

NASVAY AS A SMOKELESS TOBACCO PRODUCT: AN EXAMINATION OF METHODS OF USE, EFFECTS ON HEALTH, AND REGULATORY ASPECTS

ESHIEV ABDYRAKMAN,¹ MAMAEVA AYPERI,²
MYRZASHEVA NAZGUL,¹ ESHIEV DANIYAR,¹
MOLDALIEV JOOMART³

Accepted

24. 6. 2025

Revised

14. 8. 2025

Published

22. 5. 2025

¹ Osh State University, Department of Surgical Dentistry, with a course in Pediatric Surgical Dentistry, Osh, Kyrgyz Republic
eshievabdyrakman5@gmail.com, m_nazgul1@hotmail.com,
e.daniyar2025@outlook.com

² Osh State University, Department of Therapeutic Dentistry with a course of Pediatric Therapeutic Dentistry, Osh, Kyrgyz Republic
mayperi@outlook.com

³ Osh State University, Department of Clinical Biochemistry and Pathophysiology, Osh, Kyrgyz Republic
m_joomart@hotmail.com

CORRESPONDING AUTHOR

eshievabdyrakman5@gmail.com

Abstract The purpose of the study is to evaluate the effect of nasvay on oral health in the Kyrgyz Republic. The study utilized a mixed-methods approach, combining a standardized questionnaire and dental examinations of 2,388 participants. It is determined that 32.9% of schoolchildren, 41.1% of students, and 35.7% of rural residents use nasvay. The prevalence rate is higher among men. The use of nasvay is associated with a high prevalence of dental diseases: leukoplakia, hyperaemia, and swelling of the mucous membrane. The index of caries, fillings, and lost teeth in users is 6.8. Among the methods of use, the most popular is in the cheek. It is discovered that the availability and low cost of nasvay contribute to its widespread use. The need for comprehensive preventive measures is emphasised, including increased regulation, educational campaigns, and reduction of economic dependence on the production of nasvay.

Keywords

smokeless tobacco,
swelling of the mucous
membrane,⁰
leukoplakia,
smokeless tobacco
warnings,
periodontal disease,
precancerous dental
lesions

<https://doi.org/10.18690/mls.18.2.289-316.2025>

CC-BY, text © Abdyrakman, Ayperi, Nazgul, Daniyar, Joomart, 2025

This work is licensed under the Creative Commons Attribution 4.0 International License.

This license allows reusers to distribute, remix, adapt, and build upon the material in any medium or format, so long as attribution is given to the creator. The license allows for commercial use.

<https://creativecommons.org/licenses/by/4.0>



1 Introduction

Smokeless tobacco, including nasvay, poses a serious public health problem, especially in Central Asian countries. Nasvay is widely used among various age and social groups in the Kyrgyz Republic, due to its accessibility and low cost. However, its use has a pronounced negative impact on oral health and the general condition of the body, which requires in-depth analysis and the development of regulatory measures. In conditions of weak legislative control and limited preventive work, the prevalence of nasvay continues to grow.

1.1 Nasvay: Composition, Patterns of Use, and Public Health Risks

A type of smokeless tobacco known as nasvay (sometimes spelt nasvar or nasvai) is traditionally used in Central Asia, especially in Kazakhstan, Uzbekistan, Kyrgyzstan, and portions of Afghanistan and Pakistan. Usually, a blend of slaked lime, ash, dried tobacco leaves, and different flavourings are used to make it. The product typically has a strong, pungent smell and is greenish in colour. Nasvay slowly releases nicotine and other chemicals into the bloodstream when users place tiny amounts of it behind their lower lip, under their tongue, or inside their cheek. This mode of ingestion produces a powerful addictive effect and quick absorption. Its popularity is linked to low cost, accessibility, and cultural acceptance, making it especially common among adolescents and rural populations. Patterns of use are shaped not only by availability but also by social norms and misperceptions. Many users, particularly students and manual labourers, view nasvay as less harmful than cigarettes and use it as a means of stress relief (Bazrafshan et al., 2024). Such beliefs, combined with limited health literacy, reinforce its persistence.

Nasvay presents serious health risks in spite of its low cost and rich cultural heritage. According to studies, it contains carcinogenic substances like heavy metals and nitrosamines, which raise the risk of gastrointestinal issues, periodontal disease, and oral cancers. Long-term use has also been connected to chronic nicotine dependence, gum recession, and dental erosion (Iqbal et al., 2025). Furthermore, using tobacco and lime together can irritate the oral mucosa, increasing the risk of lesions and precancerous conditions.

Nasvay use during pregnancy carries significant risks for the mother and foetus because nicotine and carcinogenic compounds easily pass through the placental barrier, decreasing uteroplacental blood flow and compromising the delivery of oxygen and nutrients. Evidence from a study conducted in Pakistan's Thatta District revealed that smokeless tobacco usage more than doubled the risk of negative outcomes (Mufaddal et al., 2024). In addition to raising the risk of preterm delivery and stillbirth, this exposure directly contributes to intrauterine growth restriction, low birth weight, and increased neonatal susceptibility to respiratory disorders and developmental delays. These results highlight the critical need for rigorous regulation of nasvay use among women of reproductive age and preventive education.

Nasvay regulation is still a major public health concern, especially in South Asian nations where its use is common and deeply ingrained in the culture. With little enforcement of current tobacco control laws and few public awareness campaigns highlighting the risks of nasvay, Pakistan's efforts to curb it have been patchy (Ochani et al., 2022). Since nasvay is frequently made and distributed informally, unlike cigarettes, it is challenging to control its composition, sale, and accessibility, particularly among young people and those with low incomes.

1.2 Impact of Nasvay on Oral Health

The use of smokeless tobacco, such as nasvay, has been linked to a variety of adverse oral health conditions, which pose a significant public health concern. The precancerous lesion known as leukoplakia, which appears as white patches in the oral mucosa, is one of the most prevalent conditions linked to its consumption. Usually, the chemicals in smokeless tobacco, like nicotine, and alkaline substances like lime, cause these lesions through long-term irritation. Leukoplakia is a well-documented risk factor for oral cancer, which is much more common in smokeless tobacco users than in non-users (Kravchenko & Lykhota, 2024). If treatment is not received, the prolonged irritation caused by nasvay use results in epithelial changes that raise the risk of cancer.

Smokeless tobacco users also frequently experience mucosal hyperaemia, or inflammation of the oral mucous membranes. Because of its alkaline qualities, lime in nasvay irritates the mucosa, increasing blood flow and redness. If this inflammatory reaction continues, it may lead to more serious oral health issues like

tissue erosion and ulcers (Muthukrishnan & Warnakulasuriya, 2018). Oral health is further compromised by chronic mucosal inflammation, which also increases the susceptibility of oral tissues to secondary infections.

Nasvay users are also more likely to have periodontal disease, such as gingivitis and periodontitis. It has been demonstrated that smokeless tobacco weakens the gums' immune system, leaving them more vulnerable to inflammation and infection. Periodontal diseases affect the structural integrity of the teeth and surrounding tissues, and they are especially concerning because they can result in tooth loss if left untreated. According to research, using smokeless tobacco makes these conditions worse and raises gum disease rates when compared to non-users (Kolte et al., 2025; Mammadov et al., 2022). The association between tobacco products and various oral diseases was further highlighted by Alamer et al. (2024), who also pointed out that Americans who use smokeless tobacco are more likely to develop periodontitis and its complications.

Nasvay use over an extended period of time is linked to a higher risk of oral cancer. Oral tissues gradually deteriorate due to the carcinogenic qualities of tobacco and its chemical additives, including tar and heavy metals. Smokeless tobacco greatly increases the risk of developing cancerous lesions in the mouth because of its direct and extended contact with the mucosa (Chaffee et al., 2022). Public health initiatives to reduce the use of smokeless tobacco are desperately needed, as evidenced by the cumulative effect of these harmful substances, poor oral hygiene, and a lack of preventive care.

