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ASSOCIATION OF TOBACCO USE WITH GINGIVAL HEALTH STATUSAMONG PATIENTS IN REHABILITATION CENTERS IN PESHAWAR

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Abstract

Background: There is a strong association between severe oral health deterioration and substance use disorders (SUD) and long-term tobacco smoking. People undergoing addiction treatment often have complex oral health needs, exacerbated by less-than-ideal oral hygiene and infrequent dental visits. These characteristics need to be assessed within recovery frameworks to create comprehensive and integrated health solutions. **Aims and Objectives:** To find out the tobacco use profile and oral hygiene practices and their associated gingival health status of patients living in drug rehabilitation centers of Peshawar, Pakistan. **Material and Methods:** The cross-sectional study was conducted in which the sample of N = 121 male participants aged 18 to 60 years of particular rehabilitation centres in Peshawar were assessed. Dental care patterns, tobacco use and demographic data were obtained using a standardized questionnaire. Objective clinical assessment of Individual Oral Hygiene Index (OHI) scores and Gingival Index (GI) status was done. Descriptive statistics were used to analyze the data. **Result:** The mean age was 35 \standard deviation 10.2 years. The majority of the respondents had secondary education (45.5%), and the sample was 100% male. Tobacco use profile was 100%: 30.6% had smoked for >6 years; and 47.9%

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smoked 1-5 times per day. The high rate of illegal drug use was also observed at the same time, with polydrug use (2 or more drugs) at 38.0% followed by the use of methamphetamine alone (24.0%) and THC/cannabis use (23.1%). 65,3% of people used a toothbrush, 24,8% infrequently brushed and an alarming 54,5% had never been to a dentist, according to oral hygiene practices. Consequently, there was poor baseline health with 45.5% of the participants in the "Severe" gingival inflammation (GI score) and 57.9% of the subjects in the "Poor" OHI group. **Conclusion:** The prevalence of poor oral hygiene and advanced gingival inflammation among the rehabilitation patients of Peshawar is alarming and smoking, polydrug abuse and neglectful dental care are very potent factors in exacerbating this situation. These findings demonstrate the need for implementing necessary dental care treatments in traditional substance recovery programs as a diagnostic and/or preventive service.

1. Introduction

Every year, millions of people die from tobacco use, which is acknowledged as one of the main public health issues worldwide. According to the World Health Organization, smoking is associated with various oral and systemic diseases with a significant effect on the quality of life of individuals. Some of the methods of tobacco use include cigarettes, cigars, pipes, shisha, naswar, gutka and chewing tobacco. In poor countries such as Pakistan the use of smokeless tobacco products and smoked products is prevalent due to their low cost, accessibility, cultural acceptance, peer pressure as well as ignorance of their adverse effects. Tobacco addiction can also cause significant oral health problems, not only for overall health, but also for gingival and periodontal tissues (1).

A vital part of overall health and wellbeing is oral health. Gingiva or gums is the protective layer that covers the teeth and underlying bone. Healthy gingiva has a pink colour, stippling, and has no blood on probing and is stiff(2). However, there are both systemic and local factors that can compromise gingival health with tobacco use being one of the most significant modifiable risk factors. Tobacco use has been associated with gingivitis, periodontitis, gingival recession, attachment loss, tooth mobility and even tooth loss. The harmful chemicals found in tobacco adversely affect the immune system, vascular supply and healing abilities of oral tissues, making them extra susceptible to periodontal disease (3).

Gingivitis is an inflammatory condition of gingival tissues and is primary caused by the buildup of dental plaque. Gingivitis can progress to a chronic inflammatory condition known as periodontitis that affects teeth-supporting alveolar bone and periodontal ligament (4). Tobacco users are often seen to have a more advanced periodontal disease than the non-users. Research has shown that people who smoke are

2 – 6 times more likely to develop periodontal disease than non-smokers. Further, nicotine can cause vasoconstriction making it difficult to recognize clinical signs of gingival inflammation, including gingival bleeding, and delay the diagnosis and treatment of periodontal disease (5).

Tobacco use has complicated and multifaceted pathophysiological consequences on periodontal tissues. The components of tobacco are toxic and contain nicotine, which influences the function of neutrophils, reduces the production of antibody, alters the activity of the fibroblasts and decreases the blood flow in gingival tissue. These effects cause a decrease in the host immune response and in the ability of periodontal tissues to heal. In addition, smoking can promote the growth of unhealthy bacteria in the mouth cavity, thus speeding up the progression of periodontal disease. Smokeless tobacco products, such as naswar and gutka can lead to mucosal ulcers, periodontal attachment loss, localized gingival recession, and chronic inflammation around the site of implantation (6).

In recent years, rehab centres have become more important and are increasingly recognized as the treatment and recovery centres for individuals suffering from substance use disorder. Patients who have decided to join rehab centers often have been addicted to tobacco use as well (7). Patients who are recovering from other drugs and alcohol are more likely to be smokers or use smokeless tobacco, as many people tend to keep up their tobacco use. Although long-term health effects of tobacco dependence are great, tobacco dependence is often ignored in recovery clinics compared with alcohol and drug addictions (8).

Residents of rehabilitation facilities are considered to be vulnerable and have an increased risk for poor oral health. These people have poor gingival health and oral hygiene due to a number of causes. These are such as poor access to dental care, poor nutritional status, psychological stress, reduced motivation, poor information and socioeconomic limitations. In addition, many patients in rehab centers may have a heavy past of substance and tobacco use, which will only further increase gingivitis and periodontal disease (9).

Tobacco smokers have an alarming rate of periodontal disease, a fact that poses a big problem for dental professionals as well as public health practitioners. Periodontal diseases are one of the most common chronic diseases in the world and can significantly affect the quality of life, appearance, speech and mastication. Severe periodontitis is believed to be one of the most common causes for tooth loss in adults. There are many studies relating tobacco to poor periodontium outcomes. Smokers generally have larger periodontal pockets, greater attachment loss, greater alveolar

bone loss and poorer response to periodontal treatment as compared to non-smokers (10).

