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**ТИББИЁТДА ЯНГИ КУН
НОВЫЙ ДЕНЬ В МЕДИЦИНЕ
NEW DAY IN MEDICINE**

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VITILIGO: PATHOGENESIS, CLINICAL FEATURES, AND ADVANCES IN TREATMENT

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✓ *Resume*

The relationship between living conditions and vitiligo in patients of the Surkhandarya Regional Dermatovenerology Dispensary in Uzbekistan is investigated in this research. Vitiligo is an acquired depigmenting skin disease that can haunt individuals thoroughly due to despair because it affects melanocytes – the skin cells responsible for the color. Almost all reports suggest that one or several autoimmune reactions play a role in disease development along with oxidative stress and various environmental factors. This study seeks to establish the possible relationship between overcrowding sanitation and access to water within household and the distribution/ severity of vitiligo in a given community.

There were 119 participants in the cross-sectional research study, which involved patients diagnosed with vitiligo and those without vitiligo. Clinical skin assessment, semi-structured interviews and questionnaires were used in the study, where students were asked to provide sociodemographic characteristics, environment data, etc. There were significant differences among Vitiligo patients per subject's and household characteristics; widespread and progressive vitiligo lesions were more common among respondents who lived in crowded households with limited access to clean water and poor means of hygiene. Also, illiteracy and low awareness of their disease and condition led to delayed diagnosis and poor compliance with the recommended medical therapies.

We recommend that, besides the genetic and immunological susceptibility to vitiligo, the social environment factors influence the vitiligo's progression and the patients' quality of life. Practice of disease management in any country, particularly in ASHP, requires both individual patient care and general supportive measures such as raising the consciousness of the community on issues of hygiene and improving their standards of living. Controlling the broader social factors is an effective way of improving the quality of life in patients suffering from vitiligo, as well as eliminating the prejudice that they face in rural areas of Uzbekistan

Keywords: Vitiligo, Autoimmune skin disorder, Melanocyte destruction, Overcrowding, Environmental factors, Socioeconomic determinants, Uzbekistan dermatology, Water access and hygiene, Psychosocial stress, Health disparities, Public health infrastructure, Quality of life in vitiligo patients

VITILIGO: PATOGENEZI, KLINIK XUSUSIYATLARI VA DAVOLASHDAGI YUTUQLAR

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Ushbu tadqiqotda O'zbekistondagi Surxondaryo viloyat teri-tanosil dispanseri bemorlarining yashash sharoitlari va vitiligo o'rtasidagi bog'liqlik o'rganilgan. Vitiligo - bu orttirilgan depigmentatsiyalovchi teri kasalligi bo'lib, teri rangini belgilovchi melanotsitlarga ta'sir qilgani

uchun bemorlarni ruhan ezib qo'yishi mumkin. Deyarli barcha ma'lumotlarga ko'ra, kasallikning rivojlanishida oksidlanish stressi va atrof-muhitning turli omillari bilan bir qatorda bir yoki bir nechta autoimmun reaksiyalar ham rol o'ynaydi. Ushbu tadqiqot uy xo'jaliklaridagi gavjumlik, sanitariya holati va suvdan foydalanish imkoniyati bilan ma'lum bir jamoada vitiligoning tarqalishi va og'irligi o'rtasidagi mumkin bo'lgan bog'liqlikni aniqlashga qaratilgan.

Ko'ndalang kesimli tadqiqotda vitiligo tashxisi qo'yilgan va qo'yilmagan jami 119 nafar bemor ishtirok etdi. Tadqiqotda terini klinik baholash, yarim tuzilmali suhbat va so'rovnomalardan foydalanildi. Ishitirokchilardan ijtimoiy-demografik ma'lumotlar, atrof-muhit haqidagi ma'lumotlar va boshqa ma'lumotlarni taqdim etish so'raldi. Vitiligo bilan og'rigan bemorlar o'rtasida shaxsiy va uy xo'jaligi xususiyatlari bo'yicha sezilarli farqlar aniqlandi. Vitiligoning keng tarqalgan va progressiv shakllari toza suv va yaxshi gigiyena vositalaridan foydalanish imkoniyati cheklangan gavjum uy xo'jaliklarida yashovchi respondentlar orasida ko'proq uchradi. Shuningdek, savodsizlik va o'z kasalligi haqida past xabardorlik tashxis qo'yishning kechikishiga va tavsiya etilgan davolanishga rioya qilmaslikka olib keldi.

