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SMOKING AS AN UNFAVORABLE LIFESTYLE FACTOR FOR THE PROGRESSION OF PRIMARY OPEN-ANGLE GLAUCOMA

Abstract. Introduction: Smoking remains a widely used and socially accepted psychoactive substance. According to a July 2024 national survey by the Bureau of National Statistics of Kazakhstan, 20.7% of the adult population are smokers–39.8% of men and 7.6% of women.Smoking is the leading preventable health risk and a major cause of premature death, associated with increased rates of cardiovascular, respiratory, gastrointestinal, endocrine diseases, and cancer.

Methods: This study is a literature review. Databases including PubMed, Scopus, Web of Science, and Springer were searched using the terms "smoking" and "primary open-angle glaucoma" for the period from 1990 to 2024. Duplicates were removed. The selected literature focused on the roles of microcirculation and neurodegeneration in glaucoma.

Results: Cigarette smoke contains over 7,000 chemicals, including 69 known carcinogens. Sidestream smoke, which constitutes 75% of total smoke, is more toxic than mainstream smoke and contributes to passive smoking.Smoking–both active and passive–causes mitochondrial dysfunction, oxidative stress, and systemic inflammation. It negatively affects the vascular endothelium and the nervous system, increasing neurotoxins like beta-amyloid and TNF-α, while reducing protective factors like BDNF. These effects contribute to **primary open-angle glaucoma (POAG)**, now recognized as a neuroinflammatory disease with mitochondrial origins.

Conclusion: Primary open-angle glaucoma is a neuroinflammatory disease of the optic nerve and central nervous system that leads to systemic neurodegeneration. To positively influence the progression of glaucoma, the avoidance of iatrogenic risk factors is essential. Smoking has numerous unfavorable influences on the glaucomatous process, which are summ arized in this mini-review. This makes it absolutely necessary to refrain from smoking in the case of glaucoma.

Key words: smoking, glaucoma, mitochondriopathy, neurodegeneration, microcirculation.

Introduction

Smoking is a socially recognized psychotropic substance that is still widely used. From the Bureau of National Statistics Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, an annual survey of the adult population on tobacco consumption was conducted in July 2024 [1]. The results showed that of the total number of household members surveyed, 20.7 percent of the population, or 39.8 percent of men and 7.6 percent of women, currently smoke tobacco.

Smoking is the single most significant health risk in industrialized nations and the leading cause of premature mortality. Diseases that occur more frequently in smokers include cardiovascular, gastrointestinal, respiratory, endocrine, and cancer diseases [2].

Globally in 2019, 1.14 billion individuals were current smokers, who consumed 7–41 trillion cigarette-equivalents of tobacco in 2019. Globally in 2019, smoking tobacco use accounted for 7.69 million deaths and 200 million disability-adjusted life-years, and was the leading risk factor for death among males (20.2% of male deaths). 6.68 million of 7.69 million deaths attributable to smoking tobacco use were among current smokers [3].

Material and methods

This study is an evaluation review. The literature was searched in the databases PubMed, Scopus, Web of Science, and Springer. Duplicate publications have been checked and deleted. The literature search was carried out using the terms "smoking" and "primary open-angle glaucoma" in the period 1990 to 2024. The selection of papers was made in the context of microcirculation and neurodegeneration of glaucoma..

Results and discussion

Burning a cigarette produces about 2 liters of smoke. According to the American Lung Association, cigarettes contain around 600 ingredients. Burning cigarettes produces more than 7,000 chemicals. At least 69 of these chemicals are known carcinogens, and many are toxic (4).

In principle, a distinction is made between mainstream smoke and sidestream smoke. The mainstream smoke is the smoke inhaled by the smoker (25%), while the sidestream smoke is the smoke emitted from the smoldering cigarette tip between puffs (75%). The sidestream smoke together with the exhaled mainstream smoke is considered passive smoking. Passive smoking is often neglected in discussions, although the carcinogenic substances in sidestream smoke are up to 130 times higher than in mainstream smoke due to the combustion process.

Cigarette smoking, smoking with an electronic cigarette and passive smoking all lead to significant mitochondrial dysfunction (5). The consequences are a depolarization of the mitochondria, which leads to accelerated apoptosis. In addition, there is increased intracellular lipid peroxidation and protein oxidation as well as DNA damage. This triggers a far-reaching inflammatory reaction that attacks the immune system and can also trigger autoimmune processes (6,7). The toxic effect of smoking on the vascular endothelium leads to endothelial dysfunction and is partly responsible for the development of arterial hypertension (8). Smoking is also neurotoxic. In the cerebrospinal fluid, there is a significant increase in beta-amyloid, a classic marker for Alzheimer's disease, as well as an increase in tumor necrosis factor-alpha (TNF-α), a cytokine that is involved in almost all inflammatory reactions (9). TNF-α is the first cytokine released in the signaling cascade of activated macrophages. Its most important function is the activation of various immune cells. Furthermore, the neuronal growth factor BDNF (brain derived neurotrophic factor) is significantly reduced in the cerebrospinal fluid (9), which plays an important role in the formation of functional synapses in the nervous system and has neuroprotective properties (10). This leads to neuroinflammation in the central nervous system, which favors central neurodegeneration in POAG (9,11). These processes are supported by an unfavorable influence of smoking on the enteric microbiome, the bacterial composition of the intestine, which can lead to a disruption of the gut-brain axis (12).

These findings are of great importance for primary open-angle glaucoma (POAG), as POAG is now regarded as a neuroinflammatory disease that has its origin in a primary mitochondriopathy [13,14]. The resulting mitochondrial dysfunction manifests itself, among other things, in a reduced metabolism of free radicals and thus increased oxidative stress, reduced ATP production, instability of the cellular plasma membrane with uncontrolled influx of messenger substances and calcium into the cell as well as in the induction of metabolic dysfunctions [15]. This results in an excessive cellular immune response and an inflammatory reaction, which leads to an acceleration of cellular ageing and apoptosis. These inflammatory processes have demonstrated for POAG [16], which cause ocular and cerebral neuroinflammation [17] and later lead to generalized neurodegeneration [18]. Not only the visual tract, but the entire brain is involved [19]. In addition to the detection of primary mitochondrial genetic defects, the extent of damage the mitochondria is also modified by concomitant systemic diseases, in which, for example, arterial hypertension, diabetes mellitus and dyslipidemia themselves lead to secondary mitochondriopathy and thus exacerbate the primary mitochondriopathy in POAG [20,21,22]. This is of great importance because in Germany, arterial hypertension occurs in 75.5% of POAG, dyslipidemia in 50% and diabetes mellitus in 30% [23].