Despite the fact that there has been a significant decrease in tobacco consumption in the city of Peshawar, it remains quite prevalent, particularly amongst male and lower socioeconomic groups. Due to their extensive availability and cultural acceptance, cigarettes and smokeless tobacco products like Naswar are widely used in the area. There has been little research done to assess the oral and gingival health status of patients living in Peshawar's growing number of rehabilitation centers. Few studies have focused on periodontal and gingival health in individuals with rehabilitation centres and most of the studies in Pakistan have focused on systemic diseases related to tobacco use (11).

It is crucial to comprehend the connection between patients' gingival health and tobacco use in rehabilitation facilities for a number of reasons. One is that perhaps early detection of gingivitis and periodontal disease will help prevent progression to the more advanced stages of periodontal disease and tooth loss. Secondly, assessment of oral health problems in rehabilitation institutions can be beneficial to design targeted therapeutic and preventive interventions. Thirdly, by informing patients about the harmful effects of tobacco on oral tissues, they can be encouraged to reduce or eliminate their smoking habits. Finally, the findings of these studies may assist rehabilitation authorities, dentists and policy makers to make tobacco cessation counseling and oral health promotion a part of rehabilitation programs (12).

Studies conducted around the world have indicated a significant link between tobacco use and periodontal disease. Among the most important environmental risk factors for periodontal disease and an impaired healing response is smoking, according to Bergström. Similarly, Johnson and Hill discovered that tobacco smoking is associated with a poorer treatment outcome and more periodontal loss of attachment among tobacco users. Their study also revealed that a large proportion of cases of periodontal disease were directly attributable to smoking by the two individuals, Tomar and Asma. These results emphasize how crucial quitting smoking is to preserve periodontal health (13).

Smoke has a negative effect on gingival tissues, which is explained in a number of biological processes. Nicotine causes vasoconstriction which decreases blood flow to gingival tissues and inhibits bleeding and other outward signs of inflammation. Tobacco smoke increases the oxidative stress, and production of inflammatory mediators, leading to alveolar bone resorption and connective tissue destruction. In addition, smokers have altered the ecology of the microflora, and the teeth are colonized by more pathogenic

periodontal bacteria such as Treponema denticola and Porphyromonas gingivalis. Among these microorganisms, they are responsible for most of the periodontal tissue degradation (14).

Smokeless tobacco products also have a bad effect on gingival tissues. Oral tissues are in constant contact with harmful chemicals and carcinogens in tobacco products that are continuously inserted into the oral vestibule, resulting in mechanical discomfort. This may lead to gingival recession, keratosis, loss of periodontal attachment and oral mucosal lesions. Using of naswar is a big threat on oral health and is being used commonly in Khyber Pakhtunkhwa, Pakistan. But the public still is largely unaware of the negative oral health impacts of smokeless tobacco (15).

The connection between rehabilitation center patients' oral health and quality of life is another crucial factor. Oral health can negatively impact eating ability, self-confidence, communication and socialization. Periodontal disease and dental pain also can interfere with rehab and recovery treatments. Therefore, the health of gingival and proper oral hygiene should be considered as an important component of comprehensive health care in rehabilitation centers (16).

Despite the increasing knowledge of the effects of tobacco on the periodontal tissues, there is still a lack of local data specifically on population of rehab centers in Peshawar. Local epidemiological studies should be conducted because tobacco use may vary across different populations and geographical areas, as socioeconomic, oral hygiene and healthcare access and availability may differ. Thus, the aim of this study is to evaluate the association of patients' gingival health status with their tobacco consumption in rehabilitation centers, Peshawar. The aim of this study is to assess the prevalence of gingival ailments in tobacco users, and to determine the extent of influence of tobacco use in gingival health of this susceptible group (13).

This study's findings may be useful to build preventive measures as well as oral health education programs and tobacco cessation programs, as it provides insightful information regarding the oral health problems of patients in rehab centers. Furthermore, this study can serve as a foundation for future research and study regarding substance addiction and periodontal health in Pakistan. Healthcare providers can create interdisciplinary strategies to enhance oral and overall health outcomes for patients in rehabilitation facilities by recognizing the link between tobacco use and gingival health.

Literature Review

It is commonly acknowledged that one of the biggest risk factors for periodontal and dental health is tobacco smoking. In the last seven years, many studies have consistently

demonstrated the strong relationship between smoking and the use of smokeless tobacco with poor gingival health outcomes. Tobacco products affect gingival tissues through vasoconstriction, decreased antibodies, inflammation factors, and oral bacteria leading to gingivitis, PD, gingival recession, tooth mobility, and tooth loss.

Just recently a cross-sectional study was done in Pakistan to evaluate the effect of smokeless tobacco on periodontal tissue of 377 smokeless tobacco users by Syed Muazzam Nasir and associates. The study found that a substantial amount of the patient population had moderate to severe periodontal destruction (by CPI rating) and gingival recession was prevalent among the smokeless tobacco users. It was concluded that chronic smokeless tobacco uses significantly increased the prevalence of periodontal disease, gingival recession and tooth mobility (17).

Recently, a study was conducted by Anita Nisar et al in Peshawar to determine the effect of smoking cessation on outcome of periodontal therapy for smokers. The researchers observed a significant improvement in gingival index, plaque index, probing depth and clinical attachment levels after quitting smoking. This study pointed out the negative impact of smoking on periodontal regeneration and gingival healing. The results of this study are an additional proof of harmful impact of tobacco to periodontal tissue degradation and gingival degeneration (18).

In a similar study, published in the Pakistan Journal of Physiology, the impact of different methods of nicotine consumption on gingival health of dental patients was assessed. The researchers compared the dual-form users, e-cigarette users and people who smoke. Results indicated that all the nicotine users had significant gingival inflammation and the gingival condition was worse in dual-form users. The study results showed that all kinds of nicotine use significantly caused gingival impairment and increased gingivitis (19).

In addition, Dow University of Health Sciences carried out a study to determine the relationship between gingival recession at a specific site and smokeless tobacco use. The findings have indicated that smokeless tobacco use in the oral vestibule for a prolonged period of time causes severe destruction of the periodontal tissue and gingival recession. In the study, one of the most important factors contributing to localized periodontal disease was determined to be the use of smokeless tobacco product (20).

