



Saaf Hawa Aur Naagrik
Clean Air And Citizen



Air Pollution Knowledge, Attitude and Practice (KAP) Survey in Delhi NCR



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Air Pollution Knowledge, Attitude and Practice (K.A.P.) Survey in Delhi-NCR

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PREFACE

Air pollution is increasing worldwide. According to IQAir's recent report, India ranks 5th among the world's top polluted countries. The cities with the highest pollution include Delhi-NCR.

Researches have reported, with evidence, that air pollution leads to death and impairment due to various diseases that affect the eyes, brain, lung, heart, skin, and kidneys.

Though many organizations are working to combat air pollution, there is still a lack of awareness among people regarding air quality. Those who are aware, don't have an attitude to practice air pollution control measures.

Air pollution continues to be a challenge in Delhi-NCR, affecting public health and prosperity. To work towards improving air quality and health of residents of Delhi-NCR, Lung Care Foundation has started work on a 2-year project, Project Saaf Hawa Aur Naagrik (S.H.A.N) supported by the Public Affairs Section at the U.S. Embassy, New Delhi.

As part of the project, to understand the current awareness on air quality-related issues among residents of Delhi-NCR, Lung Care Foundation in collaboration with Morsel Research and Development Pvt. Ltd. surveyed 1757 respondents across the Delhi-NCR (Delhi, Ghaziabad, Noida, Gurgaon, Faridabad)_region, especially in areas with vulnerable populations including urban slums. We divided Delhi into seven regions as per Delhi Parliamentary Constituencies. Eleven metro stations were selected from seven constituencies and four metro stations, one each from Ghaziabad, Noida, Gurgaon, and Faridabad. The selection criteria for the metro stations was that they were to be busy metro stations. The data was collected within the 500 meters to 1km vicinity from all metro stations, urban slums as well as from schools.

This survey has helped to obtain information on the extent of respondents' knowledge, attitude, and practices about air pollution. Based on the findings, an attempt will be made to sensitize the common citizen about air pollution and its harmful effects on health and quality of life. This project will equip citizens with the information they need to understand the problem and take reasonable steps to reduce it or minimize its effects, leading to a better quality of health and life.

About the Project SHAN

Project **Saaf Hawa Aur Naagrik** is an endeavor to sensitize the common man about air pollution and its harmful effects on health and quality of life. By increasing awareness among the citizens, we wish to improve their participation and engagement in Government and citizen-driven initiatives to clean the air and thus positively impact their health and wellbeing.

Through project SHAN, by using a multi-pronged communication strategy, we aim to reach out to schools, colleges, RWAs, and urban slums in Delhi-NCR. We will be sensitizing the local community through multi-lingual outreach material and in-person workshops.



SHAN in Urdu signifies prestige and honor. This name will help add to the responsibility of the target audience to work towards clean air with pride and commitment. While the project attempts to create awareness about the need for Clean Air (Saaf Hawa), it is essential to emphasize the need for active participation and the responsibility and dedication of each citizen (Naagrik) to work towards clean air.

Lung Care Foundation (LCF) is a social impact trust working towards "*Care & Cure of 2.6 Billion Lungs in India*" by developing lung health services and programs and advocating for clean air by highlighting the health ill-effects of Air Pollution, Dust, Smoking and Poor Lifestyles. LCF has organized health camps for over 2000 individuals, addressed 15000+ individuals in-person, reached millions of individuals through videos, created a network of passionate Doctors across India advocating for Clean Air, and created another network of B.E.S.T. School Clubs across India engaging thousands of school students and families to achieve clean air and better lung health.

Public Affairs Section, US Embassy, New Delhi effectively communicate U.S. foreign policy priorities and engages the Indian public to enhance their understanding of and support for the values and policies of the United States. It also increases mutual understanding between the people of the United States and the people of India through educational and cultural exchange that assist in the development of peaceful relations.

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KEY FINDINGS

Out of the 1757 Respondents Surveyed:

57.7% rated the air quality to be "Bad" or "Very Bad."

83.6% did not know about Air Quality Index or AQI.

92.2% were not aware of the difference between PM2.5 & PM10.

82.2% knew that air pollution has an impact on their health.

The most common organs affected by air pollution according to respondents were Lungs **76.5%**, Eyes **57.3%**, Skin **18.7%**, Heart **14.7%**, Brain **9.2%**, Kidney **7.1%**, Reproductive system **1.7%**.

92.2% did not know the closest air quality monitor in their area.

77.3% did not check the air quality regularly.

63.2% discuss air pollution at home/with friends.

60.6% did not use masks to protect themselves from air pollution.

42.6% thought that air quality had worsened in their city over the last 3-4 year

78.7% agreed to support the steps taken by the Government to reduce air pollution even though the action might cause inconvenience.



BACKGROUND

Air pollution consistently ranks among the top risk factors for death and disability worldwide. In 2017, air pollution was the fifth-highest mortality risk factor globally and was associated with about 4.9 million deaths and 147 million years of healthy life lost.¹

Air pollution accounts for 41% of global deaths from chronic obstructive pulmonary disease (C.O.P.D.), 20% of deaths from type 2 diabetes, 19% of deaths from lung cancer, 16% of deaths from ischemic heart disease, and 11% of deaths from stroke. Air pollution also contributes to communicable diseases (e.g., 35% of deaths from lower-respiratory infection).¹

Air pollution was the second leading risk factor as per Disability Adjusted Life Years (D.A.L.Y.s) attributable to risk factors in India, 2016. This risk factor encompasses both outdoor air pollution from a variety of sources as well as household air pollution that mainly results from burning solid fuels in the home for cooking and heat. Outdoor air pollution caused 6.4% of India's total D.A.L.Y.s in 2016, while household air pollution caused 4.8%.²

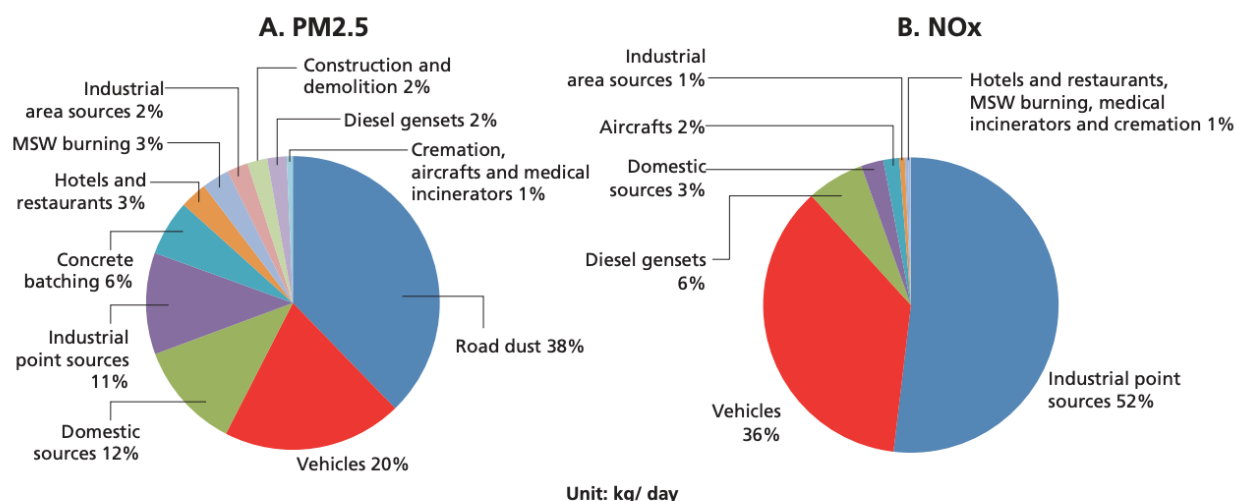
According to the **Global Burden of Disease Study 2017** - Of the total 480.7 million D.A.L.Y.s in India in 2017, 38.7 million or 8.1% were attributable to air pollution. Of the total D.A.L.Y.s attributable to air pollution in India in 2017, the largest proportions were from lower respiratory infections (29.3%), chronic obstructive pulmonary disease (29.2%), and ischaemic heart disease (23.8%), followed by stroke (7.5%), diabetes (6.9%), lung cancer (1.8%), and cataract (1.5%).³

A study funded by the World Bank Development Research Group was carried out in 1991-1994 to study the effects of air pollution. During the study period, the average total suspended particulate (T.S.P.) level in Delhi was approximately five-times the World Health Organization's annual average standard. Furthermore, the total suspended particulate levels in Delhi during this period exceeded the World Health Organization's 24-h standard on 97% of all days on which readings were taken.⁴

According to the **World Air Quality Report by IQAir, 2019**, based on Region & City PM_{2.5} Ranking. Of the world's top 30 most polluted cities during 2019, 21 are located in India. India (58.1 PM_{2.5} µg/m³) ranked fifth on the list of 98 countries in PM_{2.5} concentration behind Bangladesh and Pakistan. Delhi (98.6 PM_{2.5} µg/m³) is the top polluted capital city in the world, with its annual PM_{2.5} level nearly ten times the WHO target. Ghaziabad (110.2 PM_{2.5} µg/m³) topped the list of most polluted regional cities in Central and South Asia while Delhi ranks 4th, Noida 5th, and Gurgaon ranks 6th.⁵

As per Comprehensive Study on Air Pollution and Green House Gases (GHGs) in Delhi by I.I.T. Kanpur, the top four contributors to PM_{2.5} emissions are road dust (38 %), vehicles (20 %), domestic fuel burning (12 %) and industrial point sources (11%). The top four contributors to PM₁₀ emissions are road dust (56%), concrete batching (10%), industrial point sources (10%) and vehicles (9%).⁶

Figure 1: Emissions inventory – PM_{2.5} and NO_x ^{6, 7}



Air pollution is a major threat all over. There are studies and pieces of evidence on knowledge attitudes and practices related to air pollution. This survey was conducted so that we can get an insight into the awareness level of the respondents based on which we can formulate the steps for preventive measures by adopting various methods, including training, workshop, etc.

Despite efforts by government, private, not-for-profit, and educational entities to address the problem of poor air quality and reduce its impact on health, the problem continues. An informed populace is necessary for change; however, information regarding even the most basic efforts, effects, and solutions often does not reach critical sectors of the population. For information to filter to every section of the community, a well-structured and coordinated public education campaign is essential.⁸

This project will equip citizens with the information they need to understand the problem and take reasonable steps to reduce it or minimize its effects, leading to a better quality of health and life. This, in turn, will increase India's capacity to improve the health of its population, including the most vulnerable.⁸

OBJECTIVES

The objective of the survey was to gauge public awareness, perceptions/attitudes, and practices towards air quality in Delhi-NCR. Further, based on the findings to develop a comprehensive and innovative multi-pronged public education campaign to increase knowledge about air pollution among the target groups, leading to greater engagement by them in discussion related to air quality.



Morsel team conducting the survey



Morsel team conducting the survey



METHODOLOGY

Setting and Plan of Action: Survey was conducted in and around metro stations, bus stops, urban slums, schools.

1

Delhi was divided into 7 zones as per Delhi Parliamentary Constituencies.

2

11 Busy metro stations were taken from 7 Parliamentary Constituencies.

3

4 Busy metro stations from Ghaziabad, Noida, Gurgaon, and Faridabad (One from each).

4

The data was collected within the 500 meters to 1km vicinity from all metro stations.

5

Data from Seelampur (slum area), Samaypur Badli (slum area), Kirti Nagar (slum area) and area was also collected.

6

Data collection from 2 Schools.

7

1158 surveys were collected from Delhi while 599 surveys were conducted from Ghaziabad, Noida, Gurgaon, and Faridabad.

8

Total of 1757 surveys collected.



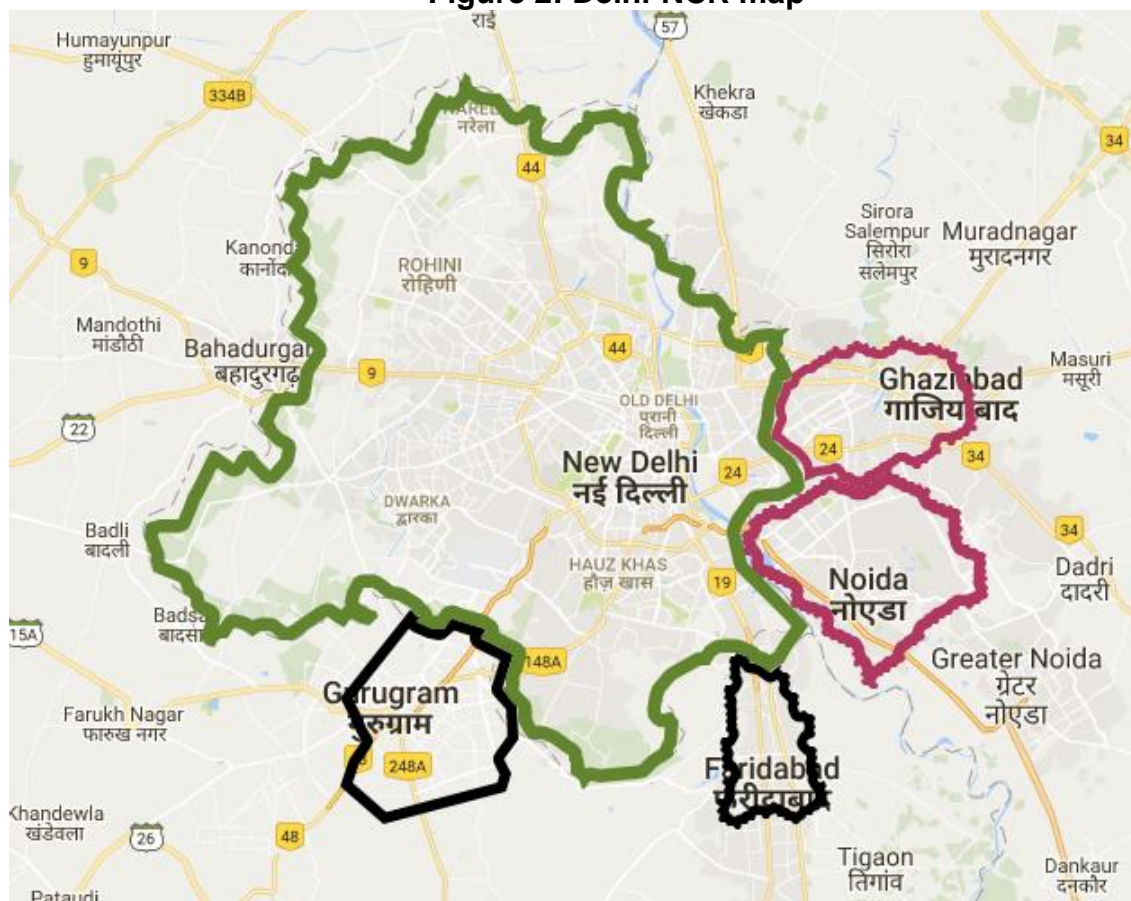
Table 1: Delhi and N.C.R. metro stations and the corresponding areas where the survey was conducted ⁹

AREA	METRO STATIONS
Chandni Chowk	Chandni Chowk + near Jama Masjid for Urdu speaking community
North East Delhi	Seelampur + urban slum
East Delhi	Laxmi Nagar Okhla N.S.I.C.
New Delhi	Rajiv Chowk Kirti Nagar + few Punjabi speaking populations + urban slum
North West Delhi	Mundka Samaypur Badli + urban slum
West Delhi	Janakpuri West + few Punjabi speaking populations
South Delhi	Chhattarpur Dwarka sector 21
Ghaziabad	Mohan Nagar
Noida	Botanical Garden
Gurgaon	Huda City Centre
Faridabad	Neelam Chowk Ajrona