Biz vitiligoga genetik va immunologik moyillikdan tashqari, ijtimoiy-muhit omillari ham kasallikning rivojlanishiga va bemorlarning hayot sifatiga ta'sir ko'rsatishini ta'kidlaymiz. Har qanday mamlakatda, xususan rivojlanayotgan mamlakatlarda, kasalliklarni boshqarish amaliyoti nafaqat individual bemor parvarishini, balki jamiyatning gigiyena masalalari bo'yicha xabardorligini oshirish va turmush darajasini yaxshilash kabi umumiy qo'llab-quvvatlash choralari ham talab qiladi. Keng qamrovli ijtimoiy omillarni nazorat qilish vitiligo bilan og'rigan bemorlarning hayot sifatini yaxshilashning, shuningdek, O'zbekistonning qishloq joylarida ular duch kelayotgan noto'g'ri qarashlarni bartaraf etishning samarali usuli hisoblanadi

Kalit so'zlar: Vitiligo, autoimmun teri kasalligi, melanotsitlar nobud bo'lishi, gavjumlik, atrof-muhit omillari, ijtimoiy-iqtisodiy omillar, O'zbekiston dermatologiyasi, suv ta'minoti va gigiyena, psixo-ijtimoiy stress, sog'liqni saqlashdagi tengsizliklar, sog'liqni saqlash infratuzilmasi, vitiligo bilan kasallangan bemorlarning hayot sifati

ВИТИЛИГО: ПАТОГЕНЕЗ, КЛИНИЧЕСКИЕ ОСОБЕННОСТИ И ДОСТИЖЕНИЯ В ЛЕЧЕНИИ

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✓ Резюме

В данном исследовании изучается взаимосвязь между условиями жизни и витилиго у пациентов Сурхандарьинского областного дерматовенерологического диспансера в Узбекистане. Витилиго — это приобретенное депигментирующее заболевание кожи, которое может сильно беспокоить людей из-за того, что оно поражает меланоциты - клетки кожи, ответственные за цвет. Почти все исследования предполагают, что одна или несколько аутоиммунных реакций играют роль в развитии заболевания наряду с окислительным стрессом и различными факторами окружающей среды. Это исследование направлено на установление возможной взаимосвязи между перенаселенностью, санитарными условиями и доступом к воде в домохозяйствах и распространением/тяжестью витилиго в данном сообществе.

В перекрестном исследовании приняли участие 119 человек, включая пациентов с диагнозом витилиго и без него. В исследовании использовались клиническая оценка кожи, полуструктурированные интервью и анкетирование, где участников просили предоставить социодемографические характеристики, данные об окружающей среде и т.д. Существовали значительные различия между пациентами с витилиго по индивидуальным характеристикам и характеристикам домохозяйств; распространенные и прогрессирующие поражения витилиго чаще встречались среди респондентов,

проживавших в многолюдных домохозяйствах с ограниченным доступом к чистой воде и плохими средствами гигиены. Также неграмотность и низкая осведомленность о своем заболевании и состоянии приводили к задержке диагностики и плохому соблюдению рекомендуемой медицинской терапии.

Мы пришли к выводу, что помимо генетической и иммунологической предрасположенности к витилиго, факторы социальной среды влияют на прогрессирование витилиго и качество жизни пациентов. Практика ведения болезней в любой стране, особенно в странах с низким и средним уровнем дохода, требует как индивидуального ухода за пациентами, так и общих мер поддержки, таких как повышение осведомленности общества по вопросам гигиены и повышение уровня жизни. Контроль более широких социальных факторов является эффективным способом повышения качества жизни больных витилиго, а также устранения предрассудков, с которыми они сталкиваются в сельской местности Узбекистана

Ключевые слова: Витилиго, Аутоиммунное заболевание кожи, Разрушение меланоцитов, Перенаселенность, Экологические факторы, Социально-экономические детерминанты, Дерматология Узбекистана, Доступ к воде и гигиена, Психосоциальный стресс, Неравенство в здоровье, Инфраструктура общественного здравоохранения, Качество жизни пациентов с витилиго

Relevance

Vitiligo is not a life-threatening disorder; rather, it significantly impacts individuals' self-perception and social well-being. Vitiligo is characterized by white spots on the skin resulting from the loss of pigment-producing cells known as melanocytes. It can manifest at any age and on any body part. Although the illness does not induce physical pain or transmit through contact, it frequently results in mental discomfort, especially when it impacts conspicuous regions like the face or hands. In communities where appearance significantly impacts social interactions, individuals with vitiligo may encounter stigma, shame, or misapprehension from others.