Brad W. Chaffee and associates stated that tobacco use is a major contributor to mortality and morbidity and affects oral health in a negative way. Oral health problems are more likely to occur as a result of smoking or tobacco use and smoking affects the success of treatment. New products that threaten periodontal health include cannabis,

heated tobacco and e-cigarettes. The importance of tobacco cessation counseling, and patient education, by dentists to improve oral health management was stressed (21). H. Silva and associates found that smoking makes periodontal disease worse and makes it more likely to have surgical complications. Tobacco use causes vascular dysfunction, reduces gingival blood flow and creates long term microvascular damage, which affects the oral microcirculation, increases periodontal inflammation and worsens healing outcomes (22).

S. Gajendra and associates have concluded that smoking adversely affects the oral health and increases the oral caries, oral cancer, periodontal disease, and oral lesion risk factors. The study also revealed the importance of dental professionals for tobacco cessation counseling and prevention programs (23). S. S. Yadadi et al. (2024) reported poor gingival and periodontal status among adults who used smokeless tobacco in Sharjah, UAE. There was a significant increase in gingivitis and clinical attachment loss among SLT users which indicated that they were at increased risk of gingivitis and periodontitis (24).

A. Beklen and colleagues have found that smoking has a tremendous negative effect on tooth caries and periodontal disease. Smoking status and tooth decay and poor periodontal health were significantly related; the highest prevalence of severe periodontitis and DMFT scores were found in those who had previously smoked (25).

Objective:

- To determine the gingival health status of patients in rehabilitation centres by using Gingival Index.
- To determine the types of tobacco, use among these patients.
- To examine the association between tobacco, use and gingival health status.

MATERIALS AND METHODS

2.1 STUDY DESIGN: Cross-Sectional study

2.2 STUDY SETTINGS: Rehabilitation centers in Peshawar.

2.3 STUDY DURATION: 4-6 months

2.4 SAMPLE SIZE:

The total number of patients admitted in the four selected rehabilitation centers in Peshawar was 176. At a 95% confidence level, 5% margin of error, and 50% expected prevalence, the initial sample size was calculated using the formula: $n = Z^2 \times p (1 - p) / d^2$ Where: Z = 1.96 at 95% confidence level p = 0.5 (assumed prevalence)

d = 0.05 margin of error

Since the total population was 176, the finite population correction formula was applied:

$nf = n / [1 + (n - 1) / N]$

Where:
n = calculated sample size
N = 176
After applying the finite population correction, the final sample size was 121 participants.

2.5 SAMPLING TECHNIQUE: Non-probability convenient sampling.

2.5 INCLUSION CRITERIA:

- Adults (18 years old or over).
- Currently admitted patients in Rehabilitation centres in Peshawar.
- Patients are willing to participate and to give informed consent.

2.5 EXCLUSION CRITERIA:

- Patients with systemic condition that which has compromised the gums health status (e.g. uncontrolled diabetes mellitus).
- Patients who have had periodontal treatment in the past 3 months.
- Patients on drugs that are known to affect the gums (e.g. phenytoin, cyclosporine, calcium channel blockers).
- Patients unwilling to participate.

2.6 DATA COLLECTION PROCEDURE:

The study was conducted after obtaining ethical approval from the Institutional Ethical Review Committee (IEC). Also, the consent of the administration or the ethics committee of each rehabilitation center was obtained. All participants gave their written informed consent before data collection. Personal data (tobacco use history) obtained from a structured questionnaire. This was then followed by a clinical oral examination that was included in gingival examination as per the Gingival Index.

2.7 DATA ANALYSIS:

SPSS (version 27) software was used to enter and analyse data. Demographic variables, tobacco use, and the Gingival Index scores was summarized by using descriptive statistics such as mean, standard deviation, frequency and percentage. Chi square test was used to analyse association between tobacco use and gingival health status. Statistically significant results was considered as a p value of $\leqslant 0.05$.

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RESULTS

Table 3.1 mean Age:

Age in years	Mean ± SD	35±10.2
	Total	121

As can be seen from Table: 1, there was complete information regarding age (18-60 years) of 121 patients in the sample size, whose mean was 35.5% and standard deviation was 10.5.

Table 3.2: *Demographic*

S/NO	variables	Categories	Frequency	Percentages
01	Gender	Male	121	100%
		Female	00	00%
2	Education level	No formal education	24	19.8%
		Primary education	15	12.4%
		Secondary education	55	45.5%
		Undergraduate	15	12.4%
		Postgraduate	12	9.9%

Table 3.2 displays the number of participants (121) based on gender and education:
Gender: No woman is included in the sample, 100% are men.
Education Level: 45.5% of the respondents have secondary education. Those without any formal education are next (19.8%) followed by primary and undergraduate education (12.4% each). The lowest proportion of postgraduates (9.9%).

Figure 3.1 education level

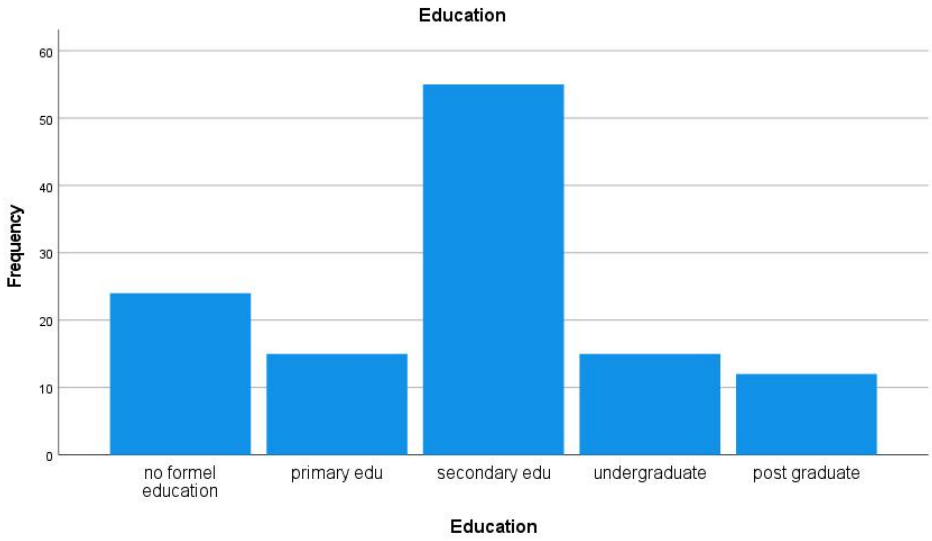

Table 3.3: *Clinical Examination*

S/NO	variables	Categories	Frequency	Percentages
01		Smoker		100%
		Tobacco chewer (smokeless)		00%
	Which category best describe your tobacco habit	Dual habits (both smoking and chewing)		
		no tobacco habit		
2		Less than one year	23	19.0%
		1 to 3 years	34	28.1%
		4 to 6 years	26	21.5%
	Duration of tobacco use	More than 6 years	37	30.6%
3		1 to 5 times	58	47.9%
		6 to 10 times	28	23.3%