Whateffectsdoessmokinghave on POAG?

In a meta-analysis published in 2024, no association between smoking and the occurrence of POAG was found (24). However, smoking does have an influence on glaucoma progression. In optical coherence tomography, a significant loss of the retinal nerve fiber layer (25) could be detected in those affected after more than 8 pack years (1 pack year = smoking 20 cigarettes per day for 1 year), and accelerated visual field progression (26) after 20 pack years in achromatic perimetry. In addition to the direct neuroinflammatory and neurotoxic effects of smoking on the nerve fibers, the impairment of ocular perfusion may also be responsible for the accelerated progression. Laser Doppler flowmetry showed reduced retinal blood flow with increased retinal perfusion pressure (27). A reduced capillary perfusion of the optic nerve (28,29) as well as a reduced reactivity of the retinal and papillary vessels to oxygen (30) could be demonstrated with scanning laser Doppler flowmetry. In a recent study, a progressive thinning of the vessel density at the optic nerve was found in OCT angiography after exceeding 22.2 pack-years (31).

In addition to these local perfusion defects, a prospective longitudinal study showed that smoking in

combination with obesity, lack of exercise and malnutrition causes a 2.6 times higher risk of cardiovascular disease in POAG patients (32).

Conclusion

In summary, smoking is extremely unfavorable for POAG patients. It exacerbates the already existing neuroinflammation and neurodegeneration in POAG and additionally worsens ocular and systemic perfusion. For this reason, it is absolutely essential to advise POAG patients to give up nicotine and to make it clear to them that electronic cigarettes are not an alternative. Since smokers usually do not manage to stop smoking themselves (33), smoking cessation therapy should be strongly recommended.

Only when we as doctors consciously position ourselves against smoking can a convincing impetus to stop smoking be given (34).

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Smoking as an unfavorable lifestyle factor for the progression of primary open-angle glaucoma

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WATERBORNE INFECTIOUS DISEASES: A PERSISTENT CHALLENGE TO PUBLIC HEALTH

Abstract. Introduction: Waterborne diseases remain a significant public health issue, particularly in regions with poor sanitation and limited access to clean water. In Tajikistan, these diseases, especially among children, are a major concern. Water scarcity and pollution, exacerbated by climate change, contribute to the problem.
Methods: This study is based on epidemiological data from Tajikistan's Ministry of Health and international organizations. It analyzes data on waterborne diseases from 1997 to 2024.
Results: and DiscussionWaterborne diseases, including hepatitis A, typhoid, and cholera, are common in Tajikistan. Poor infrastructure and sanitation contribute to the spread of these diseases, especially in rural areas, which are most vulnerable.
Government: ResponseTajikistan plays an active role in global water diplomacy and supports initiatives aimed at improving water and sanitation. However, the issue of access to clean water remains critical.
Conclusion: Addressing waterborne diseases requires improvements in water infrastructure, sanitation, vaccination, and public education. International collaboration is essential for reducing the spread of these diseases.
Key words: water-dependent infections, cholera, typhoid fever, leptospirosis, viral hepatitis A and E, rotavirus infection.

Introduction

Waterborne infectious diseases remain one of the most significant public health challenges, especially in countries with low levels of sanitation and limited access to clean drinking water. These diseases can lead to large-scale outbreaks, high morbidity rates, and even mortality, particularly among children.

Despite its simple molecular composition, water remains a substance whose full nature continues to puzzle scientists. It is vital for human life, yet at the same time, it presents numerous challenges. Around one-third of the global population lives in regions suffering from acute water scarcity, and every fifth person lacks access to safe drinking water.

Antoine de Saint-Exupéry wrote about the value of water in his 1930s book Wind, Sand and Stars, describing how, in the desert, children do not beg for money–but for water. Today, according to the 2021 UNESCO World Water Development Report, global freshwater usage has increased sixfold over the last century and continues to rise by about 1% annually. This increase in consumption has led to growing pollution from industry, agriculture, and urban waste, which threatens water sources and poses risks to human health and sustainable development.

WHO's 1991 strategy "Health for All" and Tajikistan's national health strategy both emphasize that everyone should have access to safe drinking water, and that pollution of surface and groundwater must not endanger public health. However, modern challenges–such as climate change and environmental degradation–complicate these goals.

Methods and materials

This article is based on epidemiological surveillance data on waterborne infections in the Republic of Tajikistan, including reports from the Ministry of Health, sanitary-epidemiological services, and international organizations such as WHO, UNICEF, and the World Bank.

The analysis covers official statistical data on the incidence of waterborne diseases from 1997 to 2024, including recorded outbreaks of typhoid fever, hepatitis A, and other cases.

Qualitative analytical methods were applied, including content analysis of publications and regulatory documents, as well as a comparative review of sanitary and hygienic conditions and access to safe water across different regions of the country.

The study also considers Tajikistan's international initiatives in the field of water diplomacy and sustainable development, such as the Decade of Action "Water for Sustainable Development" (2018–2028), along with national programs like WASH and immunization efforts.

The practical component of the research draws upon data on local epidemic foci, drinking water quality, sanitary interventions, and educational campaigns implemented in cooperation with national and international partners.

Results and discussion

Currently, special attention is paid to sanitation and anti-epidemic measures, which makes the book particularly relevant for analyzing approaches to waterborne infections. In particular, the foundational manual is devoted to the study of cholera, specifically its El-Tor variant [1].

According to Dustov A., regarding the prevalence and transmission mechanisms of hepatitis E in Tajikistan, there is a high vulnerability of the population under conditions of limited access to water [2]. The importance of epidemiological surveillance and diagnostics in endemic areas is emphasized.

Significant attention is also given to leptospirosis as an infection often associated with aquatic environments. The transmission routes, including contact with contaminated water, are described in detail, along with modern approaches to diagnosing and treating the disease in children [3].

When considering seasonality, transmission routes (including the waterborne pathway), and prevalence among preschool-aged children, viral diarrheas–particularly rotavirus and norovirus infections–come to the forefront. In such cases, prevention and vaccination play a crucial role [4].

