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EPIDEMIOLOGICAL, CLINICAL, AND PREVENTIVE FEATURES OF GERIATRIC TUBERCULOSIS IN THE CONDITIONS OF THE FERGANA VALLEY

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Abstract: Background: Tuberculosis (TB) remains a global health challenge, with a shifting burden towards the geriatric population. In developing regions like the Fergana Valley, data on "geriatric tuberculosis" is outdated, and the specific epidemiological and clinical features in the elderly (aged 60+) are poorly understood. This study aims to evaluate the epidemiological trends, risk factors, and clinical manifestations of pulmonary and extrapulmonary TB in the elderly population of the Andijan region. Methods: A retrospective and prospective epidemiological study covering the period 2020–2024 was conducted at the Andijan Regional Center of Phthisiology and Pulmonology. The study population included male and female patients aged 60–74 years diagnosed with TB. Clinical records were analyzed for comorbidities, atypical symptoms, and risk factors using WHO criteria. Diagnostic methods included GeneXpert MTB/RIF, radiography, and biochemical assays. Results: Preliminary analysis indicates a rising trend in extrapulmonary TB forms among the elderly compared to younger cohorts. Atypical clinical presentations, such as the absence of fever and dominance of weight loss/fatigue, significantly delay diagnosis. Major risk factors identified include multimorbidity (cardiovascular diseases, diabetes) and polypharmacy. The mortality rate in this demographic remains disproportionately high due to late detection and "immunosenescence." Conclusion: Geriatric tuberculosis in the Fergana Valley is characterized by specific regional risk factors and atypical clinical courses. Implementing a targeted screening algorithm for the elderly and integrating TB prevention into geriatric care is essential to reduce mortality and transmission.

Keywords: Geriatric tuberculosis, epidemiology, Fergana Valley, elderly population, extrapulmonary TB, comorbidities, prevention.

FARG‘ONA VODIYSI SHAROITIDA GERIATRIK TUBERKULYOZNING EPIDEMIOLOGIK, KLINIK VA PROFILAKTIK XUSUSIYATLARI

Annotatsiya: Kirish: Tuberkulyoz (sil) global muammo bo‘lib qolmoqda, biroq kasallik yuki tobora keksalar populyatsiyasiga siljimoqda. Farg‘ona vodiysi kabi rivojlanayotgan mintaqalarda "geriatrik sil" bo‘yicha ma’lumotlar eskirgan va keksalar (60+ yosh)dagi o‘ziga xos epidemiologik va klinik xususiyatlar yetarlicha o‘rganilmagan. Ushbu tadqiqot Andijon viloyatining keksa aholisi orasida o‘pka va o‘pkadan tashqari silning epidemiologik tendensiyalari, xavf omillari va klinik namoyon bo‘lishini baholashga qaratilgan. Usullar: Andijon viloyati Ftiziatriya va pulmonologiya markazida 2020–2024 yillarni qamrab olgan retrospektiv va prospektiv epidemiologik tadqiqot o‘tkazildi. Tadqiqotga sil tashxisi qo‘yilgan 60–74 yoshli erkak va ayollar kiritildi. Kasallik tarixlari komorbidlik, atipik simptomlar va JSST mezonlari bo‘yicha xavf omillari yuzasidan tahlil qilindi. Diagnostik usullar GeneXpert MTB/RIF, rentgenografiya va biokimyoviy tahlillarni o‘z ichiga oldi. Natijalar: Dastlabki tahlillar yoshlarga nisbatan keksalarda silning o‘pkadan tashqari shakllari ko‘payib borayotganini ko‘rsatmoqda. Isitmaning yo‘qligi va asosan vazn yo‘qotish/holsizlik kabi atipik

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klinik belgilar tashxisni kechiktirmoqda. Asosiy xavf omillari sifatida multimorbidlik (yurak-qon tomir kasalliklari, diabet) va polipragmaziya aniqlandi. Ushbu guruhda kech aniqlanish va "immun qarish" tufayli o‘lim darajasi yuqoriligicha qolmoqda. Xulosa: Farg‘ona vodiysida geriatrik sil o‘ziga xos hududiy xavf omillari va atipik klinik kechishi bilan ajralib turadi. Keksalar uchun maqsadli skrining algoritmini joriy etish va sil profilaktikasini geriatrik yordamga integratsiya qilish o‘lim va kasallik tarqalishini kamaytirish uchun zarurdir.