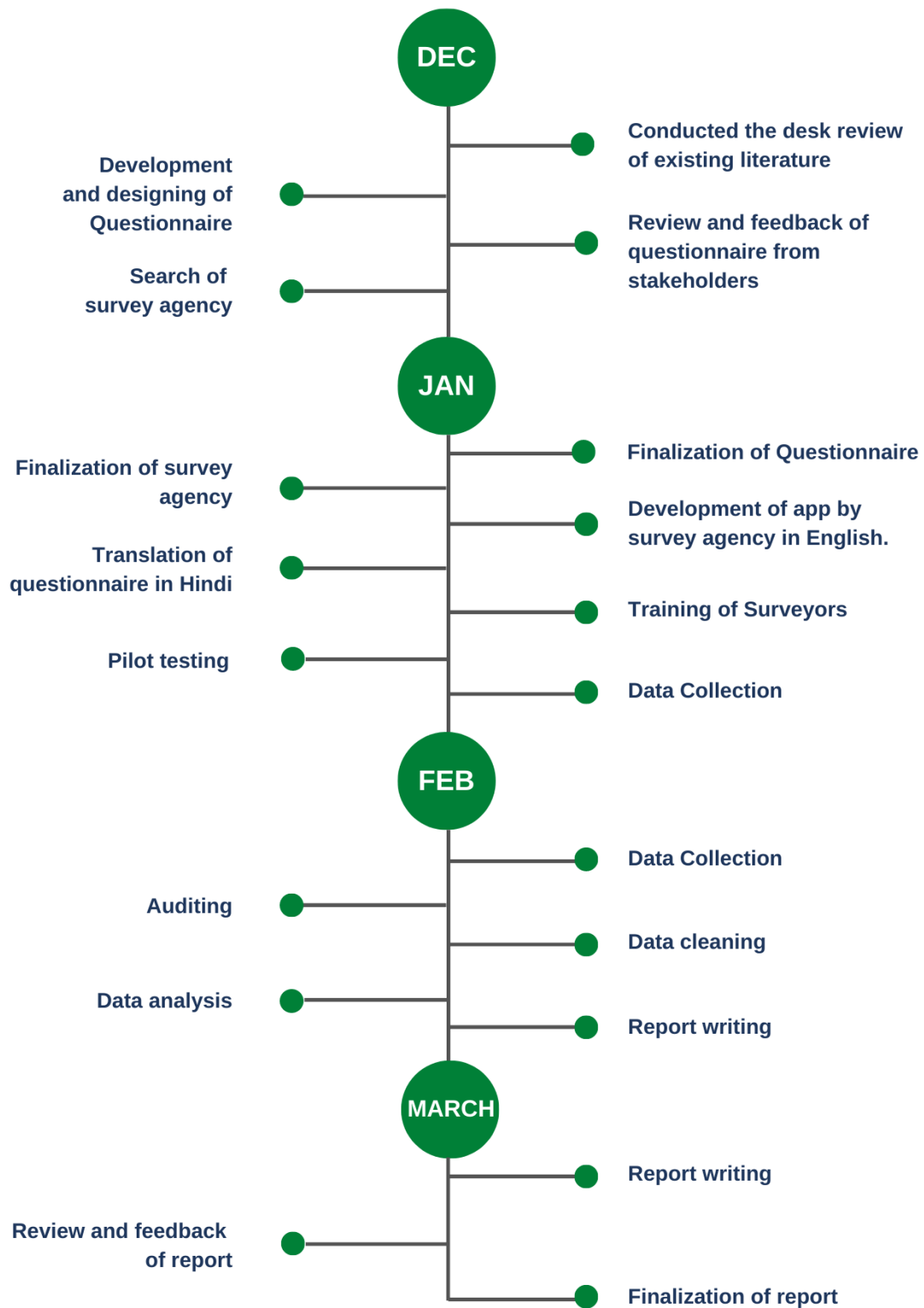
Morsel team conducting the survey



Figure 2: Delhi-NCR map ¹⁰

Survey Duration

Around three months were taken to plan and conduct the survey.



Respondents: We covered Students, youth, elderly, women, and men of all age groups ranging from 12 years to 93 years from Delhi, Ghaziabad, Noida, Gurgaon, and Faridabad.

Sample Size: 1828 respondents agreed to be part of the survey. Out of 1828, 71 did not complete the survey. The data was finally collected from **1757 respondents**

Training of Surveyors/Enumerators: Lung Care Foundation organized a full-day training of the surveyors.

Data collection and analysis: Data collection was done using the English and Hindi questionnaire on an app designed by Morsel Research and Development Pvt. Ltd.

The pilot testing of both the questionnaires was done to check the operational feasibility, the questions were then modified and changes were incorporated as per the objectives of the survey and understanding of the respondents. The corrected questionnaire was then used to collect data. The data on Socio-demographic characteristics, Knowledge, Attitude, and Practices related to air pollution was collected. Data was cleaned and analysis was done using Microsoft Excel and S.T.A.T.A. 14.

Ethical consideration and Confidentiality:

During data collection, the details of the survey were explained to the respondents. They were informed before giving consent for the survey. They were made aware of their rights to refuse and withdraw from the survey during any part of the interview. Consent was taken from respondents who were 18 years or above to conduct a survey as well as to click photographs that were taken during the survey so that it can be used in the survey report. In the case of school students, consent was taken from the Principal. All the respondents were informed that the Lung Care foundation will use the data or results that arise from this survey to create the report which will be shared in the public domain. They were assured that the name of the respondent, name of the students, the name of school responding to the questionnaire will not be used in the data analysis or final report published as an outcome of the survey.



Training of Surveyors by Lung Care Foundation's Team



On ground Audit by Lung Care Foundation's Team

RESULTS

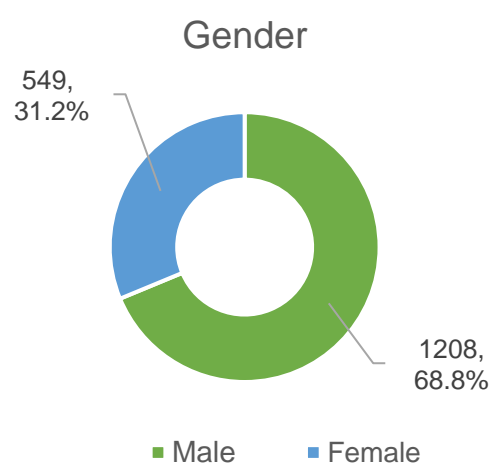
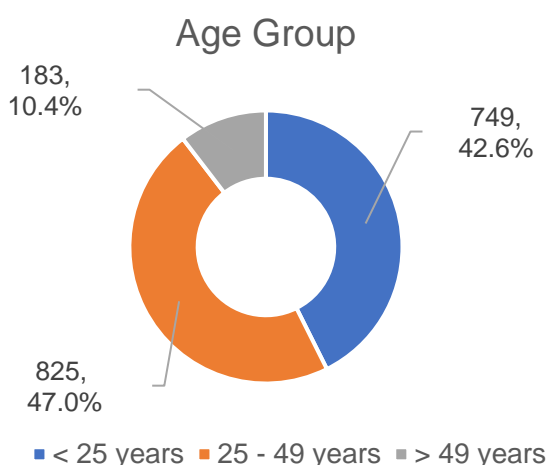
Socio-demographic characteristics.

1828 respondents agreed to be part of the survey. Out of 1828, 71 did not complete the survey. The data was finally collected from 1757 respondents

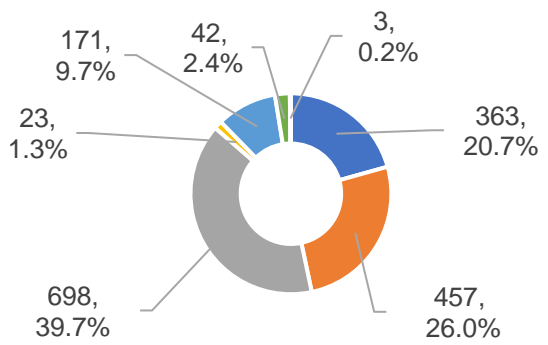
Out of 1757 respondents who were surveyed, 1208 (68.8%) were males, and 549 (31.2%) were female. 42.6%, 47%, and 10.4% belonged to the age groups of less than 25 years, 25 to 49 years, and greater than 49 years, respectively. The range of respondents' age was from 12 to 93 years. The mean age of respondents was 29.97, while the mean age of males was 30.51, and that of females was 28.77.

The most common language used by a participant in regular communication was Hindi (92.1%), followed by Punjabi (2.7%), others (2.4%), Urdu (1.4%), and English (1.4%).

20.7% of respondents have never been to school or been for very little time. Maximum respondents 698 (39.7%) out of 1757 have acquired education between 9th to 12th. The question on the family's monthly income was optional. Based on the responses, more than half of the respondents (52.2%) had a monthly income of less than ₹25,000 while (36%) did not share the income.

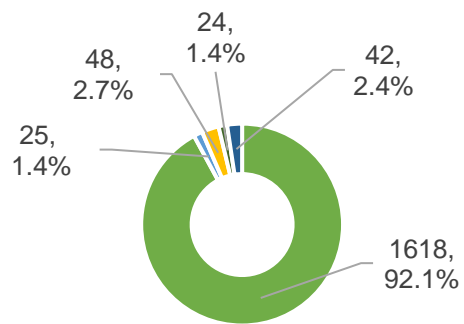


Educational Status



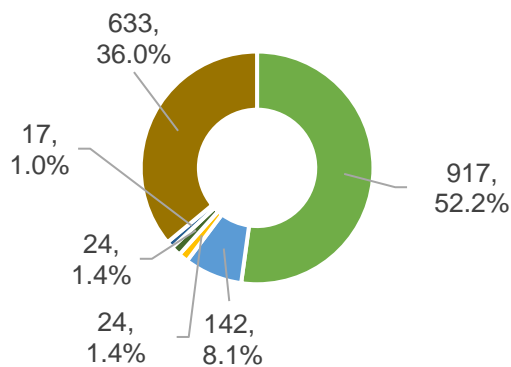
- Never Been To School
- Upto VIII
- IX TO XII
- Diploma
- Graduation
- Post Graduation

Languages Used For Communication



- Hindi
- Urdu
- Punjabi
- English
- Others

Monthly Family Income



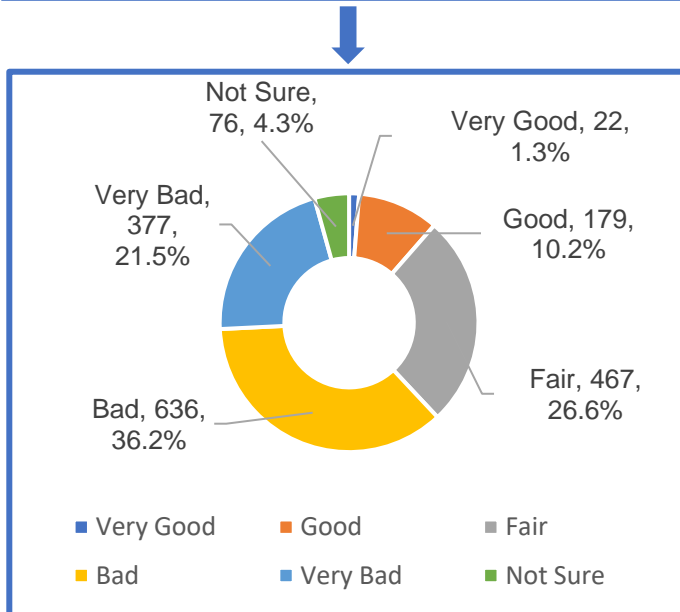
- < 25,000
- 25,000 to 50,000
- 50,001 to 75,000
- 75,001 to 1 lakh
- > 1 Lakh
- Don't want to share



Knowledge Related

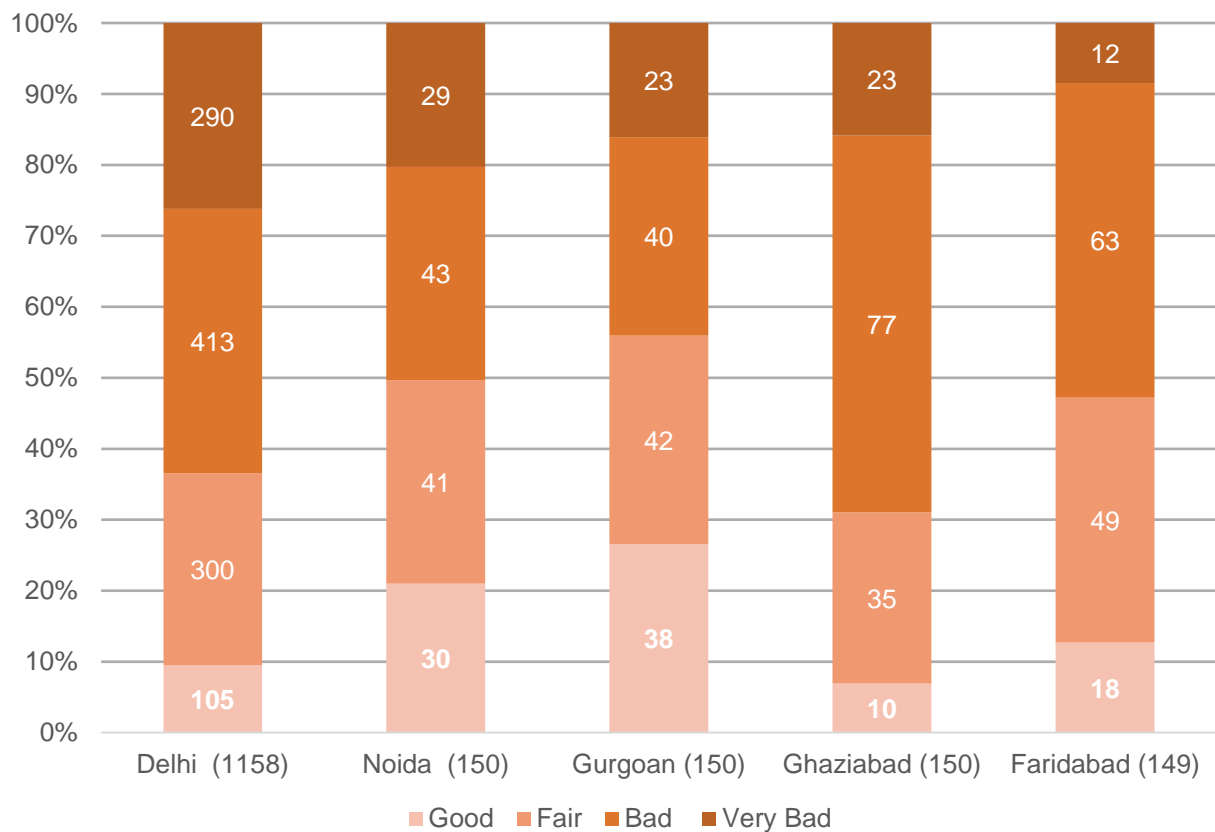


How will you rate your city's air quality?