A review of global changes in the structure of infectious diseases during the 20th century highlights the evolution of infections related to water contamination. It notes the transformation of waterborne infections in connection with urbanization and changes in sanitation conditions [5].

Nevertheless, international cooperation plays a significant role in combating epidemics, with attention given to hepatitis, typhoid, viral diarrheas, and other waterborne diseases [6]. When it comes to specialized approaches, typhoid fever in children remains a challenge despite progress in diagnostics and treatment. The authors examine the clinical features, epidemiology, and diagnostic and treatment difficulties in the context of Tajikistan. Throughout the analysis, the link between the disease and the quality of drinking water and sanitation is strongly emphasized [7].

In the Republic of Tajikistan, there are still difficulties in combating water-related infectious diseases. This is often due to insufficient access to clean drinking water and poor sanitation infrastructure in a number of regions. Nevertheless, we see significant progress that has been made in recent decades. We see this as a nationwide effort to achieve immunization, as well as to improve water and sanitation policies. But despite this, hepatitis A and typhoid fever are still major public health problems. An in-depth analysis of long-term epidemiological trends indicates a clear association between infection rates and environmental conditions, including the availability of centralized water systems, sewage networks, and public awareness of hygiene. The prevalence of seasonal spikes, especially in spring and summer, underscores the necessity of preventive hygiene education and effective early-warning mechanisms.

A critical insight revealed by the study is the disproportionate impact of socio-economic disparities on health outcomes. Populations in rural and mountainous regions, where infrastructure remains limited, are at heightened risk of outbreaks. Contributing factors such as internal migration, urban density, and climate-related strain on water resources further amplify these vulnerabilities.

Encouragingly, the Tajik government has shown ongoing dedication by participating in global water and sanitation initiatives. Programs like WASH and the UN's Decade for Water for Sustainable Development (2018–2028) have fostered intersectoral collaboration, leading to gradual improvements in water quality monitoring, public health awareness, and vaccine outreach.

Nonetheless, long-term success will depend on sustained investment in water and sanitation infrastructure, robust health surveillance systems, and deeper integration of hygiene education into local communities. Continued international cooperation is essential–not only for technical and financial support but also to align Tajikistan's efforts with international best practices in water safety.

Over the past twenty years, Tajikistan has become a significant supporter of global water diplomacy, which has initiated several major campaigns. These include the announcement of the International Year of Freshwater in 2003. The International Year of Water Cooperation was declared in 2013.Protozoal: amoebiasis, balantidiasis

Cholera outbreaks are often linked to warm, running water, which provides ideal conditions for vibrio growth. The risk of outbreaks is especially high in areas affected by war or natural disasters, where water safety measures are not enforced–such as border regions near Afghanistan. Vigilant epidemiological surveillance and long-term national health strategies are critical to prevent outbreaks.

Typhoid Fever

According to WHO, typhoid is found worldwide, with widespread outbreaks in countries with poor sanitation. In Tajikistan during the 1990s, incidence rates soared–up to 497.8 per 100,000 population. Unlike sporadic cases, waterborne outbreaks tend to involve more moderate and severe forms, rapid spread, and large-scale exposure. Eradication requires massive investments and coordinated public health responses.

Leptospirosis

This disease, common in flood-prone and rural areas, is spread by water contaminated with animal urine. Leptospires can survive up to 30 days in water and over 270 days in moist soil. In Tajikistan, outbreaks occurred in the second half of the 20th century, particularly in Baljuvon and Fayzabad districts. Prevention involves rodent control, water sanitation, and vaccination in high-risk zones.

Hepatitis A and E

Enteric hepatitis viruses are highly resistant to chlorine and can survive even in treated drinking water. As a result, outbreaks may occur even in areas with centralized water supply systems, particularly in regions with poor sanitation.

Contributing Factors to the Spread

Several key factors contribute to the transmission and persistence of waterborne diseases: Inadequate availability of safe and clean drinking water, unsatisfactory sanitation infrastructure and hygiene services, limited public awareness and education on personal hygiene practices, pollution of water sources due to untreated wastewater discharge, environmental disruptions such as floods and natural disasters that damage or disable water supply systems

Waterborne infections are particularly dangerous for children, the elderly, and individuals with weakened immune systems. Beyond physical suffering, these diseases also lead to economic losses due to high treatment costs and reduced workforce productivity. Epidemic outbreaks often necessitate quarantine measures.

Effective control of water-borne infections requires an integrated approach. This approach includes ensuring access to safe drinking water, and developing sanitation and sanitation systems. An important role is played by educating the population on hygiene issues, as well as monitoring water quality and conducting epidemiological surveillance. It is already known that targeted vaccination (for example, against hepatitis A and cholera) has a good effect. Despite all these measures, infectious diseases associated with dirty water remain a serious threat to public health in Tajikistan. And this is acutely felt in rural areas with limited access to safe water and sanitation. This is relevant for Tajikistan, as several outbreaks of diseases have been reported in recent years. Among them is typhoid fever, which had an outbreak in 1997. Due to the lack of full-scale chlorination of water, there was a large-scale outbreak of this disease. More than 29,000 cases were officially registered, with an incidence rate of 500 per 100,000 people. In the first six months of 2009, 338 cases were registered. And this is 2.2 times more than in the same period of 2008. All these endemic outbreaks of the disease are associated with poor water quality. In 2023, there was an outbreak of cholera in different regions of our planet. The Ministry of Health of Tajikistan reported that there was no threat of the spread of cholera in the republic, but nevertheless it was reflected in measures to strengthen border control. All these activities emphasize the importance of access to clean water and improved sanitation. Hepatitis A remains one of the most common waterborne diseases worldwide and in the country. Schoolchildren and children attending kindergartens are especially vulnerable. Despite the measures taken, outbreaks of the disease occur approximately every three years, on average, about 200,000 children under the age of 14 are at risk.In 2022, the Ministry of Health reported cases among children aged 3 to 14, particularly in schools and kindergartens. While a full epidemic was avoided, vaccination was administered based on epidemic indicators. Hepatitis A vaccination is not included in the national immunization schedule and is only used during outbreaks.

Government Response and Preventive Measures

Typhoid fever remains a major issue in areas with poor water supply and sanitation. The 1997 outbreak is historically significant, and although water quality has improved since then, the risk remains.

