

A study of noise pollution and its adverse effects on Traffic Policemen of Amravati City, Maharashtra, India

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Abstract

Noise pollution is considered as one of the main problems of urban communities, which has many hazardous effects on the urban environment and may result in a great deal of costs on the society and the vehicular traffic can be considered as the main source of noise pollution. Noise pollution is a significant environmental problem in rapidly developing cities. Traffic noise is probably the most rigorous and pervasive type of noise pollution. For the study of noise pollution and its impact on traffic policemen health, five different traffic areas of Amravati city were studied. The Physiological and Psychological effects were observed on traffic police health, related to vehicular pollution.

Keywords: Noise pollution, Human health, Policemen, Traffic noise, Physiological and psychological Effects.

Introduction

Noise generated from vehicular traffic is a major source of environmental pollution. Despite attempts to regulate it, noise pollution has become an unfortunate fact of life worldwide. It will continue to increase in magnitude and severity because of population growth, urbanization and the associated growth in the use of increasingly powerful, varied and highly mobile sources of noise. It will also continue to grow because of sustained growth in highway, rail and air traffic, which remain major sources of environmental noise [1]. Traffic noise considers the most important type of noise pollution than other

types in developing areas. People in urban areas are much more affected by such pollution than small cities, small towns close to the main roads are also victims of this problem [2].

Besides with the growing level of air and water pollution, road traffic noise pollution has been recognized rising as a new threat to the inhabitants of cities. The urban environmental quality of developing countries, cities has been deteriorated by an unlimited increase of vehicles, infrastructure and population. Consequently, the continuous increased intensity of traffic noise level due to the population has degraded urban quality of life [3]. Urbanization and corresponding increase in number of vehicles in metropolitan cities, pollution is increasing at an alarming rate. Main areas of concern are related to air and noise pollution. More than 70% of total noise in our environment is due to vehicular noise [4].

Methodology

Study Area :Amravati is well developed city with increase in vehicular traffic due to population growth and development. For the study of noise pollution and its impact on human health, different traffic area like Rajkamal square, Irvin square, Main Bus Stand, Panchvati square, Shegaon Naka were selected in Amravati city. This study was based on data obtained from both primary and secondary sources. The techniques employed to collect the primary data are field survey, questionnaire and personal observation. Questionnaire was prepared on the basis of physical, psychological impact of noise and effect of air pollution on traffic policemen and women.

Samples: During the study about 50 traffic policemen and women were interviewed from the different traffic areas near Rajkaml square, Irvin square, Main Bus stand, Panchvati square and Shegaon Naka. For the study two types of questionnaire has been used to collect the data.

The questionnaire which has been used in this study is filled by the traffic police both male and female of the different traffic areas, which are suffered by noise pollution. The questionnaires has been used to collect the data about the Physiological impact and Psychological impact on human health. Significant amount of data has been collected regarding the impact on human health through face to face interview. The last and best source of primary data was collected by information and personal observation by fix questionnaire (see. Supplementary 1).

Noise pollution through automobile and road construction activities was measured during different times with the help of Noise Level Meter [center (325) IEC651type-II].

Result and Discussion

Environmental pollution takes place due to higher concentration of air pollutant as well as noise pollution, which cause adverse effect on human health. In the present work, noise pollution measurement from different traffic areas, signals, crowdy area and its physiological and psychological effects on policemen and women was observed and data was collected with the help of noise level meter and questioner. The results are summarized in Table 1 and figure No. 1 to 6.

Table 1: Noise pollution by traffic areas. (Mean values of data collected during June to December 2021)

Areas	Day time		Night time	
	Maximum	Minimum	Maximum	Minimum
Rajkamal square	84.7 dBA	68.4 dBA	82.1dBA	65.0 dBA
Irvin square	83.3 dBA	62.7 dBA	85.5 dBA	62.5 dBA
Panchvati square	81.2 dBA	65.7 dBA	83.6 dBA	64.6 dBA
Shegavnaka	75.5 dBA	64.0 dBA	79.6 dBA	60.5 dBA
Bus stop	85.0 dBA	61.8 dBA	77.4 dBA	65.4 dBA

