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NUTRITIONAL STATUS OF PERSONNEL CONTROLLING TRAFFIC IN A TERTIARY CARE HOSPITAL OF DELHI: A PROSPECTIVE PILOT STUDY

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ABSTRACT

Background: *Traffic controllers work in the middle of innumerous noisy and polluting vehicles and endure physical strain in an environment polluted by fumes, exhaust of vehicles, use of blowing horns, blow of dust in the air, etc. Their stressful lives often make them resort to unhealthy food choices, ill-timed and unbalanced meals, leading to many problems.* **Objective:** *The present study aimed to analyse the nutritional status of personnel controlling traffic in a tertiary care hospital of Delhi through the 'ABCD' approach of nutritional assessment: Anthropometric, Biochemical, Clinical and Dietary status to get a fair idea about their individual nutritional needs.* **Methodology:** *It was a prospective analysis done in hospital of Delhi by assessing anthropometry, biochemical, clinical parameters, and dietary status on a sample size of 48 personnel controlling traffic.* **Results:** *The results of the study showed that only few of the subjects were of appropriate weight (29%), were consuming adequate calories (18.75%), and were consuming adequate proteins (16.66%). Majority of them had health problems with deranged blood parameters and many were also subjected to substance abuse and had very little and inaccurate nutritional knowledge.* **Conclusion:** *The study highlighted the need for proper nutrition education sessions for them and the importance of nutritional counseling amongst them. Better health outcomes can thus be hoped with this prospective study in the target population.*

Key Words: *Traffic Controller, Nutritional Assessment, Nutritional Status, Pollution, Health Status.*

INTRODUCTION

With the growing urbanization, a large number of cities around the world are witnessing a very sharp growth in the number of vehicles, which require a subsequent growth in the number of personnel controlling traffic to ensure a steady movement of traffic and mitigate traffic congestion problems. As a result, personnel controlling traffic have to work among innumerous noisy and polluting vehicles in an environment polluted by fumes, exhaust of vehicles, use of blowing horns, blow of dust in the air, etc. (Al-Alawi, 2009; Satapathy et al., 2009) along with having long, unpredictable working hours, and sudden encounters with events which lead to physical and psychological strain (Sridher et al., 2017). Because of the constant workload, they neglect their general health, feel fatigued, dehydrated, experience heat stress and bone health problems including lower back pain, and sometimes engage in detrimental habits which further affect their health and nutritional status (Sridher et al., 2017; Almale et al., 2015; Raval et al., 2018).

Exposure to air pollutants is known to be deleterious to the general health and particularly to the lungs (Taggart, 1996), which subsequently affect nutritional status. And thus, traffic

controlling personnel's prolonged exposure to the dust and pollutants can cause several problems for them. Adverse effects include irritation of the eye, nose and throat, lung function impairment, headache, fatigue, nausea and increase in the susceptibility to infections and pulmonary diseases. Chronic exposure leads to problems like cough, sputum production and decline in lung function along with other respiratory morbidities, vision, hearing and skin problems (Chattopadhyay et al., 2003; Sydbom et al., 2001). In the long run, the exposure to pollutants lead to various diseases such as asthma, COPD and malignancy in the exposed individuals along with significant changes in lung functions (Ranganadin et al., 2013).

Due to their stressful lives, they often resort to unhealthy food choices, ill-timed and unbalanced meals leading to problems like gastrointestinal distress, high blood pressure, diabetes and obesity and subsequent varicose veins problems all of which require timely attention (Almale et al., 2015; Sridher et al., 2017; Tambe et al., 2012). Overweight and obesity which is the abnormal or excessive fat accumulation in the body may furthermore impair health (WHO Western Pacific Region. Obesity and overweight: fact sheet, 2021). In particular, android obesity is associated with diseases and metabolic disorders such as hyperinsulinemia, insulin resistance, type 2 diabetes, hypertension, dyslipidemia, coronary heart disease, gallbladder disease, and certain cancers which can contribute to high morbidity and mortality (Kumar et al., 2015; Pi-Sunyer, 2002).

The level of productivity is directly proportional to good nutritional status and the occupational environment of the personnel controlling traffic pose a threat to their well being and subsequently, their productivity. Below, we review some of the relevant studies that describe the health problems that affect or are affected by the nutritional status of personnel controlling traffic vis-à-vis the working environment.