No major cholera outbreaks have been recorded in recent years, but the proximity to epidemic zones such as Afghanistan remains a concern. n 2024, Tajikistan's Ministry of Health strengthened surveil-

lance of water quality along the Panj River in an effort to mitigate the potential cross-border transmission of infectious diseases. The national government continues to place strong emphasis on improving water, sanitation, and hygiene (WASH), with particular focus on healthcare institutions and local communities. However, access to centralized water services remains limited–only 41% of the population benefits from such systems, and in rural areas, this number falls to just 22%. The reliance on surface water sources in many communities significantly heightens the risk of contamination.

One of the critical obstacles in curbing hepatitis A is the absence of a routine vaccination program; immunization is administered only reactively, during outbreaks, as it is not part of the national immunization schedule.

In response to these challenges, a range of initiatives is being implemented. In partnership with international organizations such as WHO, UNICEF, and the World Bank, Tajikistan is working to upgrade its water infrastructure–especially in remote and mountainous regions. This includes the construction of new wells and the installation of advanced filtration and water purification systems.

Local sanitary-epidemiological authorities regularly disinfect water sources and conduct water sampling to test for pathogens including typhoid, dysentery, and hepatitis A.

In the event of outbreaks, local quarantines, sanitation measures, and distribution of personal protective equipment are enforced. Border areas undergo enhanced water quality inspections, especially along the Panj River due to cholera risks from neighboring regions.

Awareness campaigns play a vital role. Public education programs promote hygiene and safe water use. The national "WASH" program is being implemented in schools, hospitals, and public institutions to raise hygiene standards. Visual types of propaganda should be used for sanitary and educational work. Such as posters, brochures. Working with religious and community groups plays an important role. Targeted hepatitis A vaccination is usually carried out in outbreak zones. Sectoral cooperation involving the Ministry of Health, the Ministry of Energy and Water Resources, the Ministry of Education and local authorities plays an important role.

Conclusion

Waterborne infectious diseases continue to pose a serious public health concern in Tajikistan. Addressing them effectively requires a comprehensive strategy that encompasses improvements in water supply infrastructure, sanitation services, immunization efforts, and public education. Meaningful progress can only be achieved through coordinated action across the health, environmental, and education sectors, enabling a reduction in disease transmission and the protection of human lives.

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Waterborne infectious diseases: a persistent challenge to public health

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INVESTIGATE AND COMPARE GENDER-SPECIFIC DIFFERENCES IN COPING MECHANISMS AMONG PATIENTS DIAGNOSED WITH OBSESSIVE-COMPULSIVE DISORDER USING THE MEANING-CENTERED COPING SCALE SCORES

Abstract. Introduction: Investigate and compare gender-specific differences in coping mechanisms among patients diagnosed with Obsessive Compulsive Disorder using the Meaning-Centered Coping Scale scores. Background: Obsessive-Compulsive Disorder affects 2-3% of the world's population. Evidence suggests significant gender-based differences in presentation and management. Currently, gender-specific differences in coping mechanisms have been seen as an important area of research. Their impact on treatment outcomes and quality of life remains understudied.
Objective: Our study aimed to investigate and compare gender-specific differences in coping mechanisms among patients diagnosed with OCD using Mean-Centered Coping Scale (MCCS) scores.
Methods: This is a cross-sectional comparative study that was conducted at SKIMS Medical College and HospitalBemina's outpatient psychiatry department. Ethical clearance was taken. Confidentiality and privacy were taken care of. Fifty-five patients (38 females, 17 males) with confirmed OCD diagnoses were recruited and evaluated using the MINI 7.0.2 for diagnosis and MCCS, a 9-item scale measuring various coping strategies. Participants were recruited through consecutive sampling, and data were analyzed using descriptive and inferential statistics.
Results and Discussion: In our study, males had significantly higher overall coping scores ($M = 28.3$, $SD = 7.4$) compared to females ($M = 25.9$, $SD = 8.1$; $t = 2.34$, $p = 0.023$) with a modest effect size (Cohen's $d = 0.31$). A significant interaction between gender and education ($F = 2.76$, $p = 0.038$) was observed. Males demonstrated higher utilization of religious coping, problem-solving approaches, and social support networks compared to females. The mean age of 27.4 years ($SD = 8.2$), with 74.5% from rural areas, was documented.
Conclusion: Our study saw significant gender-based variations in coping strategies among OCD patients, with males showing higher adaptive coping scores. Educational level moderated the relationship between gender and coping mechanisms. Findings emphasize the importance of developing individualized, gender-sensitive approaches in OCD treatment.
Key words : MCCS, MINI7.0.2, Coping score, Sociodemographics of OCD,

Introduction

Obsessive-Compulsive Disorder (OCD) is a significant mental health challenge in modern times affecting at least 2-3% of the population around the world, evidence suggests significant differences in its presentationgenders[1]Gender-specific differences in coping mechanisms have emerged as an important area of research, as these differences can significantly effect treatment outcomes and overall quality of life for patients with OCD[2].Men and women differ in their approaches tomanaging mental health challenges. Women predominantly demonstrate emotion-focused coping strategies,and seek social support, while men often use problem-focused and action-oriented coping strategies[3,4]. Believed to be an interplay of biological, social, and cultural factors that shape gender-specific responses to psychological distress [5].The Meaning-Centered Coping Scale (MCCS), is a validated instrument that provides a comprehensive framework for assessing various coping strategies employed by individuals withOCD[6]. Many Studieshave revealed important insights into how patients manage their OCD semeiology, yet research specifically examining gender differences in coping strategy selection and

effectiveness remains limited[7] Studiesare evident about distinct patterns of OCD symptom presentation among genders. Women more often report contamination, fears, and cleaning compulsions, while men have checking behaviors and symmetry-related compulsions [8]. The relationship between symptomatic differences and the selection of coping strategies requires further research.The interaction between demographicsand coping mechanisms remains understudied[9].The present study aims to address these knowledge gaps by investigating gender differences in OCD coping mechanisms through analysis of Mean-Centered Coping Scale scores. This research seeks to contribute to the development of gender-sensitive treatment approaches that better address the specific needs and tendencies of both male and female OCD patients. Understanding these differences could lead to more personalized and effective therapeutic interventions, potentially improving treatment outcomes and patient well-being [10].

AIMS

This study aimed to investigate and compare gender-specific differences in coping mechanisms among patients diagnosed with OCD using Mean-Centered Coping Scale scores.