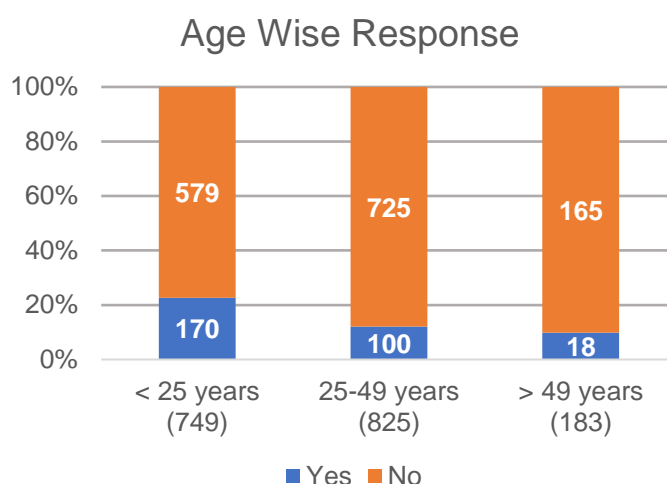
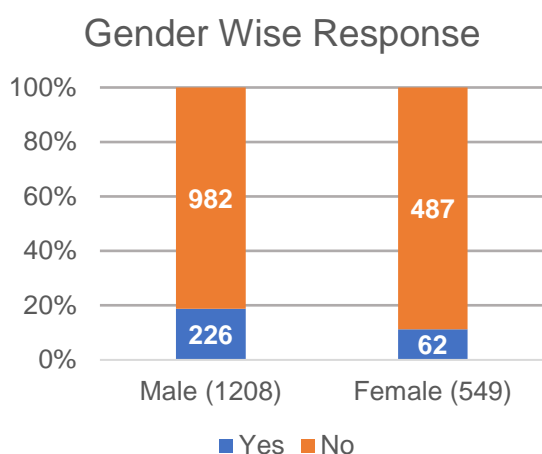
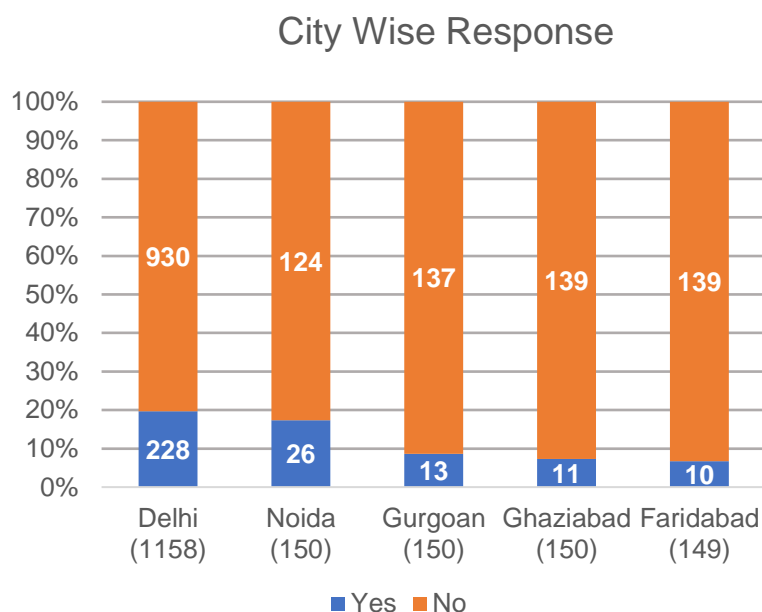
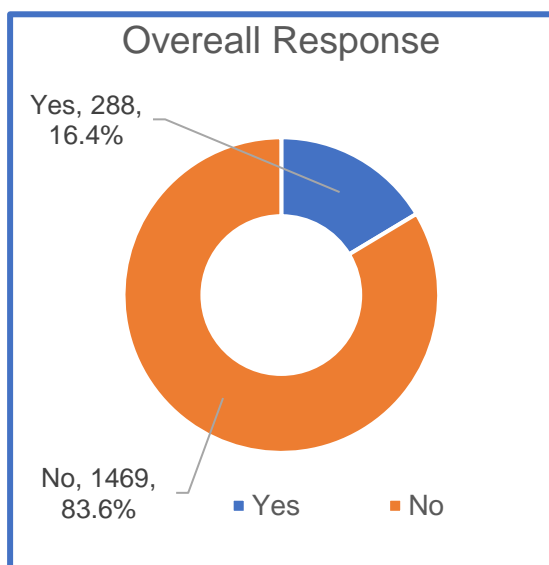


More than half (57.7%) of the respondents rated the air quality in their city as bad (36.2%) or very bad (21.5%).

City Wise Response



Are you aware of the Air Quality Index (AQI)?

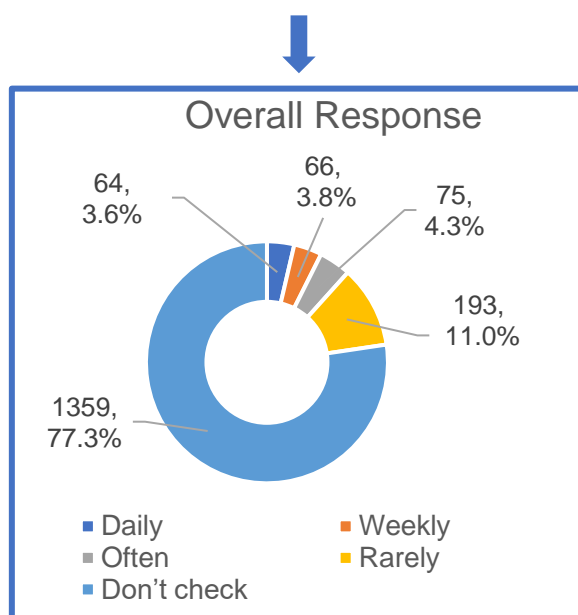


Response Highlights:

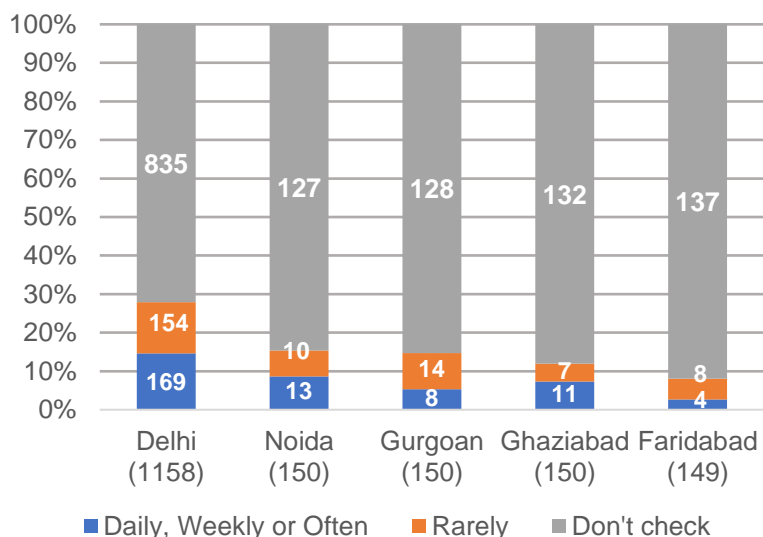
- **83.6%** of total respondents were unaware about AQI.
- **93%** of respondents in Faridabad & Ghaziabad, **91%** of respondents in Gurgaon, **83%** of respondents in Noida and **80%** of respondents in Delhi were unaware of AQI.
- **89%** Females and **81%** Males were unaware about AQI.
- **90%** of respondents above 50 Years, **88%** of respondents between 25 – 49 Years and **77%** of respondents less than 25 Years were unaware of AQI.



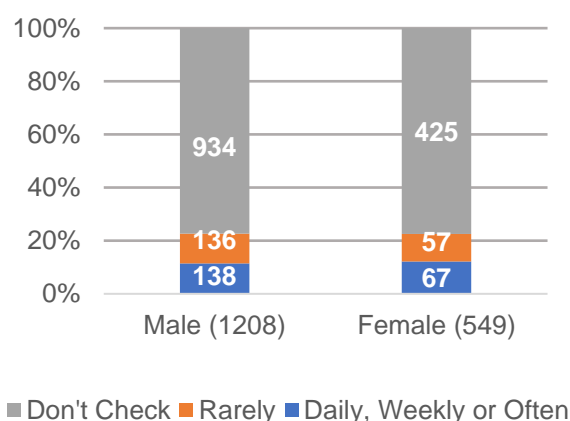
How frequently do you check air quality?



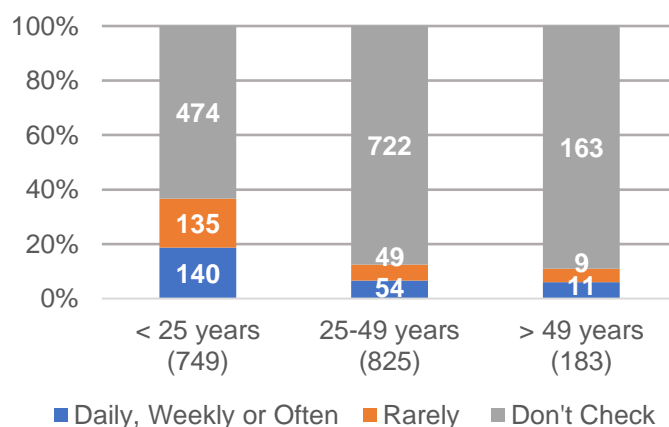
City Wise Response



Gender Wise Response



Age Wise Response

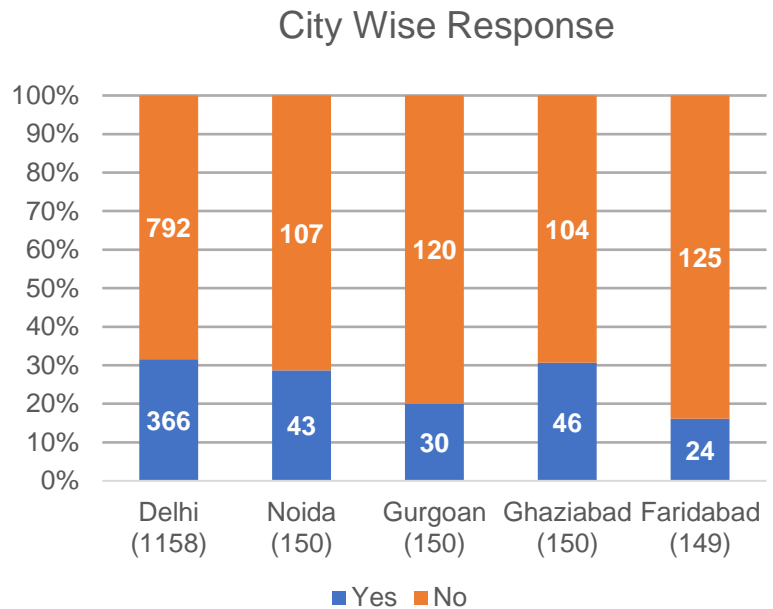
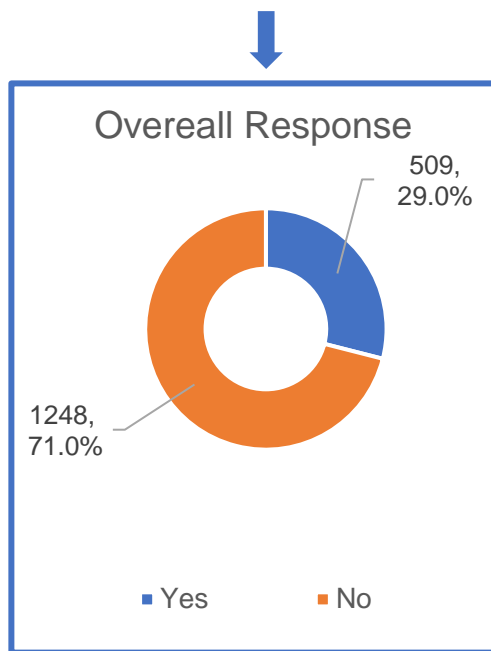


Response Highlights:

- **91.9%** of respondents in Faridabad, **85.3%** in Gurgaon, **84.6%** in Noida, **88%** in Ghaziabad and **72.1%** of respondents in Delhi did not check air quality.
- **77.4%** Females and **77.3%** Males did not check air quality.
- **89%** of respondents above 50 Years, **87.5%** of respondents between 25 – 49 Years and **63.3%** of respondents less than 25 Years didn't check air quality.



Have you ever seen the screens displaying air quality as severe/poor/good in different colors in different parts of the city?

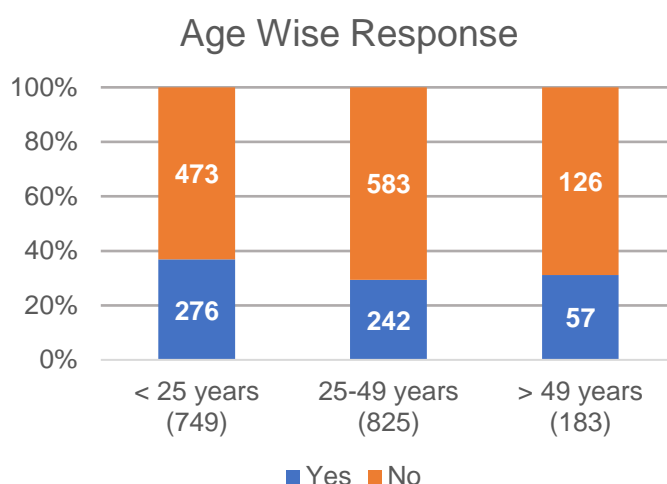
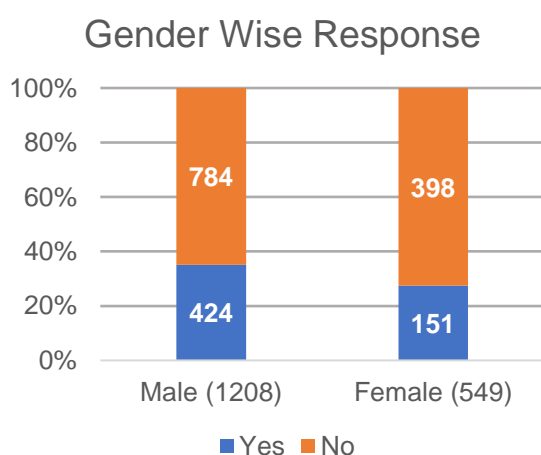
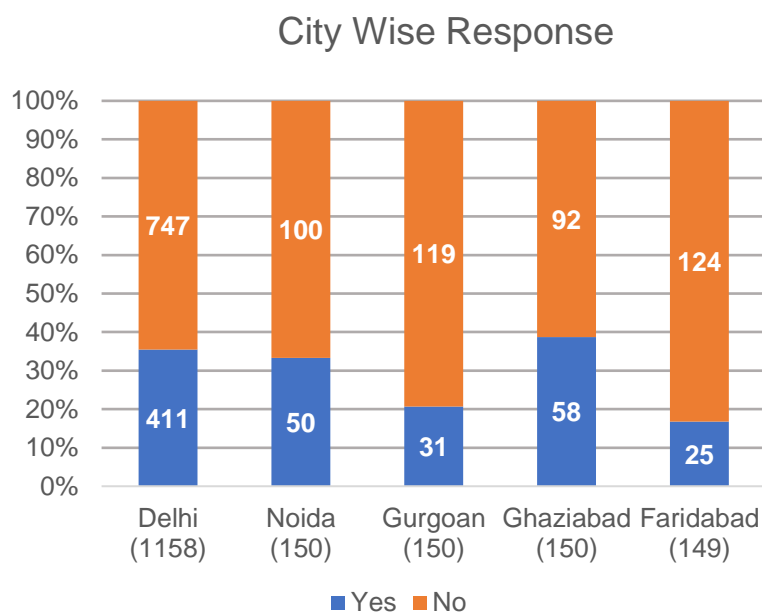
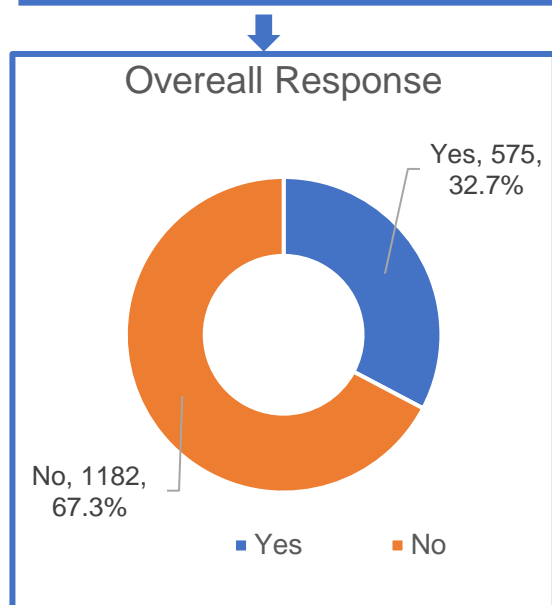


Response Highlights:

- Screens displaying air quality as severe/ poor/ good in different colors were seen by **29%** of people while the remaining **71%** had never seen the screen.
- 68.4%** respondents in Delhi, **71.3** in Noida , **80%** in Gurgaon , **69.3%** in Ghaziabad and **83.9%** in Faridabad had never seen the screen displaying air quality.