	Frequency of tobacco user	More than 10 times	33	27.3%
4		Less than 1 year	45	37.2%
		1 to 3 years	32	26.4%
	For dual users only: how many years have you used both form	More than 3 years	40	33.1%
5		Toothbrush	79	65.3%
		Conventional method	6	7.4%
	How do you clean your teeth	(miswak, finger etc.)	32	26.4%
6		Twice daily	44	36.4%
		Once daily	47	38.8%
	How often do you clean your teeth	Occasionally	30	24.8%
7		Within the last year	22	18.2%
		More than one year ago	33	27.3%
	When was your last visit to a dentist	Never visited a dentist	65	53.7
	Any drugs addiction	Tetrahydrocannabinol (THC)		
		Methamphetamine (METH)		
		Heroine		

Opioid
None

1.Tobacco Use Characteristics: Features of Tobacco Use According to the data, there were no exclusive smokeless tobacco users or dual users; 100% (n = 121) of the study sample were active smokers. As for chronicity, 30.6% (n = 37) of the participants smoke for more than six years while 28.1% (n = 34) use tobacco for 1-3 years. Half of the sample (47.9%, n = 58) smoke between 1 and 5 times a day while 27.3% (n = 33) smoke more than 10 times a day.

2.Oral Hygiene Practices: Most of the individuals (65.3%, n = 79) use a toothbrush whilst 29.8% (n = 36) use the conventional miswak. The other 5.0% (n = 6) use other traditional techniques. When it comes to brushing their teeth, 38.8% (n = 47) brush once a day, and 36.4% (n = 44) brush twice a day. Nevertheless, a noteworthy 24.8% (n = 30) of the sample only infrequently brush their teeth.

3.Dental Utilization: The data has revealed that there is a substantial proportion of the population studied that has limited access to professional dental care and/or is negligent. More than half of the subjects (54.5%, n = 66) have not visited dentist ever in their life. Twenty-seven and a half per cent (n = 33) reported that their most recent dental check-up was over one year ago and only 18.2 per cent (n = 22) had seen a dentist or requested one in the year prior to the survey.