In a study conducted by Sridher et al. (2017), health status of 139 traffic police personnel from Chennai was assessed. Among the study population, 33 (23%) had diabetes, 32 (23%) had high blood pressure issues, 17 (12.2%) had respiratory problems, 26 (18.7%) had skin issues, 70 (50.4%) suffered from low back pain, 34 (24.5%) reported vision problems, 20 (14.4%) had low PEFR, and 18 (12.9%) were diagnosed to have varicose veins by Trendelenberg's test. Significant correlation ($p<0.05$) was found between years of service with diabetes, hypertension, abnormal waist circumference and usage of personal protective equipment (mask and sunglasses). The study emphasised the need for regular health assessments and education programs with focus on lifestyle modification, stress minimisation, smoking and alcohol limitation.

Health ailments detected in another study by Radhakrishna et al. (2016) on 36 Bangalore traffic police personnel, were eye irritation (38.9%), chronic cough (22.2%), wheeze (11.1%), dermatitis (16.7%), anxiety (11.1%), varicose veins (11.1%) and fatigue (11.1%). 22.2% also had chest expansion less than 4 cm and 58.3% of the participants had reduced PEFR less than 500 l/min. Higher occurrence of all the health ailments was found in the group which had been exposed in this occupation for greater than 5 years. It was also noted that only 11 personnel were using personal protection measures.

The aim of a study by Haralkar and Gite (2018) was to study socio-demographic characteristics and morbidity profile of 114 traffic policemen in Solapur city, Maharashtra. The study indicated that while on the duty, eye irritation was experienced by 32.46% of them which was sometimes associated with watering and eye redness. About half of the participants (50.88%) also experienced respiratory symptoms at work. Itching all over the body was experienced by 13.16% of them. Obesity affected them the most (63.16%). Hypertension, URTI, chronic rhinitis, chronic bronchitis, urticaria, diabetes mellitus was observed in 29.82%, 14.91%, 14.04%, 13.16%, 13.16% and 8.77% of the traffic policemen respectively.

A cross-sectional study by Prajapati et al. (2015) including 482 traffic police personnel of Ahmedabad, reported 11.62%, 44.81%, 24.68%, and 2.91% of the respondents to have skin problems, eye problems, allergic or seasonal rhinitis and varicose veins respectively and other problems like tinnitus, recurrent upper respiratory tract infection, chronic dry cough, chronic cough with sputum, constipation, hyper-acidity, bloating, piles, fissure and recurrent diarrhea, which all showed an association with years of job experience. The study suggested simple interventions for their betterment like periodic health checkups and personal care.

Satapathy et al. (2009) conducted a study to assess the health status of the traffic police personnel of the Berhampur city in which it highlighted that the most prevalent form of addiction was tobacco chewing (48%), followed by alcohol addiction

present in 20.8% of the respondents. 38.3% of subjects belonged in the overweight category and 8.5% were obese. The study indicated the presence of hypertension in 25% of study subjects which also had a positive correlation (r=0.4) with BMI. A large proportion (66.6%) of the study population had a PEFR value between 300 and 500 liters/min, 8.3% had below 300 litres/min and 25% had higher than 500 litres/min. The study indicated a negative correlation (r=-0.6) between PEFR and BMI. Different morbidity patterns were also studied and anemia was reported in 43.75%, musculoskeletal disorders in 27.08%, hypertension in 25% and eosinophilia in 18.75%. Respiratory disorders like rhinorrhoea, chronic bronchitis, pharyngitis, etc., were observed in 16% of the subjects. Varicose veins of legs affected 2 individuals which may be owed to the long standing hours or obesity.

In another study by Bandopadhyay et al. (2018), prevalence and factors associated with respiratory, eye and ear morbidities among 196 traffic police personnel of Nashik city were assessed. It was found that respiratory and eye morbidities were prevalent in 29.6% and 25.0% of the participants respectively. The most common respiratory morbidity was restrictive lung disease (17.9%). Refractive error (14.8%), was the most common eye morbidity. The association between respiratory diseases with old age (> 40 years), ≥10 years' service duration and presence of co-morbidities (Diabetes, Hypertension etc.,) was very significant. Eye disease did not show any association with any of the factors studied. It was concluded that respiratory health problem was the most common morbidity in traffic police.

