NVEO
NATURAL VOLATILES &
Essential Oils

Imprints Of Alimental Patterns On Oral Health Status And Body Mass Index Among Third Shift Personnel In Chennai City, Tamilnadu, India- A Cross-Sectional Study

Swathi Venkatesan[1], Bharathwaj V V[2], Suganya P[3], Sindhu R[2], Dinesh Dhamodhar[4], Shreelakshmi S[2] , Prabu D[5], Rajmohan M[4]

[1]Under Graduate Student, SRM Dental College and Hospital, Ramapuram, Chennai, India.
[2]Master of Dental Surgery, Senior Lecturer, Department of Public Health Dentistry, SRM Dental College and Hospital, Ramapuram, Chennai, India
[3]Post Graduate Student, Senior lecturer, Department of Public Health Dentistry, SRM Dental College and Hospital, Ramapuram, Chennai, India
[4]Master of Dental Surgery, Reader,Department of Public Health Dentistry, SRM Dental College and Hospital, Ramapuram, Chennai, India
[5]Master of Dental Surgery, Professor and Head, Department of Public Health Dentistry, SRM Dental College and Hospital, Ramapuram, Chennai, India
CORRESPONDING AUTHOR:
Name: Dr. Bharathwaj V V
Designation: Senior Lecturer, Department of Public Health Dentistry.
Address: SRM Dental College and Hospital, Bharathi Salai, Ramapuram, Chennai, Tamilnadu-600089.
Email: bharatvenkat92@gmail.com

ABSTRACT:

AIM: This study aims to assess the imprints of food patterns on oral health status and body mass index among third shift personnel in Chennai city, Tamilnadu, India.

MATERIALS AND METHOD: A descriptive study was conducted among 109 people aged 30-60 years working on a shift basis in various Information Technology (IT) companies of Chennai city based on the multistage cluster sampling method. Questionnaire regarding food pattern, oral hygiene and physical variables were collected. Then their BMI and oral health examination was assessed using WHO Proforma (2013). The data were tabulated and analyzed using descriptive statistics and Chi-square test. P-value <0.05 was considered to be statistically significant.

RESULTS: Most of the night shift workers were found to be overweight this might be due to their sedentary lifestyle and increased consumption of sugary food items which causes increased prevalence of dental caries (73.39%) and other dental problems like Periodontitis (60.55%), Erosion (71.56%) and Fluorosis (63.30%). The oral health parameters such as dental caries (P= 0.007), missing teeth (P= 0.02), periodontal pocket (P=0.004) were found to be statistically significant with Body mass index (BMI).

CONCLUSION: The shift workers with higher BMI and irregular eating habits are prone to dental caries, sensitivity, and periodontitis. So, they need to be more attentive towards dietary habits and physical exercise to maintain their overall health.

KEYWORDS: Oral health, Dental caries, Periodontitis, food patterns, Body mass index, Night shift workers.

INTRODUCTION:

Shift work is a common aspect in the daily life of various fields, which includes industries, hospitals and many other essential sectors. The lifestyle patterns of the shift workers have a drastic impact on their health due to the proposed underlying causes such as circadian rhythm disruption, sleep deficit, stress, hormonal disturbances, gastrointestinal, neuro-psychic, cardiovascular disorders, etc [1, 2, 3, 4].

Night shift workers might need to be more attentive towards the maintenance of oral health because of their irregular eating habits without any time constraints [5].

Oral health is a highly personalized concept of awareness that highly relies on an individual's culture and socio-economic status. It can be defined as a standard of health of the oral cavity and associated tissue structures, which enables an individual to devour food, communicate and socialize without any restraints, discomfort, or embarrassment, which contributes to general and emotional well-being.

Maintaining good oral health requires joint efforts from both the dentist as well as the patient himself. One of the most significant factors that decide the dental health of a population is the viewpoint of people

toward their dentition. The documentation states that oral health is as equally important as general health [6].

Moreover, knowledge of oral health among the common people also serves as an essential factor for overall health. Lack of maintaining oral health affects the physical, psychological, and social well-being of a person. Chronic diseases such as diabetes, obesity, and caries are the common risk factors have a higher rate in developing countries, leading to poor quality of dental and general health.