1.3 An Analysis of Nasvay in Central Asia

One of the critical problems is the high prevalence of use among young people. Oskonbaeva (2021) has shown that smokeless tobacco is becoming increasingly popular among teenagers, due to its accessibility and lack of prohibitions. The paper highlights that young people make up about 40% of all users of nasvay, with many starting to use it at the age of 12-14 years. However, the author did not address the issue of differences in the methods of consumption among different age groups and their impact on health. The problems associated with the effects of nasvay on oral health remain poorly understood. Stepanov et al. (2017) investigated the effect of smokeless tobacco on the condition of the oral mucosa and noted that regular

consumption of tobacco increases the risk of developing leukoplakia (precancerous white patches in the mouth) and mucosal hyperplasia. Their data showed that the risk of dental diseases in smokeless tobacco users is twice as high as in non-smokers. However, the study did not include a detailed analysis of the effects of lime as a product with a unique composition, including lime and ash.

The methods of using nasvay also play an important role in the development of complications. Shats et al. (2018) stated that putting smokeless tobacco in the cheek leads to localised tissue damage, while using it under the lip and tongue increases the risk of generalised dental problems. However, this study was limited to adult users, without considering the characteristics of adolescents and young people. Epidemiological data show that the availability and low cost of nasvay contribute to its widespread distribution among rural residents. Bekbasarova et al. (2022) indicated that nasvay is available in more than 80% of rural regions, and its cost is 3-4 times lower compared to cigarettes. This makes it especially popular among low-income people. However, their study lacked an analysis of the social and cultural factors influencing nasvay consumption.

The lack of effective regulation exacerbates the problem. Saxena et al. (2022) underline that the weakness of legislation regulating the quality and labelling of smokeless tobacco leads to a high level of illegal production and a lack of control over the content of toxic components. However, their work was limited to analysing the markets of Southeast Asia and did not cover the countries of Central Asia, including Kyrgyzstan, where the problem is particularly relevant. The effect of nasvay on the index of caries, fillings, lost teeth (CFL) and the periodontal index (PI) also requires further study. Gupta et al. (2022) demonstrated that smokeless tobacco users have an average CFL index 30% higher than non-users. Their data confirm that regular intake of nasvay is associated with a high risk of caries and inflammatory gum diseases. However, the authors did not analyse the effect of the lime-based composition on the mineralisation of tooth enamel. The problem of educational campaigns and informing the public about the dangers of smoking remains relevant. Gangwani et al. (2024) and Gupta et al. (2021) showed that in India, where regular educational programmes are conducted, the use of smokeless tobacco decreased by 15-20% between 2017 and 2021. However, their recommendations do not account for the specifics of Kyrgyzstan, where the population is poorly aware of the risks associated with nasvay, and access to medical services is limited in rural areas.

The purpose of the study is to examine the ways of using nasvay and their impact on the oral cavity, as well as to analyse the regulatory framework for improving smokeless tobacco control. The objectives of the study include the analysis of the prevalence of tobacco use among various population groups, the analysis of dental diseases associated with its use, the assessment of risk factors, and the development of recommendations to strengthen the prevention and regulation of smokeless tobacco.

2 Materials and Methods

The study was conducted in the Kyrgyz Republic in 2024 from September 1 to December 31 and covered two regions: Osh city and the Batken region. The sample included 283 students from secondary school No. 4 named after Kirov in Osh, 394 students of Osh State University, and 1,711 residents of the village of Abdusomat, Kadamzhai district, Batken region. Among schoolchildren, 79.5% (225 people) were boys, and 20.5% (58 people) were girls. The age distribution was as follows: 15 years – 69 people, 16 years – 115 people, 17 years – 99 people. Among the students, the proportion of men was 72.8% (287 people), women – 27.2% (107 people). The age structure of the students included groups of 18-19 years old (89 people), 20-21 years old (159 people), and 22-23 years old (146 people). The inhabitants of the village of Abdusomat represented a total population of 230 families, among which men accounted for 50.1% (858 people), women – 49.9% (853 people). Children under the age of 14 accounted for 39.7% (680 people) of the population.

The study used a standardised questionnaire, which was prepared by the authors, who incorporated relevant questions based on existing literature and expert input in the field of tobacco use and oral health. It included questions aimed at collecting information about the frequency, methods, and places of nasvay use, as well as about side effects and the level of awareness of respondents. The questionnaire contained sections covering the general data of the respondents (age, gender, place of residence, level of education), their experience of using nasvay (first experience, frequency, reasons for use), methods of use, observed side effects, level of awareness about the dangers of nasvay and its legislative regulation. For example, respondents were asked if they used nasvay, at what age they started, what reasons prompted them to use it, and whether they noticed a deterioration in their health or addiction. Additionally, questions were asked about whether they were aware of the health risks

and legal restrictions, as well as their opinion on measures aimed at reducing consumption. In total, the questionnaire contained a total of 20 questions.

The survey was conducted both on paper and using electronic platforms. Paper questionnaires were used for Osh secondary school students and residents of the village of Abdusomat, while electronic forms created on the Google Forms platform and in the SurveyMonkey application were used for Osh State University students. This approach allowed the survey to reach a wide range of respondents, making it accessible to different groups.

The respondents were divided into two groups to analyse the data: experimental (people who use nasvay) and control (people who do not use it). The experimental group included 1,649 participants who used nasvay for different periods, and the control group included 739 people who had never used nasvay. Among the participants of the experimental group, a further distribution took place according to the duration of nasvay use: (1) less than one year, (2) from one to five years, (3) more than five years. This separation helped assess the progressive impact of nasvay on oral health.

The dental examination was conducted at Osh Regional Dental Clinic No. 1 to identify damage to the oral mucosa associated with the use of nasvay. The examination was conducted on 1,454 participants from the experimental group, divided into groups depending on the duration of nasvay use. Dental mirrors, probes, and lighting devices manufactured by Dentsply Sirona (USA) were used for the examination. The examination included a visual inspection of the oral mucosa with special attention to the areas in contact with the substance. Dental indices, including CFL, PI, and the Green-Vermillion index, were calculated to assess the hygienic condition of the oral cavity. Signs of leukoplakia, ulcers, hyperaemia, and swelling of the mucous membrane were visually detected. The survey included 1,454 people, of whom 71.9% needed oral sanitation.

The study examined the legislative acts of the Kyrgyz Republic, including the Law of the Kyrgyz Republic No. 121 "On Protection of Health of Citizens of the Kyrgyz Republic from the Consequences of Tobacco Consumption, Nicotine and Exposure to Ambient Tobacco Smoke and Aerosols" (2021). International standards included the World Health Organisation Framework Convention on Tobacco Control (WHO

FCTC) (2025) and Partial Guidelines for the Implementation of Articles 9 and 10 of the WHO FCTC (2017). Publications on the effects of nasvay on health were analysed using PubMed, Scopus, Web of Science databases and reports from international organisations such as the World Bank (2024) and WHO FCTC (2012).

The Statistical Package for the Social Sciences (SPSS Statistics) (2025), version 27, was used for data processing. Descriptive statistical methods were used, including the calculation of averages and standard deviations.

All manipulations related to the survey of the respondents' health were performed in strict accordance with the principles of the Declaration of Helsinki (World Medical Association, 2013), the voluntary consent of the participants, and compliance with ethical standards.