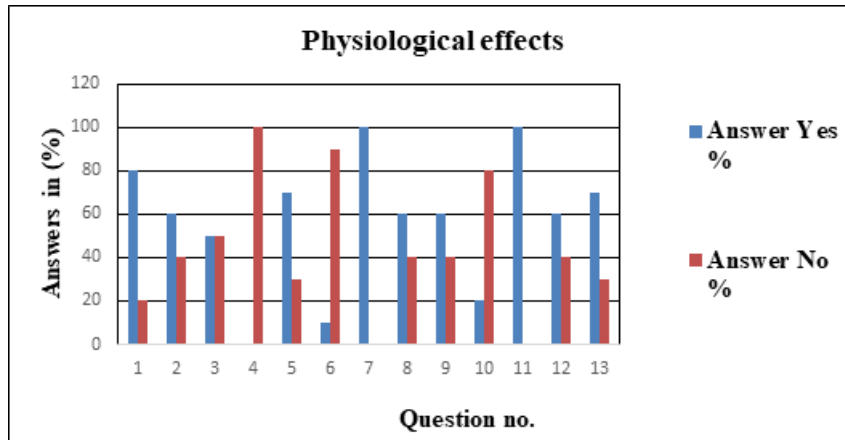


Fig. 1: Physiological effects on traffic policemen observed in traffic areas

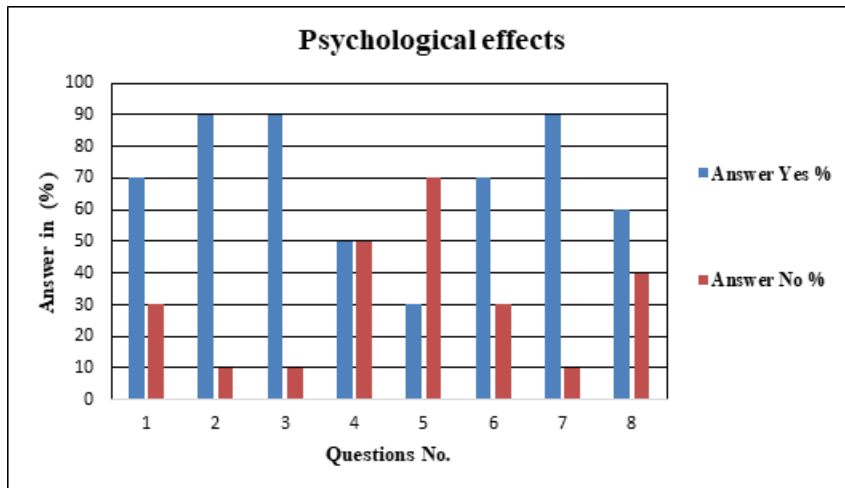


Fig. 2: Psychological effects on traffic policemen observed in traffic areas

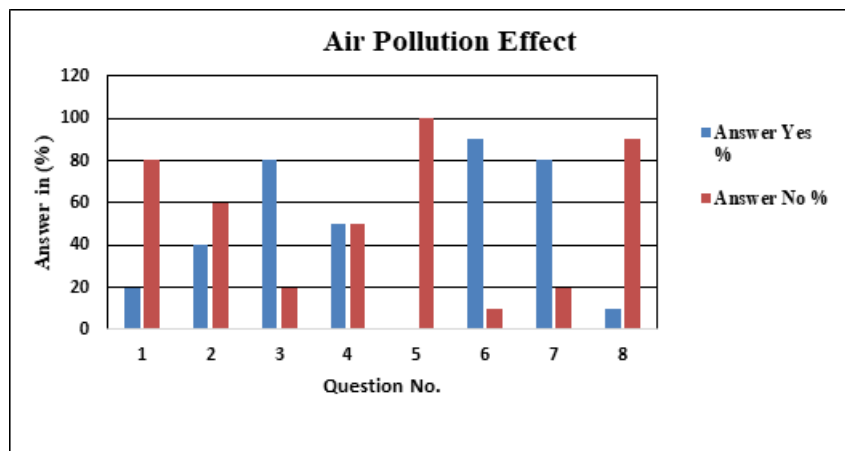


Fig. 3: Effect of Air pollution on traffic policemen observed in traffic areas

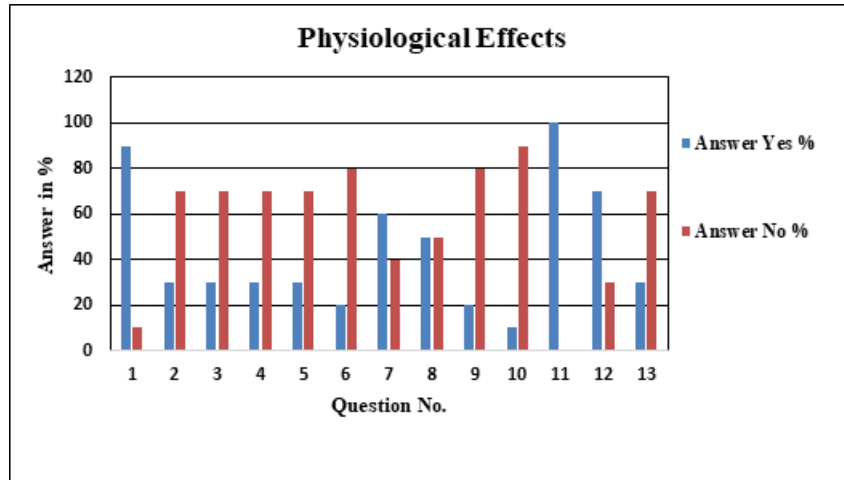


Fig 4: Physiological effects on traffic police (Women) observed in traffic areas

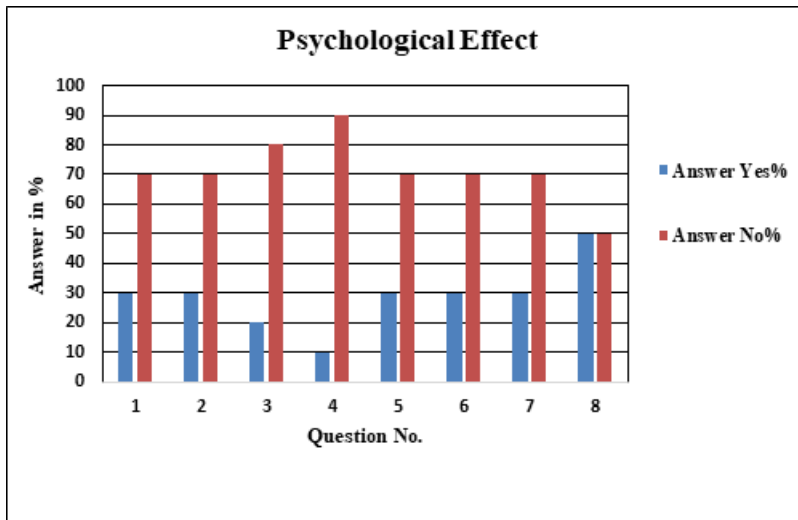


Fig 5: Psychological effects on traffic police (women) observed in traffic areas