The major difficulty faced by people was the high treatment cost of any dental disease. Most people tend to ignore their impending dental problems, which later on increases the severity of diseases and affects overall health. Failure of the people to realize this fact had increased the prevalence of dental problems and poor quality-of-life ultimately ending up with tooth loss [6].

Obesity is now a major concern in shift workers because of increasing preference for fast food, lack of physical activity and decreased nutrition intake. [7]. Overweight individuals are associated with prolonged and excessive consumption of carbohydrates, especially sugar leading to increased prevalence of dental issues [8].

Oral diseases, especially dental caries are still prevalent in most of the developing countries. Dental caries is a multi-factorial disease attributed to both modifiable risk factors and non-modifiable risk factors such as diet, socio-economic status, etc. The key factors identified to have an influence on shift workers are irregular working hours, break availability, family life and cultural influences [9, 10].

Periodontal disease affects the tissue that surround and supports the tooth. The disease is characterized by bleeding or swollen gums (gingivitis), pain and sometimes bad breath. In severe form of periodontitis, the gingiva moves away from the tooth and supporting bone, causing teeth to become loose and sometimes fall out. The main causes of periodontal disease are poor oral hygiene and tobacco use [11].

Unhealthy dietary behaviours among shift-working population were due to lack of available healthy food choices at night [12]. It is observed that shift workers consume an increased number of meals like snacks and often skip the main meals indicates the risk factor for type 2 diabetes mellitus [13, 14]. Increased consumption of coffee/tea and other caffeine products to avoid sleep is common.

Similar studies had conducted in other countries regarding the dietary patterns of night shift workers [15, 16] but none of the studies had conducted the association of dietary patterns and oral health status among night shift workers especially in India [15]. Therefore, this present study aims to assess the impact of food patterns on oral health status and body mass index among night shift workers in Chennai city, India.

MATERIALS AND METHOD:

A descriptive cross-sectional study was conducted among night shift workers of aged 30-60 years in Chennai city to assess their oral health status and body mass index based on their food patterns. Based on the previous study conducted by Benzian et al, the sample size was calculated to be 109 with a confidence interval of 95 % and margin of error being 5% [10].

The ethical approval of this study was obtained from the department of public health dentistry, SRM dental college, Ramapuram. The inclusion criteria of this study includes only those people works on shift basis (night shifts), only those subjects with working experience of more than five years were included, only subjects of aged 30-60 years were included, only those people working on night shift basis in Information Technology (IT) Companies were selected and those who are willing to participate in the study were included. The exclusion criteria of this includes subjects who are not cooperative, subjects suffering from any systemic diseases, and those workers who did not fulfil the consent form and questionnaires were excluded from the study.

A total of 109 night shift workers in Chennai city were selected from various Information Technology (IT) companies. Out of 4000 IT companies in Chennai city, four IT companies were selected based on the multistage cluster sampling method. The self administered 9 item closed ended questionnaire regarding demographic data and dietary habits meals and snacks, sweets, fruits and vegetables, consumption, and

amount of non-vegetarian food intake among the shift workers to determine their food habits were collected after getting the consent form filled from the night shift workers.

The content validation and the reliability of the questionnaire were validated by Cronbach's alpha (0.8). The oral health status was recorded by using WHO Proforma (2013) and their body mass index were recorded.

BMI values <18.5 kg/m^2: Underweight

18.6-25kg/m^2: Normal

25<30 kg/m^2: Overweight

>30kg/m^2: Obese

The collected data were tabulated and analyzed using descriptive statistics and chi square test for statistical analysis. P value < 0.05 considered to be statistically significant.