Kalit so‘zlar: Geriatrik sil, epidemiologiya, Farg‘ona vodiysi, keksa aholi, o‘pkadan tashqari sil, komorbidlik, profilaktika.

ЭПИДЕМИОЛОГО-КЛИНИЧЕСКИЕ И ПРОФИЛАКТИЧЕСКИЕ ОСОБЕННОСТИ ГЕРИАТРИЧЕСКОГО ТУБЕРКУЛЕЗА В УСЛОВИЯХ ФЕРГАНСКОЙ ДОЛИНЫ

Аннотация: Введение: Туберкулез (ТБ) остается глобальной проблемой, при этом бремя болезни смещается в сторону гериатрической популяции. В таких регионах, как Ферганская долина, данные о «гериатрическом туберкулезе» устарели, а специфические эпидемиологические и клинические особенности у пожилых людей (60+ лет) изучены недостаточно. Целью данного исследования является оценка эпидемиологических тенденций, факторов риска и клинических проявлений легочного и внелегочного ТБ среди пожилого населения Андижанской области. Методы: На базе Андижанского областного центра фтизиатрии и пульмонологии было проведено ретроспективное и проспективное эпидемиологическое исследование, охватывающее период 2020–2024 гг. В исследование были включены мужчины и женщины в возрасте 60–74 лет с диагнозом ТБ. Проведен анализ историй болезни на предмет коморбидности, атипичных симптомов и факторов риска по критериям ВОЗ. Методы диагностики включали GeneXpert MTB/RIF, рентгенографию и биохимические анализы. Результаты: Предварительный анализ указывает на рост внелегочных форм ТБ среди пожилых по сравнению с молодыми когортами. Атипичные клинические проявления, такие как отсутствие лихорадки и преобладание потери веса/слабости, значительно задерживают диагностику. Основными факторами риска являются мультиморбидность (сердечно-сосудистые заболевания, диабет) и полипрагмазия. Смертность в этой демографической группе остается непропорционально высокой из-за позднего выявления и «иммунного старения». Заключение: Гериатрический туберкулез в Ферганской долине характеризуется специфическими региональными факторами риска и атипичным течением. Внедрение алгоритма целевого скрининга для пожилых людей и интеграция профилактики ТБ в гериатрическую помощь необходимы для снижения смертности.

Ключевые слова: Гериатрический туберкулез, эпидемиология, Ферганская долина, пожилое население, внелегочный туберкулез, коморбидность, профилактика.

Introduction

Throughout human history, very few diseases have been as persistent and deadly as tuberculosis. For thousands of years, it has plagued humanity under grim monikers such as the "white plague," "consumption," and the "thief of youth," serving as a death sentence for millions globally. Although the advent of modern vaccines, advanced diagnostic criteria, and antibiotic therapies has significantly reduced overall morbidity and mortality rates, tuberculosis remains a

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formidable adversary. According to recent World Health Organization reports from 2021 and 2023, while the general incidence is declining, specific demographic shifts are creating new challenges that the global health community must address with urgency.

One of the most concerning trends is the shifting burden of the disease towards the elderly population. While overall tuberculosis cases may be decreasing, the risk of morbidity and mortality is paradoxically rising in specific regions and among vulnerable groups, particularly older adults and those with comorbid conditions. This demographic transition is accompanied by a change in the clinical presentation of the disease, with a notable increase in extrapulmonary forms such as pleural, lymphatic, urogenital, osteoarticular, meningeal, gastrointestinal, and cutaneous tuberculosis. The elderly are biologically more susceptible to all forms of the disease, yet "geriatric tuberculosis" remains an under-recognized and under-researched entity in the context of developing countries.

In the Fergana Valley, a densely populated and demographically evolving region of Uzbekistan, the situation is particularly critical. New scientific data suggests that tuberculosis-related mortality and disability are increasing among the elderly population. The rise of extrapulmonary tuberculosis and non-traditional clinical presentations in this age group creates significant diagnostic difficulties, leading to delayed treatment and poor outcomes. The provision of medical care is further complicated by the high prevalence of comorbidities and the adverse effects of medications, which strain healthcare resources. Furthermore, statistical data confirms that tuberculosis remains a leading cause of death in low- and middle-income countries, constituting a major part of the global disease burden.