The precise etiology of vitiligo remains ambiguous. Most studies concur that it encompasses a combination of autoimmune activity, oxidative stress, and genetic predispositions, with environmental causes such as skin trauma or stress occasionally contributing. Despite the expansion of medical literature, a significant portion emphasizes biological processes, frequently neglecting the everyday experiences of individuals living with the condition, particularly in resource-constrained environments. In Uzbekistan, especially in the Surkhandarya region, dermatological services are predominantly located in metropolitan areas. Rural populations frequently have insufficient access to professionals, and public awareness of dermatological conditions is constrained. Consequently, individuals with vitiligo may delay seeking medical consultation for months or even years. In certain instances, individuals may refrain from seeking medical consultation, convinced that the ailment is incurable or apprehensive of societal judgement. Such delays may exacerbate mental distress and diminish therapy efficacy.

Moreover, environmental and socioeconomic factors, like household overcrowding, inadequate access to clean water, and substandard hygiene facilities, may not directly induce vitiligo, yet they significantly influence the patient experience. Residing in confined spaces, sharing beds, or lacking access to regular hygiene supplies can exacerbate the stress associated with treating a visible dermatological condition. When coupled with low health literacy or diminished faith in medical systems, these problems lead to postponed diagnosis and insufficient care. This research was conducted at the Surkhandarya Regional Dermatovenerology Dispensary to investigate the correlation between living conditions and the prevalence and severity of vitiligo. The research seeks to provide a comprehensive understanding of the disease's impact on daily living by examining both clinical characteristics and the social context. The objective is to emphasize the necessity for more comprehensive care techniques that extend beyond pharmacological interventions, including education, awareness, and the larger determinants that influence health outcomes for individuals with vitiligo.

Materials and methods

Comprehending vitiligo necessitates not only an examination of its biological origins but also an attentiveness to patients' experiences and the influence of their environment on their condition's

progression. In the last twenty years, experts have discovered that vitiligo involves more than merely the loss of skin pigmentation. As Taïeb and Picardo explain, the body's own immune system may be at the heart of the issue, mistakenly targeting pigment-producing cells and slowly erasing patches of natural colour from the skin .

But immunity alone doesn't tell the whole story. Environmental stress, particularly oxidative stress, is now known to make things worse. In a well-known study, Schallreuter and her colleagues discovered that vitiligo patients often have higher levels of unstable oxygen molecules, free radicals that damage melanocytes and make their survival harder . This could explain why vitiligo sometimes begins after a sunburn, an injury, or a period of emotional exhaustion.

Genetics also play a role. Jin and his team used large-scale genetic studies to show that people with vitiligo often carry specific genes linked to immune system regulation . Interestingly, many of these same genes are involved in other autoimmune diseases, like thyroid disorders, which, as Betterle's research points out, commonly show up in patients with vitiligo .

Still, the emotional impact of vitiligo might be just as powerful as the biological one. Ongenaie and colleagues documented how patients often face anxiety, isolation, and even depression when their areas . For milder cases, creams like corticosteroids or calcineurin inhibitors are still commonly used, though as Silverberg notes, they don't always work long-term and can cause side effects .

Lately, researchers like Harris and Rashighi have started exploring new classes of drugs, such as JAK inhibitors, that target deeper immune pathways. These treatments are still in their early stages, but they might soon offer better options for patients whose vitiligo is spreading or resistant to other methods.

Access to care, however, remains a challenge. A study from rural India by Sharma and Dhar found that many people with vitiligo had never seen a dermatologist, not because they didn't want to, but because such services were simply too far away or unfamiliar to them . This rings true in parts of Uzbekistan, too, where most dermatological care is located in big cities, far from rural homes.