Do you know the meaning of severe/ poor/good air quality?



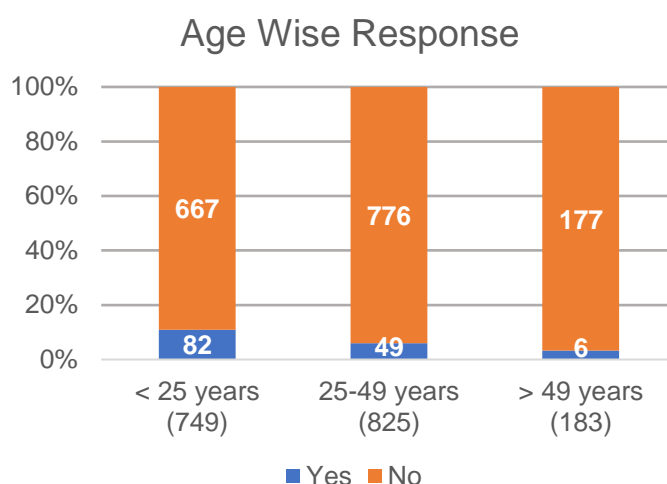
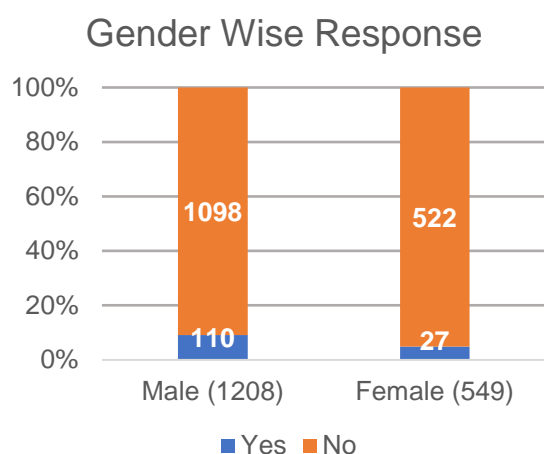
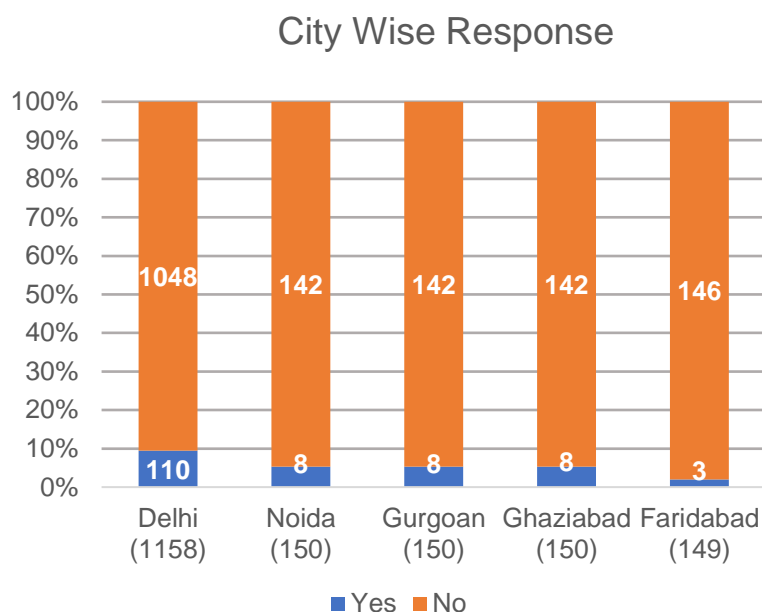
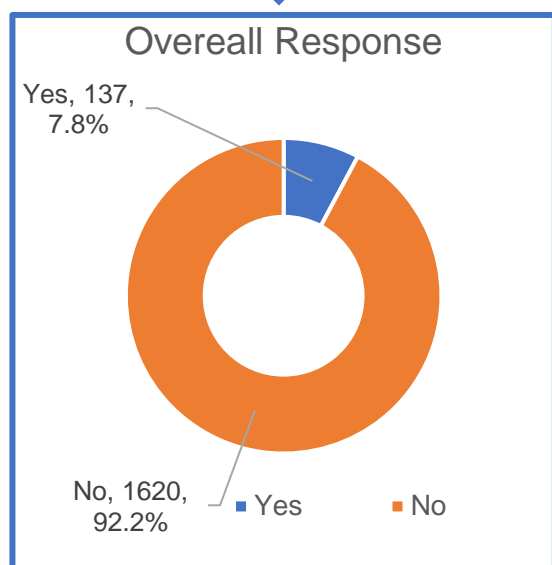
Around one-third of the respondents (**32.7%**) i.e. 575 knew the meaning of severe/ poor/good air quality. While **67.3%** i.e. 1182 respondents were not aware of the meaning of severe/ poor/good air quality.

If the AQI is red, what does that mean?

Out of **575 respondents** who were aware of the meaning of severe/ poor/good air quality, only **155 (27%)** respondents gave the correct answer to the question as very poor when AQI is red.



Do you know the difference between PM2.5 and PM10?

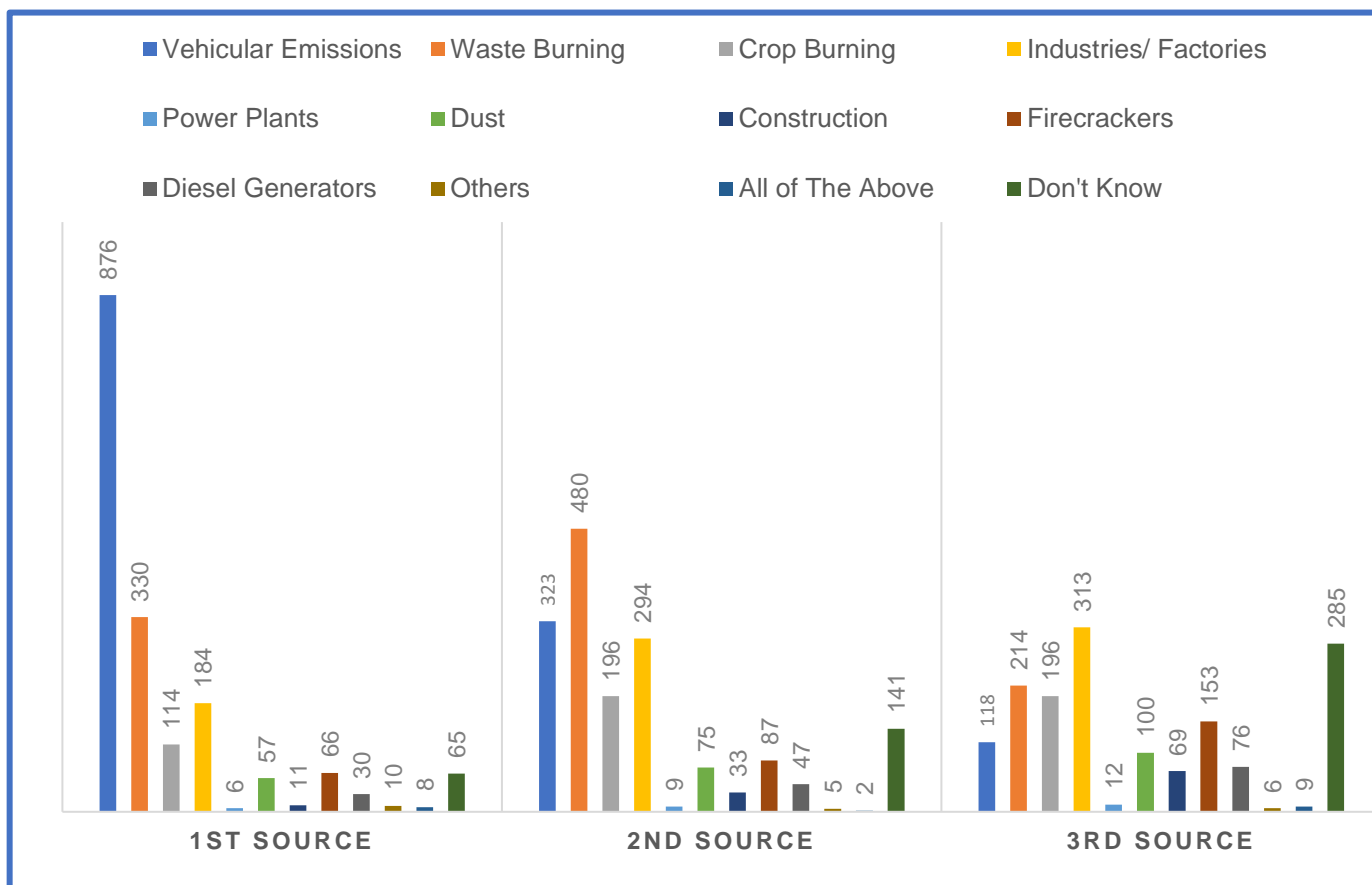


Response Highlights:

- **92.2%** of total respondents didn't know the difference between PM2.5 and PM10.
- **98%** of respondents in Faridabad, **95%** of respondents in Gurgaon, Noida and Ghaziabad and **91%** of respondents in Delhi didn't know the difference between PM2.5 and PM10.
- **95%** Females and **91%** Males didn't know the difference between PM2.5 and PM10.
- **97%** of respondents above 50 Years, **94%** of respondents between 25 – 49 Years and **89%** of respondents less than 25 Years didn't know the difference between PM2.5 and PM10.
- Out of 137 people who said they know the difference between PM2.5 and PM10, **21%** said PM10 is harmful than PM2.5 and thus don't have the right knowledge.



Rank top 3 sources of outdoor air pollution in Delhi and N.C.R.?

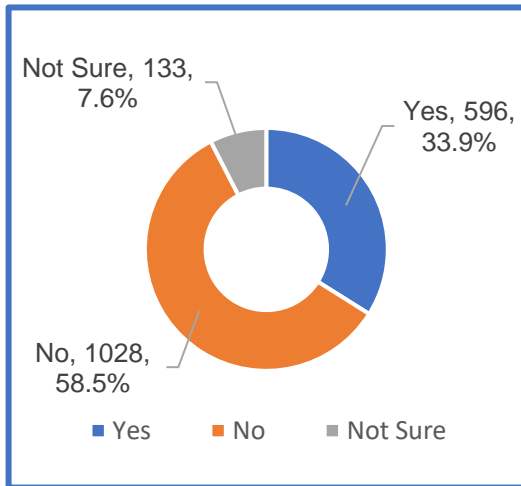


This question was asked three times as the first source, second source and third source of outdoor air pollution. The responses for the first source, second source, and the third source was determined on the basis of maximum frequency. Of 1757, 876 (49.9%) respondents listed **vehicular emissions as the first source** of air pollution.

65 respondents did not know in the first option, so the second option was asked from 1692 respondents. Out of 1692, 480 (28.4%) mentioned **waste burning as the second source**.

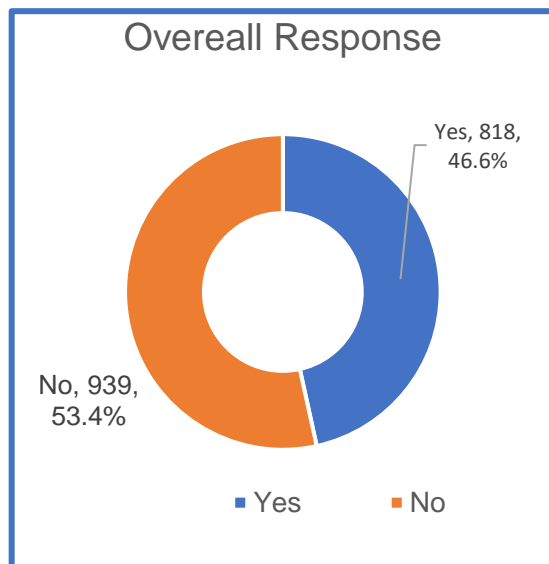
206 respondents didn't know the first and the second option so 1551 respondents answered the 3rd option. Out of 1551, 313 (20.2%) answered **industries/factories as the third source**.

Does your or your family member's workplace give regular updates about air pollution?

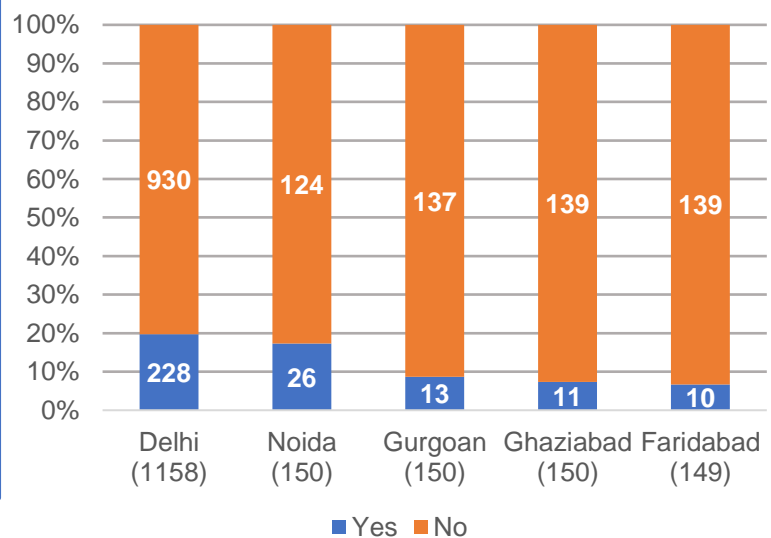


This highlights that Air Pollution is regularly talked about at work. However as highlighted above, most respondents are unaware about AQI. Thus, it can be inferred that air pollution levels are not discussed at workplace.

Have you or your family members had to miss work/school/ college due to poor air quality in the last year?