Despite the obvious public health implications, there is a significant gap in local epidemiological data. Most studies on geriatric tuberculosis in the region rely on data that is over 30 years old. Given the dynamic nature of epidemiological laws, the true situation regarding geriatric tuberculosis may have changed three-fold or more since those studies were conducted. This outdated knowledge base is insufficient for modern healthcare planning. Therefore, there is an immediate and pressing need for new, comprehensive epidemiological research to update our understanding of the prevalence, risk factors, and clinical features of tuberculosis in the elderly population of the Fergana Valley. This study aims to fill this void by conducting a thorough epidemiological and clinical analysis, which will serve as the foundation for developing targeted preventive strategies.

Literature review

The association between aging and tuberculosis has been the subject of extensive international research, providing a global context for our local investigation. Studies conducted in diverse nations including China, India, the United States, Brazil, Mexico, Chile, Venezuela, South Africa, and Uruguay have consistently demonstrated a strong correlation between advanced age and tuberculosis incidence. These studies reveal that the prevalence of tuberculosis in individuals aged 75 and older is more than four times higher than in those under 40 years of age. This dramatic increase highlights the vulnerability of the aging immune system, a phenomenon often referred to as immunosenescence.

A particularly striking finding in the literature is the high rate of extrapulmonary tuberculosis in the geriatric population. Research by Raviglione et al. (1992), Schaaf et al. (2010), Xia et al. (2011), and Pratt et al. (2011) indicates that up to 50% of tuberculosis cases in the elderly are extrapulmonary. This shift from the classic pulmonary presentation to extrapulmonary sites complicates diagnosis, as symptoms may be vague or mimic other age-related conditions.

AMERICAN ACADEMIC PUBLISHER
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The World Health Organization (2013) has also highlighted this trend, emphasizing the need for high clinical suspicion when treating elderly patients with unexplained symptoms.

The clinical presentation of geriatric tuberculosis is notoriously atypical, often described as "silent." Meta-analyses by Perez-Guzman et al. (1999), Pottumarthy et al. (1999), and Kobashi et al. (2008) have shown that elderly patients frequently lack the classic triad of fever, night sweats, and hemoptysis. Instead, they present with non-specific signs such as anorexia, fatigue, weight loss, and cognitive decline. These "masked" symptoms lead to significant diagnostic delays, often resulting in the disease being identified only at an advanced stage or post-mortem. The literature suggests that the prevalence of undiagnosed active tuberculosis in the elderly may be double that of recognized cases due to this cryptic presentation.

The prognosis for geriatric tuberculosis is further darkened by the presence of comorbidities. As the elderly population grows, the burden of tuberculosis-related mortality and Disability-Adjusted Life Years (DALYs) is forecast to increase. This is inextricably linked to the rise in concurrent chronic conditions such as diabetes mellitus, cardiovascular diseases, and malignancies, as well as the use of immunosuppressive therapies. The World Health Organization has warned that if these factors are not adequately assessed through systematic screening, geriatric tuberculosis could pose serious problems for global tuberculosis control in the future. Researchers like Gandhi et al. (2010), Abuaku et al. (2010), and Tatar et al. (2012) have provided substantial evidence supporting this warning, showing that failure to manage comorbidities leads to poor treatment outcomes.

Despite significant global efforts, the decline of tuberculosis in industrialized countries has plateaued or even reversed in recent years due to the weakening of prevention programs. Reports indicate that even in developed nations like the USA, tuberculosis rates, which had been falling for 30 years, have been steadily rising since 2020. With 1.5 million deaths annually, tuberculosis remains the world's deadliest infectious killer. This worrying trend, combined with the prevalence of latent tuberculosis infection which is asymptomatic but can reactivate in the elderly, underscores the critical need for targeted screening programs. The high risk of treatment failure and the complexity of managing polypharmacy in the elderly make geriatric tuberculosis a priority for preventive medicine. Therefore, new epidemiological studies must focus on this demographic to inform national and regional programs, ensuring that active case finding and preventive strategies are tailored to the unique needs of the elderly.

Materials and methods

Study Design and Setting This study employs a mixed retrospective and prospective epidemiological design, covering the period from 2020 to 2024. The research is based at the Andijan Regional Center of Phthisiology and Pulmonology, which serves as the primary referral center for the region.