Lastly, education and awareness still matter enormously. Alikhan and colleagues stress that without community education and support, even the best treatment can fall short. Patients need more than prescriptions they need understanding, reassurance, and tools to manage both the condition and the stigma that often comes with it .

The literature unequivocally illustrates that vitiligo is a multifaceted interaction of biological, psychological, and social factors. Focusing solely on one aspect of that scenario fails to grasp the complete reality. Genuine advancement necessitates the integration of treatments with education, compassion, and equitable access to healthcare.

Results and discussions

This study was conducted at the Surkhandarya Regional Dermatovenerology Dispensary in southern Uzbekistan to elucidate how living factors influence the experience of vitiligo. The hospital is the largest dermatological centre in the region, catering to patients from metropolitan neighborhoods and outlying villages alike. The study spanned one year, from March 2023 to February 2024, and aimed to encompass both the clinical dimensions of vitiligo and the environmental and social circumstances of the patients' lives.

A total of 119 participants engaged in the investigation. Seventy-one individuals were diagnosed with vitiligo by a qualified dermatologist, while the remaining 48 constituted a control group without any indications of pigmentary disorders. All participants were long-term inhabitants of the area, having resided in the same household for a minimum of one year preceding the study. Individuals with other apparent skin illnesses or autoimmune disorders necessitating medication were eliminated to ensure that the data concentrated exclusively on vitiligo and its possible environmental associations.

Every participant had a comprehensive dermatological assessment. Physicians recorded the location, size, and kind of lesions in individuals with vitiligo. Diagnoses were validated with a Wood's lamp to illuminate depigmented regions, particularly during the initial phases of the disease or in individuals with lighter skin tones. In few instances, additional examinations, including skin scrapings, were conducted to eliminate alternative reasons of pigment loss.

The research team created a questionnaire to collect data on participants' living conditions, recognizing that skin illnesses are influenced by environmental factors. The questionnaire was conducted in Uzbek by qualified medical personnel to guarantee clarity and comfort during the interview

procedure. Participants were enquired about the number of individuals they cohabited with, the number sharing the same sleeping quarters, the frequency of access to piped water, and the availability of a private or communal restroom. Bedding practices, including the frequency of laundering sheets and blankets, were documented, alongside educational background and knowledge of vitiligo as a medical problem.

Rather than condensing living conditions into a singular number, researchers classified houses into extensive groups, spanning from adequate to extremely inadequate. The classifications were determined by various combined characteristics, including overcrowding (exceeding two individuals per room), insufficient daily access to clean water, and communal sleeping arrangements. This methodology enabled the team to examine the correlation between varying levels of environmental adversity and the occurrence or severity of vitiligo.

All gathered data were input into statistical software (SPSS v26) and analyzed via established methodologies. The team employed descriptive statistics to encapsulate the participants' fundamental features and thereafter performed group comparisons utilizing t-tests and chi-square tests, contingent upon the data type. A logistic regression model was employed to identify the environmental factors most significantly correlated with vitiligo, while controlling for age, sex, and educational attainment.

Ethical approval for the study was secured from the Ethics Committee of the Tashkent Medical Academy, and all participants, or their legal guardians, provided informed consent. Privacy was upheld at every stage—data were anonymized and securely kept, and participation was completely voluntary.

The efficacy of this method is rooted on its integration of clinical acumen with experiential authenticity. By integrating the body with the surrounding environment, the study offered a more comprehensive and humanistic perspective on the interaction between vitiligo and daily life. This viewpoint is particularly significant in areas where individuals encounter not only health-related obstacles but also infrastructural and educational deficiencies that affect the perception, treatment, and management of diseases.

This study's findings provided significant insight into the correlation between vitiligo and environmental and social living conditions in Surkhandarya. Of the 119 volunteers, 71 were diagnosed with vitiligo, whereas 48 constituted the control group. Significant disparities were observed between the two groups regarding household size, sanitation facilities, and access to essential services.