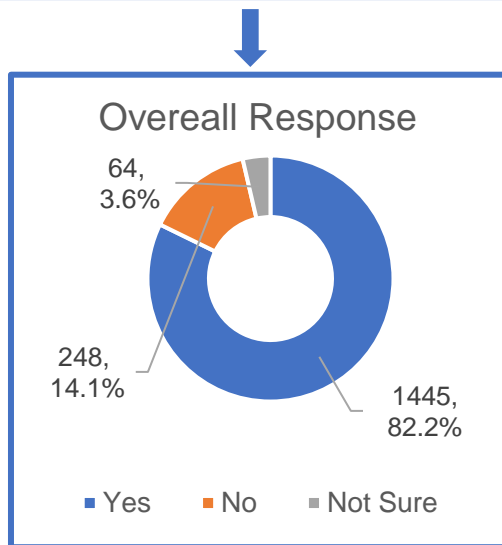


City Wise Response

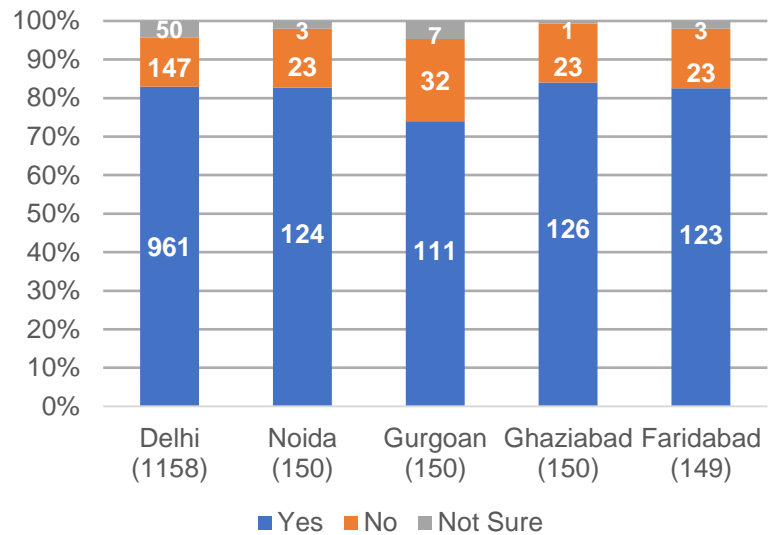


46.6% respondents said that they and their family members had missed work/school/ college due to poor air quality in the last one year while 53.4% respondents and their family members never missed their work or school or college.

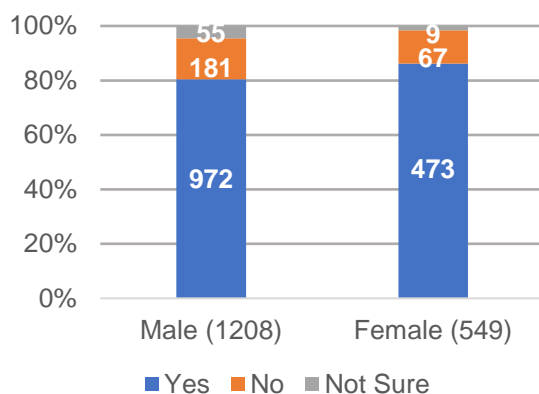
Do you think air pollution has an impact on your health?



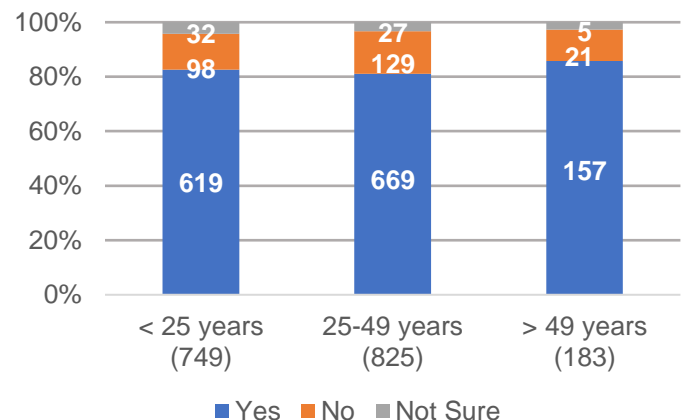
City Wise Response



Gender Wise Response



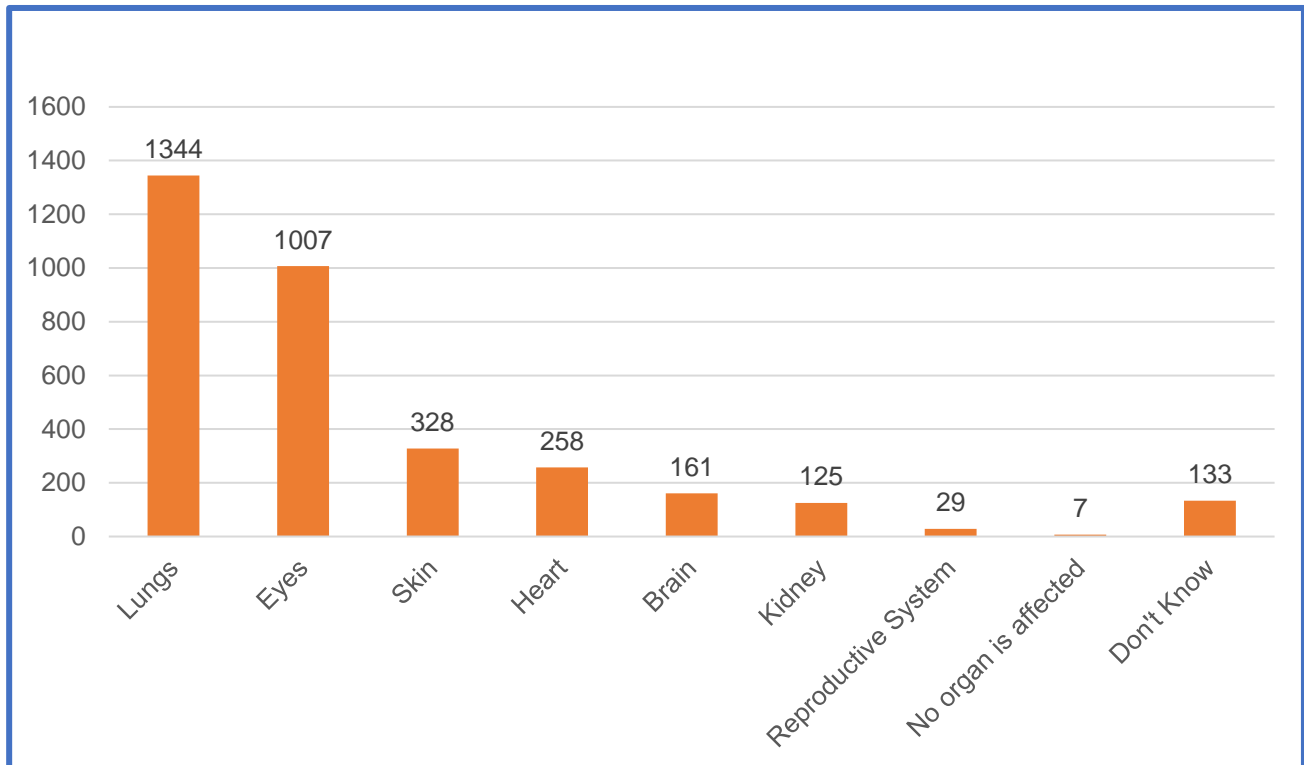
Age Wise Response



Majority of the respondents (**82.2%**) i.e. 1445 respondents mentioned that air pollution has an impact on their health. Out of 1445, 473 (**32.7%**) were females and 972 (**67.3%**) were males.



Which organs do you think are affected by air pollution? (Multiple choices)



LUNG
76.5%



EYES
57.3%



SKIN
18.7%



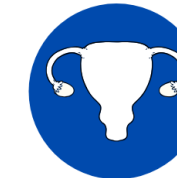
HEART
14.7%



BRAIN
9.2%



KIDNEYS
7.1%



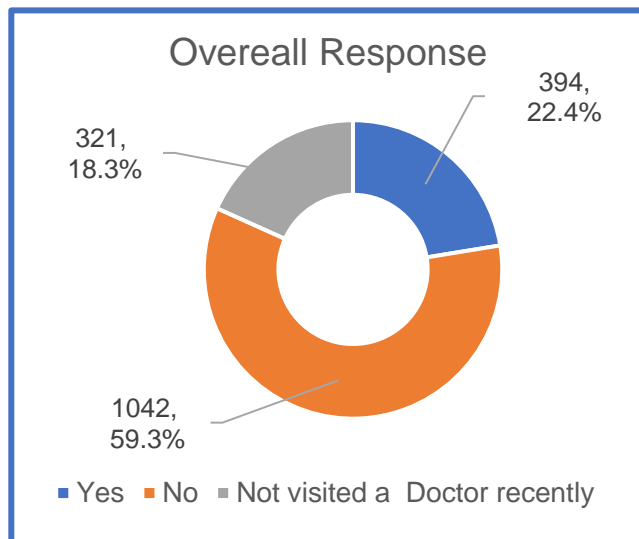
SKIN
1.7%



DON'T KNOW
7.6%

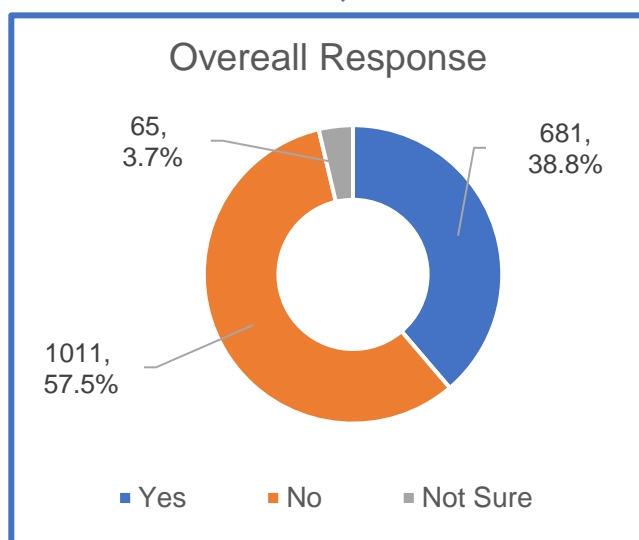


Has your doctor ever talked to you regarding air pollution?



Only 394 respondents (22.4%) told that their doctor has talked to them regarding air pollution while 1,042 (59.3%) respondents said that their doctor never talked to them regarding air pollution and 321 (18.3%) respondents had not visited any doctor recently.

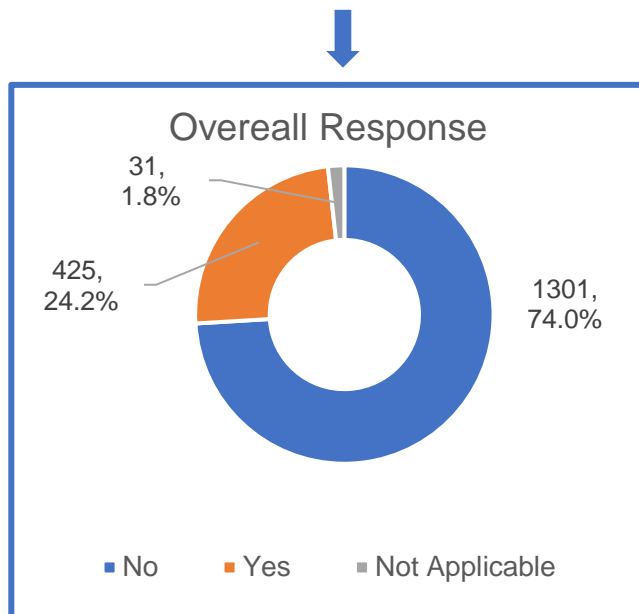
Have you or any of your relatives visited the hospital due to respiratory discomfort (asthma/ cough) in the last one year?



38.8% of respondents have visited the hospital due to respiratory discomfort in the last one year.

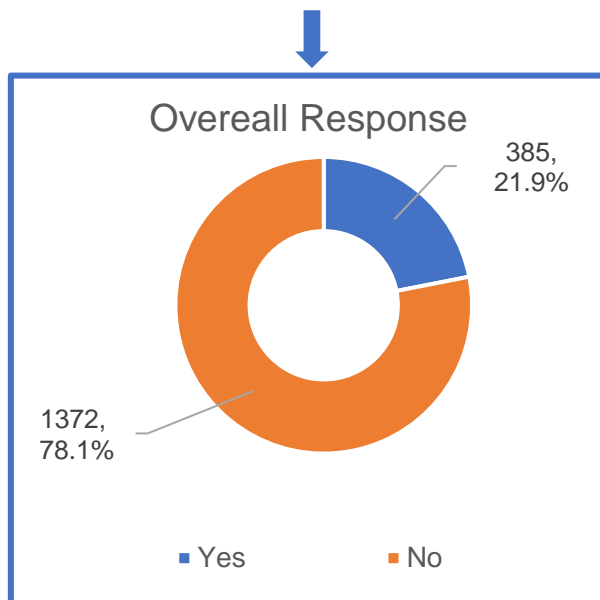


Have you/your relatives ever been diagnosed with a disease due to air pollution?



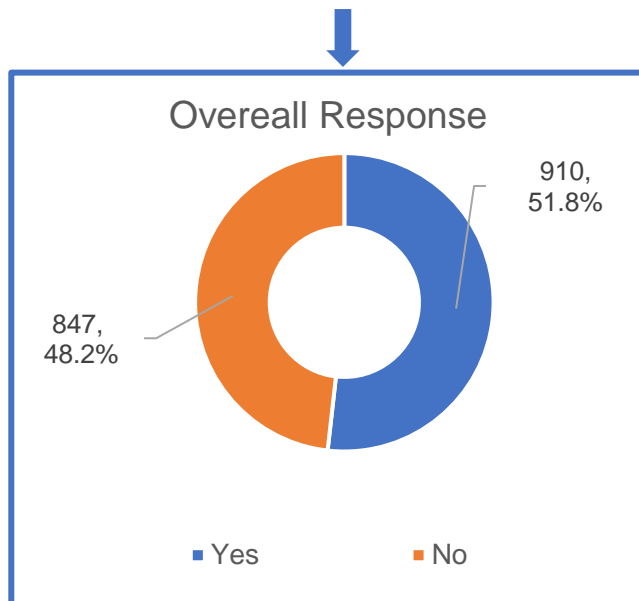
Around three-fourth of the respondents i.e. 1301 (**74%**) or their relatives were never diagnosed with a disease due to air pollution. Around **24.2%** i.e. 425 respondents or their relatives were diagnosed with a disease due to air pollution.

Do you know of any program or initiative undertaken by the local Government to tackle air pollution in your city?



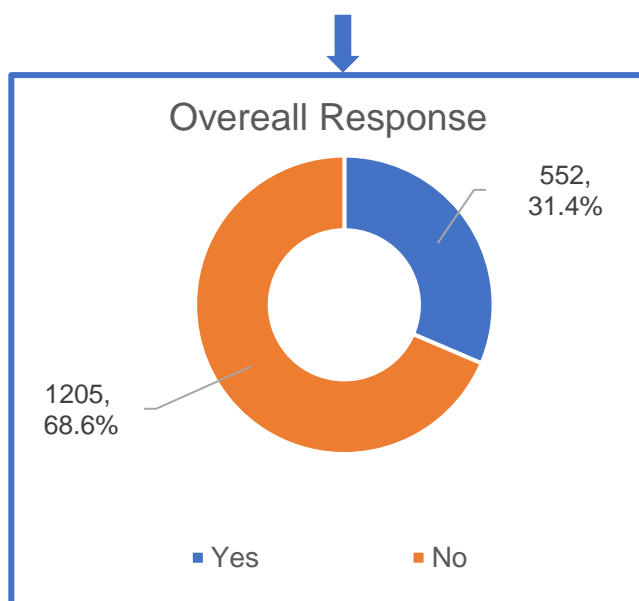
When asked about the Local Government's initiatives undertaken to reduce air pollution, more than three-fourth of the respondents (**78.1%**) were not aware of it. Only 385 (**21.9%**) respondents were aware of the initiatives.