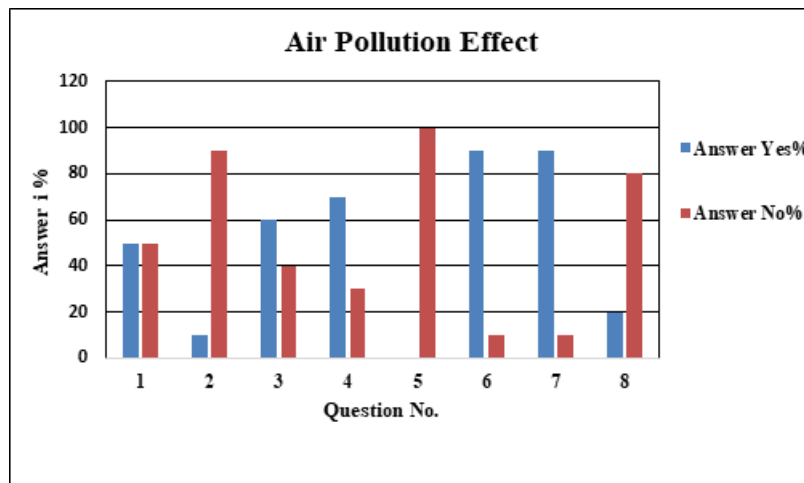


Fig. 6: Effect of Air pollution on traffic police (women) observed in traffic areas

This imperial study has based on questioner method. In this survey, about 50 male and female traffic policemen were interviewed personally. Respondents were asked to answer about the health problems faced by them due to noise and air pollution. They were asked to answer in two categories that are Yes and No. Following paragraph describe the results obtained by data analysis of the responses collected through questionnaire from the traffic policemen on the selected locations about the effects of noise pollution on them.