A significant disparity was seen in household density. Individuals with vitiligo resided in bigger families on average, with a household size of 6.1 ± 1.5 members, in contrast to 4.0 ± 1.1 in the control group. Moreover, 68% of vitiligo patients resided in accommodations with more than two individuals, whereas just 29% of the control group indicated similar circumstances. The findings are encapsulated in Table 1 below:

Table 1. Household and Hygiene Conditions in Vitiligo and Control Groups

Variable	Vitiligo group	Control group	p-value
Mean household size (persons)	6.1 ± 1.5	4.0 ± 1.1	<0.001
More than 2 people per room (%)	68%	29%	<0.001
Daily piped water access (%)	41%	76%	<0.001
Private sanitation access (%)	45%	82%	<0.001

The inequalities in water access were equally pronounced. Only 41% of individuals with vitiligo had consistent daily access to piped water, whereas the majority of the control group—76%—did. Likewise, private sanitation was accessible to just 45% of vitiligo patients, in contrast to 82% of the control group. These trends substantiate the idea that inadequate hygiene infrastructure contributes to the initiation or continuation of vitiligo, potentially by influencing skin health, psychological stress, or the promptness of care-seeking behaviour.

Figure 1 demonstrates that the prevalence of vitiligo escalates with the size of the household. The incidence was comparatively low among households consisting of three or fewer persons. In households with six or more individuals, the disorder was more than four times as prevalent. This probably indicates both stress-induced factors and postponed intervention in congested households.

Figure 2 illustrates the prevalence of vitiligo in relation to water accessibility. The highest rates were noted among persons lacking piped water, whereas everyday access to water correlated with markedly fewer cases. This indicates that access to fundamental hygiene serves as a protective factor.

A logistic regression model was utilised to investigate the independent associations of several factors with vitiligo. Table 2 indicates that the primary predictors of influence are big household size (OR = 2.6), lack of daily water availability (OR = 3.1), shared sleeping practices (OR = 2.0), and low educational attainment (OR = 1.7). All of these correlations were statistically significant.

Figure 1. Vitiligo Prevalence by Household Size

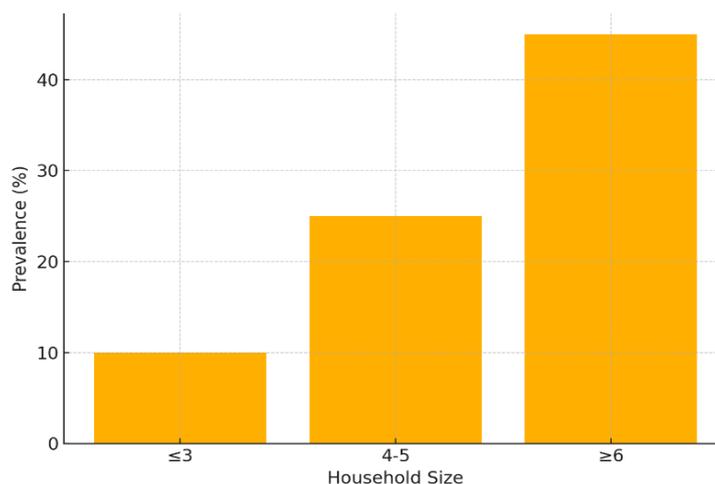


Figure 2. Vitiligo Prevalence by Water Access

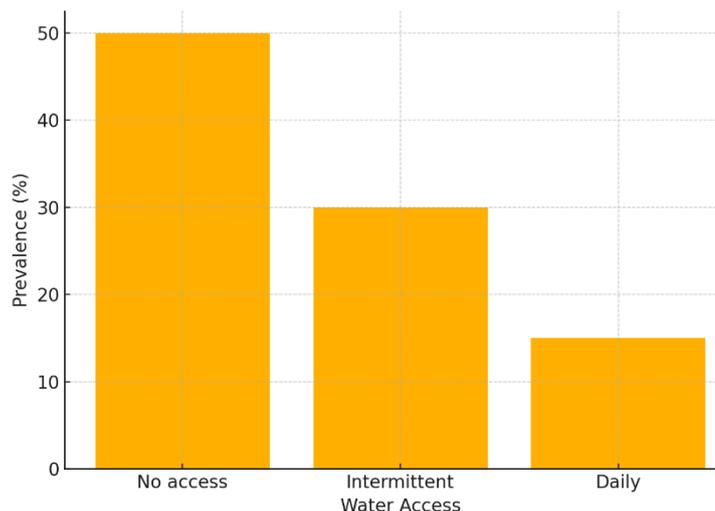


Table 2

Logistic Regression of Risk Factors for Vitiligo

Risk Factor	Odds Ratio (OR)	95% CI	p-value
Household size >5	2.6	1.7–4.0	<0.001
No daily water access	3.1	1.9–5.0	<0.001
Shared bedding	2.0	1.2–3.3	0.004
Low education (primary only)	1.7	1.0–2.9	0.027