Are you aware of the health warning being given by the State or Central Government in winter when air pollution increases?



According to the survey more than half of the respondents **51.8%** i.e. 910 respondents were aware of the health warning being given by the State or Central Government in winter when air pollution increases.

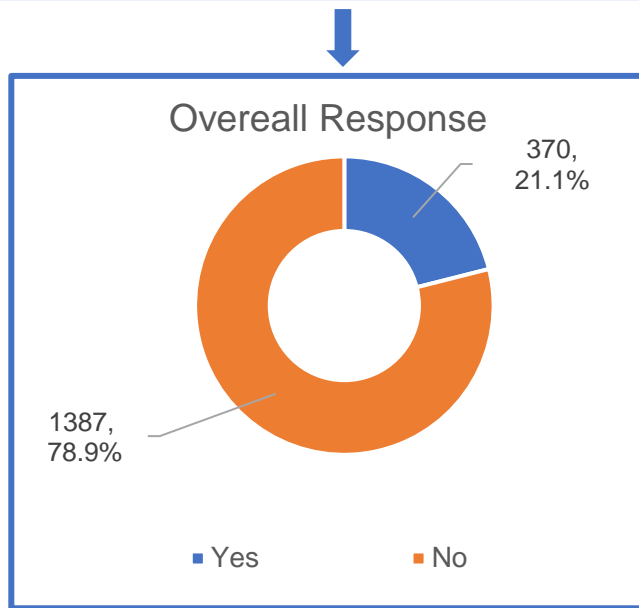
Are you aware of any public health emergencies issued by the Government of Delhi on account of extremely poor air quality in the last two years?



Only 552 (**31.4%**) respondents were aware of any public health emergencies issued by the Government of Delhi on account of extremely poor air quality in the last two years while 1205 (**68.6%**) were unaware of any public health emergencies.



Are you aware of the National Clean Air Programme?



Many people 1387 (**78.9%**) had no idea about the National Clean Air Programme. Very few respondents 370 (**21.1%**) knew about the National Clean Air Programme.

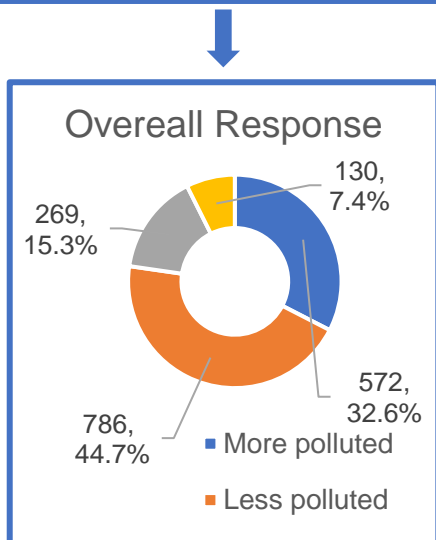


Morsel team conducting the survey

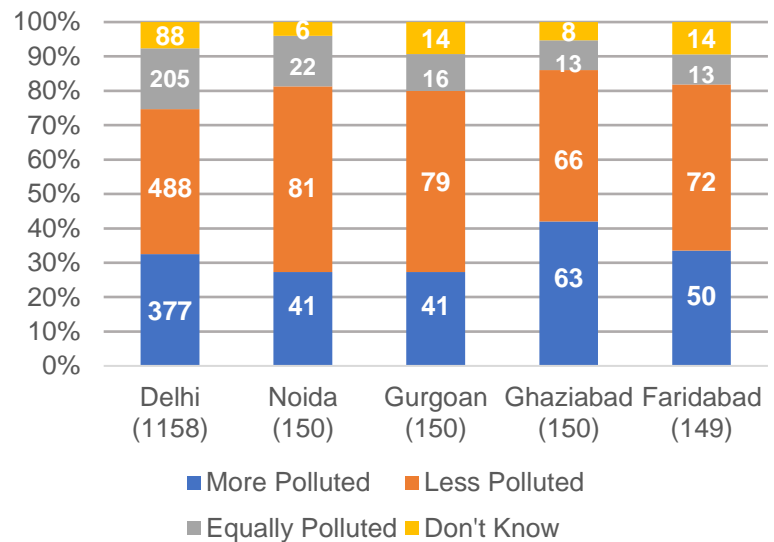


Attitude Related

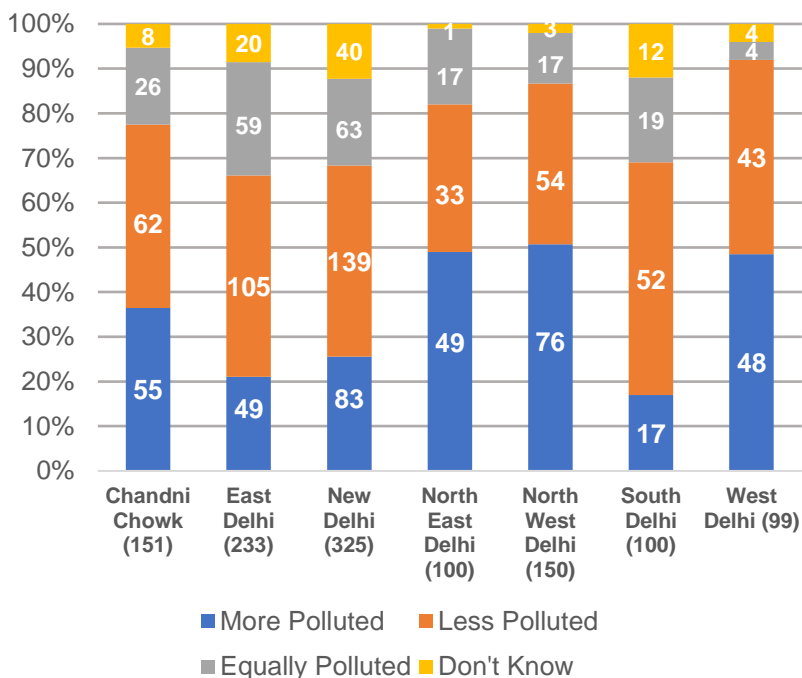
How polluted do you think is the area where you stay when compared to the rest of Delhi-NCR?



City Wise Response

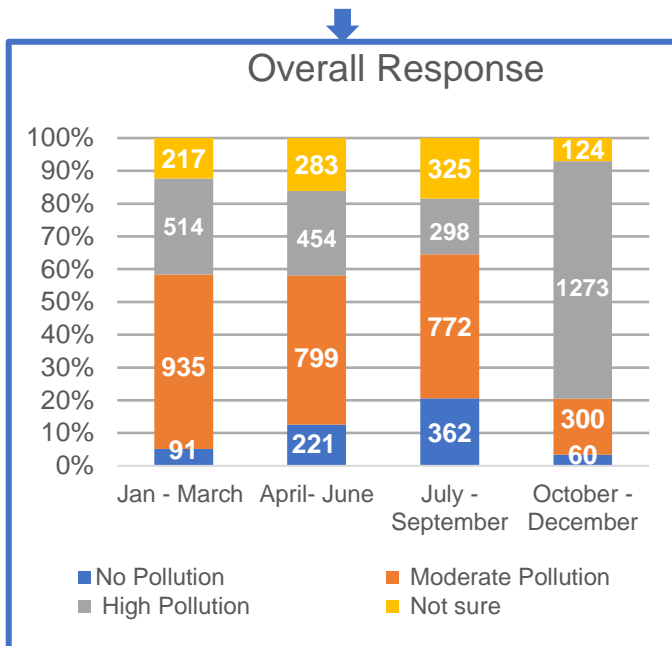


Area Wise Response - Delhi



Around **50%** population in North East Delhi, North West Delhi and West Delhi think that the area where they reside is more polluted than rest of the areas in Delhi

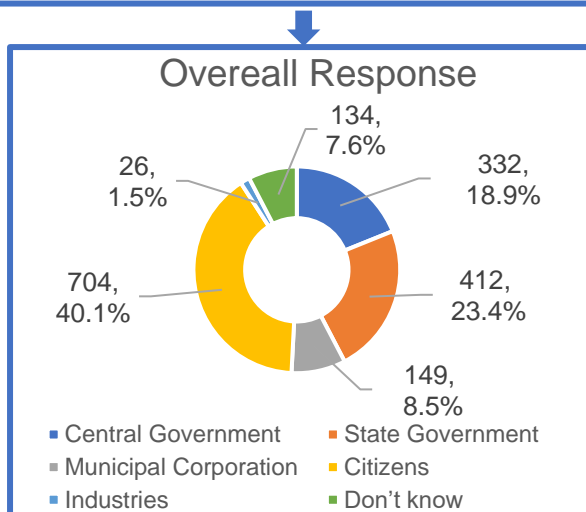
How would you rank the air pollution level in the following quarters?



Majority of the respondents **72.4%** ranked high pollution in October-December quarter.

53.2% of the respondents ranked January-March as a moderate pollution quarter.

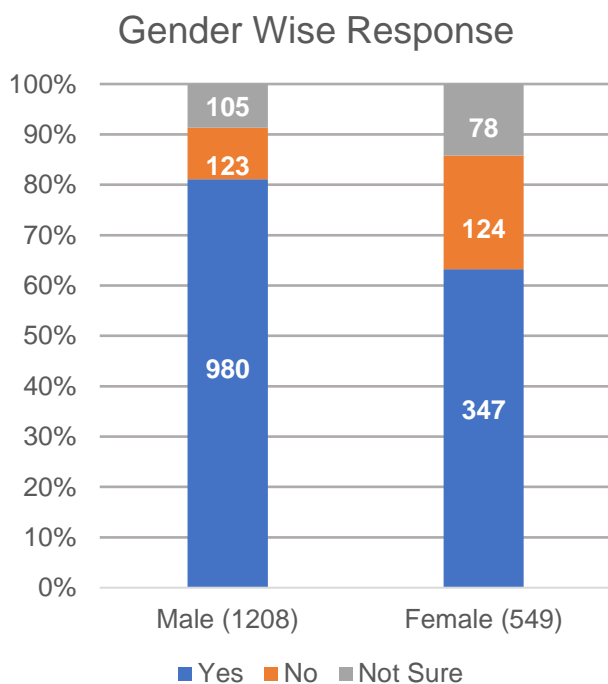
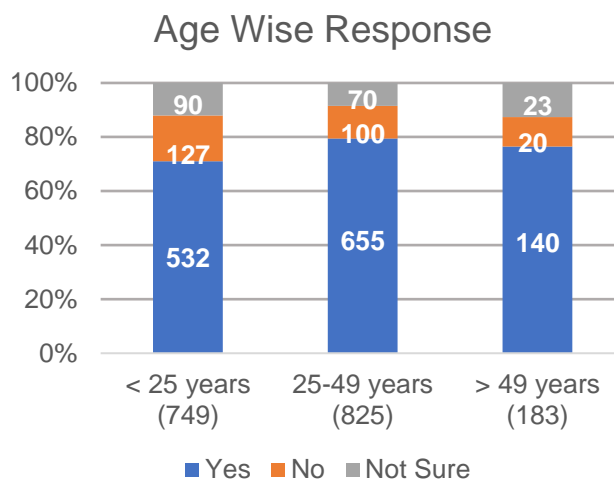
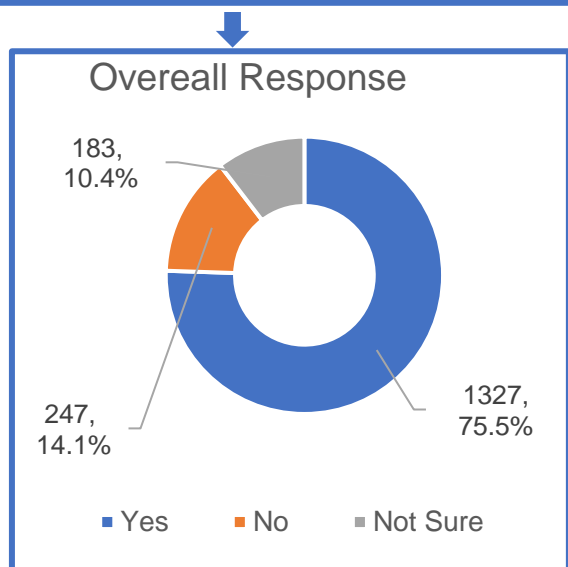
Who should be most responsible for reducing air pollution in your city?



40.1% of the respondents mentioned that the citizens should be responsible for reducing air pollution followed by State Government **23.4%** and Central Government **18.9%**.



Do you think that exposure to a high level of air pollution can reduce your life?

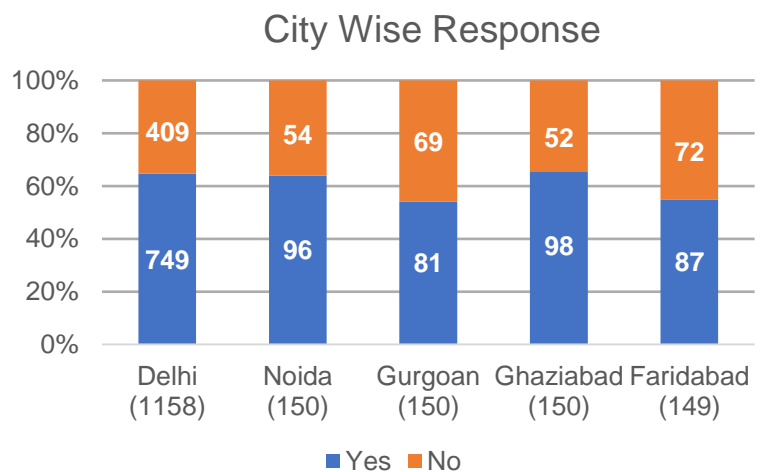
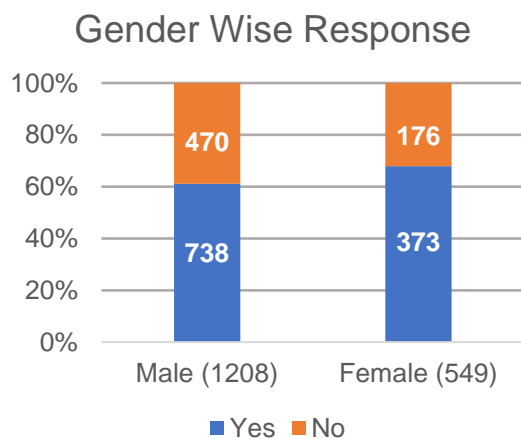
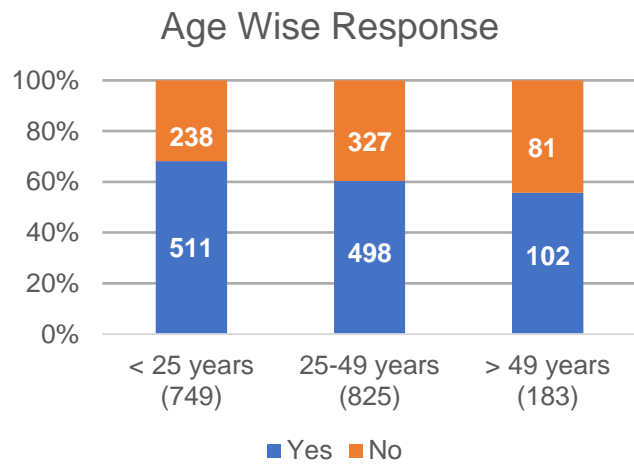
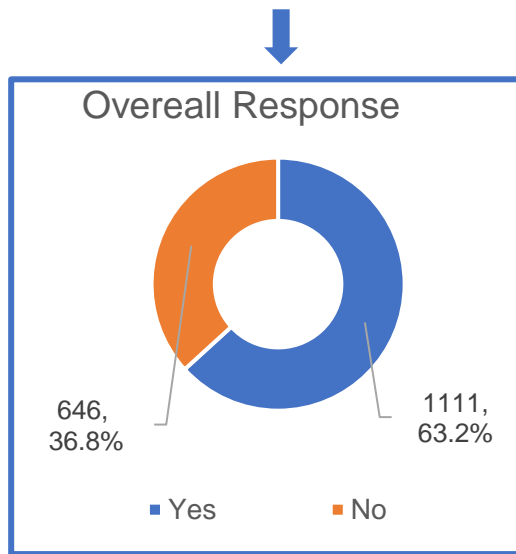


75.5% of the respondents were aware that exposure to a high level of air pollution could reduce their life.