Figure 3.2 Tobacco Habit

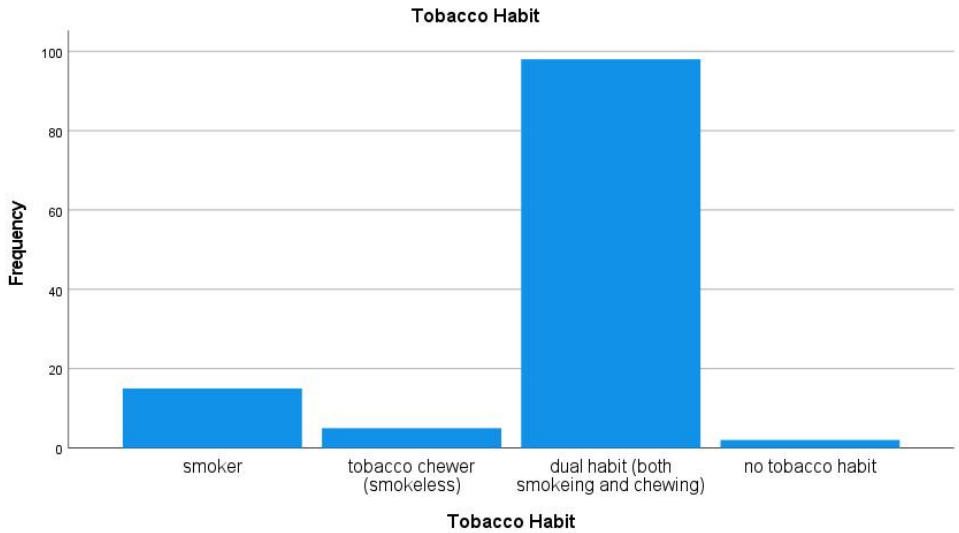

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Figure 3.3 Tobacco use

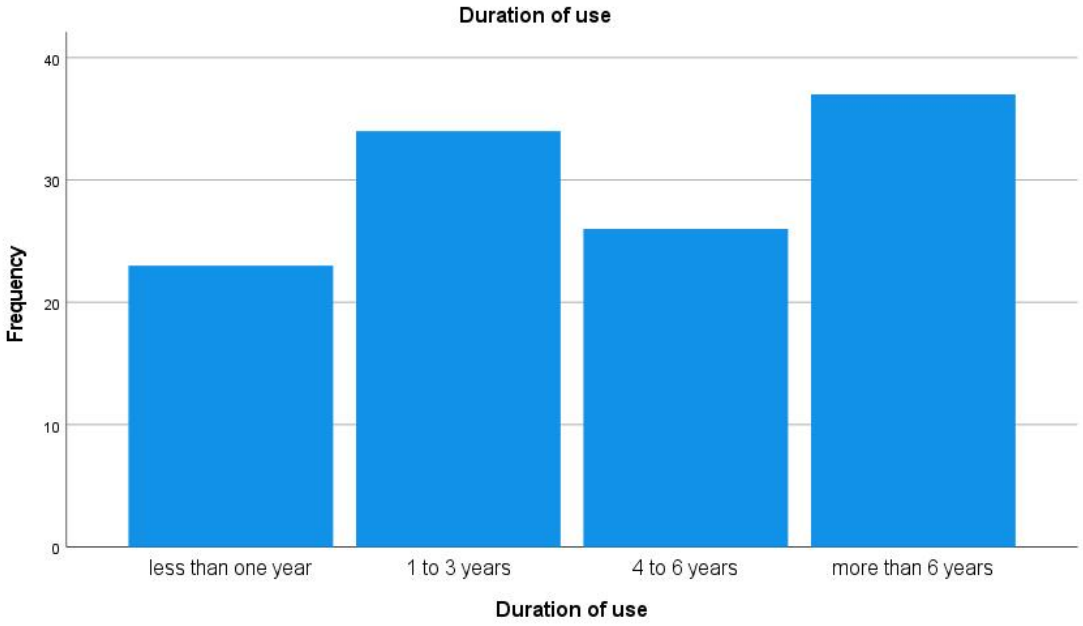

Figure 3.4 Frequency Per Day

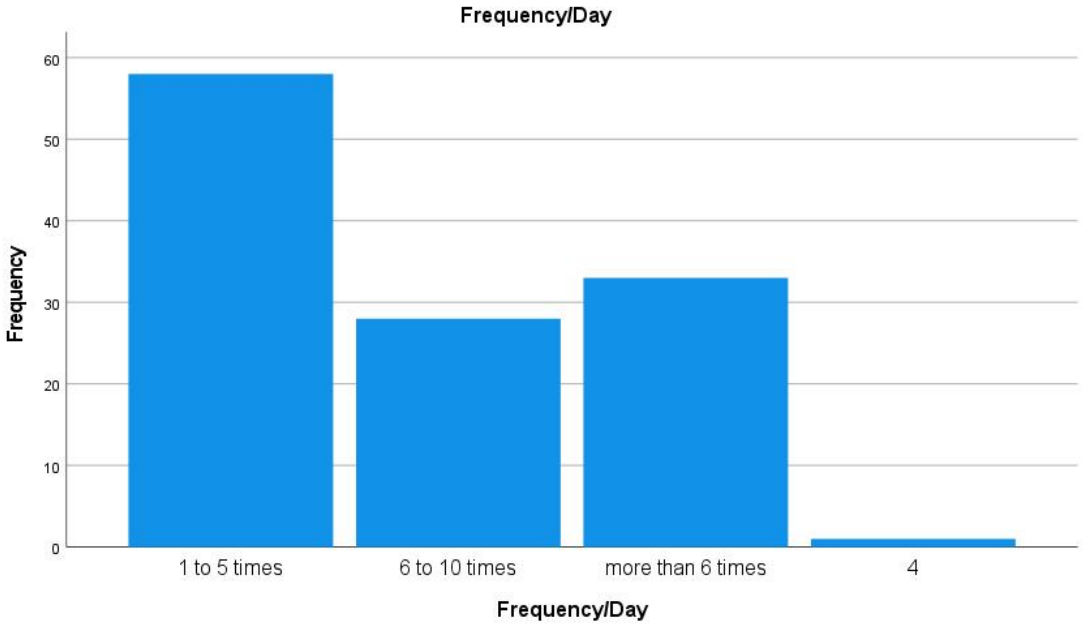

Figure 3.5 Cleaning Method

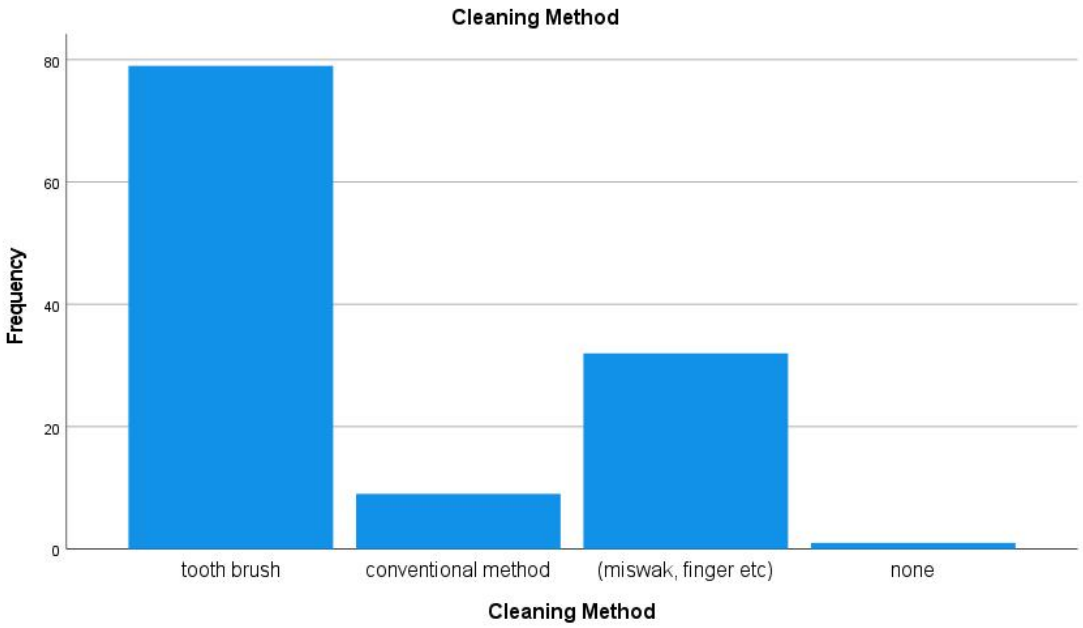

Figure 3.6 Dual Use Duration

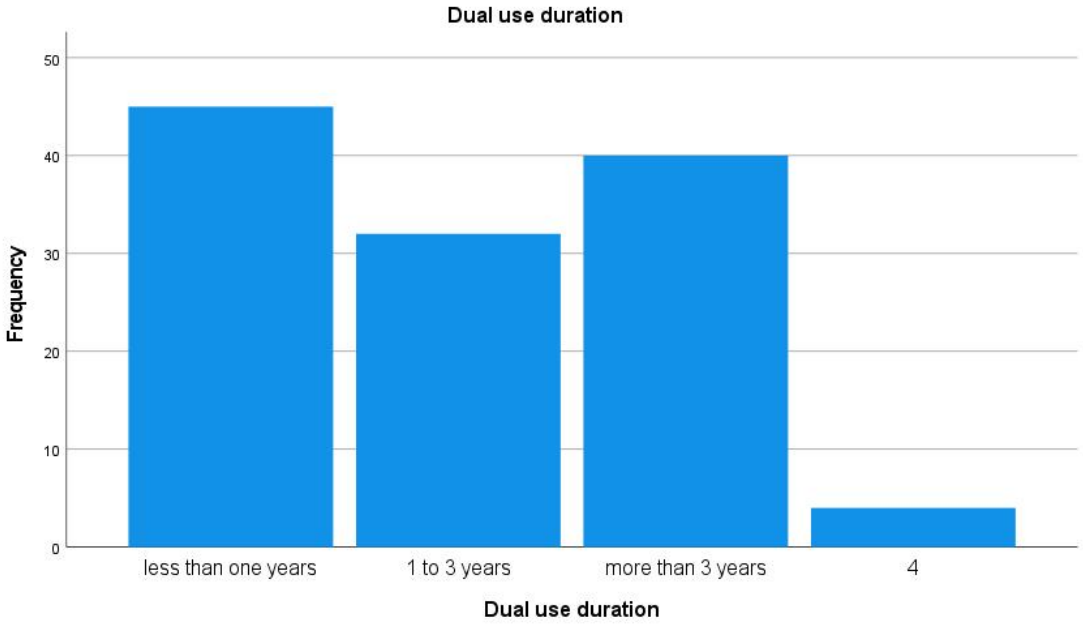

Table 3.4: *Oral hygiene index (OHI*

S/NO	Variable	Category	frequency	Percentage
	Oral hygiene index (OHI)	Good	19	15.7%
		Fair	32	26.4%
		Poor	70	57.9%
	Total		121	100%

Table 3.5 shows the distribution of the study population (N = 121) by Oral Hygiene Index (OHI) status is shown in Table 3.4. With 57.9% (n = 70) falling into the "Poor" oral hygiene category, the data shows that a significant majority of the participants have poor oral health. Meanwhile, 26.4% (n = 32) of the sample is classified as having "Fair" oral hygiene. The smallest group of the total sample population (15.7%, n = 19) are those who have "Good" oral hygiene.