Respiratory health status of 94 traffic policemen of Puducherry was assessed using spirometry by Ranganadin et al. (2013). 'Cough' was reported by greater than half (52.1%) of the subjects in the past three months. Rhinitis (common cold) was reported by 40% of the traffic policemen. All observed Pulmonary Function Test (PFT) parameters including Forced Vital Capacity, Forced expiratory volume in one second, Peak Expiratory Flow Rate and Mid Maximal Expiratory Flow were less than their respective predicted values, which all highlighted the need for preventive measures.

In a study by Makarani et al. (2016), in which the respiratory status of 100 traffic police personnel was assessed, it was examined that a majority (66%) had abnormal peak expiratory flow rate.

Another study was carried out by Makwana et al. (2015) in which SPIROEXCEL was used to assess the lung function impairment of 100 traffic police personnel posted in Saurashtra region, Gujarat, compared to matched unexposed control group. It was found that the traffic police personnel had significantly decreased forced vital capacity (FVC), forced expiratory volume in one second (FEV1), slow vital capacity (SVC) and maximum voluntary ventilation (MVV) when contrasted to predicted normal values, which can be due to vehicular exhaust exposure. Comparison of test result values between cases and controls exhibited significantly declined FVC, MVV, higher FEV1/FVC ratio and marginally reduced FEV1 and SVC in cases. Traffic police personnel with longer periods of exposure had much more declined lung functions than those with shorter periods of exposure. In comparison to non-smokers, personnel who smoked had lower test values with significance only in unexposed group. It was concluded that pollution by vehicular exhausts might have been the cause for the pulmonary function impairments and it was thereby suggested to offer traffic police personnel with personal protective measures.

30 traffic police personnel of Chennai city were also evaluated for cardio dynamic response to cold pressor test and compared to 30 controls in another study by Kumar et al. (2015). Traffic police personnel had much higher BMI, resting heart rate and diastolic blood pressure than the controls. After immersion, Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) showed markedly ($P<0.001$) higher value in traffic policemen than the controls. Differences between SBP and DBP also had high significance ($P<0.05$) among the policemen, but there was no such difference between the BP and the duration of exposure ($P>0.05$). Traffic policemen reacted more strongly to cold pressor test than the controls. Hence the need for their risk sensitisation and stress management was emphasised.

A study was conducted by Raval et al. (2018) to identify heat exposure, health effects, and coping mechanisms amongst a group of 16 traffic police workers. It was found that the traffic police workers were at risk of heat stress as they were encountered with wet bulb globe temperature (WBGT) levels higher than the recommended limit value as per American Conference of Governmental Industrial Hygienists guidelines even beyond the hottest months of the season. It was therefore pointed up to establish protection strategies to reduce present and future heat-related risks for

traffic controlling police workers as well as those groups with similar occupational risk. The methodology undertaken for occupational heat exposure assessment in this study could be applied to assess the same in a larger group.

Another study was performed by Shihurkar et al. (2005) to evaluate chronic lead poisoning in which 25 traffic policemen of Bangalore were taken as cases and 25 law and order policemen as controls. Blood lead levels of cases and controls were respectively found to be 9.188 ± 1.7372 and 9.772 ± 2.0800 µg/dl ($p<0.05$). The study showed a decrease in their blood lead levels in the past five years owing to the introduction of unleaded gasoline. The baseline lead exposure was greater in the study population. The study emphasized the need to replace all the supply with unleaded gasoline and to reduce environmental exposure to lead from other sources.

Studies from abroad too, denoted a similar scenario with Sancini et al. (2010) from Italy highlighting that longer occupational exposure to urban pollutants increased the risk of impairment in respiratory functions; Shrestha et al. (2015) from Nepal signifying the air pollution exposure duration to have effect on the PFT parameters; Karmacharya et al. (2019) from Nepal statistically showcasing 12% of the traffic police officers to be at risk of varicose veins which is significantly associated with the family history of varicose veins and smoking.