RESULTS:

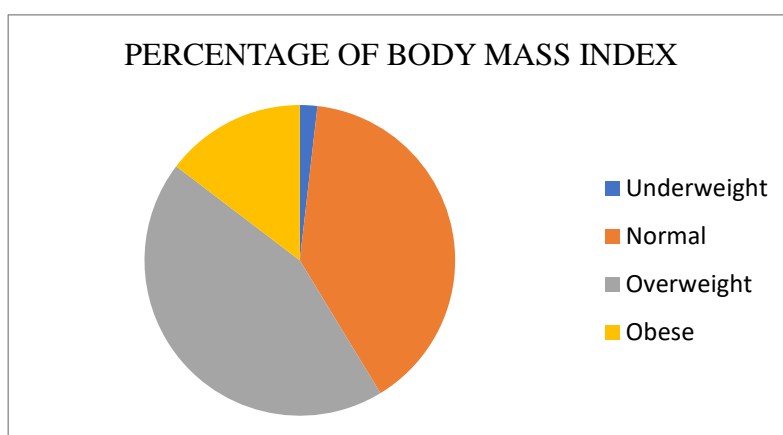**FIGURE 1: DESCRIPTIVE ANALYSIS OF BODY MASS INDEX**

TABLE 1: ASSOCIATION OF DIETARY PATTERNS AND BODY MASS INDEX AMONG NIGHT SHIFT WORKERS

Questionnaire regarding patterns of food habits	Frequency	Percentage	P value
How many times do you eat per day? Once Twice Thrice More than that	 0 3 88 18	 0% 2.75% 80.73% 16.52%	0.012*
How often do you skip your meals? Everyday Sometimes Rarely Never	 5 42 42 20	 4.58% 38.54% 38.54% 18.34%	0.039*
Do you eat fruits and vegetables? Always Often	 58 31	 53.21% 28.45%	0.046*

Rarely	19	17.43%	
Never	1	0.91%	
How often do you consume non-vegetarian foods? Always Often Rarely Never	 29 42 17 21	 26.61% 38.54% 15.59% 19.26%	0.036*
How often do you eat sweet stuff? Always Often Rarely Never	 10 44 50 5	 9.17% 40.36% 45.89% 4.58%	0.014*
How often do you consume intermittent snacks? Always Often Rarely Never	 12 45 49 3	 11% 41.28% 44.96% 2.76%	0.123
How often do you eat outside food? Always Often Rarely Never	 15 52 37 5	 13.77% 47.7% 33.95% 4.58%	0.117

*P<0.05 considered to be statistically significant.

Table 1 depicts about the relationship between dietary habits and BMI. There was a statistically significant association found between BMI and frequency of food intake (P=0.012), skipping of meals (P=0.039), intake of fruits and vegetables (0.046), non-vegetarian foods (P=0.036) and sweets (P=0.014).

TABLE 2: ASSOCIATION OF ORAL HEALTH STATUS AND BODY MASS INDEX AMONG NIGHT SHIFT WORKERS

DENTAL PARAMETERS		PERCENTAGE OF BMI				P value
Parameters	Percentage	Normal	Under weight	Over weight	Obese	
Dental caries	61.47%	31.34%	0%	50.75%	17.91%	0.0070*
Missing tooth	18.35%	20%	5%	40%	35%	0.0241*
Restored tooth	37.61%	48.78%	0%	34.15%	17.07%	0.7182
Gingival bleeding	73.39%	40%	1.25%	45%	13.75%	0.9417

Periodontitis	60.55%	30%	0%	51.52%	18.18%	0.0040*
Erosion	71.56%	39.74%	0%	37.50%	31.25%	0.8996
Trauma	14.68%	31.25%	0%	37.50%	31.25%	0.09336
Fluorosis	63.30%	40.58%	1.45%	43.48%	14.49%	0.8266
Sensitive tooth	5.50%	33.33%	0%	33.33%	33.3%	0.002*

*P<0.05 considered to be statistically significant.

Table 2 shows about the association of oral health status and body mass index. There was a statistically significant association found between Body mass index and dental caries (P=0.007), missing teeth (P=0.02), Periodontitis (P=0.004) and sensitivity of teeth (P=0.002).

DISCUSSION:

Diet plays an essential role in maintaining the overall health of people. Improper dietary habits and frequent intake of sugary food items affects the oral health and paves the pathway for many systemic diseases. The night shift workers are more prone to oral diseases due to their irregular lifestyle and dietary habits.

Figure 1 shows that the majority of night shift workers were overweight (43.6%) and 14.5 % of them were obese which may be due to the increase in the sedentary lifestyle pattern of the individuals whereas 1.8 % of workers were underweight this may be due to inadequate nutritional intake and irregular eating habits. These health conditions can be improved by maintenance of good dietary patterns and regular exercise.