Objectives:

To compare the overall Mean-Centered Coping Scale scores between male and female OCD patients

To analyze gender-specific patterns in individual coping strategy components

To examine how gender differences in coping mechanisms interact with other demographic variables.

Methodology

This study was a cross-sectional, comparative study designed to examine gender differences in coping mechanisms among individuals with Obsessive-Compulsive Disorder (OCD) using the Mean-Centered Coping Scale (MCCS). The 9-item scale measures various coping strategies. Each item is scored on a 7-point Likert scale, with Total scores ranging from 9 to 63, in which higher scores indicate more adaptive coping mechanisms[11]. The study was conducted in the outpatient department of psychiatry at SKIMS MCH Bemina. The Institutional Ethics Committee approved the research protocol. The study was conducted between July 2024 to December2024.written informed consent was taken before participation, and the right to withdraw from the study at any point in time. Participants were recruited using consecutive sampling from the outpatient psychiatric department.55 patients were recruited for the current study. The minimum required sample size was calculated using G*Power analysis with an effect size of 0.5, α error probability of 0.05, and power of 0.80.MINI.7.0.2 was used to evaluate the patient for diagnosis[12]. Sociodemographic information was collected through structured interviews, the Meaning-Centered Coping Scale was administered in a quiet, private setting, and participants were given adequate time to complete the assessment. All questionnaires were checked for completeness. Data analysis was performed using SPSS version 24.0. Descriptive, inferential, and subgroup analysis was performed.

Inclusion Criteria:

Confirmed diagnosis of OCD according to DSM-5 criteria.

Age 18 years and above.

Ability to comprehend and complete the assessment tools.

Willing to provide informed consent

Exclusion Criteria:

Presence of severe psychiatric comorbidities and medical comorbidities.

Acute suicidal ideation.

Cognitive impairment affects the ability to complete assessments.

Current substance use disorder.

Table 1 –Socodemographic variables

Variable	Mean	S.D
Age		
Overall mean age	27.4	8.2
Females	26.8 years	7.9
Males	28.6 years	8.7

Continuation of the table

Variable	N	%
Residence		
Rural	41	74.5
Urban	14	25.5
Marital status		
Married	23	41.8
Unmarried	30	54.5
Divorced	2	3.7
Gender		
Female	38	69.1
Male	17	30.9
Educational Status:		
Illiterate	8	14.5
Primary	12	21.8
Secondary	15	27.3
Graduate	14	25.5
Postgraduate	6	10.9
Duration Categories:		
< 6 months	8	14.5%
6-12 months	12	21.8%
13-24 month	15	27.3%
2-5 years	14	25.5%
5 years	6	10.9%

Table 1 indicates that the overall mean age is 27.4 years (SD = 8.2), Females are slightly younger with a mean age of 26.8 years (SD = 7.9), Males have a higher mean age at 28.6 years (SD = 8.7), Majority lives in rural areas (74.5%, n=41), Only a quarter of participants are from urban areas (25.5%, n=14), Most participants are unmarried (54.5%, n=30). A substantial portion is married (41.8%, n=23), and a small fraction is divorced (3.7%, n=2). Secondary education is the most common (27.3%, n=15), Graduate level follows closely (25.5%, n=14), Primary education (21.8%, n=12), Illiteracy rate is notable (14.5%, n=8), Postgraduate education is the least common (10.9%, n=6), The distribution mirrors exactly the educational status percentages, Mid-range durations (13-24 months) are most common (27.3%, n=15),2-5 years and 6-12 months categories show moderate representation, Both shortest (<6 months) and longest (>5 years) durations are less frequent.

Table 2 – Inferential analysis(Gender differences in total MCCS Score)

Gender	Mean	S.D	T-Test	P value	Cohens d
Males	28.3	7.4	2.34	0.023	0.31
Females	25.9	8.1			

Table 2 above indicates that males had a mean score of 28.3, indicating their average level of coping strategies. Females had a mean score of 25.9, slightly lower than males. S.D. = 7.4 in males showing the spread of scores around their mean, and in females with S.D. = 8.1, indicating slightly more variability in scores compared to males. A T-Test value of 2.34 indicates males scored higher than females. p-value of 0.023 Indicates that the difference between male and female scores is unlikely to have occurred by chance.0.31 represents a small to medium effect size, the difference is statistically significant, the practical difference between male and female coping strategies is modest.

Table 3 – Annova analysis

Source of variation	F value	P value
Gender Education Gender and education	4.82 2.84 2.76	0.333 0.035 0.038
Gender Marital status Gender and marital	4.59 3.06 3.12	0.03 0.55 0.083
Gender Residence Gender and residence	4.73 3.67 2.80	0.034 0.061 0.100

Table3 shows Gender effects are significant (F=4.82, p=0.033),Education has a significant effect (F=2.84, p=0.035),Residence shows marginal significance (F=3.67, p=0.061),Marital status effect is not significant (F=3.06, p=0.055),the interaction effects between gender and other factors are mostly non-significant (p>0.05), except for gender-education interaction (p=0.038).

Table 4 – Analysis of MCCS Scoring

Variable	Average score	S.D
Gender Female Male	 24.41 35.09	 8.97 9.88
Religious Coping Males Females	 5.0 2.27	 2.19 1.56
Problem-solving Males Females	 4.27 2.37	 2.34 2.16
Social Support Males Females	 4.09 2.37	 2.47 1.91
Thought Suppression Males Females	 3.82 2.44	 2.59 1.89
Seeking Reassurance Males Females	 3.81 2.71	 1.90 1.64

Table 4 explains Males showed higher total MCCS scores (M = 35.09, SD = 9.88), Females showed lower total MCCS scores (M = 24.41, SD = 8.97),In Religious Coping Males reported significantly higher use of religious coping strategies(Males: M = 5.09, SD = 2.19)Males showed a stronger tendency toward problem-solving approaches(Males: M = 4.27, SD = 2.34). Moderate Differences were seen in Social Support, Males reported higher utilization of social support networks((Males: M = 4.09, SD = 2.47). Thought Suppression showed Males used greater thought suppression strategies: (M = 3.82, SD = 2.59). The smallestdifference was seen in Seeking Reassurance (Q1) which is Males: M = 3.18, SD = 1.90 and females: M = 2.71, SD = 1.64.