Study Population The study focuses on the "geriatric" and "elderly" categories as defined by WHO:

Inclusion Criteria: Patients aged 60–74 years (elderly) and 75+ years (senile) diagnosed with any form of active tuberculosis (pulmonary or extrapulmonary).

Exclusion Criteria: Patients <60 years, HIV-positive status (to isolate age-related factors from HIV-related immunosuppression).

Data Collection We analyzed medical records (inpatient charts, outpatient cards) to extract data on: Demographics - Age, gender, ethnicity, residence (rural/urban). Clinical Forms - Pulmonary vs. Extrapulmonary (pleural, lymphatic, bone, meningeal, urogenital). Risk Factors -

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
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Nutritional status (BMI), smoking, alcohol use, and comorbidities (arterial hypertension, diabetes, gastrointestinal diseases). Symptoms - Presence/absence of fever, cough, weight loss.

Diagnostic Methods The diagnosis of TB was confirmed using a combination of: 1) Microbiological - Sputum smear microscopy and GeneXpert MTB/RIF assay. 2) Radiological - Chest X-ray, MSCT (where indicated). 3) Biochemical: Blood analysis (protein, bilirubin, ALT, AST, creatinine, glucose).

Statistical Analysis - Data processing was performed using Excel 2022 and standard statistical software. Non-parametric tests (Kolmogorov-Smirnov, Mann-Whitney U) and Pearson's correlation coefficient (r) were used. A p-value of <0.05 was considered statistically significant.

PRELIMINARY RESULTS AND EXPECTED OUTCOMES

Epidemiological Trends Initial analysis suggests that the prevalence of TB in the Andijan region has a distinct age-related peak in the 60-74 age group. Unlike younger populations where pulmonary forms dominate, the elderly cohort shows a significant proportion (approx. 35-40%) of extrapulmonary or disseminated forms.

Clinical Characteristics The clinical picture in the study group differs markedly from classic descriptions. 1) Fever - Observed in only 30% of elderly patients (vs. 75% in younger controls). 2) Weight Loss - The most consistent symptom, present in 85% of cases. 3) Masked Onset - Many patients were treated for "chronic bronchitis" or "heart failure" for months before TB was suspected.

Risk Factor Profile The study identified a "Geriatric TB Risk Profile" specific to the Fergana Valley: 1) Comorbidity - 70% of patients have ≥2 concurrent chronic diseases (Hypertension and Diabetes being most common). 2) Social Factors - Living in multigenerational households (common in the region) poses a dual risk: transmission *to* vulnerable elders from active young cases, or transmission *from* undiagnosed elders to children.

Nutritional Status: Hypoalbuminemia and low BMI were strong predictors of mortality.

Discussion

The findings underscore that "Geriatric TB" is distinct from adult TB. The high rate of extrapulmonary forms challenges the current screening protocols which rely heavily on cough and chest X-rays. In the elderly, a "high index of suspicion" is required even in the absence of respiratory symptoms.

The phenomenon of immunosenescence likely explains the atypical presentation. The aging immune system fails to form distinct granulomas, leading to disseminated disease without the robust inflammatory response that causes fever.

Furthermore, the study highlights the issue of polypharmacy. Treating TB in the elderly requires careful management of drug interactions (e.g., Rifampicin inducing metabolism of cardiac medications), which is often overlooked in standard DOTS programs. The high mortality rate in this group is not just due to TB, but due to the decompensation of comorbid conditions triggered by the infection and its treatment.

Conclusion

The investigation into geriatric tuberculosis in the Fergana Valley leads to several critical conclusions that must reshape our approach to this public health issue. First and foremost, geriatric tuberculosis has evolved into a predominantly preventive medicine challenge. The current passive case-finding strategies are insufficient for a demographic that presents with atypical symptoms and often does not seek medical help due to the normalization of age-related

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 01. January ,2026

ailments. Therefore, the leadership role in mitigating the risk of geriatric tuberculosis must be assumed by a preventive strategy that emphasizes active screening and early detection. Strengthening this position within phthisiology, and specifically within gerontophthisiology, is not just an academic exercise but an urgent practical necessity.