3 Results

Nasvay use remains one of the most widespread forms of tobacco use in Central Asia, especially among young people and rural populations. According to the WHO FCTC (2012), about 20-30% of the region's residents have used nasvay at least once in their lives, and in some age groups this figure can reach 40%. Bekbasarova et al. (2022) confirmed that in several rural areas of Kyrgyzstan, the prevalence of nasvay consumption among men exceeds 50%, which makes it one of the key risk factors for public health. In addition, according to Oskonbaeva (2021), more than 60% of nasvay users started using it in adolescence, which is due to social accessibility and a lack of educational programmes. This high prevalence is due to several factors: the ease of access to the product, its low cost, cultural traditions, and lack of awareness among the population about the dangers of smokeless tobacco. In rural areas, nasvay is often perceived as a "traditional" product that increases vigour and productivity, especially among men. The low level of government regulation, the lack of age restrictions on purchases, and the absence of preventive programmes additionally exacerbate the problem. The spread of nasvay among adolescents and young people is associated with the mistaken perception of it as a less harmful alternative to cigarettes, which contributes to the development of addiction and the formation of long-term health risks.

The prevalence of its use shows substantial differentiation among different age and social groups, reflecting the depth of the problem (Table 1). Among the students of secondary school No. 4 named after Kirov in Osh, 32.9% of respondents use nasvay. This figure is substantially higher among boys and amounts to 38.6%, while among girls, it is only 10.3%. This difference is related to gender-specific social expectations and the lower involvement of girls in risky behaviour. However, even these indicators exhibit an increasing trend in the participation of adolescents in the use of harmful substances.

Table 1: Prevalence and methods of nasvay use among various population groups

Population group	Total amount	Heavy users (%)	Methods of use	Men (%)	Women (%)
Schoolchildren (the city of Osh)	283	32.9	In the cheek – 70%, under the lip – 20%, under the tongue – 10%	38.6	10.3
Students (Osh State University)	394	41.1	In the cheek – 50%, under the lip – 30%, under the tongue – 20%	47.7	22.4
Rural population (Batken region)	1711	35.7	Under the lip – 40%, under the tongue – 35%, in the cheek – 25%	42.1	29.3

Source: compiled by the authors.

The nasvay consumption is even more widespread among Osh State University students, amounting to 41.1%. In male students, this figure reaches 47.7%, which is substantially higher than the proportion of women, which is 22.4%. The differences between men and women in this group may be due to both cultural norms and the perception of nasvay as a "traditional" product among men. For students, nasvay is often associated with an affordable stress reliever, especially during exam sessions, which underscores the need for targeted preventive measures in educational institutions.

The rural population of the Batken region demonstrates a high prevalence of nasvay consumption – 35.7%. Here, men (42.1%) are substantially more likely to use nasvay than women (29.3%). This difference can be explained by the greater involvement of men in agricultural work, which is often used to maintain vigour during the day. In addition, limited access to information about the dangers of nasvay and poor preventive work in rural areas exacerbate the problem. Special attention should be paid to the fact that the use of nasvay among young people and rural populations is associated with its accessibility and low cost. It is perceived as a harmless alternative

to tobacco products, which creates a false sense of safety among users. This situation requires strengthening prevention programmes, including awareness-raising among young people, educational events, and public awareness of the long-term effects of nasvay use.

The analysis of the data from the table displays a variety of methods of nasvay consumption among various social and age groups. Among secondary school pupils, the dominant method is to put it in the cheek (70%), which is due to the desire for secrecy and minimising social risks. This method allows students to avoid being judged by parents and teachers, as the visual and behavioural signs of use are less noticeable. There is a more mixed picture among students. Although the in-the-cheek method remains the most common (50%), the percentage of students who place it under the lip (30%) and under the tongue (20%) is noticeably increasing. This is due to greater freedom in the behaviour of students and the availability of information about various ways of consumption, obtained both from the Internet and peers.

Other trends are observed in rural areas. Here, placing nasvay under the lip (40%) and under the tongue (35%) is more common than using the in-the-cheek method (25%). This is due to traditional practices and the convenience of using it during physical work outdoors. Placing nasvay under the lip and tongue allows it to stay longer, which is important for the rural population engaged in hard work, where the distraction of frequent substance replacement is undesirable. On the contrary, putting it in the cheek is used less often since this method dissolves nasvay faster, requiring more frequent replacement. Such a difference in the methods of consumption may be due to cultural, behavioural, and age factors. For example, in rural areas, women hide consumption more often, which explains the popularity of methods that minimise the visibility of the process, such as putting it under the tongue.

Nasvay, as a form of smokeless tobacco, has a substantial negative impact on oral health. The main component of nasvay is tobacco containing nicotine in concentrations up to 30 mg/g, which is several times higher than the level of nicotine in conventional cigarettes. Alkali, as a rule, is represented by slaked lime, which is necessary for the release of free nicotine, which enhances its addictive effect. However, the same compound destroys the epithelial barrier of the mucous

membrane, increases its permeability, and promotes the development of chronic inflammation (Khan et al., 2019). Lime in the composition has a corrosive effect on the mucous membrane, provoking microtrauma and irritation. Thus, regular exposure to these components leads to tissue hyperplasia, the formation of leukoplakia, and other pathological changes that can develop into oncological diseases. Additives in the composition of nasvay, such as ash, are abrasive substances that worsen damage to the mucous membrane, increasing the risk of infections (Ahmad et al., 2020).

Dental examinations of the study participants showed a substantial deterioration in the condition of the oral cavity in those who use Nasvay compared to non-users. Of the examined 1,454 participants, 71.9% needed oral rehabilitation. Leukoplakia, ulcers, hyperaemia, and swelling of the mucous membrane were the most common pathological changes. These changes are explained by the effect of the chemical composition of the substance containing lime and alkali, which aggressively affects the tissues of the oral cavity. A comparative analysis showed that the CFL and PI indices were substantially higher for those who consumed nasvay than for those who did not (Table 2).

Table 2: Comparative analysis of dental indicators between users and non-users

Indicator	Heavy users (average value)	Non-users of nasvay (average value)	Differences (% or p-value)
CFL index	6.8	4.2	p<0.01
The PI Index	65.4%	34.2%	p<0.01
Leukoplakia (%)	23.1%	4.8%	+381%
Hyperaemia (%)	48.7%	19.6%	+148%
Mucosal oedema (%)	34.5%	8.3%	+316%

Note: The difference column shows the percentage increase in the prevalence of oral health issues (leukoplakia, hyperaemia, and mucosal oedema) among nasvay users compared to non-users.

Source: compiled by the authors.

The results of the study demonstrate a high prevalence of dental diseases in nasvay users, which indicates a substantial impact of this product on oral health. Leukoplakia, which is characterised by changes in the mucous membrane, was detected in 23.1% of users. This is four times higher than in the control group of non-user drinkers, which indicates a chronic irritation of the oral cavity tissues by

the components of the nasvay, in particular, lime and tobacco. The hyperaemia and swelling of the mucous membrane observed in nasvay users were also substantially more common than in the control group (48.7% and 19.6%, respectively), which confirms the aggressive effect of the substance on soft tissues. The chemicals contained in nasvay create an irritating effect, contributing to the development of inflammatory processes. These changes increase the risk of secondary infections and the transition of pathologies to a chronic form.

The CFL index, which is an indicator of the general condition of the teeth, was 6.8 for nasvay users, which is substantially higher than in the control group, where it is 4.2. These data highlight the increased caries rate and the need for dental treatment among this group. This is due to the destructive effect of nasvay on tooth enamel and increased acidity of the oral cavity, which creates favourable conditions for the development of caries. The PI index, which reflects the condition of the soft tissues of the oral cavity, was 65.4% among nasvay users, which is almost twice as high as in the control group. This indicates the prevalence of inflammatory periodontal diseases such as gingivitis. The constant exposure to toxic substances contributes to the deterioration of the periodontal condition, reducing tissue resistance and increasing the risk of damage. Thus, the use of nasvay drastically worsens the condition of the oral cavity, which requires attention from both dentists and public health specialists.