Figure 3.7 Oral Health Index

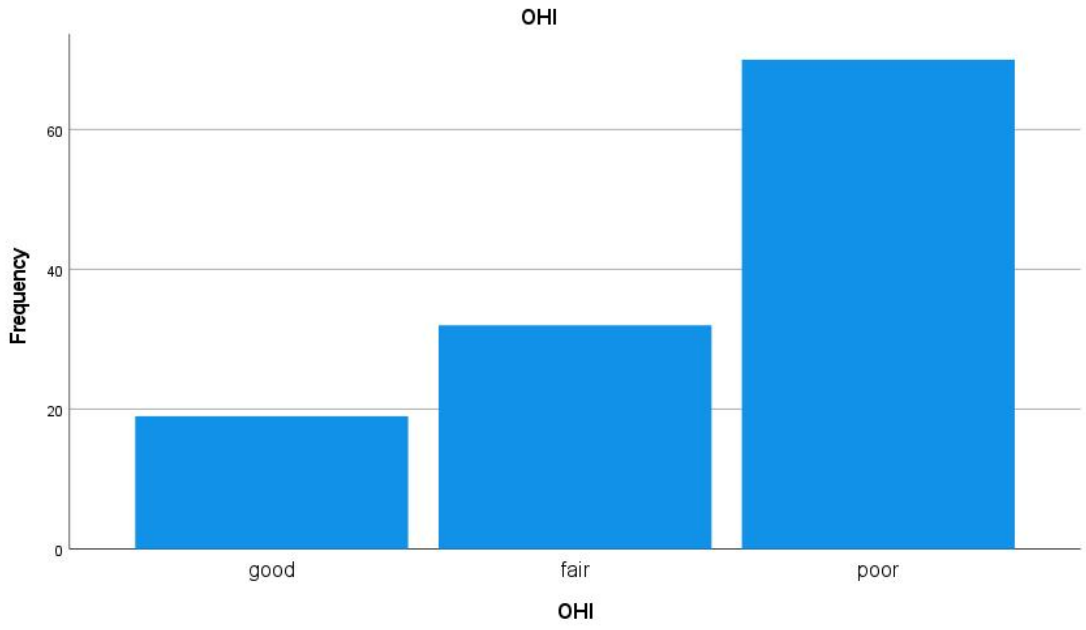

Figure 3.8 Dentist Visit

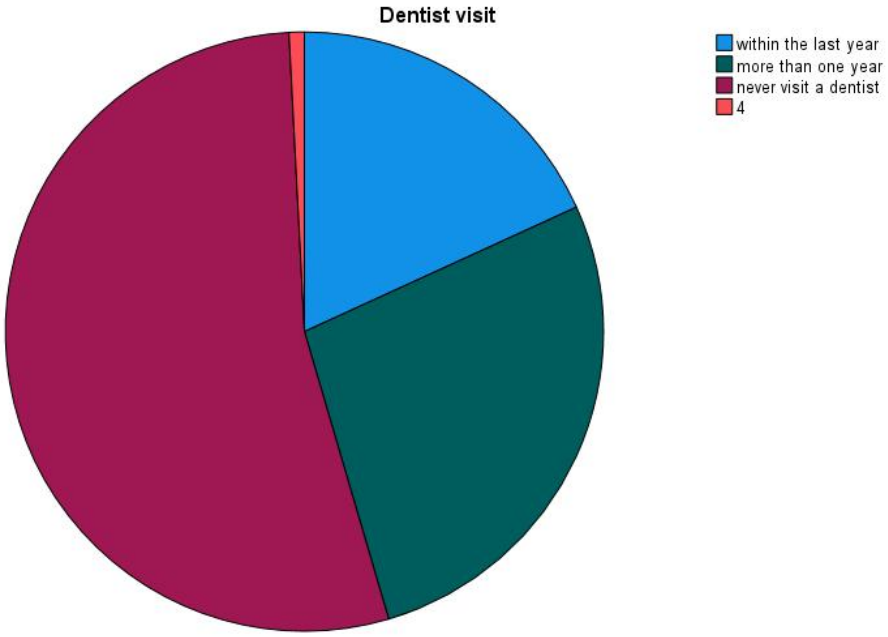

Table 3.5: *Gingival Index (GI) Score*

S/NO	Variable	Category	frequency	Percentage
	Gingival index (GI) score	Mild	22	18.2%
		Moderate	44	36.4%
		Sever	55	45.5%
	Total		121	100%

The clinical distribution of the study population (N = 121) based on their Gingival Index (GI) score is shown in Table 3.5. The results show that participants had a high prevalence of advanced gingival inflammation. The highest proportion of the sample (45.5%, n = 55) is "Severe" gingival inflammation. 36.4% ($n = 44$) of the participants with "Moderate" gingivitis come next. In contrast, the lowest clinical group are individuals with "Mild" gingival scores, representing only 18.2% (n = 22) of the population that were evaluated.