Table 1 shows the association of dietary food patterns and Body mass index (BMI) among night shift workers. From the results, it is evident that there was a strong significant relation found between the food patterns and BMI among shift workers due to their irregular eating habits and the disorganised type of their routine food consumption [12].

Increased consumption of outside food may cause increased health issues due to lack of sterile environment or a diet with high fat, cholesterol, and sugars. Increased non-vegetarian diet causes constipation and acidity and it also increases the risk of hypertension, obesity, and heart diseases. Increased intake of fruits and vegetables along with exercise improves the overall health of the individual [17]. No statistically significant association was found between BMI and intake of intermittent snacks and consumption of outside foods.

Intermittent snack consumption helps to improve the concentration when taken in moderate amounts. It also shows the food consumption pattern by the shift workers that may be the major reason behind the related oral manifestations. There was an increased consumption of coffee followed by tea, milk and others to avoid sleep during night shifts. Also, the majority of the workers often consume sugary food items which may increase the incidence of dental caries.

Table 2 shows the association of body mass index (BMI) and oral health status among night shift workers. A statistically significant association was found between BMI and Missing teeth (P=0.02), Dental caries (P=0.007), Periodontitis (P=0.004) and Sensitive teeth (0.002). The parameters such as restored teeth, gingival bleeding, periodontal lesion, erosion, trauma and Fluorosis were not found to statistically significant.

Previous study conducted by Reeves et al in the year 2004 discussed about the food items among night shift workers and concluded that the night-shift workers had a significant difference (P< 0.05) in the intake of food patterns on rest and working days, while the day working population had no significant relation in their food patterns [11].

Similar studies conducted by Hamasha et al in the year 2019 discussed about the association of BMI and oral health status among Saudi adults. The study was conducted using questionnaires and clinical examinations and they concluded that there was a statistically significant relation found between body mass index and dental caries (P<0.026), traumatic ulcer (P=0.018). The participants with higher BMI had higher DMFT scores in the presence of low education, presence of oedematous gingiva, smoking or a medical condition [18].

Another study conducted by Kim et al in the year 2017 discussed about the relationship between body mass index (BMI) and oral health status among Korean adults using the Fifth Korea National Health and Nutrition Examination Survey and concluded that the Body mass index was related to periodontitis, but not to dental caries, suggesting that obesity is a risk factor for periodontitis [19].

The current study focused only on the food patterns among night shift workers of Indian adults of Chennai city and their impact on BMI and oral health status. The dietary patterns such as frequent intake of sugary food items, sweets, non-vegetarian food items and skipping meals were found to be statistically significant with BMI.

The oral health parameters such as dental caries, periodontitis, missing teeth, sensitivity of teeth were found to statistically significant with BMI. Lack of good food facilities and improper timing of food consumption during night shift are the major difficulties in the establishment of healthy eating patterns among night shift workers. They may need additional maintenance of oral health because of their varied eating habits without any time constraints and physical exercise to maintain a healthy life. The employers must pay attention in reviewing the quality of food and dining facilities available for night shift workers to maximize their healthy eating options.

LIMITATIONS:

Overestimation or underestimation of the responses from the people may be observed. The chance of Social desirability bias among the population may alter the results. Variables like age, gender and socio-economic status were not included. There might be chance of gender bias. Further longitudinal studies should be conducted to get more relevant outcome.

CONCLUSION:

There was an observed impact of food patterns on oral health status and body mass index of an individual working in a shift-based routine. The shift workers with higher BMI and irregular eating habits are prone to dental caries, sensitivity and periodontitis. So, they need to be more attentive towards their dietary habits. The government should ensure more awareness programs to enlighten the knowledge of public regarding the dietary habits and oral health for the maximum benefits. The night shift workers should modify their lifestyle behaviours by regular exercise, proper diet plans, routine dental check-ups, proper brushing habits and use of other dental aids to overcome this problem.