The literature search indicated that a number of studies have been conducted that described the health problems that affect or are affected by the nutritional status of personnel controlling traffic in India as well as abroad. However, to the best of knowledge, no study till date had been reported that took into consideration the dietary aspect of these personnel in detail.

In view of the above said various health hazards and problems associated with their working environment and lack of sufficient studies on their nutrition, the present study aimed to assess the nutritional status of personnel controlling traffic in a tertiary care hospital of Delhi.

The objectives of the study were:

- To assess and analyse all the components of 'ABCD' approach of nutritional assessment including: Anthropometric assessment, Biochemical assessment, Clinical assessment and Dietary intake and substance abuse assessment.
- To assess pre-existing nutritional knowledge.

METHODOLOGY

Research Design: Prospective pilot study

Locale: Dietetics Department OPD, Sir Ganga Ram Hospital, New Delhi.

Sampling Design: Personnel controlling traffic at Sir Ganga Ram Hospital, New Delhi were the study population. Inclusion criteria: The personnel controlling traffic was outside the hospital building. Exclusion criteria: The personnel controlling traffic inside the parking area or any other covered, traffic-free area. The sample size calculation was based on estimating the most crucial parameter i.e. obesity whose prevalence was reported as 71.9% by Sridher et al. The required sample size with a precision of 5% and confidence interval of 95% was found to be 311. However, due to the non-availability of the required number of subjects, the study was carried out as a 'pilot study' with the available smaller sample size of 48 subjects.

Following formula was used for calculating the sample size:

$n \geq Z^2_{1-\alpha/2}.p(1-p)/d^2$

Where $Z_{1-\alpha/2}$ =1.96 for 95% confidence interval

P= 0.719 (expected proportion)

d= 0.05 (margin of error/precision)

Tools and Technique: Tools that were used for different study objectives were: for anthropometric assessment: Stadiometer and Weighing scale. For biochemical assessment: Complete Blood Count (CBC), Total Leukocyte Count (TLC), Differential Leukocyte Count (DLC) and Erythrocyte Sedimentation Rate (ESR) tests, Fasting Blood Sugar (BS-F) and Hemoglobin A1C (HbA1C) tests, Blood Urea Nitrogen (BUN) and serum creatinine tests, Uric acid test, Blood protein test, Serum Glutamic-Oxaloacetic Transaminase (SGOT), Serum Glutamic Pyruvic Transaminase (SGPT) and Lactate Dehydrogenase (LDH) tests, Gamma-Glutamyl Transferase (GGT) test, Lipid profile test. For clinical assessment: Chest X-Ray analysis and Interview schedule validated by the validation committee. For dietary intake and substance abuse assessment: 24-hour dietary recall, Indian Food Composition

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Table, 2017 by National Institute of Nutrition (Longvah et al., 2017), Compilation of Food Exchange List, 2017 (Siddhu et al., 2017), Interview schedule validated by the validation committee. For pre-existing nutrition knowledge assessment: Structured questionnaire.

Data on nutritional status was collected through a validated interview schedule and preprocessed using the Excel package. The information on various biochemical parameters was collected from the individual's routine test reports. The data thus collected was duly coded by two individual assessors and was secured by using appropriate anonymized plan.

The following ethical considerations were taken into account:

1) Written informed consent was obtained from the traffic controllers.
2) All the traffic controllers were explained about the whole process beforehand.
3) No invasive procedures were carried out.
4) Strict confidentiality was maintained.
5) Traffic controllers had the freedom to withdraw his/ her consent at any stage of the study.
6) Approval was sought from the institute ethical committee.

Data Analysis and Statistical analysis: Responses to each question was estimated in percentage/proportion with 95% confidence interval. Excel was used for data recording and analysis.