Unwanted sound or sound above 55 db is known as noise pollution. Effect of long-term exposure to noise pollution has an adverse impact on human health. Evidence from the literature suggests that sleep-apnoea, stress, and cardiovascular disease are related to the high level of sound. Poor concentration is commonly observed in students caused due to noise pollution [5].

The traffic policemen was found highly affected by respiratory problem was 80%, dizziness was 60%, suppression of immune system was 70%, fatigue was 100%, fluctuation in blood pressure was 20%, mental disorientation was 90%, interference during communication was 50%, feels like decreasing mental capability was 30%, emotionally disturb 70% and sleeping disturbances was 90%.

The traffic policemen in metropolises are the most affected groups exposed to this dangerous factor during their working hours and in their leisure time. The noise dose received by this group as 88 dB and in some cases it has been increased up to even 100 Db [6]. Sudden and unexpected noise has been observed to produce market changes to the body, such as increase in blood pressure, increase in heart rate, and muscular contraction. Moreover, digestion, stomach contraction and flow of saliva and gastric juices all get stop. These changes fortunately wear off as a person becomes accustomed to the noise [7].

It was found that, male and female were highly affected physiologically and psychologically by noise pollution because noise pollution from traffic areas was always greater than desirable limit in residential area. Noise

induces social and behavioral effects, notably annoyance and sleep disturbance; from a medical point of view, the effects of noise on human health are also well known: hearing impairment, speech intelligibility, physiological dysfunctions, mental illness, performance reduction, and cardiovascular diseases [8,9].

Male loose physical control more i.e. 50%, fluctuation in blood sugar level was 10%, temporary deafness was 60%, and interference during communication was 50%. Females were highly affected by noise pollution. Suppressed mentally or stress can feel 30%, suddenly increased in heartbeats was 50%, reduce working efficiency was 20% and aggressiveness was 50%.

The traffic policemen were found affected by respiratory problem was 20%, pulsation/pulse rate was 40%, sneezing and coughing was 80%, disturbance during communication was 50%, irritation of eye was 90%, skin problem was 80%, blood pressure was 10%. The traffic policewomen were found affected by respiratory problem was 50%, pulsation/pulse rate was 10%, sneezing and coughing was 60%, disturbance during communication was 70%, irritation of eye was 90%, skin problem was 90%, blood pressure was 20%.

In several countries in the past decades have shown that noise has adverse effect on human health, living in the close proximity of busy roads and highways [10]. The potential health effects of noise pollution are numerous, pervasive, persistent, medically and socially significant. Noise produces direct and cumulative adverse effects that impair health and that degrade residential, social and working environments with corresponding real (economic) and intangible (well-being) losses. High noise levels can contribute to cardiovascular effects in humans and an increased incidence of coronary artery disease. In animals, noise can increase the risk of death by altering predator or prey detection and avoidance, interfere with reproduction and navigation, and contribute to permanent hearing loss [11]. The effect of noise on the cyclist policeman was less than other groups because of their high-quality motorcycles and their use of helmet. As a solution to all the harmful problems caused by the traffic noise, it is necessary for

these people to undergo periodical checkups to eliminate late diagnosis of hearing capability loss and problems in the mental and nerve systems [12].

Pathak, et al. [13] in 2008 studied a vegetation belt of different width and height. Then they monitored the noise level and found that area without vegetation belt was highly polluted as compare to area with vegetation belt.

Main limitation for plants to function as scavenger of pollutants are- Plants interaction to air pollutants, sensitivity to pollutants, climatic conditions and soil characteristics. While making choice of plants species for plantation in green belts, due consideration has to be given to the natural factor of bio-climate. Character of plants mainly considered for affecting absorption of pollutant gases and removal of dust particles. The plants can help to reducing noise pollution in the following ways: a) the sounds that are produced by the leaves helps muffle the noise. b) Hedging makes a thick front of the wall and blocks the noise. c) Thick tree trunks create a sound-absorbing buffer zone. Some species of plants which helps to reduce air and noise pollution are

Azadirachta indica (Neem tree), *Dalbergia sissoo* (Sheesham), *Madhuca indica* (Mahua), *Mangifera indica* (Mango), *Bougainvillea Spectabilis* (Booganbel), *Nerium indicum* (Kaner), *Ficus benghalensis* (Banyan), *Ficus religiosa* (Peepal) [14].