Figure 3. Gingival Index

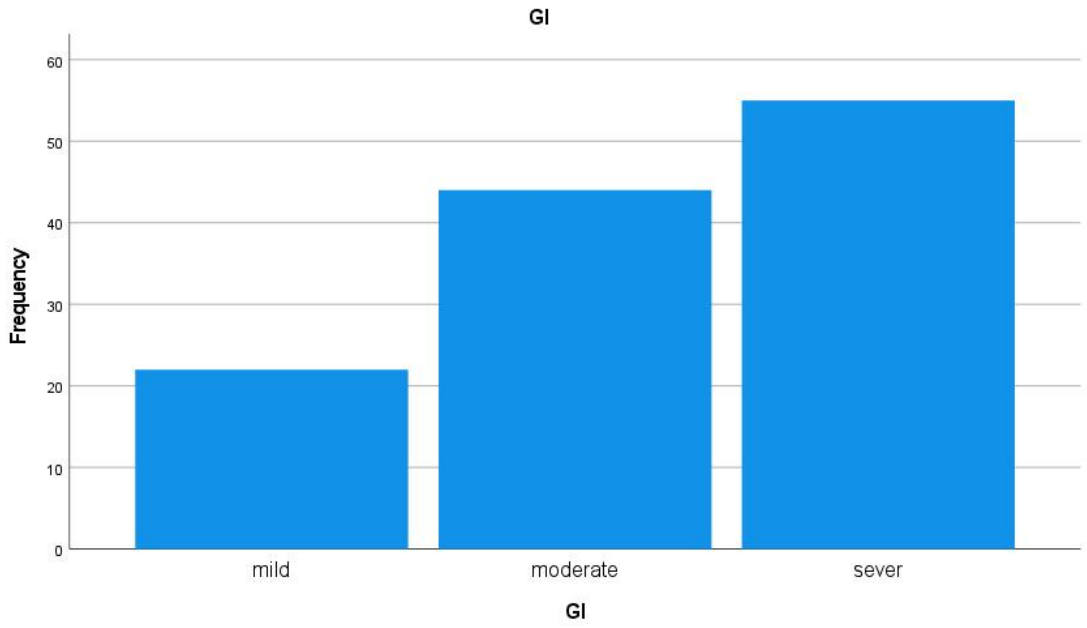

Table Multiple Drug use profile:

S/NO	Variable	Category	frequency	Percentage
	Multiple Drug use profile	Poly drug use (2 plus substance)	46	38.0%
		Methamphetamine (METH) only	29	24.0%
		THC/Cannabis	28	23.1%
		Heroin only	10	8.3%
		Opioid only	6	5.0
		None	2	1.7
	Total		121	100%

The table displays the distribution, as well as certain patterns, in substance use among the study participants (N = 121). The data indicates a high rate of substance

involvement, and the most typical characteristic is the use of more than one substance at a time.

The largest group within the population is 'poly drug use (2 plus substances)' with 38.0% (n = 46) of the sample. Those who use only one illegal substance have the highest frequency use of "Methamphetamine (METH)" at 24.0% (n = 29) followed by "THC/Cannabis" at 23.1% (n = 28). Single substance drug use was present, although less common; 8.3% (n = 10) of participants reported using heroin only while 5.0% (n = 6) reported the use of opioids only. Only 1.7% (n = 2) reported using no illegal drugs ("None") while 1.1% (n = 1) reported being a former user but not using drugs in the last month.

DISCUSSION

The present study investigated gingival health status, oral hygiene status and tobacco use status of the patients residing in drug rehabilitation centres of Peshawar. People with substance use disorder are one of the most vulnerable groups of people who often demonstrate extreme lack of care for their own welfare. The findings of this study confirm a strong association between severe periodontal degeneration, poor oral hygiene habits, drug dependence (illegal drugs) and chronic tobacco smoking.

Prevalence and Impact of Tobacco Habits:

The most important findings of the study are that all the patients who were rehabilitated (n = 121) smoked regularly with 30.6% smoking for more than six years. This 100% tobacco saturation is well correlated with the advanced periodontal damage we see clinically.

The results obtained are like those observed in the region and throughout the world that indicate tobacco use is the leading cause of oral morbidity. Chaffee et al. report that tobacco use remains a significant global contributor to morbidity and causes significant adverse impacts on the oral health, oral disease burden and reduces the success of any dental treatment (21). The evidence of biological processes involved in this devastation is plentiful. Smoking is known to have a longterm effect on microvascular damage, systemic vascular dysfunction and reduction of gingival blood flow, all of which exacerbates periodontal disease (22). This decreased oral microcirculation leads to increased periodontal inflammation, and a significant decrease in the local immune response (22).

The overall literature of the region emphasizes the negative effect of all methods of nicotine delivery, including on the periodontium, although our study sample consisted only of people who smoked traditionally. In a cross-sectional study conducted in Pakistan, Nasir et al. (1) found that there was a significant association between severe

periodontal damage, clinical tooth movement and localized gingival recession among 377 smokeless tobacco (SLT) users. Baseline gingival health was poorer, and clinical attachment loss was significantly higher in persons who used smokeless tobacco in Sharjah, UAE (24).

Moreover, a local study published in the Pakistan Journal of Physiology concluded all forms of smoking including dual-form smoking, traditional smoking and e-cigarette smoking negatively affect the gingival health and contribute to gingivitis as dual-form smokers are found to have the most severe gingival inflammation (19). These studies show that our cohort of 100% smokers is continually harming the surrounding oral tissues.

The Compounding Effect of Illicit Drug and Polydrug Use

Our study sample is unique in that there were multiple contemporaneous types of illicit drug use: polydrug (2 or more drugs, 8.0%), isolated methamphetamine (24.0%), and isolated cannabis (23.1%).

This exposure to complex chemicals, together with smoking, worsens clinical outcomes. The acute microvascular vasoconstriction and accompanying severe hypo salivation (dry mouth) that occurs with methamphetamine and other illegal substances, along with the vascular dysfunction and alteration of baseline inflammatory response that occurs with tobacco use (22), are all significant risk factors for oral complications. In the absence of the buffer and preventive properties of saliva, pathogenic plaque can proliferate. The cross-interaction could account for the significant and compounding relationship between heavy smoking, increasing dental deterioration, and decreasing periodontal health status that Beklen et al. found (25).