Collectively, these findings affirm that environmental and social factors are significantly correlated with the prevalence and management of vitiligo. While vitiligo is fundamentally an autoimmune disorder, this study indicates that overcrowded living conditions, insufficient water access, and poor



levels of education can exacerbate the disease burden. While these circumstances may not directly induce vitiligo, they evidently affect its severity, progression, and the patient's capacity to manage or pursue treatment.

The research underscores the necessity of formulating localized public health strategies that extend beyond therapeutic interventions. In regions such as Surkhandarya, where rural communities encounter various systemic disadvantages, effective vitiligo management should encompass public cleanliness initiatives, enhancements to water infrastructure, and community-oriented educational activities. To alleviate the burden of skin conditions such as vitiligo, it is essential to treat the comprehensive spectrum of medical and social causes.

This study underscores a notable correlation between the incidence of vitiligo and many environmental and socioeconomic factors in Surkhandarya. The increased incidence noted in persons living in bigger homes and overcrowded conditions substantiates the concept that psychosocial stressors and delayed access to care are significant exacerbating factors in vitiligo. Chronic stress, prevalent in such settings, is recognized to initiate or exacerbate autoimmune responses. This study found that patients from households with more than five individuals had an odds ratio of 2.6 for vitiligo, highlighting the significance of incorporating housing conditions into public health planning.

The observed disparity in access to water and sanitation is equally significant. Only 41% of vitiligo patients indicated reliable access to piped water, in contrast to 76% in the control group. The logistic regression model identified this variable as one of the most significant predictors (OR = 3.1). Access to water is not solely a hygiene concern; it affects the capacity to preserve skin integrity, diminish microbial colonization, and address comorbid dermatological diseases. Inadequate sanitation was correlated with an increased prevalence, indicating that infrastructural deficiencies may exacerbate disease persistence and consequences. The significance of educational attainment must not be disregarded. Individuals possessing solely primary schooling exhibited a 1.7-fold heightened probability of developing vitiligo. This may indicate a lack of information concerning early signs, diminished healthcare participation, and inadequate disease management. Shared bedding, observed in 68% of vitiligo cases, reinforces the notion that crowding and limitations in personal space may promote disease manifestation. In conclusion, although vitiligo is largely an autoimmune illness, the evidence robustly underscores the significance of social determinants of health. In areas like Surkhandarya, public health initiatives must focus on clinical treatment as well as enhancements in hygiene, housing, and health education to successfully alleviate the burden of vitiligo.

Conclusion

This study presents persuasive evidence that vitiligo, while primarily an autoimmune illness, is substantially affected by environmental and social factors. The examination of 119 participants from Surkhandarya indicated that individuals with vitiligo more commonly resided in congested houses, experienced inconsistent access to piped water and sanitation, and frequently possessed lower educational attainment. Each of these factors separately correlates with an elevated risk of vitiligo and may contribute to the condition's persistence or severity. The statistical results of the study, including the odds ratios for household sizes above five (OR = 2.6) and lack of daily water availability (OR = 3.1), underscore the significant impact of living standards on disease dynamics. The correlation between shared bedding and the prevalence of vitiligo (OR = 2.0) highlights the impact of proximate physical settings and socioeconomic adversity on skin health, immunological function, and overall well-being.

These findings indicate that medical treatment alone is inadequate for controlling vitiligo in resource-constrained regions. Effective public health efforts must integrate social interventions, like enhancing access to clean water, alleviating household congestion, and broadening community education on skin health. Enhancing awareness of the non-contagious characteristics of vitiligo and advocating for prompt medical intervention might mitigate stigma and prevent delays in treatment. Ultimately, the implications of vitiligo cannot be adequately addressed using biological models alone. A comprehensive approach is necessary that recognizes the impact of social determinants, particularly in marginalized areas such as Surkhandarya, where environmental stresses and inadequate infrastructure exacerbate health issues.

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