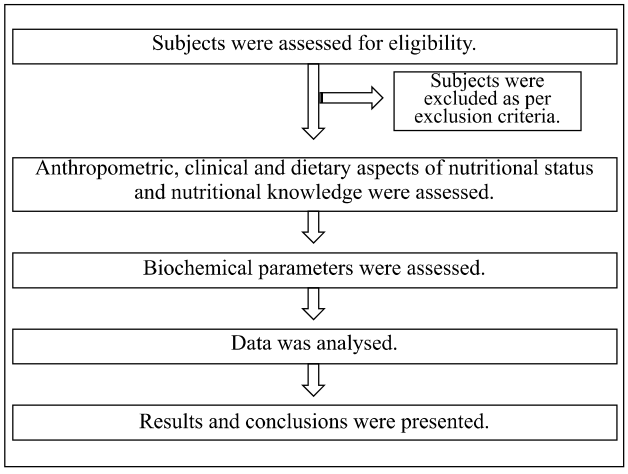

Figure 1: Study flowchart

RESULTS AND DISCUSSION

Out of the total 48 personnel controlling traffic, 24 (50%) were between 20-30 years of age, 16 (33.33%) were between 30-40 years of age and 8 (16.66%) were above 40 years of age. Looking at the years of experience as traffic controllers, 19 (39.58%) had less than 2 years of experience, 26 (54.16%) had between 2-4 years of experience and 3 (6.25%) had more than 4 years of experience as traffic controllers. All subjects were male.

Anthropometric assessment: According to the BMI classification for South Asian population, 1 (2%) traffic controller was underweight (BMI<18), 14 (29%) were of normal weight (BMI between 18-22.9), 18 (37.5%) were overweight (BMI between 23-24.9), 12 (25%) were obese grade I (BMI between 25-29.9) and 3 (6.25%) were obese grade II (BMI between 30-34.9) (Table 1).

Table 1: Classification of study population on the basis of BMI (Asians)

Classification of personnel controlling traffic as per BMI (Asians)	Number of personnel controlling traffic	Percentage of personnel controlling traffic (%)
Underweight (BMI<18)	1	2
Normal (BMI between 18-22.9)	14	29
Overweight (BMI between 23-24.9)	18	37.5
Obese grade I (BMI between 25-29.9)	12	25
Obese grade II (BMI between 30-34.9)	3	6.25
Obese grade III (BMI >/=35)	0	0

Biochemical parameter assessment: The biochemical tests showed abnormal parameters. Deranged parameters were observed in 43 (89.58%) CBC, TLC, DLC, ESR test results; 8 (16.66%) fasting blood sugar and HbA1C test results, 4 (8.33%) BUN and serum creatinine test results, 7 (14.58%) uric acid test results, 8 (16.66%) blood protein test results, 27 (56.25%) SGOT, SGPT and LDH test results,

1 (2.1%) GGT test result and 46 (95.83%) lipid profile test results (Table 2).

Table 2: Classification of study population on the basis of biochemical parameters

Biochemical parameter(s)	Number of normal test results	Percentage of normal test results (%)	Number of abnormal test results	Percentage of abnormal test results (%)
CBC, TLC, DLC, ESR	5	10.41	43	89.58
Fasting blood sugar, HbA1C	40	83.33	8	16.66
BUN, Serum creatinine	44	91.66	4	8.33
Uric acid	41	85.41	7	14.58
Blood protein	40	83.33	8	16.66
SGOT, SGPT, LDH	21	43.75	27	56.25
GGT	47	97.91	1	2.10
Lipid profile	2	4.16	46	95.83

Clinical signs and symptoms assessment: The study highlighted various health problems faced by the personnel controlling traffic. Amongst the 48 participants, 21 (43.75%) complained of bone health issues like back pain, knee pain, ankle pain, heel pain etc; 16 (33.33%) had gastrointestinal discomfort and 12 (25%) faced respiratory issues. 5 (10.4%) of the participants also showed abnormal chest X-rays. Evaluating their fatigue level, only 24 (50%) of the respondents felt fresh/energetic during their work hours, while 14 (29.16%) felt fatigued/tired and 10 (20.83%) felt a mix of both at different phases of their work hours (Table 3).