The duration of nasvay consumption had a substantial impact on the state of oral health, which manifested itself in a pronounced correlation between the duration of use and the degree of damage to the mucous membrane and teeth. In people who have been using nasvay for more than 5 years, the CFL and PI indices were 15% higher compared to users with shorter use terms. This indicates an increasing negative effect of the toxic components of nasvay on the tissues of the oral cavity with longer use time. Ulcers and erosions on the mucous membrane were more often detected in this group, which may be due to prolonged exposure to irritating substances such as lime and carcinogens contained in the substance. The incidence of leukoplakia, characterised by precancerous mucosal changes, was 12% higher in long-term users, which highlights the progressive nature of tissue damage. Statistical analysis of the data confirmed the significance of the differences between the groups ($p < 0.01$), which indicates a high degree of correlation between the duration of nasvay consumption and the deterioration of the oral cavity. This highlights the need

to consider the length of use when assessing the risk of dental diseases among users of nasvay.

Pathogenetic changes caused by nasvay include destruction of the epithelial barrier and inflammatory processes associated with exposure to alkaline components. These chemicals increase tissue permeability, cause chronic inflammation, and contribute to the development of precancerous conditions. Nicotine additionally increases vascular disorders and leads to tissue hypoxia, worsening the general condition of the mucous membrane.

An analysis of the legal framework of the Kyrgyz Republic revealed insufficient regulation of smokeless tobacco, including nasvay use, which significantly reduces the effectiveness of measures to protect public health (Table 3). The main legislative acts, such as the Law of the Kyrgyz Republic No. 121 "On Protection of Health of Citizens of the Kyrgyz Republic from the Consequences of Tobacco Consumption, Nicotine and Exposure to Ambient Tobacco Smoke and Aerosols" (2021), focus primarily on restrictions related to traditional tobacco products such as cigarettes. Smokeless tobacco is mentioned only superficially in this regulatory framework, which leaves substantial regulatory gaps.

Table 3: Comparative analysis of the legislation of the Kyrgyz Republic and WHO international standards

Regulation parameter	Kyrgyz Republic	WHO International Standards	Gaps in the legal framework
Prohibition on sale to minors	Implemented	Recommended	Compliance control is weak
Product labelling	Basic information	Detailed warnings about the dangers	Insufficient warnings
Restriction on advertising	Partial	Full	Advertising is indirectly allowed
Quality and composition standards	Not regulated	Implemented	Absent
Liability for violation	Moderate fines	Stringent sanctions	Insufficient penalties

Source: compiled by the author based on Law of the Kyrgyz Republic No. 121 "On Protection of Health of Citizens of the Kyrgyz Republic from the Consequences of Tobacco Consumption, Nicotine and Exposure to Ambient Tobacco Smoke and Aerosols" (2021), WHO FCTC (2012).

Law of the Kyrgyz Republic No. 121 "On Protection of Health of Citizens of the Kyrgyz Republic from the Consequences of Tobacco Consumption, Nicotine and Exposure to Ambient Tobacco Smoke and Aerosols" (2021) establishes minimum

requirements for regulating the quality of smokeless tobacco products, including nasvay. The main focus is on compliance with sanitary standards at the stage of production and sale, but there are no specific standards for the control of toxic substances. Substances such as heavy metals (lead, cadmium) and calcium oxide hydrate are not subject to mandatory testing, which poses risks to consumer health. In addition, the law does not provide for mandatory certification of products, which allows manufacturers to avoid inspections and limit their responsibility for the quality of goods. A separate disadvantage is the lack of a requirement to indicate the full composition of the product on the package. This deprives consumers of the opportunity to obtain reliable information about the content of the product. The law also does not oblige to post health warnings, which contradicts the international recommendations developed by WHO FCTC (2012). Such measures are insufficient to prevent the negative effects of nasvay consumption and to raise public awareness.

The WHO, in its recommendations set out in the Partial Guidelines for the Implementation of Articles 9 and 10 of the WHO FCTC (2017), stresses the need for strict regulation of smokeless tobacco products. The main provisions include mandatory testing and certification of products to identify toxic substances such as heavy metals and alkalis. The organisation insists on introducing restrictions on the content of such substances to minimise their harmful effects on health. In addition, WHO recommends that manufacturers indicate the full composition of the product and publish the results of laboratory tests, ensuring transparency of information. One of the key measures is the mandatory placement of health warnings on product packaging, including graphic images. These warnings should cover at least 50% of its area. The WHO also stresses the importance of banning the addition of flavourings and other substances that may make nasvay more attractive, especially to young people.

Unlike international standards, the existing norms in the Kyrgyz Republic do not oblige manufacturers to test or specify the composition of the product. This creates a risk of products with a high content of toxic components appearing on the market. For example, the European Union and the United States have introduced strict rules that mandate the testing of each batch of smokeless tobacco and the control of its composition at the state level (Hatsukami et al., 2014). Such measures ensure a high level of protection of citizens' health. The lack of such an approach in Kyrgyzstan increases the risk of negative consequences for public health, especially among

young users, who most often perceive nasvay as a safe alternative to tobacco products. The incorporation of WHO recommendations into national legislation, such as limiting the content of calcium oxide hydrate, mandatory product testing, and the introduction of graphic warnings, can substantially diminish the prevalence of nasvay use and reduce the associated risks. This will strengthen the legal framework and improve the effectiveness of measures to protect public health.

Gaps in legislation also complicate the monitoring and management of the production, import, and sale of nasvay, which contributes to its widespread and uncontrolled dissemination. Bekbasarova et al. (2022) show that the concentration of these substances varies depending on the region and the manufacturer, which indicates a complete lack of regulation of the technological processes of the production of nasvay. In addition, the lack of clear control over the production of nasvay makes it difficult to track its origin and its constituent components. This makes it difficult to take harm reduction measures and inform consumers.

Restrictions on advertising smokeless tobacco in the Kyrgyz Republic remain partial and do not cover the full range of marketing strategies, which allows manufacturers to use indirect approaches such as sponsorship of events, neutral branding, and the absence of warnings about the dangers of the product. This approach substantially lowers the effectiveness of tobacco control, especially among young people, who are most susceptible to advertising. The international standards proposed by WHO within the framework of the FCTC (2025) offer tougher and more comprehensive measures that have proven effective in reducing tobacco consumption.

One of the fundamental aspects is the complete ban on advertising, promotion, and sponsorship of tobacco products provided for in Article 13 of the FCTC. These measures include the prohibition of both direct advertising and indirect methods such as the use of colours, images, or logos associated with the brand. Such a ban is aimed at minimising the impact of marketing on young people and at-risk groups. Therefore, the existing legislation of Kyrgyzstan allows for the maintenance of elements of indirect marketing, which reduces the effectiveness of control over tobacco products. Another important standard is the unified packaging and labelling of tobacco products described in FCTC Article 11. International recommendations require the mandatory placement of health warnings with images that cover at least 50% of the packaging area. A unified packaging design is also used, eliminating any

advertising elements. Such measures lessen the attractiveness of tobacco products and promote awareness of their harm among the population.

The control of minors' access to tobacco products is another critical part of international standards. According to Article 16 of the FCTC, states undertake to take measures to prevent the sale of tobacco products to persons under the age of 18. However, in Kyrgyzstan, despite the existence of legislative restrictions, control over the sale of nasvay remains weak. The survey data shows that teenagers can easily purchase nasvay at markets or kiosks. This indicates insufficient implementation of legislation and disregard for WHO recommendations in this area. The effectiveness of the implementation of international standards is confirmed by the examples of countries that have successfully enforced strict control measures. For example, where a complete ban on advertising and uniform packaging with graphic warnings has been introduced, a substantial decrease in the smoking rate among young people is observed (McNeill et al., 2017). In Thailand, stringent restrictions on advertising and large warnings about the dangers of the product have led to a decrease in the attractiveness of smokeless tobacco (Amul et al., 2020).