63.2% of females and **81.1%** of males were aware that exposure to a high level of air pollution could reduce their life.



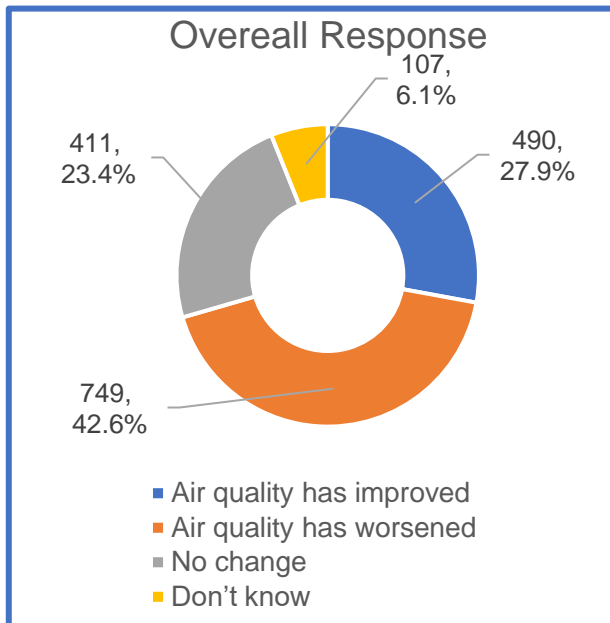
Do you talk about air pollution at home/with friends?



63.2% of respondents talked about air pollution at home while **36.8%** of respondents did not talk about it.

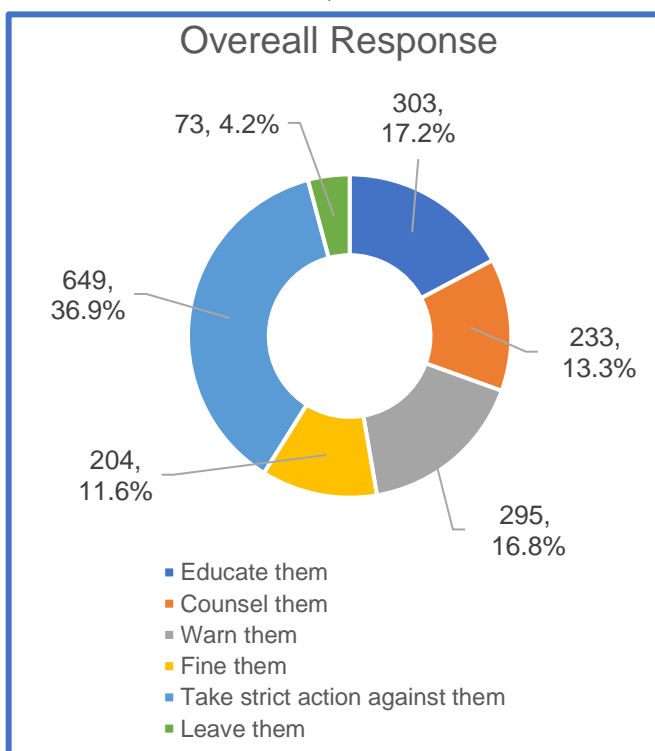


What are your thoughts on the change in air quality in your city over the last 3-4 years?



42.6% of the respondents thought that air quality has worsened. Though **27.9%** respondents claimed that air quality had improved.

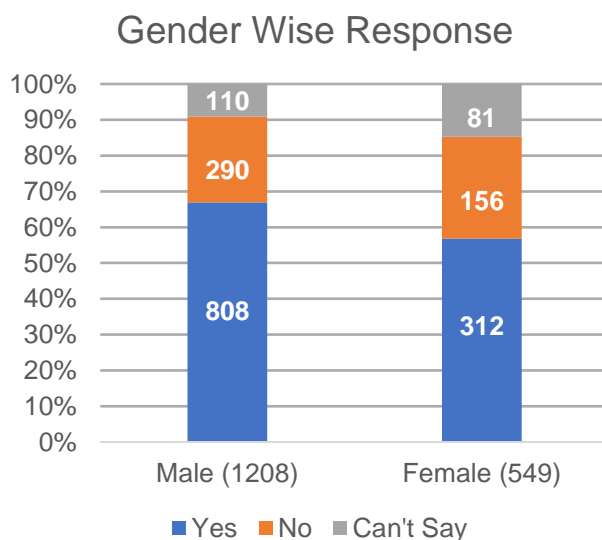
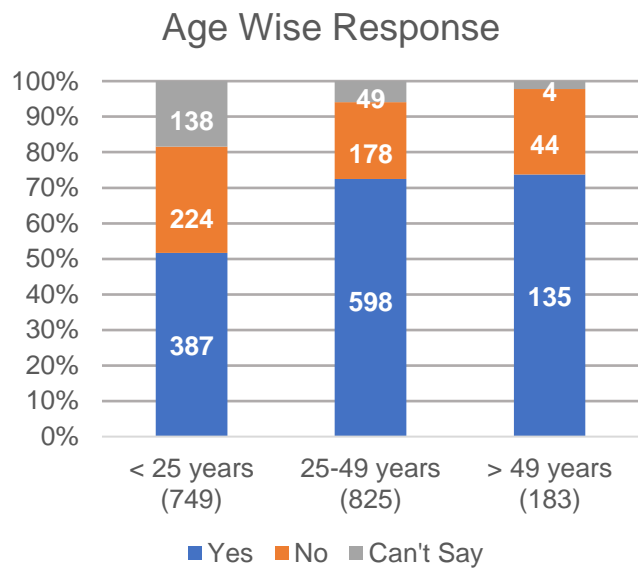
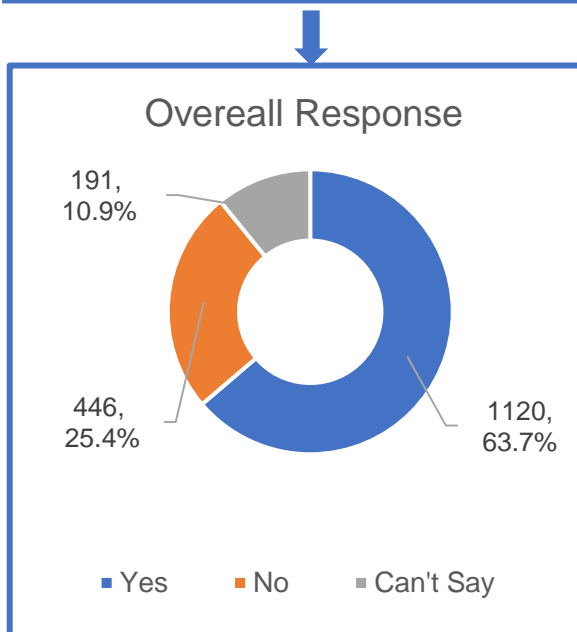
What can be done to industries that cause a lot of air pollution?



Majority of the population (**36.9%**) were in favour of taking strict action against the industries that cause a lot of air pollution followed by educating them (**17.2%**), warning them (**16.8%**), counsel them (**13.3%**), fine them (**11.6%**) and leave them (**4.2%**).



Do you think air pollution affects you financially?

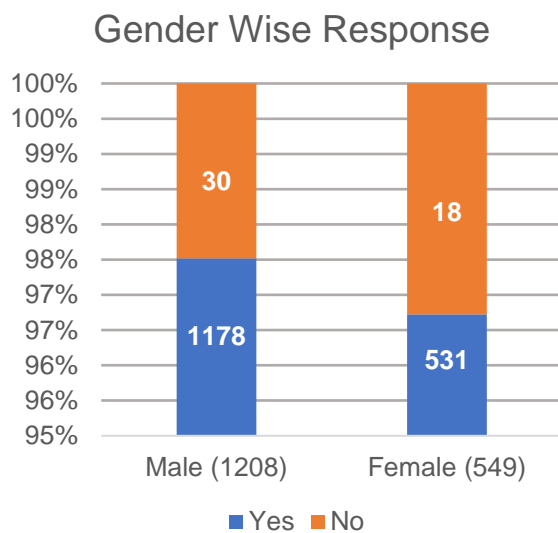
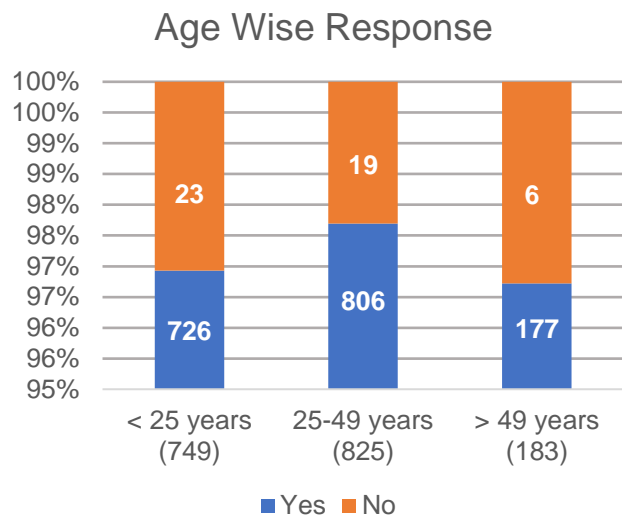
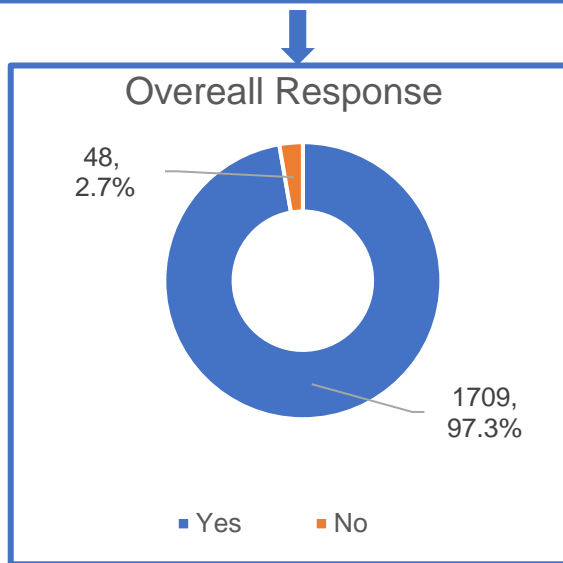


63.7% of the respondents thought that they get financially affected by air pollution.

56.8% of females and **66.9%** of males thought they get financially affected by air pollution.



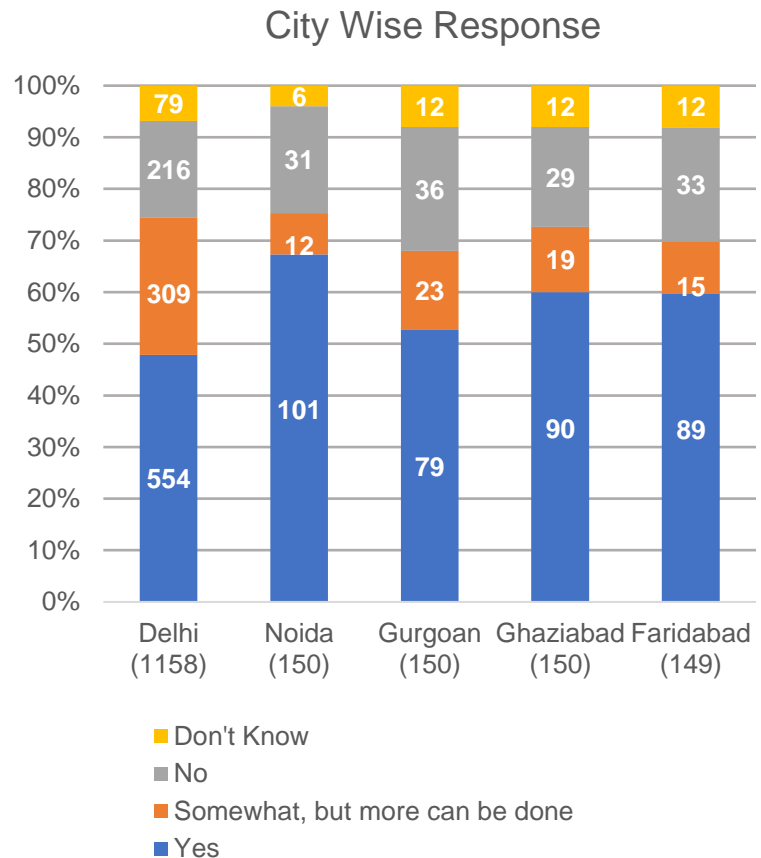
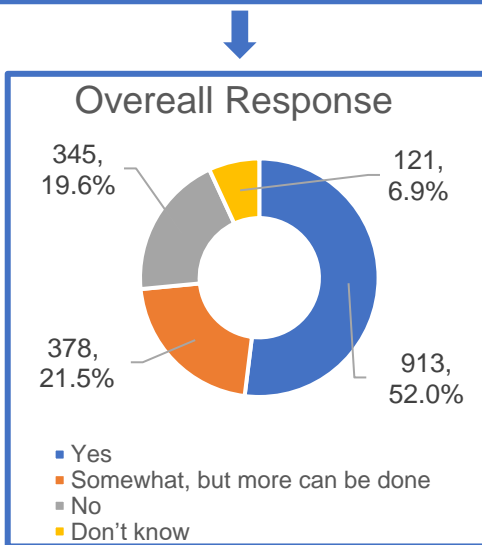
Do you think you have a responsibility to protect your environment?



97.3% of the respondents felt that they should be responsible for protecting their environment. Only **2.7%** of the respondents felt no responsibility to protect their environment.



Do you think the Central Government and State Government are taking adequate steps to improve air quality in your city?