Table 3: Prevalence of clinical signs and symptoms in the study population

Clinical signs and symptoms	Number of personnel controlling traffic unaffected	Percentage of personnel controlling traffic unaffected (%)	Number of personnel controlling traffic affected	Percentage of personnel controlling traffic affected (%)
Bone health issues	27	56.25	21	43.75
Gastrointestinal issues	32	66.66	16	33.33
Respiratory issues	36	75	12	25
Issues visible in chest X-Ray	43	89.58	5	10.4

Dietary intake assessment and substance abuse: On assessing their 24 hour dietary recall, it was found that only 9 (18.75%) of them were intaking appropriate calories according to their RDA (2,000-2,400 kcals), 3 (6.25%) were consuming more than 2,400 calories, and a majority- 36 of them (75%) were consuming less than 2,000 calories. Regarding proteins, a meagre number of 8 (16.66%) traffic controllers were consuming an appropriate amount (60-65 g), 7 (14.43%) were consuming more than 65 g of protein and 33 (69%) were consuming less than 60 g of protein daily. 41 (85.41%) of the traffic controllers carried home cooked food at work, while 7 (14.58%) ate their meals from outside. As far as overall outside food consumption is concerned, 5 (10.41%) had food from outside daily, 3 (6.25%) had once a week, 7 (14.58%) had few times in a week, 9 (18.75%) had once a month, 10 (20.83%) had few times in a month and a majority 14 (29.16%) rarely consumed food from outside. A majority of 28 (58.33%) traffic controllers perceived their eating habits to be healthy and 20 (41.66%) admitted to eating unhealthily. On a scale of 1-5, where 1 rates the outside food as least safe and hygienic and 5 rates it to be most safe and hygienic, the traffic controllers on an average rated it as 2.5. 26 (54.16%) of the traffic controllers were intaking an adequate amount of water daily (3-4 litres), whereas 7 (14.58%) were not intaking enough water (less than 3 litres) and 15 (31.25%) were intaking more than the required amount of water (more than 4 litres) daily (Table 4).

Table 4: Assessment of dietary intake of the study population

Nutritional component	Number and % of personnel controlling traffic with optimal intake	Number and % of personnel controlling traffic with excess intake	Number and % of personnel controlling traffic with poor intake
Calories	9 (18.75 %)	3 (6.25 %)	36 (75 %)
Proteins	8 (16.66 %)	7 (14.43 %)	33 (69 %)
Water	26 (54.16 %)	15 (31.25%)	7 (14.58 %)

Substance abuse was also observed in the participants with 7 (14.58%) confessing smoking, 15 (31.25%) admitting alcohol consumption and 40 (83.33%) acknowledging tobacco consumption (Table 5).

Table 5: Prevalence of substance abuse in the study population

Type of substance abuse	Number of personnel controlling traffic confessed	Percentage of personnel controlling traffic confessed (%)	Number of personnel controlling traffic not confessed	Percentage of personnel controlling traffic not confessed (%)
Smoking	7	14.58	41	85.41
Alcoholism	15	31.25	33	68.75
Tobacco consumption	40	83.33	8	16.66

Pre-existing nutrition knowledge assessment: It was found that although 39 (81.25%) participants understood the importance of healthy and nutritious food, only 21 (43.75%) participants knew what consisted of a balanced meal. Their knowledge about specific nutrients was also gauged and it was noted that only 20 (41.66%), 7 (14.58%), and 4 (8.33%) of the participants were aware about the importance of common nutrients like calcium, iron and vitamins respectively. And an even lesser strata of 11 (22.91%), 5 (10.41%), 2 (4.16%) participants respectively knew the food sources of the common nutrients- calcium, iron and vitamins.