The study confirms that the early detection rate of both pulmonary and extrapulmonary tuberculosis can be improved by more than 50% through targeted interventions. By implementing a systematic approach, diagnostic capabilities for geriatric tuberculosis can be enhanced four-fold, leading to a drastic reduction in mortality rates. The development of a specific prophylaxis algorithm and prognostic tables, tailored to the unique conditions of the Fergana Valley, offers a tangible path to halting the steady increase in geriatric tuberculosis cases. These tools will also help eliminate the dangerous practice of polypharmacy by enabling more precise treatments, thereby reducing the risks associated with pharmacotherapy in the elderly.

Ultimately, the successful management of geriatric tuberculosis requires a holistic improvement in the quality of medical care, with potential improvements exceeding 50%. The findings of this study advocate for the popularization and strengthening of predictive phthisiology as a key scientific and practical direction in gerontology. By shifting the focus from reactive treatment to proactive prevention and prediction, we can protect the vulnerable elderly population from this ancient disease and reduce the overall burden of tuberculosis in the region.

Recommendations

Based on the findings of this study and the identified gaps in current practice, the following recommendations are proposed for implementation in the healthcare system of the Fergana Valley:

Implementation of Active Screening Algorithms - Healthcare providers should adopt a proactive screening protocol specifically designed for the elderly population (aged 60 and above). This protocol should not rely solely on the classic symptom of cough but should include unexplained weight loss, fatigue, anorexia, and cognitive decline as key indicators for tuberculosis investigation. Screening should be integrated into routine geriatric care, as well as in cardiology and endocrinology clinics where high-risk elderly patients frequently present for comorbidities.

Focus on Extrapulmonary Tuberculosis - Given the high prevalence of extrapulmonary forms in the elderly, diagnostic vigilance must extend beyond the lungs. Physicians should maintain a high index of suspicion for tuberculosis in elderly patients presenting with FUO (fever of unknown origin), lymphadenopathy, unexplained back pain, or sterile pyuria. The use of advanced diagnostic tools like GeneXpert MTB/RIF should be prioritized for extrapulmonary samples to ensure rapid and accurate diagnosis.

Management of Comorbidities and Polypharmacy - Treatment protocols for geriatric tuberculosis must be integrated with the management of chronic comorbidities such as diabetes and hypertension. A multidisciplinary approach involving phthisiologists, gerontologists, and cardiologists is essential to manage drug-drug interactions and minimize hepatotoxicity. Careful review of medication lists to reduce polypharmacy is crucial for improving treatment adherence and outcomes.

Social and Nutritional Support - Preventive strategies must address the social determinants of health. Public health initiatives should focus on improving the nutritional status of the elderly, as malnutrition is a significant risk factor. Additionally, educational programs should target multigenerational households to raise awareness about the risks of transmission between elderly members and children, promoting safer household environments.

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 01. January ,2026

Update of National Guidelines - National and regional tuberculosis control programs should be updated to explicitly include geriatric tuberculosis as a distinct category requiring specialized attention. Policy makers should allocate resources for the development of "Gerontophthisiology" as a sub-specialty and support further research to monitor epidemiological changes over time.

References.

1. World Health Organization. (2023). *Global Tuberculosis Report 2023*. WHO Press.
2. Rajagopalan, S. (2001). Tuberculosis and aging: a global health problem. *Clinical Infectious Diseases*.
3. Perez-Guzman, C., et al. (1999). Atypical clinical presentation of tuberculosis in the elderly. *Journal of the American Geriatrics Society*.
4. Kobashi, Y., et al. (2011). Clinical analysis of pulmonary tuberculosis in the elderly. *Internal Medicine*.
5. Schaaf, H. S., et al. (2010). Tuberculosis at extremes of age. *Respirology*.
6. Gandi, N. R., et al. (2010). Multidrug-resistant and extensively drug-resistant tuberculosis: a threat to global control. *The Lancet*.
7. Raviglione, M. C., et al. (1992). Secular trends of tuberculosis in Western Europe. *Bulletin of the World Health Organization*.
8. Pratt, R. H., et al. (2011). Tuberculosis in the elderly: data from the National Tuberculosis Surveillance System, 1993–2008. *Aging Health*.
9. Babu, G. R., et al. (2012). Tuberculosis in the elderly in India: a review. *Tuberculosis Research and Treatment*.
10. Karstaedt, A. S., et al. (2014). Tuberculosis in the elderly in Soweto, South Africa. *International Journal of Tuberculosis and Lung Disease*.