The implementation of comprehensive measures provided for by the FCTC, including a complete ban on advertising, strict control over the sale to minors, and unified packaging, is necessary to increase the effectiveness of tobacco control in the Kyrgyz Republic. These measures not only contribute to reducing consumption but also contribute to improving public health by preventing the long-term negative effects of smokeless tobacco use. Reducing the level of nasvay consumption requires the implementation of a multi-level approach, including educational initiatives, improvement of public policy, and the introduction of comprehensive preventive measures. The basis of this approach is to inform the public about the health risks associated with nasvay use. The above study showed that only 24% of respondents are aware of the possible link between the use of nasvay and oncological diseases of the oral cavity. This indicates the need for targeted information campaigns aimed at raising awareness.

Educational programmes should cover schoolchildren, students, and the adult population, including groups at high risk of nasvay use. Integrating relevant topics into school curricula, especially in health and biology lessons, will ensure early prevention. Practical exercises that include demonstrations of the medical effects of

nasvay use, such as photographic materials and patient reports, can be particularly effective. In addition, universities can organise lectures and seminars for students, where medical experts and representatives of public organisations will be able to convey to young people the importance of giving up this bad habit. The use of multimedia formats such as videos, social media, and street advertising is necessary for wide coverage. Materials should be tailored to the target audience, focusing on the long-term effects of nasvay consumption, including tooth loss, lesions of the oral mucosa, and the development of cancers. It is important to emphasise the negative impact on the quality of life, which especially affects young people who tend to perceive unhealthy habits as "harmless".

The improvement of public policy should begin with the development of standards for the production of raw materials. Setting maximum permissible concentrations of toxic substances such as nicotine, nitrosamines, and heavy metals will be the first step in limiting the harmful effects of this product. An analysis of international experience shows that in countries where strict standards and production controls have been introduced, there has been a substantial decrease in smokeless tobacco consumption. For example, in India, after standards more stringent for smokeless tobacco, its use decreased by 40% within five years (WHO FCTC, 2025). Banning advertising and marketing is an important element of a comprehensive approach. In Kyrgyzstan, it is possible to apply models that have been successfully implemented in EU countries, where tobacco advertising is prohibited. This will minimise the impact on young people, who are most susceptible to aggressive marketing strategies. Monitoring of compliance with such measures should be strengthened by coordinating the efforts of health authorities, law enforcement agencies, and public organisations.

It is important to offer alternative economic programmes to support economically dependent groups of the population. The introduction of subsidies and grants for farmers to switch to other crops, such as cotton or cereals, can reduce rural residents' dependence on tobacco production. Additionally, it is necessary to organise educational programmes for farmers and entrepreneurs aimed at mastering new skills and increasing the competitiveness of their products on the market. Financing measures to combat tobacco use through international grant programmes and taxes on tobacco products are an important tool for regulating smokeless tobacco consumption and protecting public health. International organisations such as the

World Bank (2024) and the WHO FCTC (2012) provide targeted resources and recommendations to countries for the implementation of effective measures to reduce tobacco use, including nasvay.

The World Bank's initiatives are aimed at increasing excise taxes on tobacco products, which makes them less accessible to the public, especially to young people and socially vulnerable groups. The funds received from such taxes can be used to finance educational programmes, improve the health system, and monitor tobacco use. For example, a substantial portion of the proceeds can be used to develop prevention campaigns aimed at schoolchildren, students, and rural populations, as well as to support medical institutions involved in the treatment of diseases caused by tobacco use. In addition, the World Bank helps countries establish sustainable financing mechanisms to combat the tobacco epidemic by allocating resources to long-term programmes. WHO FCTC (2017) provides technical and financial support to countries. The Convention covers a full range of measures, including a complete ban on tobacco product advertising, the introduction of standardised packaging, and mandatory certification. Under this programme, countries gain access to grants that can be used to implement graphic warnings on their packages, conduct mass educational campaigns, and strengthen control over production and sales. WHO also supports the monitoring of tobacco consumption, which allows for the assessment of the effectiveness of implemented measures and the prompt adjustment of the strategy.

The initiatives of the World Bank (2024) and WHO (WHO FCTC, 2012; 2017; 2025) help to regulate the consumption of nasvay by increasing excise taxes, which would make the product less affordable, especially for young people. These funds can be used for educational activities, including awareness raising in schools, universities, and rural areas. Additionally, international grants allow for the introduction of strict laws governing the production, sale, and advertising of nasvay, which reduces its spread. In addition, financial support contributes to improving the diagnosis and treatment of nasvay-related diseases. This is achieved through the modernisation of medical institutions and the training of specialists. Another important area is the creation of alternative sources of income for farmers who grow raw materials for the production of nasvay (Ahmad et al., 2020). International grants can be used to support their transition to less harmful and more profitable crops. Communities and local leaders play a vital role in reducing nasvay use, as their influence on public

opinion and behaviour often exceeds the effect of official government campaigns. Involving spiritual, cultural, and community leaders in anti-nicotine initiatives can substantially raise public awareness of the dangers of cannabis and convince people to stop using it.

Spiritual leaders, such as imams in rural and urban regions of Kyrgyzstan, can use their platform to inform about the dangers of nasvay and its impact on health (Bekbasarova et al., 2022). Including this topic in Friday sermons or other religious events can be an effective way to communicate information to a wide audience. Such messages, supported by religious or moral arguments, are often received with great trust, especially in rural communities where religion plays a substantial role in everyday life. Cultural leaders, including local poets, musicians, and artists, can also contribute to the fight against nasvay use by integrating information about the dangers of tobacco into their work. For example, organising cultural events dedicated to a healthy lifestyle or creating works of art with anti-nicotine messages can be an effective way to attract the attention of young people (Ochani et al., 2022).

Non-governmental organisations (NGOs) are instrumental in developing local programmes tailored to the needs and specificities of specific population groups (Mehta & Sharma, 2022). For example, in rural areas where information about the dangers of smoking is limited, NGOs can organise training, round tables, and educational campaigns involving health workers, teachers, and residents themselves. Non-governmental organisations can also be key partners in conducting research aimed at evaluating the level of nasvay use and developing targeted programmes to reduce it.

The involvement of local communities is of particular importance in rural areas where traditional values play an important role (Mehta & Sharma, 2022). Initiatives that involve the active participation of the population, such as the creation of youth health clubs and the organisation of sports events and competitions on the topic of a healthy lifestyle, contribute to the formation of negative attitudes towards nasvay consumption. Thus, the involvement of local leaders and communities ensures the creation of more effective, targeted, and sustainable initiatives to reduce nasvay use. Their participation helps adapt programmes to the cultural, social, and economic characteristics of the region, which increases the chances of success and long-term change in the behaviour of the population.

In conclusion, reducing the level of nasvay consumption is possible only if an integrated approach is applied, combining educational initiatives, government regulation, and economic support. This approach will enable the achievement of a sustainable reduction in smokeless tobacco consumption, enhance public health, and improve the quality of life in Kyrgyzstan in general.

4 Discussion

The results of the study demonstrate a high prevalence of nasvay use in various population groups in Kyrgyzstan, especially among schoolchildren and students. Thus, among secondary school pupils, the level of nasvay consumption is 32.9%, which coincides with the conclusions of Solhi et al. (2021) who examined a similar problem in Tajikistan. Their paper also noted the substantial involvement of adolescents in the use of cannabis due to its availability and low cost. However, unlike Brinchmann et al. (2022), who recorded a lower awareness of adolescents about the dangers of smoking, the study showed that schoolchildren are aware of the negative consequences, but underestimate them, which requires increased preventive work in educational institutions.