Conclusion

A questionnaire survey was carried out in Amravati city of Maharashtra state to investigate the adverse effects of vehicular traffic noise on exposed individuals. According to noise pollution (Regulation and control) rules 2000, it must be under desirable limit. But it was found 84.7dB and above during day time of survey period, which is very harmful to traffic policemen. Due to continuous hearing of high noise, traffic policemen and women have to suffer mainly from sleeping disturbance, fatigue, irritation and respiratory problem

which were reported by respondents. Vehicular road traffic was major source of noise pollution which creates annoyance among individuals. To reduce the noise and air pollution in urban area of Amravati city, plantation of native trees near the roadside must be compulsory. Shop owner in market area and house owner in residential area must be adopted atleast two plant species according to height and growth of plant, and space available for plantation and do compulsory to maintain it for five years.

Conflicts of interest: The author stated that no conflicts of interest.

References

1. Goines L. and L. Hagler (2007) Noise Pollution: A Modern Plague, *South Med J*, 100, pp 287-94.
2. Jadaan K., A. Al-Dakhlallah, J.Goussousand and H. Gammoh, (2013) Evaluation and Mitigation of road traffic noise in Amman, Jordan, *Journal of Traffic and Logistics Engineering*, Vol, 1, pp 51-53.
3. Keerthana, R. G., N. Singhvi, V. Chitravel, S. Saranya and T. Kannan. (2013) An Analysis of noise pollution in Tirupur city. *Scholars Journal of Engineering and Technology (SJET)*; vol 1(3),pp 154-168.
4. Calixto A., F.B. Diniz and P.H.T. Zannin (2003) The statistical modeling of road traffic noise in an urban setting, *Cities*, 20, pp 23-29.
5. Murlidharan L., Gaur S. and Murlidharan C. (2018) A study on noise pollution in mumbai, india and its adverse impact on human health, *International Journal of Research and Analytical Reviews*. 5(3) pp 505-508.
6. Ingle, S.T; B.G. Pachpande, N.D. Wagh and S.B. Attarde (2006): Noise exposure and hearing loss among the traffic policemen working at busy streets of jogaon urban centre. *Transport. Res*, 10, pp 69-75.
7. Broadbent, D. (1957): Noise in retention in annoyance, performance and mental health *JAcust.Soc.Am.* -68; pp 15-17.
8. Kim M., S.I. Chang, J.C. Seong, J.B. Holt, T.H. Park, J.H. Ko and J.B. Croft (2012) Road Traffic Noise: Annoyance, Sleep Disturbance, and Public Health Implications, *Am J Prev Med*, 43, pp 353-360.
9. WHO (World Health Organization) (2011) Burden of disease from environmental noise: Quantification of healthy life years lost in Europe, *WHO Regional Office for Europe*.

10. Pirrera S., E.D. Valck and R. Cluydts (2010) Nocturnal road traffic noise: A review on its assessment and consequences on sleep and health, *Environ Int*, 36, pp 492-498.
11. Reddy Sudhakar M.(2020) Noise pollution and human health, *Journal of Gujarat Research Society*. 22(1), pp 205-209
12. Omidvari M. and J. Nouri (2009): Effect of noise pollution on Traffic Policemen, *Int. J. Environ. Res.* 3(4) pp 645-652.
13. Pathak, V., B. D. Tripathi, and V. K. Mishra (2008) Dynamics of traffic noise in a tropical city Varanasi and its abatement through vegetation, *Environ. Monit. Assess.*, vol. 146, no.1-3, pp. 67-75. 14. Taj Trapezium Zone Preparation of Vision Document, First Draft Report, Volume I, July 2018. (http://www.uppcb.com/pdf/plantation-report-Agra-city_100619.pdf)

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QUESTIONNAIRE (SEE. SUPPLEMENTARY 1).