Also, because of general substance addiction, a patient's cognitive focus on self-care is reduced, allowing aggressive oral disease to rapidly advance.

Oral Hygiene Neglect and Dental Care Utilization Gaps:

Although 65.3% of the participants reported using a toothbrush, the behavioral compliance was quite low with only 24.8% reporting infrequent brushing. An alarming 54.5% of participants had never visited a dentist in their entire lives, showing a huge gap between the nominal ownership of a toothbrush and having organised tooth-brushing habits.

This serious neglect of preventative treatment completely accounts for the large amount of local irritating elements. Tobacco use is also seen to be associated with dental caries, periodontal disease and oral lesions, thus preventative education and tobacco cessation counselling by dental practitioners is essential and commitment from them will be very helpful in tobacco cessation (23). Unfortunately, this therapy is not so

easily available for the drug dependent population in Pakistan, both in the institutionalized and recovering period.

Previous study at the Dow University of Health Sciences demonstrated that if localized neglect (in the oral vestibule) is combined with persistent oral habits then serious periodontal tissue damage is inevitable (20). More than half of the subjects in our research sample are not under any dental treatment and thus early changes in gum tissue have been allowed to progress to more advanced and irreversible conditions.

Clinical Status Outcomes and Reversibility:

The objective clinical parameters of our study reveal the end point of neglectful dental care, high polydrug use and chronic smoking, i.e. 57. Forty-five percent and fifty-five percent of the individuals suffered from "Severe" gingival inflammation and 9 % of them had "Poor" Oral Hygiene Index (OHI) scores respectively.

These deep baselines are not only a major healing challenge but also are an opportunity for targeted intervention during the healing process. In a study conducted in Pakistan, Nisar et al., evaluated smokers undergoing periodontal therapy, and found the reduction in the GI, PI, PD and CIL to be highly significant and quantifiable, following successful smoking cessation (18). This local evidence indicates that gingival repair is possible and that the negative trend of periodontal tissue loss can be halted with vigorous implementation of structured oral hygiene program and cessation of tobacco use (18).

Clinical Implications and Recommendations:

Presently, all the drug rehabilitation institutes in Peshawar ignore dental care and focus almost exclusively on chemical detoxification, psychological and social reintegration. Poor oral health, structural tooth loss and excruciating gingival pain have a negative impact on a patient's Oral Health-Related Quality of Life (OHRQoL). This may lead to poor nutrition, poor self-esteem, increased social stigma and ultimately increased risk of behavioral relapse.

The findings of this study clearly show that the routine preventive care treatments, basic dental health education and mandatory diagnostic screening procedures should be incorporated into the regular multi-disciplinary procedures carried out in the all drug rehabilitation centers of Peshawar city.

CONCLUSION

In this study, it is found that smoking is an important problem among patients of rehabilitation facility in Peshawar and that there is significant gingival problem among them. All participants were current smokers and some had more than a long smoking history and made extensive use of drugs. Oral hygiene practices were generally poor

with less than half of the participants having visited a dentist before and only some brushing their teeth regularly, few using other oral hygiene methods, and very few using dental services.

The clinical findings revealed that majority of the patients had moderate to severe gingival irritation and poor dental hygiene. The results suggest that there is a direct, clinically significant association between chronic smoking and gingival problems in this vulnerable population. Combined use of more than one drug coupled with inadequate self-care and long-term neglect of preventive and therapeutic dental care appear to be increasing the impact of smoke.

The overall results of the study indicate that dental health is a key area of rehabilitation which is neglected crucially. Oral health promotion, tobacco cessation, and providing access to needed dental services should be included in rehabilitation programs to enhance oral health and overall health outcomes for those who are recovering from substance use disorders.

RECOMMENDATION

1.At the time of admission and on a regular basis during the rehabilitation process, thorough dental health evaluations should be carried out.
2.Behavioral assistance and structured counseling for quitting smoking as a basic part of any recovery program.
3.Regular oral health education workshops should be provided to raise awareness, motivation and acceptance of good oral health practices.
4.Working with dental providers and medical facilities, simple curative and preventative dental care should be provided including scaling, periodontal assessment, and restorative care.
5.Oral health issues should be identified by rehabilitation staff and a timely referral for dental care should be made.
6.To encourage residents to practice good oral hygiene, ensure residents are equipped with toothbrushes and fluoride toothpaste.
7.Public health professionals and policy makers need to invest in integrated care strategies and recognize the importance of oral health care in addiction care.
The need for more multicenter and longitudinal research to evaluate the short- and long-term outcomes of OH and tobacco cessation therapies in rehabilitation settings is recommended.

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8. Appendices

Data Collection Questionnaire

Participant Name: _____

Age: _____ years

Gender:

[ ] Male

[ ] Female

[ ] Other

Educational Level:

[ ] No formal education

[ ] Primary

[ ] Secondary

[ ] College/University

1.Which category best describes your tobacco habit?

[ ] Smoker

[ ] Tobacco chewer (smokeless)

[ ] Dual habit (both smoking and chewing)

[ ] No tobacco habit

2.Duration of tobacco use:

[ ] Less than 1 year

[ ] 1–3 years

[ ] 4–6 years

[ ] More than 6 years

3,Frequency of tobacco use per day:

[ ] 1–5 times

[ ] 6–10 times

[ ] More than 10 times

4.For dual users only: How many years have you used both forms?

[ ] Less than 1 year

[ ] 1–3 years

[ ] More than 3 years

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5.How do you clean your teeth?

[ ] Toothbrush

[ ] Conventional methods (Miswak, finger, etc.)

6.How often do you clean your teeth?

[ ] Twice daily

[ ] Once daily

[ ] Occasionally

7.When was your last visit to a dentist?

[ ] Within the last year

[ ] More than one year ago

[ ] Never visited a dentist

For the examiner, based on clinical findings

1.Oral Hygiene Index (OHI) Score: _____

[ ] Good

[ ] Fair

[ ] Poor

2.Gingival Index (GI) Score: _____

[ ] Mild

[ ] Moderate

[ ] Severe