The prospective pilot study thus conducted is one of the very few studies that addressed all aspects of the nutritional status of personnel controlling traffic, overcoming the shortcomings of various studies of the past that greatly neglected the role of nutrition in their health status assessment. It was found that despite the majority (75%) consuming fewer calories than required, a very large proportion (68.75%) of the personnel controlling traffic were either overweight or obese, which is consistent with the result of a study conducted by Haralkar and Gite (2018), wherein it was found that obesity affected 63.16% of traffic policemen in Solapur city, Maharashtra. A similar study by Satapathy et al. (2009) reported a slightly lower prevalence (46.8%) of overweight and obesity in traffic police personnel of Berhampur city, Odisha. The problem of obesity found in our study can be correlated with the finding of their unhealthy eating patterns, high frequency of outside food consumption, poor nutritional knowledge, long standing hours and substance abuse. The biochemical assessment of the personnel controlling traffic was also found to be alarming, with the most affected parameters being lipid profile (95.83%) and SGOT, SGPT and LDH (56.25%), which, apart from long periods of exposure to air pollutants and unhealthy dietary patterns, can be corresponded to the high prevalence of obesity (68.75%) and substance abuse like tobacco consumption (83.33%) and alcohol consumption (31.25%). The aforementioned findings of substance use are slightly deviant from the findings of a study by Kumar Sahu and Mollick (2023), which records a prevalence of tobacco consumption in 51.7% and alcohol consumption in 46.5% of the traffic police personnel studied in Nagpur division, Maharashtra. The findings of various studies, including the prevalence of 29.6% respiratory issues among traffic police personnel in Nashik by Bandopadhyay et al. (2018), as well as the prevalence of gastric issues in 40.87% and bone-related issues in 62.65% of traffic police personnel in Ahmedabad by Prajapati et al. (2015), are majorly congruent with our study's results, which found respiratory, gastrointestinal and bone-related issues presence in 25%, 33.33% and 43.75% of the study population, respectively. These findings can be attributed to their poor lifestyle and nutrition, along with excessively long standing hours in a highly polluted environment. The study was thus able to highlight the nutritional status of personnel controlling traffic with a more comprehensive approach, considering all aspects rather than just one.

CONCLUSION

The study highlighted the nutritional status of traffic controllers of Delhi, most of whom had an undeniable need of nutritional counseling. Nutritionally, they were not consuming an appropriate amount of calories (81.25%)

and proteins (83.34%) and had too much of a gap between their meals, which is very unhealthy. They also resorted to unhealthy quick snacks during their work hours when proper meal break was not provided. Water intake was also not appropriate in many of them (45.84%).

They faced a couple of health problems, the most common being bone-related (43.75%) which can be owed to their long standing hours and overweight/obese conditions found in the majority of them. Other issues included: gastrointestinal issues (33.33%) and respiratory issues (25%). Their biochemical tests also showed abnormal parameters with their lipid profile being the most affected (95.83%).

It was also found that only 50% of the participants felt fresh/ energetic during their work hours, which calls for immediate attention to alter their work culture. Many of the participants also disclosed being subjected to substance abuse.

Their nutritional knowledge was also not satisfactory, which reiterates the need for proper counseling with the hope of improving the health and nutritional status of the traffic controllers who work hard day in and day out for the general public.

REFERENCES

Al-Alawi, R. (2009). Web-based intelligent traffic management system. In *Proceedings of the World Congress on Engineering and Computer Science 2009* (Vol. I, pp. 1-3). San Francisco, USA: IAENG.

Almale, B. D., Gokhe, B. S. S., Suryanswanshi, S. R., Vankudre, A. J., Pawar, K. V., & Patil, R. B. (2015). Health profile of Mumbai police personnel: A cross-sectional study. *Indian Journal of Forensic and Community Medicine*, 2, 87-90.

Bandopadhyay, A., Bandopadhyay, S., Lele, P., & Patil, R. N. (2018). A cross-sectional study to assess respiratory, eye, and ear health problems among traffic police personnel in Nashik city. *Journal of Clinical Diagnosis and Research*, 12, 1-5.

Chattopadhyay, B. P., Alam, J., & Roychowdhury, A. (2003). Pulmonary function abnormalities associated with exposure to automobile exhaust in a diesel bus garage and roads. *Lung*, 181, 291-302.

Haralkar, S. J., & Gite, R. N. (2018). Study of socio-demographic factors and morbidity profile of traffic policemen in Solapur city of Maharashtra. *International Journal of Community Medicine and Public Health*, 5, 122-128.

Karmacharya, R. M., Prajapati, L., & Rai, S. (2019). Risk assessment of varicose veins among the traffic police of Kathmandu Metropolitan City, Nepal. *Indian Journal of Vascular and Endovascular Surgery*, 6, 107-109.

Kumar, S. S., Sheelaravinder, S., Maheshkumar, K., & Dilara, K. (2015). Cardio dynamic response to cold pressor test in traffic policemen in Chennai city. *IOSR Journal of Dental and Medical Sciences*, 14, 28-30.

Kumar Sahu, P., & Mollick, F. (2023). Health Condition of Traffic Police Personnel in Nagpur Division of Maharashtra, India. *The Anthropologist, 52*(1-3), 1–7.