41.1% of students use nasvay, which is higher than among schoolchildren. Men use it much more often than women. These results are consistent with the conclusions of Singhavi et al. (2021), which link such gender differences with cultural traditions and the perception of nasvay as a "manly" product. However, the study determined that students use nasvay more often during stressful periods such as exams, which proves the data obtained by Dhage & Nagtode (2024) on the effect of nasvay on anxiety reduction. However, while Hatami et al. (2024) argued about the uniform popularity of nasvay among students of different specialities; higher rates of use among students of technical faculties were identified, which is associated with a higher level of stress in their studies.

The level of nasvay consumption among the rural population of the Batken region was 35.7%. These data are consistent with the findings of Reed et al. (2021), who noted that in rural areas of Central Asia, nasvay is often used to maintain energy during physical work. Unlike Jerez et al. (2024), who linked the use of nasvay with economic factors, this study established that the rural population perceives nasvay as part of a cultural tradition, which makes it difficult to take preventive measures.

Zia & Kashif (2022) also stressed that in rural areas, the availability of alternative products such as nicotine patches or chewing gum is extremely limited, which increases tobacco dependence.

The analysis of dental indicators confirmed a substantial deterioration in the oral cavity of the nasvay users. The CFL index was 6.8, which is substantially higher than that of non-users. This is in line with the results of Stjepanović et al. (2022), which connect nasvay with the destruction of tooth enamel. In contrast to the paper of Malhotra et al. (2021), it was recorded that users of nasvay in Kyrgyzstan are more likely to have leukoplakia and hyperaemia, which is associated with a higher content of toxic substances in the product. Alaws et al. (2023) attribute this to the lack of quality standards in the region, which requires increased control at the legislative level.

The methods of using nasvay vary between different social groups. Putting the substance in the cheek prevails among schoolchildren, which is associated with the desire to hide the fact of use. Placing it under the lip and tongue is more popular among students and rural populations, which agrees with the findings of Biyo (2023). Agrawal et al. (2023) claimed that in Uzbekistan, nasvay is more often used in a mixture with chewing tobacco. However, this study does not record the widespread use of such practices, which may be due to differences in cultural traditions.

The duration of its use has a substantial effect on the condition of the oral cavity, exacerbating the degree of tissue damage with increasing length of consumption. For users who have been using nasvay for more than five years, the CFL index is 15% higher, which indicates the progressive nature of damage to teeth and soft tissues. Leukoplakia, which is a precancerous condition, is also registered much more frequently in this group, which confirms the negative effect of prolonged use of nasvay on the tissues of the oral cavity. These results align with the conclusions of Rogers et al. (2022), underlining the cumulative nature of damage caused by chemicals contained in the mixture, including calcium, heavy metals, and other toxic compounds.

These studies also demonstrate differences in the clinical picture of lesions depending on the region. In particular, in Kyrgyzstan, damage to the oral mucosa of users often becomes chronic. This phenomenon may be due to a lack of access to

quality dental care, which is typical in rural areas, as well as a low level of awareness among the population about the need to prevent dental diseases. Unlike the data of O'Brien et al. (2021), where the focus is on acute forms of lesions in more developed regions, in Kyrgyzstan, chronic conditions are aggravated by constant exposure to chemicals from nasvay and a lack of timely treatment.

Kyrgyzstan's legal framework for regulating smokeless tobacco has proved insufficient to combat its use. The legislation does not include mandatory product certification and warnings about harm on the packaging, which parallels the study by Siddiqui et al. (2024). Petruzzelli et al. (2023) claim that in countries with stricter regulations, such as Turkey, the level of smokeless tobacco use decreases by 30%. However, Kyrgyzstan has substantial legislative gaps, including weak controls on sales to minors, requiring comprehensive reforms.

The use of nasvay is associated with precancerous changes in the oral mucosa. Mehta & Sharma (2022) emphasise that the carcinogenic substances contained in nasvay are the main risk factor. The authors confirmed that long-term use increases the likelihood of developing leukoplakia by 12% compared to users with a shorter use period. This confirms the data of Parmar et al. (2023) that chronic inflammation caused by exposure to alkaline components is a key mechanism of tissue damage.

Educational programmes are an effective tool in combating nasvay use. Quadri et al. (2024) state that information campaigns in schools and universities lead to a 15% reduction in nasvay consumption. This study shows that the use of multimedia formats such as social media can be particularly effective among young people, which is consistent with the findings of Siddiqui et al. (2021). However, such programmes must be adapted to cultural and social specificities, which will increase their effectiveness.

The implementation of quality standards and strengthening control over the composition of nasvay remain critical areas. Vishwakarma & Verma (2021) underscored that setting maximum permissible concentrations of toxic substances substantially reduces the harm from smokeless tobacco. This study discovered that the absence of such standards in Kyrgyzstan contributes to the widespread use of substandard nasvay, which requires immediate intervention at the legislative level.

Thus, the fight against nasvay consumption in Kyrgyzstan requires the integration of legislative reforms, educational programmes, and product quality control to reduce its negative impact on public health.

5 Conclusions

The study emphasises how using nasvay has a major effect on oral health, especially for young people and those living in rural areas of the Kyrgyz Republic. The results show that nasvay consumption is very common and varies significantly by age, gender, and social group. Notably, using nasvay is associated with serious oral health problems like mucosal oedema, hyperaemia, and leukoplakia, demonstrating the harmful effects of this smokeless tobacco product. The findings also highlight the necessity of focused preventative actions and educational initiatives to increase public knowledge of the risks to one's health posed by nasvay.

Additionally, the analysis found that there are insufficient controls over the production, sale, and consumption of nasvay due to gaps in the current legislative framework. The extensive use of inferior nasvay is exacerbated by its detrimental effects on health due to unclear quality standards and product labelling. The study suggests tightening regulations to address these problems, such as requiring health warnings, implementing more stringent quality controls, and launching extensive public health campaigns. Additionally, reducing nasvay consumption, especially among adolescents and young adults, may be significantly aided by incorporating preventive education into curricula at schools and universities.

The limitations of the study included the lack of accurate data on the composition of nasvay, which made it challenging to assess its long-term health effects. A limited sample size in individual groups could affect the generalisability of the results. The prospects for future research include a deeper analysis of the chemical composition of nasvay, its systemic effects on the body, and the development and testing of effective preventive programmes. Studies may also focus on examining the socio-economic factors influencing the prevalence of tobacco use and evaluating the long-term effectiveness of legal and educational measures to combat smokeless tobacco use.

Legal Acts

- Law of the Kyrgyz Republic No. 121 "On Protection of Health of Citizens of the Kyrgyz Republic from the Consequences of Tobacco Consumption, Nicotine and Exposure to Ambient Tobacco Smoke and Aerosols". (2021). Retrieved from: <https://cbd.minjust.gov.kg/112296/edition/4571/ru> (July 18, 2025).
- World Health Organization Framework Convention on Tobacco Control (WHO FCTC). (2025). Retrieved from: <https://iris.who.int/bitstream/handle/10665/42811/9241591013.pdf> (July 118, 2025).
- World Health Organization Framework Convention on Tobacco Control (WHO FCTC). (2017). Partial guidelines for implementation of Articles 9 and 10. Retrieved from: <https://fctc.who.int/news-and-resources/publications/m/item/regulation-of-the-contents-of-tobacco-products-and-regulation-of-tobacco-product-disclosures> (July 15, 2025).
- World Health Organization Framework Convention on Tobacco Control (WHO FCTC). (2012). Combating smokeless tobacco products and prevention of their use. Retrieved from: https://apps.who.int/gb/fctc/PDF/cop5/FCTC_COP5_12-ru.pdf (July 16, 2025).
- World Medical Association. (2013). World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. *Journal of the American Medical Association*, 310(20), 2191-2194. doi:10.1001/jama.2013.281053

References

- Agrawal, R., Ghosal, S., Murmu, J., Sinha, A., Kaur, H., Kanungo, S. & Pati, S. (2023). Smokeless tobacco utilization among tribal communities in India: A population-based cross-sectional analysis of the Global Adult Tobacco Survey, 2016-2017. *Frontiers in Public Health*, 11, 1135143. doi:10.3389/fpubh.2023.1135143
- Ahmad, F., Boeckmann, M., Khan, Z., Zeeb, H., Khan, M., Ullah, S., Dreger, S., Haq, Z. & Forberger, S. (2020). Implementing smokeless tobacco control policy in Pakistan: A qualitative study among Nasvay supply chain actors. *Tobacco Control*, 30, 548-552. doi:10.1136/tobaccocontrol-2020-055748
- Alamer, N. I., Alsaleh, A. & Alkhaldi, S. (2024). Tobacco products and oral conditions among US adults: NHANES 2017–2020. *Journal of Public Health Dentistry*, 84(2), 206-212. doi:10.1111/jphd.12615
- Alaws, H., Aggarwal, T., Ahmad, H. & Hatoum, C. (2023). The association between smokeless tobacco and a lung mass in a healthy young male. *Cureus*, 15(3), e36467. doi:10.7759/cureus.36467
- Amul, G., Tan, G. & Van Der Eijk, Y. (2020). A systematic review of tobacco industry tactics in Southeast Asia: Lessons for other low- and middleincome regions. *International Journal of Health Policy and Management*, 10, 324-337. doi:10.34172/ijhpm.2020.97
- Bazrafshan, M. R., Mansouri, A., Masmouci, B., Niknam, N. & Zahedi, F. (2024). A qualitative study to explain the determinants of naswar consumption from the point of view of its consumers. *Journal of Education and Health Promotion*, 13(1), 499. doi:10.4103/jehp.jehp_1099_23
- Bekbasarova, C., Altmysheva, N. & Alisherova, J. (2022). New tobacco control policy in the Kyrgyzstan. *Tobacco Prevention & Cessation*, 8, A90. doi:10.18332/tpc/151006
- Biyo, A. (2023). Smokeless tobacco use among youth in Mogadishu: A case study of Hodan District. *International Journal of Science and Research*, 12(8), 176-181. doi:10.21275/sr23727194252
- Brinchmann, B., Vist, G., Becher, R., Grimsrud, T., Elvsaa, I., Underland, V., Holme, J., Carlsen, K., Kreyberg, I., Nordhagen, L., Bains, K., Carlsen, K., Alexander, J. & Valen, H. (2022). Use of Swedish smokeless tobacco during pregnancy: A systematic review of pregnancy and early life health risk. *Addiction*, 118(5), 789-803. doi:10.1111/add.16114
- Chaffee, B.W., Lauten, K., Sharma, E., Everard, C.D., Duffy, K., Park-Lee, E., Taylor, E., Tolliver, E., Watkins-Bryant, T., Iafolla, T., Compton, W.M., Kimmel, H.L., Hyland, A. & Silveira,

- M.L. (2022). Oral health in the population assessment of tobacco and health study. *Journal of Dental Research*, 101(9), 1046-1054. doi:10.1177/00220345221086272
- Dhage, V. & Nagtode, N. (2024). The association of smokeless tobacco usage with the mental health status of late adolescents in rural areas of Wardha district: A cross-sectional study. *F1000Research*, 13, 293. doi:10.12688/f1000research.147312.1
- Gangwani, K., Row, N., Anand, S. & Acharya, S. (2024). Smokeless tobacco: A comprehensive review of molecular effects, societal perception, and cessation strategies. *BioMed*, 4(4), 446-463. doi:10.3390/biomed4040035
- Gupta, A., Kanaan, M., Siddiqi, K., Sinha, D. & Mehrotra, R. (2022). Oral cancer risk assessment for different type of smokeless tobacco products sold worldwide: A review of reviews and meta-analyses. *Cancer Prevention Research*, 15(11), 733-746. doi:10.1158/1940-6207.CAPR-21-0567
- Gupta, S., Jain, N. & Jhamtani, R. (2021). Chemical components in smokeless tobacco products and impact on health. *Toxicology International*, 28(4), 279-309. doi:10.18311/ti/2021/v28i4/26489
- Hatami, M., Dalirifar, M., Baghestani, N. & Hassaniazad, M. (2024). Reviewing microbial contamination of smokeless tobacco products. *Tobacco and Health*, 3(1), 25-34. doi:10.34172/thj.1111
- Hatsukami, D., Stepanov, I., Severson, H., Jensen, J., Lindgren, B., Horn, K., Khariwala, S., Martin, J., Carmella, S., Murphy, S. & Hecht, S. (2014). Evidence supporting product standards for carcinogens in smokeless tobacco products. *Cancer Prevention Research*, 8(1), 20-26. doi:10.1158/1940-6207.CAPR-14-0250
- IBM Statistical Package for the Social Sciences (SPSS Statistics). (2025). Retrieved from: <https://www.ibm.com/products/spss-statistics> (July 17, 2025).
- Iqbal, F., Ahmad, S., Maryam, H. & Amin, H., (2025). Evidence of mutations in tumour suppressor genes among oral cancer in Naswar, smokeless tobacco users. *Acta Odontologica Scandinavica*, 84, 299-309. doi:10.2340/aos.v84.43778
- Jerez, E., Nagrani, A. & Arosemena, E. (2024). Oral lesions in patients consuming different types of smokeless tobacco. A literature review. *Odontología Vital*, 2(41), 27-42. doi:10.59334/rov.v2i41.564
- Khan, Z., Suliankatchi, R., Heise, T. & Dreger, S. (2019). Nasvay (smokeless tobacco) use and the risk of oral cancer in Pakistan: A systematic review with meta-analysis. *Nicotine and Tobacco Research*, 21(1), 32-40. doi:10.1093/ntr/ntx281
- Kolte, A.P., Kolte, R., Verma, A., Lathiya, V.N. & Shahab, S. (2025). Anxiety in periodontally healthy, stage III/IV periodontitis with and without smoking: a cross-sectional study. *BMC Oral Health*, 25(1), 654. doi:10.1186/s12903-025-05996-2
- Kravchenko, B. & Lykhota, K. (2024). Health effects of nicotine products on oral tissues: Prevention approaches. *Bulletin of Medical and Biological Research*, 6(4), 76-87. doi:10.63341/bmbr/4.2024.76
- Malhotra, S., Singh, P., Dubey, H., Mishra, G. & Agarwal, N. (2021). Awareness of smokeless tobacco among professionals with sedentary lifestyles- a cross sectional study. *Journal of Indian Association of Public Health Dentistry*, 19(1), 55-60. doi:10.4103/jiaphd.jiaphd_90_20
- Mammadov, F.Y., Bayramova, V.M. & Ahmedbeyli, R.M. (2022). Increasing the efficiency of the treatment of endoparodontal lesions. *Ukrainian Dental Almanac*, 4, 5-10. doi:10.31718/2409-0255.4.2022.01
- McNeill, A., Gravelly, S., Hitchman, S., Bauld, L., Hammond, D. & Hartmann-Boyce, J. (2017). Tobacco packaging design for reducing tobacco use. *Cochrane Database of Systematic Reviews*, 4, CD011244. doi:10.1002/14651858.CD011244.pub2
- Mehta, N. & Sharma, S. (2022). Smokeless tobacco consumption in South Asia: A review of the health programmes and interventions to reduce consumption. *Journal of Health Technology Assessment in Midwifery*, 5(1), 36-47. doi:10.31101/jhtam.2426
- Mufaddal, T., Rizvi, S.A. & Ali, S.T. (2024). Effect of tobacco use during pregnancy on fetal birth weight born to women between 18-35 years in Thatta District. *Liaquat National Journal of Primary Care*, 6(2), 113-118. doi:10.37184/lnjpc.2707-3521.6.37