Discussion

Our study resulted in a mean age of 27.4 years, a dominance of females, and a majority of the population was rural, unmarried having a secondary level of education. The majority of the patient population had a duration of symptoms greater than one year,the findings of the sociodemographic profile were consistent with the study by Beatrice et al[13].Our study evaluated gender-specific differences in coping mechanisms among patients diagnosed with OCD using Meaning-Centered Coping Scale (MCCS) scores.Our studyfindingsrevealed significant gender-based variations in coping strategies, with several noteworthy patterns emerging from the analysis. The study found that male participants demonstrated significantly higher coping scores (Mean = 28.3, SD = 7.4) compared to females (Mean = 25.9, SD = 8.1; t = 2.34, p = 0.023). This aligns with previous research by Mathis et al[14].Effect size (Cohen's d = 0.31) suggests amodest practical difference between genders, consistent with the findings of the study[13].Sociodemographic Influences on Gender-Based Coping A significant interaction between gender and education (F = 2.76, p = 0.038) emerged as a crucial finding. This interaction suggests that educational attainment moderates the relationship between gender and coping mechanisms, supporting literature by Mckay andAbramowitch[15,16] who emphasized the role of education in shaping coping strategies among OCD patients. The predominantly rural sample (74.5%) adds a unique contextual dimension to these findings, particularly given the marginally significant effect of residence (F = 3.67, p = 0.061).The reasonis the location of our multispecialityhospital in a rural area. The distribution of educational status in our sample revealed interesting patterns, with secondary education being most common (27.3%) followed by graduate level (25.5%). This educational level may influence the observed gender differences in coping strategies echoed by a study by Perez et al [17]. The age distribution analysis revealed that males (Mean = 28.6 years) were slightly older than females (Mean = 26.8 years). This age difference, though minor , may contribute to the observed variations in coping strategies, consistent withstudies by Rosa et al[18]showing age-related evolution in OCD coping mechanisms.

Implications

The findings have several important clinical implications. First, the gender differences in coping scores suggest the need for gender-sensitive therapeutic approaches. Second, the significant interaction between gender and education indicates that therapeutic interventions should consider both factors when designing treatment plans.

Limitations

The uneven gender sample (69.1% female) may affect the generalizability.

The predominantly rural setting might limit the applicability of results to urban populations.

Sample from a single tertiary care hospital.

Future Research Directions :

To assess longitudinal changes in gender-specific coping mechanisms

To investigate the role of cultural factors in shaping gender differences in OCD coping strategies

Evaluate the interaction between gender, education, and treatment outcomes

Conclusion

Our study documented evidence for significant gender differences in coping mechanisms among OCD patients, a moderate effect of educational status, and potential influence by residential settings. Our findings emphasize the need for individualized, gender-sensitive approaches in OCD treatment while considering educational and demographic factors.

Abbreviations:

MCCS: Meaning-Centered Coping Scale.

MINI: Mini International Neuropsychiatric Interview.

OCD: Obsessive-compulsive disorder

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STUDY OF LEADERSHIP QUALITIES AMONG MANAGERS OF A MEDICAL ORGANIZATION

Abstract. Introduction: Leadership in healthcare is essential for driving reform, improving service quality, and ensuring organizational adaptability. In Kazakhstan, while leadership development is gaining attention, many healthcare managers still lack formal training.
Aim: To assess leadership and managerial qualities among healthcare managers in Kazakhstan and identify potential demographic predictors of leadership traits.
Materials and Methods: A cross-sectional study was conducted with 100 managers from the Research Institute of Cardiology and Internal Diseases and Atlas Dental clinics. Participants completed the MBA. SU "Leader or Manager?" test. Data were analyzed using SPSS v26 with chi-square tests and logistic regression.
Results: Most participants exhibited ambiguous personality traits, followed by managerial, with leadership types being least common ($\chi^2 = 13.571$, $p = 0.001$). Female managers and those with postgraduate education were more likely to show leadership qualities, though not statistically significant.
Discussion: The dominance of ambiguous types reflects a transitional leadership landscape. Limited representation of leadership traits may hinder reform efforts. Trends suggest gender and education could influence leadership development.
Conclusion: There is a need for structured leadership training to strengthen healthcare management in Kazakhstan and support ongoing reforms.
Key words: healthcare management, leadership, Managerial skills.

Introduction

Effective leadership in medical organizations plays a critical role in ensuring the delivery of high-quality healthcare services, optimizing organizational performance, and driving strategic transformation within health systems. Leadership competencies among healthcare managers are increasingly recognized as essential in adapting to the dynamic demands of the sector, particularly in the context of global health reforms and emerging challenges such as pandemics, workforce shortages, and technological advancement.

Continuous professional development is crucial for healthcare managers to effectively respond to evolving challenges. Research indicates that while top-tier managers are required to have certain qualifications, middle-tier managers often lack opportunities for skill enhancement. This disparity hampers the execution of decisions and the overall efficiency of healthcare organizations [1].

A substantial portion of healthcare leaders in Kazakhstan lack formal management education. Recent policy documents from the Ministry of Healthcare of the Republic of Kazakhstan underscore the importance of strengthening managerial capacity as a strategic priority [2]. According to the Ministry of Healthcare, approximately 60% of medical organization heads possess only medical degrees without professional management training, and merely 13.5% hold a master's degree. This gap underscores the necessity for structured leadership development programs to equip managers with essential skills. Furthermore, initiatives such as the introduction of master's degree programs in healthcare management and leadership development courses at institutions like Al-Farabi Kazakh National University [3] and Nazarbayev University School of Medicine [4] indicate a growing commitment to cultivating leadership at various levels of the healthcare system.

Despite these positive developments, studies indicate that a substantial number of healthcare managers in Kazakhstan still lack formal training in management and leadership. This gap hinders the effective implementation of reforms and limits the capacity of organizations to respond adaptively to

evolving healthcare needs [5]. Additionally, international collaborations have highlighted the need for comprehensive leadership training tailored to the national context, addressing both systemic and individual-level challenges [6].

Understanding the distinction between management and leadership is crucial in this context. While managers are responsible for planning, organizing, and coordinating tasks to achieve specific objectives, leaders focus on setting a vision, inspiring and motivating teams, and driving change. Managers tend to maintain stability and control, whereas leaders embrace innovation and adaptability. In healthcare settings, both roles are essential; however, the dynamic nature of the sector increasingly demands that managers also possess strong leadership qualities to effectively guide their organizations through transformation and uncertainty [7]. Without competent management, even a well-defined vision may fail to materialize; conversely, inadequate leadership results in a lack of direction or purpose. Leadership involves establishing a clear path, motivating others, and overseeing transformation, while management focuses on efficiently allocating resources and preserving operational stability [8,9]. These differences are summarized in Table 1.