Physiological effect

- 1) Do you feel any effect on respiratory system / some problem while respiration?
(अतिध्वनीप्रदूषणामुळेश्वासासंबंधीचात्रासजाणवतोका?)
Yes/हो or No/नाही
- 2) Do you feel like dizziness? (गरगरल्यासारखेवाटतेका?)
Yes/हो or No/नाही
- 3) Do you loose physical control due to noise?(तुमचे शारीरिक नियंत्रण कमी झाल्याचे वाटतेका?)
Yes/हो or No/नाही
- 4) Do you feel like Vomiting due to noise?(अतिआवाजामुळे उलटी किंवा मळमळ जाणवतेका?)
Yes/हो or No/नाही
- 5) Do you feel lack of immune system?(प्रतिकारशक्ती कमी झाल्यासारखे वाटतेका?)
Yes/हो or No/नाही
- 6) Do you feel that blood sugar level increase or decrease?
(रक्तातील साखरेचे प्रमाण कमी किंवा जास्त झाले आहे?)
Yes/हो or No/नाही
- 7) Do you feel like fatigue?(थकवा आल्यासारखे वाटतेका?)
Yes/हो or No/नाही
- 8) Do you feel that your heartbeat is suddenly increased due to noise?(जास्त आवाजामुळे हृदयाचे ठोके वाढल्याचे जाणवतेका?)
Yes/हो or No/नाही
- 9) Do you feel temporary deafness due to noise?(जास्त आवाजामुळे तुम्हाला तात्पुरते बहिरेपण जाणवतेका?)
Yes/हो or No/नाही
- 10) Do you feel increase in blood pressure due to noise?
(जास्त आवाजामुळे तुमचा रक्तदाब वाढतोका?)
Yes/हो or No/नाही

11) Do you feel worn out at the end of the day?(दिवसाच्याशेवटीतुम्हालाकंटाळाआलासारखावाटतोका?)

Yes/हो or No/नाही

12) During working do you feel excess of sweating?(कामकरतांनाजास्तघामयेतेका?)

Yes/हो or No/नाही

13) Is there any change in daily routine?(दररोजच्यानियमानुसारआणिराहण्याच्यास्थितीतकाहीबदलवाटतोका?)

Yes/हो or No/नाही

Psychological effect

1) From how many years are you working in traffic police?

(तुम्हीकितीवर्षांपासूनट्राफिकपोलीसमध्येनोकरीकरतआहात?)

2) Do you feel lack of Concentration?(एकाग्रताकमीझाल्यासारखीजाणवतेका?)

Yes/हो or No/नाही

3) Do you feel that mental disorientation at high noise level? (अतिआवाजामुळेगोंधळल्यासारखेवाटतेका?)

Yes/हो or No/नाही

4) Do you feel that working efficiency is reduced due to loud noise or continuous noise?

(मोठ्यावसततआवाजामुळेकार्यक्षमताकमीझाल्यासारखेवाटतेका)

Yes/हो or No/नाही

5) Do you feel interference during communication?(संवादकिंबाबोलचालसुरुअसतांनाअडथळाआल्यासारखेवाटतेका?)

Yes/हो or No/नाही

6) Do you feel like mental capability is reduced? (मानसिकक्षमताकमीझाल्याचेजाणवतेका?)

Yes/हो or No/नाही

7) Do you feel emotionally disturbed?(भावनिकव्यत्ययजाणवतेका?)

Yes/हो or No/नाही

8) In there any sleeping disturbances?(झोपेतव्यत्यययेतोका?)

Yes/हो or No/नाही

9) Do you feel that aggressiveness is increased?(स्वभावआक्रमणझाल्याचेवाटतेका?)

Yes/हो or No/नाही

Impact of air pollution on human health

- 1) Do you have respiratory problems? (तुम्हाला श्वसनाचा त्रास होतो का?)
Yes/हो or No/नाही
- 2) Do you feel you have increase in population/pulse rate? (तुम्हाला हृदयाचा दडपण असल्याचे जाणवते का?)
Yes/हो or No/नाही
- 3) Do you have trouble getting sneezing and coughing? (तुम्हाला शिंका आणि खोकल्याचा त्रास होतो का?)
Yes/हो or No/नाही
- 4) Do you have some disturbance during communication? (तुम्हाला बोलतांना त्रास होतो का?)
Yes/हो or No/नाही
- 5) Do you use a mask at the time of working? (तुम्ही कामकाजाच्या वेळेला मास्क वापरता का?)
Yes/हो or No/नाही
- 6) Do you feel like irritation of eye? (डोळ्यात जळजळ होते का?)
Yes/हो or No/नाही
- 7) Do you feel that skin become dry? (त्वचा कोरडी झाल्यासारखी वाटते का?)
Yes/हो or No/नाही
- 8) Do you have problem of blood pressure? (तुम्हाला रक्तदाबाचा त्रास आहे का?)
Yes/हो or No/नाही