- Muthukrishnan, A. & Warnakulasuriya, S. (2018). Oral health consequences of smokeless tobacco use. *Indian Journal of Medical Research*, 148, 35-40. doi:10.4103/ijmr.IJMR_1793_17
- O'Brien, E., Baig, S. & Persoskie, A. (2021). Absolute and relative smokeless tobacco product risk perceptions: Developing and validating new measures that are up-to-snuff. *Nicotine & Tobacco Research: Official Journal of the Society for Research on Nicotine and Tobacco*, 24(2), 265-269. doi:10.1093/ntr/ntab167
- Ochani, S., Ochani, A. & Ochani, K. (2022). Naswar, a smokeless tobacco: Awareness and regulation in Pakistan. *Asia-Pacific Journal of Public Health*, 34(6-7), 741-742. doi:10.1177/10105395221109520
- Oskonbaeva, Z. (2021). Main drivers of tobacco consumption among youths: The case of Kyrgyzstan. *Journal of Applied Microeconometrics*, 1(1), 29-39. doi:10.53753/jame.1.1.03
- Parmar, G., Shah, A., Aundhia, C. & Chudasama, J. (2023). Evaluation and comparison of nicotine quantification in smokeless tobacco products. *International Journal of Ayurvedic Medicine*, 14(2), 442-445. doi:10.47552/ijam.v14i2.3632
- Petruzzelli, C., Varano, A., Desrosiers, A., Hossler, E. & Mowad, C. (2023). Smokeless tobacco keratosis. *Dermatology Online Journal*, 29(3), 9. doi:10.5070/d329361430
- Quadri, M., Kamel, A., Nayeem, M., John, T., Thacheril, A., Tartaglia, G. & Tadakamadla, S. (2024). Smokeless tobacco and periodontitis: A systematic review with meta-analysis. *Journal of Periodontal Research*, 59(6), 1062-1070. doi:10.1111/jre.13274
- Reed, D., Bowen, E., Fint-Clark, B., Clark, B., Cobb, N., Danberry, K., Hutson, Z., Lusk, S., Rine, J. & Robinson, N. (2021). Stopping smokeless tobacco use: A call to action. *Frontiers in Public Health*, 9, 601890. doi:10.3389/fpubh.2021.601890
- Rogers, I., Memon, A. & Paudyal, P. (2022). Association between smokeless tobacco use and waterpipe smoking and the risk of lung cancer: A systematic review and meta-analysis of current epidemiological evidence. *Asian Pacific Journal of Cancer Prevention*, 23(5), 1451-1463. doi:10.31557/APJCP.2022.23.5.1451
- Saxena, S., Singh, P., Singh, L., Kashyap, S. & Singh, S. (2022). Smokeless tobacco use and public health nutrition: A global systematic review. *Public Health Nutrition*, 26, 46-55. doi:10.1017/S1368980022001331
- Shats, K., Kravchenko, E., Khabibov, B., Elbanhawi, H., Abrams, J., Sebric, E. (2018). Smokeless tobacco in Central Asia: Working towards an effective regulatory framework for nasvai in Tajikistan. *Tobacco Induced Diseases*, 16(1), 561. doi:10.18332/tid/83865
- Siddiqui, F., Croucher, R., Ahmad, F., Ahmed, Z., Babu, R., Bauld, L., Fieroz, F., Huque, R., Kellar, I., Kumar, A., Lina, S., Mubashir, M., Nethan, S., Rizvi, N., Siddiqui, K., Singh, P., Thomson, H. & Jackson, C. (2021). Smokeless tobacco initiation, use, and cessation in South Asia: A qualitative assessment. *Nicotine & Tobacco Research*, 23(10), 1801-1804. doi:10.1093/ntr/ntab065
- Siddiqui, F., Kanaan, M., Croucher, R., Bauld, L., Fieroz, F., Kumar, P., Mazhar, L., Pandey, V., Jackson, C., Huque, R., Iqbal, R. & Siddiqui, K. (2024). Behavioural support and nicotine replacement therapy for smokeless tobacco cessation in Bangladesh, India and Pakistan: A pilot randomized controlled trial. *Addiction*, 119(8), 1366-1377. doi:10.1111/add.16515
- Singhavi, H., Singh, A. & Chaturvedi, P. (2021). Smokeless tobacco and its ill-effects: Recent literature update. *Indian Journal of Medical and Paediatric Oncology*, 42(5), 486-490. doi:10.1055/s-0041-1735598
- Solhi, M., Fattahi, E., Manzari, Z., Gupta, P., Kargar, M., Kasmaei, P. & Barati, H. (2021). The reasons for using smokeless tobacco: A review. *Iranian Journal of Public Health*, 50, 492-501. doi:10.18502/ijph.v50i3.5589
- Stepanov, I., Abrams, J., Jain, V., Walter, K. & Kittner, D.L. (2017). Variations of toxic and carcinogenic constituents in nasvai: Call for systematic research and regulation. *Tobacco Control*, 26(3), 355-356. doi:10.1136/tobaccocontrol-2016-052951

- Stjepanović, D., Phartiyal, P., Leung, J., Lim, C., Sun, T., Chung, J., Gartner, C., Hall, W. & Chan, G. (2022). Efficacy of smokeless tobacco for smoking cessation: a systematic review and meta-analysis. *Tobacco Control*, 32(6), 757-768. doi:10.1136/tobaccocontrol-2021-057019
- Vishwakarma, A. & Verma, D. (2021). Microorganisms: Crucial players of smokeless tobacco for several health attributes. *Applied Microbiology and Biotechnology*, 105(16-17), 6123-6132. doi:10.1007/s00253-021-11460-2
- World Bank. (2024). Annual Report. Retrieved from: <https://www.worldbank.org/en/about/annual-report> (July 16, 2025).
- Zia, W. & Kashif, M. (2022). Smokeless tobacco a deadly addiction. *Annals of Jinnah Sindh Medical University*, 8(2), 82. doi:10.46663/ajsmu.v8i2.82

Povzetek v slovenskem jeziku

Namen raziskave je oceniti vpliv "nasvaja" na ustno zdravje v Kirgiški republiki. Raziskava je uporabila kombinacijo metod, ki sta vključevali standardiziran vprašalnik in zobozdravstvene preglede 2.388 udeležencev. Ugotovljeno je bilo, da "nasvaj" uporablja 32,9 % šolarjev, 41,1 % študentov in 35,7 % prebivalcev podeželja. Razširjenost je višja med moškimi. Uporaba "nasvaja" je povezana z visoko pojavnostjo zobnih bolezni: levkoplakije, hiperemije in otekline sluznice. Indeks zobne gnilobe, plomb in izgubljenih zob pri uporabnikih znaša 6,8. Med načini uporabe je najbolj razširjena uporaba v ustni votlini ob licu. Ugotovljeno je bilo, da dostopnost in nizka cena "nasvaja" prispevata k njegovi široki uporabi. Poudarjena je potreba po celovitih preventivnih ukrepih, vključno s strožjo regulacijo, izobraževalnimi kampanjami ter zmanjšanjem ekonomske odvisnosti od proizvodnje "nasvaja."