Table 1 – Distinction between leadership and managerial qualities in medical organizations (adapted from Northeastern University Bouvé College of Health Sciences, 2023)

Leadership	Management
Visionary Thinking Leaders anticipate future challenges and opportunities, guiding organizations toward long-term goals.	Planning and Organizing Managers develop and implement operational plans to meet healthcare objectives.
Inspiration and Motivation Effective leaders inspire healthcare professionals to achieve excellence and embrace change.	Process Orientation They establish procedures and protocols to maintain quality and safety standards.
Innovation Leaders encourage the adoption of new technologies and practices to enhance patient outcomes.	Control and Problem-Solving Managers monitor performance metrics and address operational issues promptly.
People-Centric Approach They prioritize team development, collaboration, and stakeholder engagement.	Short-Term Focus They concentrate on immediate tasks and resource management to ensure daily operations run smoothly.

Given this backdrop, the present study seeks to examine the leadership qualities among managers of medical organizations in Kazakhstan. Addressing this gap, the present study aims to investigate the leadership qualities of managers within a medical organization in Kazakhstan, utilizing a validated assessment tool to differentiate between managerial and leadership traits. Enhancing managerial leadership within medical institutions is a crucial step toward achieving the overarching goals of healthcare reform and improving health outcomes nationwide.

Methodology

Study Design and Participants

A cross-sectional study was conducted to assess leadership and management qualities among healthcare managers in Kazakhstan. Participants were selected from JSC "Research Institute of Cardiology and Internal Diseases" and "Atlas Dental" network of dental clinics. Inclusion criteria encompassed individuals holding managerial positions with at least one year of experience in healthcare management. A total of 100 managers participated in the study. All procedures adhered to ethical standards for research involving human participants, in line with the Declaration of Helsinki.

Study instrument

The primary instrument utilized was the "Leader or Manager?" competency test developed by Zhavoronkova and published on the web-site of MBA.SU, accessible at https://www.mba.su/manager_or_leader/. This questionnaire is designed to differentiate between managerial and leadership competencies by evaluating responses across various scenarios and statements. The number of responses marked as [A] and [B] selected by each respondent was counted. The total number of responses was 14. Personality types were classified as follows:

1. Managerial type (characterized by a focus on structuring, adherence to procedures, reduction of uncertainty, and regulation-based management) was identified when the number of [A] responses predominated (more than 8).

2. Leadership type (marked by a drive for change, emotional engagement, and the ability to inspire others) was determined when [B] responses predominated (more than 8).

3. Ambiguous type (demonstrating flexibility and adaptability without a strong inclination toward either extreme) was diagnosed when the number of [A] and [B] responses was approximately equal (e.g., 6:8 or 7:7).

Data Collection Procedure

Participants were invited to complete the questionnaire electronically via a secure online platform between October 2024 and January 2025. Prior to participation, informed consent was obtained, ensuring confidentiality and anonymity. Demographic data, including age, gender, educational background, and years of managerial experience, were also collected to contextualize the findings.

Data Analysis

Responses were scored according to the guidelines provided by MBA.SU. Participants' scores were categorized to reflect predominant managerial or leadership tendencies. Statistical analyses were performed using SPSS software, version 26.0. Descriptive statistics summarized demographic variables and overall scores. Inferential statistics, including chi-square test + Cramér's V and logistic regression (ENTER method), were employed to examine differences in groups. A significance level of $p < 0.05$ was set for all analyses.

Results and discussion

The study involved 100 respondents of both genders, with two-thirds being female and one-third male. Participants ranged in age from 24 to 55 years.

The largest proportion of respondents (13%) had worked in a managerial position for two years. Between 9% and 11% of participants had one (9%), three (10%), six (9%), seven (11%), or ten (10%) years of experience. Only five respondents had over 16 years of managerial experience (up to 30 years), with one individual representing each of those years.

In terms of education, 26% of respondents had a university degree, and 74% held postgraduate qualifications.

The chart below (Figure 1) shows the overall distribution of manager personality types of the responders (managerial, ambiguous, leadership) by number of respondents. The most common type was the ambiguous personality, which may indicate complexity in respondents' traits or suggest that this type is the most prevalent among those surveyed. The managerial type ranked second, reflecting a moderate prevalence of organizational and administrative qualities. The leadership type was the least common, possibly due to the more specific traits associated with leadership or a smaller number of individuals identifying themselves as leaders.

The differences in distribution were statistically significant, with a one-sample chi-square test result of $\chi^2 = 13.571$, $p = 0.001$.

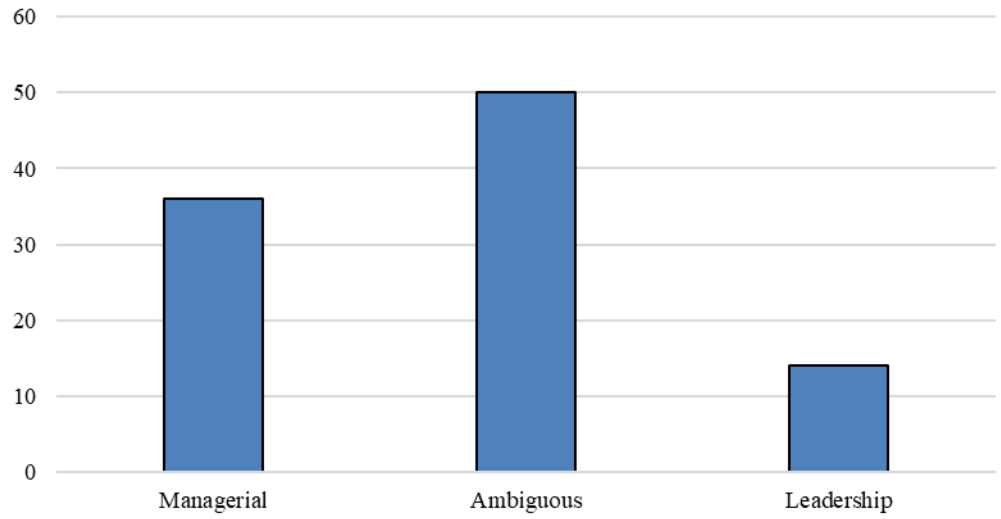

Figure 1 – Personality types

Logistic regression analysis was also applied.