Longvah, T., Ananthan, R., Bhaskarachary, K., & Venkaiah, K. (2017). *Indian Food Composition Tables*. Hyderabad, Telangana: National Institute of Nutrition.

Makarani, M. A., Bhardwaj, G., Singh, J., & Narwal, A. (2016). An exploratory study to assess the effect of air pollution on respiratory status among traffic police personnel in selected areas of Pune city. *International Journal of Nursing Sciences and Practice*, 1, 9-15.

Makwana, A. H., Solanki, J. D., Gokhale, P. A., Mehta, H. B., Shah, C. J., & Gadhavi, B. P. (2015). Study of computerized spirometric parameters of traffic police personnel of Saurashtra region, Gujarat, India. *Lung India*, 32, 457-461.

Pi-Sunyer, F. X. (2002). The obesity epidemic: Pathophysiology and consequences of obesity. *Obesity*, 10(S12).

Prajapati, P., Modi, K., Rahul, K., & Shah, A. (2015). A study related to effects of job experience on the health of traffic police personnel of Ahmedabad city, Gujarat, India. *Indian Journal of Industrial Medicine and Safety*, 2, 127-133.

Radhakrishna, V., Rajagopal, Y., Sunilkumar, S. R., Khazi, S., Vishwakarma, V., & Haran, A. (2016). Health status of traffic police personnel: A cross-sectional study. *Journal of Medical Science and Clinical Research*, 4, 15075-15079.

Ranganadin, P., Chinnakali, P., Vasudevan, K., & Rajaram, M. (2013). Respiratory health status of traffic policemen in Puducherry, south India. *International Journal of Current Research and Review*, 5, 87-91.

Raval, A., Dutta, P., Tiwari, A., Ganguly, P. S., Sathish, L. M., Mavalankar, D., et al. (2018). Effects of occupational heat exposure on traffic police workers in Ahmedabad, Gujarat. *Indian Journal of Occupational and Environmental Medicine*, 22, 144-151.

Satapathy, D. M., Behera, T. R., & Tripathy, R. M. (2009). Health status of traffic police personnel in Brahmapur city. *Indian Journal of Community Medicine*, 34, 71-72.

Sancini, A., Caciari, T., Andreozzi, G., Scimitto, L., Schifano, M. P., Giorgio, V. D., et al. (2010). Respiratory parameters in traffic policemen exposed to the urban population. *European Journal of Inflammation*, 8, 157-163.

Shihurkar, R., Devadass, P. K., Manjunath, K. H., & Bagali, P. G. (2005). Chronic lead poisoning consequent to occupational exposure in traffic police personnel of Bangalore city. *VCFL Sciences Journal*, 1, 16-26.

Shrestha, H. S., Nepal, O., Khanal, K., & Kapoor, B. (2015). A cross-sectional study of lung functions in traffic police personnel at work in Kathmandu Valley, Nepal. *Annals of Clinical Chemistry and Laboratory Medicine*, 1, 42-48.

Siddhu, A., Singh, K., Bhatia, N., & Gupta, S. (Eds.). (2017). *Technical Series 6 'Compilation of Food Exchange List'*. New Delhi: Global Books Publishers. ISBN: 978-93-80570-518.

Sridher, S., Thulasiram, S., Rishwanth, R., Sakthivel, G., Rahul, V., & Maheswari, U. R. (2017). Health status of traffic police personnel in Chennai city. *Public Health Reviews: International Journal of Public Health Research*, 4, 98-103.

Sydbom, A., Blomberg, A., Parnia, S., Stenfors, N., Sandstorm, T., & Dahlen, S. E. (2001). Health effects of diesel exhaust emissions. *European Respiratory Journal*, 17, 733-746.

Taggart, S.C. (1996). Asthmatic bronchial hyperresponsiveness varies with ambient levels of summertime air pollution. *European Respiratory Journal*, 9, 1146-1154.

Tambe, N. N., Singh, V., & Narang, K. (2012). A prevalence study of risk factors for chronic diseases among police personnel in a metropolitan area. *Journal of Recent Trends in Science and Technology*, 5, 61-63.

WHO Western Pacific Region. (2021). Obesity and overweight: Fact sheet. Retrieved from https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight.