevalence rates between 5.1% and 42.7%. In the United Kingdom, a major observational study recorded 5.4 cases per 10,000 people with severe tinnitus [16]. The National Health Service (NHS) estimates annual treatment costs at £750 million [16].

Approximately 25% of respondents attribute tinnitus onset to noise-related injuries caused by aviation noise, gunshots during hunting, or other acoustic factors. Additionally, 65% of participants provided a clear mechanism for tinnitus onset, while 31% struggled to explain it. Stress was identified as the primary cause in 26.4% of cases, with occupational stress accounting for 54.2% of these instances. Moreover, 37% linked tinnitus to stress from domestic or psycho-emotional circumstances [17-19].

The lack of standardized treatment approaches for tinnitus continues to generate debate among specialists and patients. In the Netherlands, direct healthcare costs for tinnitus treatment reached €1.9 billion, while total disease-related expenses, including productivity loss and other costs, were significantly higher at €6.8 billion [27].

No studies on tinnitus in the Republic of Kazakhstan were found in the available literature. Furthermore, there is no clinical protocol for treating tinnitus patients. The relevance of this study lies in examining risk factors, prevalence, and the organization of medical and preventive care for patients with tinnitus in Kazakhstan.

Purpose of the study: improvement of medical and preventive care for patients with tinnitus.

Research objectives:

1. To study international and domestic experience in providing professional care to patients with tinnitus.

2. 2. To analyze the prevalence of tinnitus and risk factors influencing its development using the example of Almaty.

3. To assess the quality of life of patients with tinnitus using the example of Almaty.

4. To study the existing practice of providing medical and preventive care to patients with tinnitus.

5. To develop methodological recommendations for improving medical and preventive care for patients with tinnitus.

Research methods:

a) Bibliographic Search: Using databases such as PubMed, Cochrane, CRD, Google Scholar, and other library resources.
b) Sociological Approach: Based on international questionnaires (Tinnitus Functional Index [TFI], EQ-5D-3L).
c) Questionnaires have been developed for the population over 18 years old, ENT doctors, and neurologists.

Research Object:

ENT specialists, neurologists, and the population of Almaty aged 18 and older.

Research Subject:

The organization of medical and preventive care for tinnitus patients in Kazakhstan, including risk factors, prevalence, quality of life, and analysis of existing treatment approaches.

Main Provisions for Defense:

1. The high prevalence of tinnitus and the factors leading to its development justify the need for the development and implementation of comprehensive measures for organizing preventive care at the level of primary health care, with an emphasis on increasing public awareness of this symptom.

2. Analysis of the TFI scale showed that men had higher scores on most subscales, while women demonstrated significant differences in the "reduced sense of control" and "cognitive difficulties" subscales, as well as in the overall scale score. A strong correlation was found between cognitive impairments, hearing problems, emotional distress, difficulties with relaxation, and reduced quality of life in patients with tinnitus.

3. The use of an adapted international tool, the "Tinnitus Functional Index," allows for monitoring the patient’s condition over time, identifying the most pronounced problems, and determining treatment strategies.

4. Quality of life analysis using the EQ-5D-3L scale revealed significant issues with pain/discomfort and anxiety/depression, particularly among women and individuals over the age of 50.

5. The medical and organizational support for tinnitus patients in Kazakhstan is characterized by low efficiency, as evidenced by the lack of a multidisciplinary approach to patient management, limited access to medical services—particularly consultations with audiologists, neurologists, and psychologists—as well as restricted availability of diagnostic procedures such as speech audiometry, tympanometry, CT, and MRI.

Main results of the study:

The study resulted in the integration of research findings into practical healthcare.

1. The "Tinnitus Functional Index" questionnaire was adapted into Kazakh and Russian (Certificate of Authorship No. 52730 dated December 18, 2024).
2. Methodological guidelines titled "Management of Tinnitus Patients" were implemented in several healthcare institutions, including:
    - "City Clinical Hospital No. 5," Almaty
    - "City Clinical Hospital No. 7," Almaty
    - "City Polyclinic No. 35," Almaty
    - "Multidisciplinary Regional Hospital," Kyzylorda Region.
3. Developed a diagnostic algorithm for managing tinnitus patients.
4. Co-authored a clinical protocol for tinnitus, currently under review by the National Scientific Center for Health Development.

Justification of scientific novelty:

- For the first time, the adapted international questionnaire “Tinnitus Functional Index” has been introduced into practical healthcare for use in the Republic of Kazakhstan.

- For the first time, data on the prevalence and risk factors of tinnitus among the population of Almaty have been studied, which contributes to the expansion of epidemiological knowledge regarding this pathology.

- For the first time, the quality of life of patients with tinnitus has been assessed using international tools such as the Tinnitus Functional Index and EQ-5D-3L (EuroQol Group)- The clinical protocol "Clinical protocol for the diagnosis and treatment of tinnitus (tinnitus)" has been developed, which is at the stage of examination at the NSCRH.

- Methodological recommendations "Peculiarities of managing patients with tinnitus" have been developed, which are a practical guide for doctors and other medical professionals in Kazakhstan.

Theoretical and Practical Significance:

The adapted international questionnaire “Tinnitus Functional Index” in Kazakh and Russian will enable clinical specialists to assess treatment effectiveness both before and after its implementation.

The identified prevalence and risk factors of tinnitus will support the development of preventive measures at the primary healthcare level, including raising public awareness.

The developed methodological recommendations serve as a practical guide for physicians in Kazakhstan on the diagnosis and treatment of tinnitus. In the

absence of an officially approved clinical protocol, they fill an important gap by drawing on international experience and adapting it to the national healthcare system. The document provides primary healthcare professionals and ENT specialists with effective tools for the identification, counseling, and rehabilitation of patients, emphasizing the need for their implementation based on an analysis of current clinical practice.

Doctoral Candidate's Personal Contribution:

The presented work is the original contribution of Seitqali Akbota Seitqaliqyzy. It involves the development of the theoretical and methodological framework for the study, defining its goals and objectives, organizing and conducting the research, directly participating in all stages of the research process, performing statistical data analysis, writing dissertation chapters, interpreting and discussing results, formulating the findings to be defended, and providing conclusions and practical recommendations.

This work also includes the adaptation of the international questionnaire "Tinnitus Functional Index," the development of methodological guidelines, and participation in creating a clinical protocol for tinnitus.

Conclusions:

1. The prevalence of tinnitus in Almaty is 23.4% (95% CI: 17.5–26.4). The factors contributing to the development of tinnitus were identified using logistic regression analysis. Older adults have a 2.87 times higher risk of developing tinnitus compared to younger individuals (OR=2.87; 95% CI: 1.82–4.52), while smokers also have an increased risk (OR=2.35; 95% CI: 1.16–4.77).

2. The Tinnitus Functional Index (TFI) score among patients with tinnitus was 55.4 points. Analysis of the TFI scale showed that men had higher scores across most subscales, whereas women exhibited more pronounced issues in the aspects of "reduced sense of control" (-1.64 points) and "cognitive interference" (-0.74 points).

3. A significant correlation coefficient was found between hearing difficulties associated with tinnitus and relaxation impairment ($r = 0.769$), as well as between cognitive interference and relaxation impairment ($r = 0.815$), confirming their impact on the deterioration of quality of life.

4. Quality of life analysis using the EQ-5D-3L scale revealed significant issues with pain/discomfort and anxiety/depression, particularly among women and individuals over 50 years old. The average score on the visual analogue scale was higher in men (80 points) compared to women (75 points). The 50–69 age group rated their health condition better than other age groups.

5. Medical and organizational support for tinnitus patients in Kazakhstan is characterized by low efficiency, which can be attributed to the insufficient awareness of medical professionals (ENT specialists and neurologists) regarding modern approaches to tinnitus management, the absence of a clinical protocol for tinnitus diagnosis and treatment, and the lack of a multidisciplinary team including ENT specialists, neurologists, psychologists, and audiologists.

6. The main barriers to accessing medical care for tinnitus patients include financial costs associated with expensive diagnostic procedures (such as speech audiometry, tympanometry, CT, and MRI), as well as an insufficient number of

specialized professionals (audiologists, neurologists, psychologists) or their inadequate professional training at the primary healthcare level.

Dissertation Approval:

The key findings of the dissertation were discussed at scientific and practical seminars and meetings of the Department of Health Policy, Management, and Public Health at KazNMU.

The results and conclusions of the dissertation research were presented at the international conference:

The 7th East Asian Symposium on Otology (EASO 2022) (March 24–26, 2022, Tokyo, Japan).

Publications on the Dissertation Topic:

Publications Related to the Dissertation Research

A total of 5 scientific works have been published on the topic of the dissertation, including:

1 article in an international scientific journal indexed in the Scopus database,

3 articles in journals recommended by the Committee for Quality Assurance in Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan,

1 conference report included in collections and conference proceedings.

1. Seitkali A.S., Kosherbaeva L.K., Medeulova A.R. Study of the impact of tinnitus on the psychological state of patients: A literature review // *Nauka i Zdravookhranenie [Science & Healthcare]*. 2021. Volume 23, Issue 6, pp. 205–213. doi: 10.34689/SH.2021.23.6.022
2. Seitkali A.S., Kosherbaeva L.K., Medeulova A., Akhmetzhan A.D., Imamatdinova A.M. Tinnitus perspectives among physicians of Kazakhstan // *Nauka i Zdravookhranenie [Science & Healthcare]*. 2023. Volume 25, Issue 2, pp. 65–69. doi: 10.34689/SH.2023.25.2.009
3. Seitkali A., Hailey D., Akhtayeva N., Akhmetzhan A., Kosherbayeva L. Study of the health condition of patients with tinnitus // *Nauka i Zdravookhranenie [Science & Healthcare]*. 2023. Volume 25, Issue 5, pp. 91–96. doi: 10.34689/SH.2023.25.5.012
4. Akbota Seitkali, Lyazzat Kosherbayeva PhD, Aigul Medeulova PhD, Nurgul Alekenova, Dinmuhamed Ayaganov, Gulnara Kandygulova. Tinnitus prevalence and care experience among the population of Almaty city // *Journal of Otology.* [Online publication]. doi: 10.1016/j.joto.2024.02.003
5. Akbota Seitkali, Lyazzat Kosherbayeva PhD, Aigul Medeulova PhD. Patient experience in participating in the development of a clinical protocol for tinnitus // *7th EAST Asian Symposium on Otology (EASO 2022).*

Implementation Acts

The research findings have been implemented in practice at the following healthcare facilities:

- City Clinical Hospital No. 5, Department of Health of Almaty;
- City Clinical Hospital No. 7, Department of Public Health of Almaty;
- City Polyclinic No. 35, Department of Public Health of Almaty;

- Multidisciplinary Regional Hospital, Department of Health of the Kyzylorda Region.

Volume and Structure of the Dissertation:

The dissertation is presented on 139 pages of typed text and includes normative references, definitions, a list of abbreviations and symbols, an introduction, a literature review, a description of materials and methods, the results of the author's research, and a conclusion comprising findings, practical recommendations, and a bibliography. The work is illustrated with 6 figures, 19 tables, and contains 7 appendices. The bibliography includes 212 sources.