REFERENCES:

1. Gupta S, Pati AK, Levi F. Pattern of shift rota modulates oral temperature circadian rhythm and sleep-wakefulness profiles in shift workers. Journal of biosciences. 1997 Sep 1; 22(4):477-88.
2. Pepłońska B, Burdelak W, Krysicka J, Bukowska A, Marcinkiewicz A, Sobala W, Klimecka-Muszyńska D, Rybacki M. Night shift work and modifiable lifestyle factors. International journal of occupational medicine and environmental health. 2014 Oct 1; 27(5):693-706.
3. Knutsson A, Bøggild H. Gastrointestinal disorders among shift workers. Scandinavian journal of work, environment & health. 2010 Mar 1:85-95.
4. Costa G. The impact of shift and night work on health. Applied ergonomics. 1996 Feb 1; 27(1):9-16.
5. Ishizuka Y, Yoshino K, Takayanagi A, Sugihara N, Maki Y, Kamijyo H. Comparison of the oral health problems and behavior of male daytime-only and night-shift office workers: An Internet survey. Journal of occupational health. 2016 Mar; 58(2):155-62.

6. Singh A, Gambhir RS, Singh S, Kapoor V, Singh J. Oral health: How much do you know? –A study on knowledge, attitude and practices of patients visiting a North Indian dental school. European journal of dentistry. 2014 Jan; 8(01): 063-7.

7. Willershausen B, Moschos D, Azrak B, Blettner M. Correlation between oral health and body mass index (BMI) in 2071 primary school pupils. European journal of medical research. 2007 Jul 26; 12(7):295-299.

8. Shivakumar S, Srivastava A, Shivakumar GC. Body mass index and dental caries: a systematic review. International journal of clinical paediatric dentistry. 2018 May; 11(3):228-232.

9. Gupta CC, Coates AM, Dorrian J, Banks S. The factors influencing the eating behaviour of shift workers: what, when, where and why. Ind Health. 2019; 57(4):419-53.

10. Benzian H, Bergman M, Cohen L, Hobdell M, Mackay J. The UN High-level meeting on prevention and control of non-communicable Diseases and its significance for oral health worldwide. Journal of Public Health Dentistry. 2012; 72(2): 91-3.

11. Reeves SL, Newling-Ward E, Gissane C. The effect of shift-work on food intake and eating habits. Nutrition & Food Science. 2004 Oct 1; 34(5): 216-221.

12. Bonnell EK, Huggins CE, Huggins CT, McCaffrey TA, Palermo C, Bonham MP. Influences on dietary choices during day versus night shift in shift workers: a mixed methods study. Nutrients. 2017 Mar; 9(3):193.

13. Freitas ED, Canuto R, Henn RL, Olinto BA, Macagnan JB, Pattussi MP, Busnello FM, Olinto MT. Alteration in eating habits among shift workers of a poultry processing plant in southern Brazil. Cien Saude Colet. 2015; 20:2401-10.

14. Mekary RA, Giovannucci E, Willett WC, van Dam RM, Hu FB. Eating patterns and type 2 diabetes risk in men: breakfast omission, eating frequency, and snacking. The American journal of clinical nutrition. 2012 May 1;95(5):1182-9.

15. Lowden A, Moreno C, Holmbäck U, Lennernäs M, Tucker P. Eating, and shift work—effects on habits, metabolism, and performance. Scandinavian journal of work, environment & health. 2010 Mar 1:150-62.

16. Mehta VV. Effect of motives for food choice on oral health among primary school children in Mangalore: An analytical survey. Journal of clinical and diagnostic research: JCDR. 2017 May;11(5): ZC59.

17. Dhandevi PE, Jeewon R. Fruit and vegetable intake: Benefits and progress of nutrition education interventions-narrative review article. Iranian journal of public health. 2015 Oct; 44(10):1309-21.

18. Hamasha AA, Alsolaihim AA, Alturki HA, Alaskar LA, Alshunaiber RA, Aldebasi WT. The relationship between body mass index and oral health status among Saudi adults: a cross-sectional study. Community dental health. 2019 Feb 25;36(1):217-22.

19. Kim YS, Kim JH. Body mass index and oral health status in Korean adults: The Fifth Korea National Health and Nutrition Examination Survey. International journal of dental hygiene. 2017 Aug; 15(3):172-8.