The target outcome (dependent variable) was the presence of leadership qualities, while the predictors included gender, age, work experience, and level of education of the managers.

The results indicate that female employees at the "Research Institute of Cardiology and Internal Diseases" and "Atlas Dental" potentially exhibit more pronounced leadership qualities: they were 2.354 times more likely to demonstrate the target outcome compared to their male counterparts.

Additionally, managers with postgraduate education had slightly higher odds of exhibiting leadership qualities, with an Exp(B) value of 1.336.

The regression analysis statistics are presented below (Table 2).

Table 2 – Main results of regression analysis statistics

Variable	B	Root Mean Square Error	Wald	df	Significance	Exp (B)
Gender	0.856	0.875	0.957	1	0.328	2.354
Age	0.005	0.078	0.005	1	0.945	1.005
Work experience	-0.074	0.107	0.472	1	0.492	0.929
Level of education	0.290	0.809	0.128	1	0.720	1.336
Constant	-3.337	2.700	1.528	1	0.216	0.036

It should be noted that although none of the variables demonstrated a statistically significant relationship with the dependent variable, their influence can be considered as a trend that requires further investigation.

Discussion

The present study aimed to assess the prevalence of leadership and managerial qualities among healthcare managers at the JSC "Research Institute of Cardiology and Internal Diseases" and "Atlas Dental" network of dental clinics. The results reveal a predominant presence of "ambiguous" personality types among respondents, followed by managerial types, with leadership-oriented individuals comprising the smallest group. This distribution aligns with findings in existing literature suggesting that healthcare systems, particularly in post-Soviet contexts, often emphasize administrative efficiency and stability over transformational leadership capabilities.

The predominance of ambiguous traits may reflect the transitional nature of Kazakhstan's healthcare leadership landscape, where many managers simultaneously exhibit features of both management and leadership without fully embodying either. This hybridization could result from evolving institutional expectations and a lack of formal leadership development frameworks tailored to the national context. It may also signify internal role conflicts or insufficient clarity between administrative and visionary functions in healthcare management roles.

Interestingly, the relatively low proportion of leadership-oriented individuals in the study sample may point to systemic gaps in the cultivation of leadership within medical organizations. Leadership competencies – such as strategic thinking, emotional intelligence, and innovation – are critical for navigating complex health challenges and driving reform. Their limited presence in the managerial cohort could hinder the sector's adaptability and resilience in the face of ongoing health system transformation.

Logistic regression analysis, although not yielding statistically significant predictors, provided insight into potential demographic trends associated with leadership tendencies. Female managers were found to be 2.354 times more likely to exhibit leadership qualities than their male counterparts, suggesting that women in healthcare management may possess or develop more pronounced transformational or participative leadership styles. This aligns with global findings that women often excel in collaborative leadership, especially in healthcare and education sectors. Particularly, Gipson et al. (2017) [10] highlighted that women managers in academia are tend to be more task-focused, what make their leadership more favorable in the context of reforming and crisis. Accordingly, Shaked, Glanz, and Gross (2018) [11] noted that women generally exhibit transformational leadership more frequently than men, particularly in general and educational management settings. They were more likely to employ participative, democrat-

ic, and task-oriented leadership approaches compared to their male peers. According to Isnaini et al. (2023) [12] women leaders often adopt a participatory leadership style, encouraging collaboration and inclusive decision-making. This approach can lead to increased trust and cooperation within teams, contributing to improved organizational outcomes.

Managers with postgraduate qualifications also showed slightly higher odds of exhibiting leadership qualities. While the association was not statistically significant, this trend supports the notion that advanced education may enhance strategic and reflective thinking – key components of effective leadership. Nonetheless, neither age nor work experience showed a meaningful predictive value, which may indicate that leadership development is less a function of tenure and more influenced by personality, training, and organizational culture.

We suppose that healthcare managers with postgraduate qualifications often exhibit enhanced leadership qualities due to the comprehensive training and development during their studies. Postgraduate education equips managers with advanced competencies in strategic thinking, emotional intelligence, and evidence-based decision-making, which are crucial for effective leadership in complex healthcare environments. A study conducted in public health institutions in Addis Ababa in 2020, Ethiopia, found that managers with master's degrees or higher were significantly more effective in leadership roles compared to those with only diplomas. This effectiveness was linked to better vision creation, implementation, and the development of followership [13]. A systematic review by Sultan et al. (2019) [14] emphasized that postgraduate leadership education contributes to the development of key management competencies, including strategic planning, resource management, and change leadership, which are essential for navigating the complexities of healthcare systems. The latest research from Australia (2024) [15] demonstrated that healthcare professionals who completed a 12-month postgraduate leadership program reported sustained improvements in self-awareness, interpersonal relationships, and organizational culture. These enhancements translated into more effective leadership practices within clinical settings.

The study's findings underscore the need for targeted interventions to foster leadership capabilities in Kazakhstan's medical management system. This includes developing structured leadership development programs, incorporating leadership training into postgraduate medical and management curricula, and cultivating an institutional culture that values innovation, accountability, and people-oriented governance.

Limitations of the study include its modest sample size, which may limit generalizability. Moreover, the logistic regression model did not identify any statistically significant predictors of leadership qualities among the variables tested. This suggests that other factors not included in the model may play a more substantial role in determining leadership characteristics. Additionally, the "Leader or Manager?" questionnaire used, while practical and widely available, may have limitations in psychometric robustness for academic research. Future studies should consider using validated tools, larger sample sizes, and longitudinal designs to better understand how leadership qualities develop and manifest over time.

Conclusion

Based on the results of the conducted study, several key conclusions can be drawn:

– The majority of managers at the "Research Institute of Cardiology and Internal Diseases" and "Atlas Dental" exhibit an ambiguous personality type, indicating the complexity of their personal characteristics and a moderate prevalence of managerial qualities.

– The leadership type is less common which may be due to the specific and narrow set of requirements for leadership traits in this particular environment.

– Gender, age, work experience, and level of education do not show a statistically significant association with the presence of leadership qualities. However, there is a tendency for female managers and those with postgraduate education to have higher odds of demonstrating leadership traits.

Conflict of interest

Authors declare no conflict of interest.

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Study of leadership qualities among managers of a medical organization

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