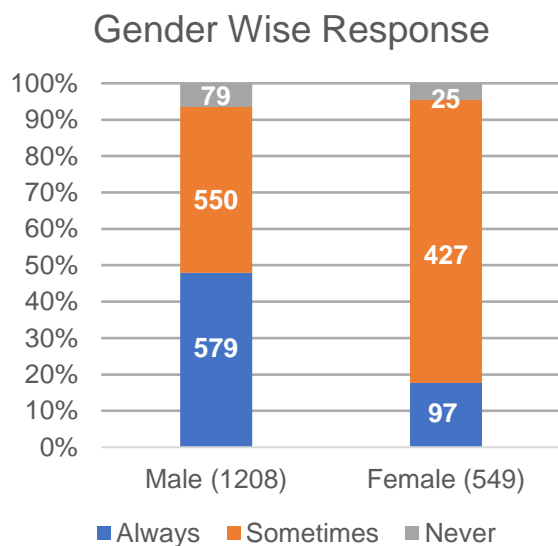
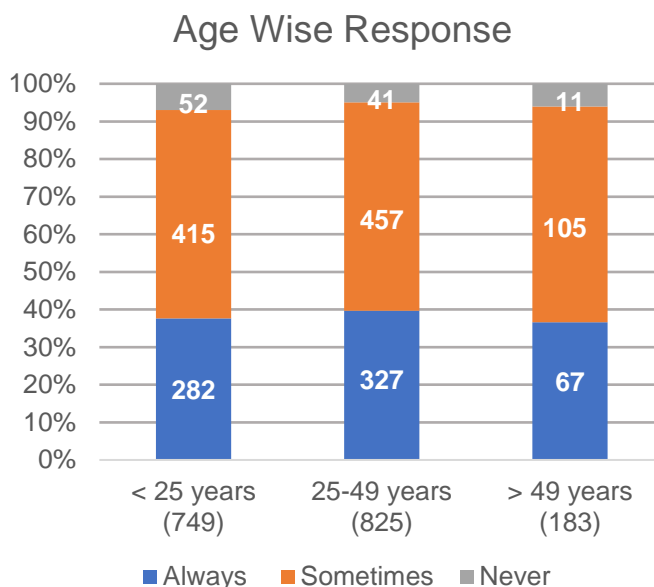
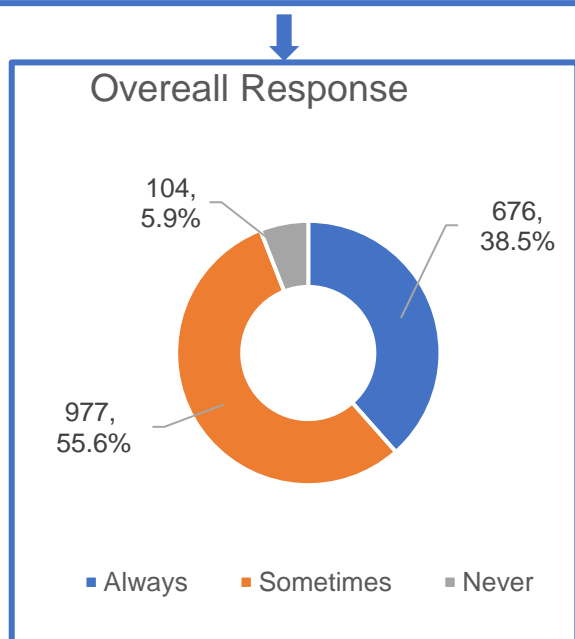
73.5% of the respondents considered that the Central Government and Government of the State were taking or somewhat taking adequate steps to improve air quality in their city.

47.8% of the respondents from Delhi, **67.3%** from Noida, **52.7%** from Gurgaon, **60%** from Ghaziabad, **59.3%** from Faridabad considered that the Central Government and Government of the State were taking or somewhat taking adequate steps to improve air quality in their city.



Practice Related

Do you use public transport in your daily life?

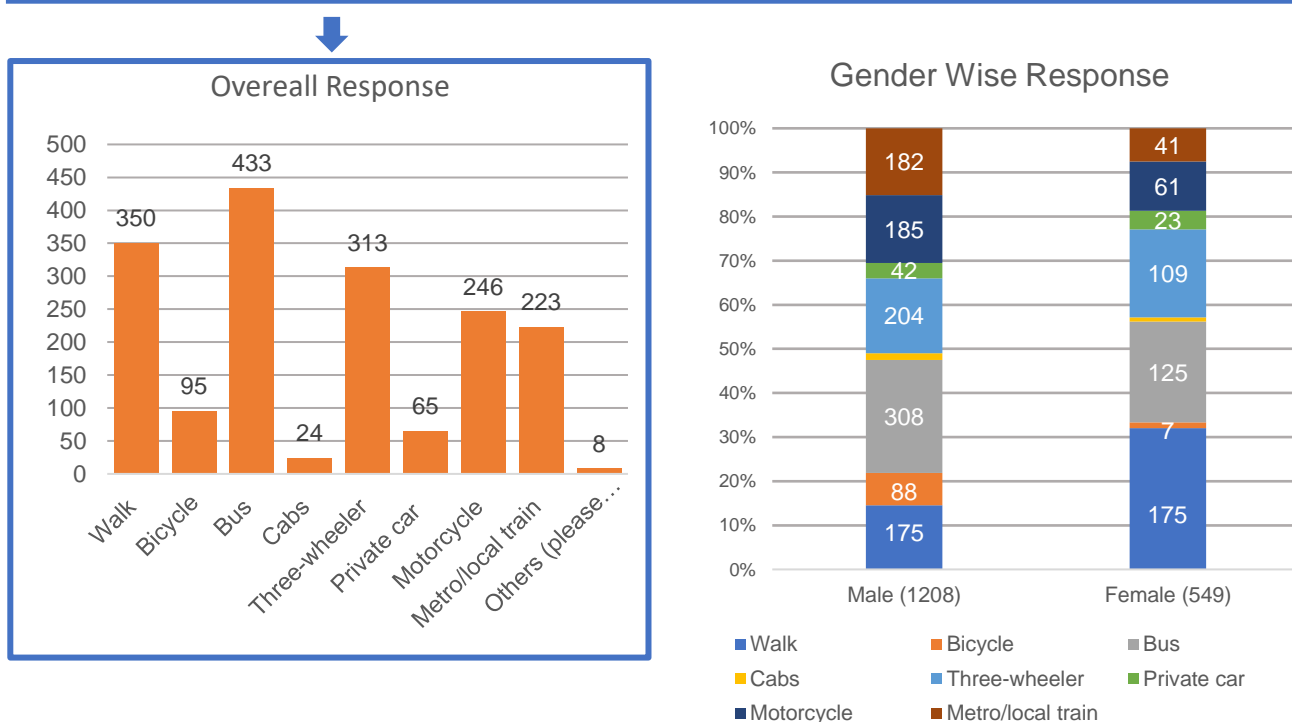


38.5% of the respondents always used the public transport while **55.6%** used it sometimes.

17.67% females and **47.9%** males always used the public transport



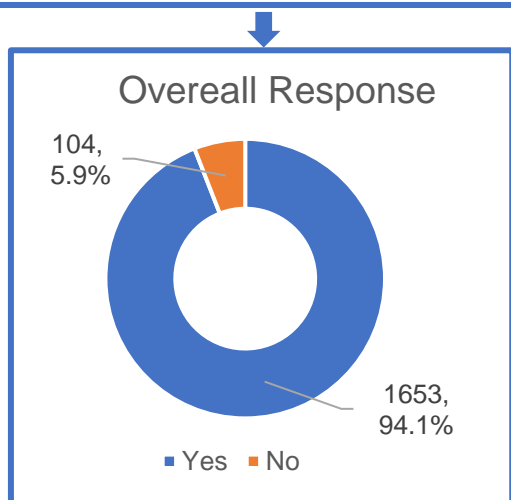
What is/are your main mode(s) of transport for your everyday life?



The main mode of transport used by **24.6%** of the respondents was the bus, **19.9%** preferred walking, **17.8%** respondents used three-wheeler, **14%** used motorcycle and **12.7%** preferred the metro/local train.

The main mode of transport used by **31.9%** females was walking while in the case of males the most common mode used was a bus (**25.5%**).

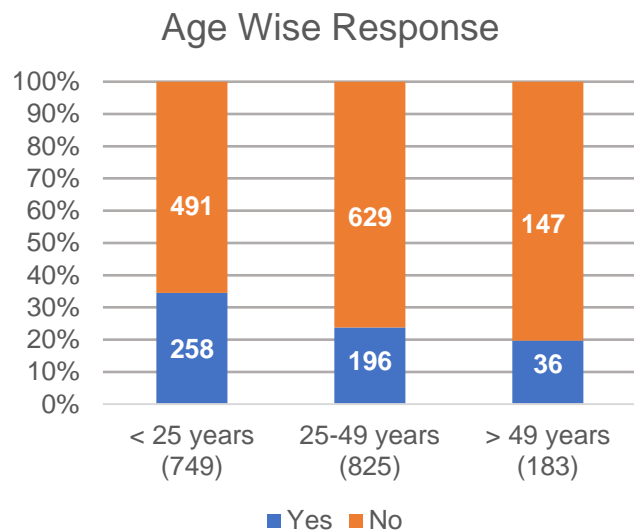
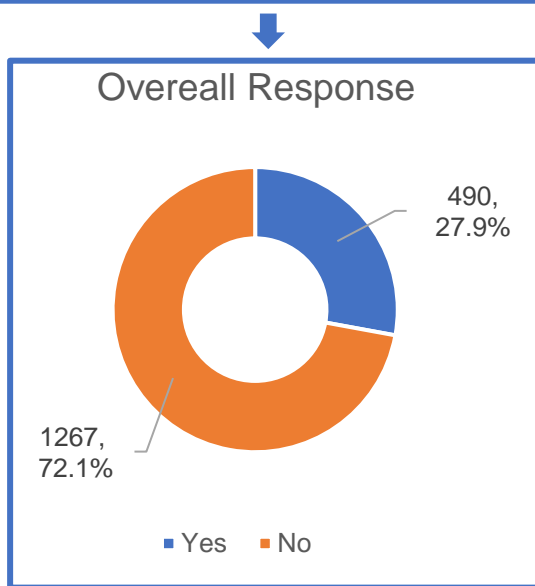
Do you walk to or use a bicycle for nearby destinations?



94.1% of the respondents walk or make use of bicycle for nearby destinations.



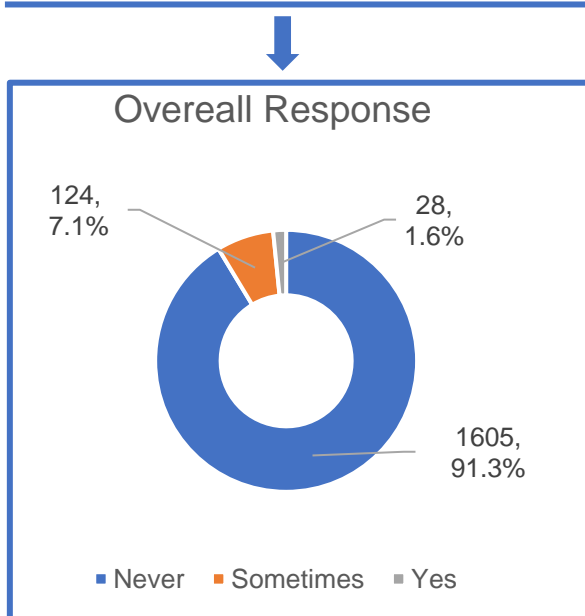
Do you or your family members burn firecrackers?



72.1% of the respondents said that they do not burn firecrackers whereas **27.9%** still follow this practice.

34.4% of the respondents in the age group <25 years , **23.8%** in age group 25-49 years and **19.8%** in the age group >49 years said that they burn firecrackers.

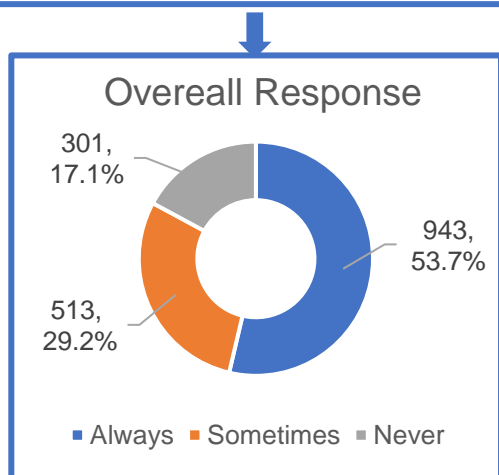
Do you burn waste?



91.3% of the respondents said that they never burn waste while there were only a few respondents **8.6%** who burn waste always or sometimes.

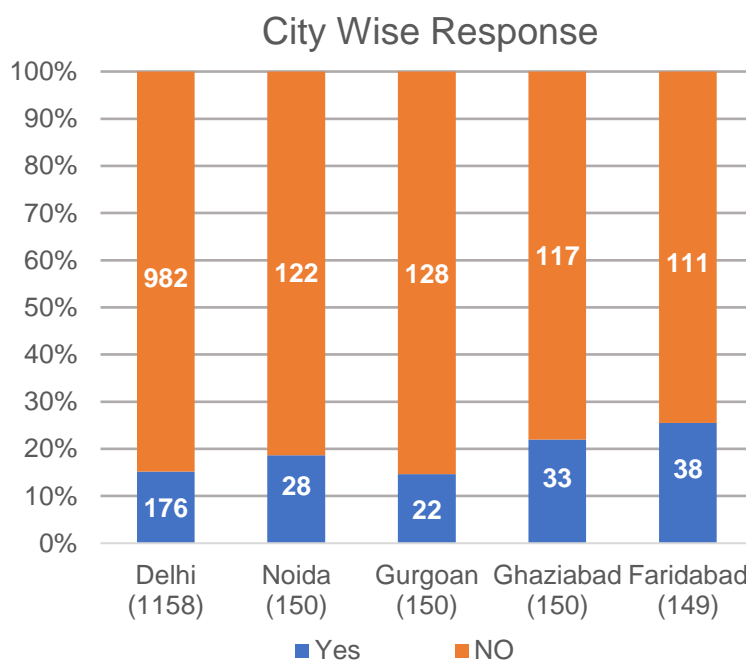
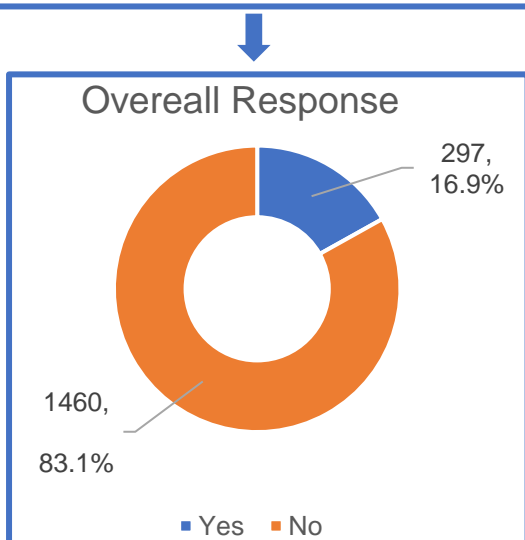


Do you use agarbatti/ incense sticks/ room freshener at home?



Incense sticks/ room fresheners were always or sometimes used at home by **82.9%** of the respondents. There were very few respondents (**17.1%**) who never used them.

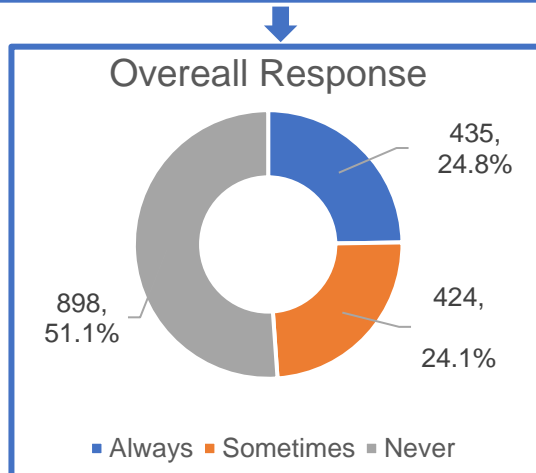
Do you use chula/kerosene stove/ burn wood/ coal for cooking or heating purpose?



- Only **16.9%** of the respondents were using chula/ kerosene stove/ burn wood/ coal for cooking or heating purpose. While **83.1%** of the respondents were not using them.
- Faridabad with **25.5%** of the respondents saying they were still using chula/ kerosene stove/ burn wood/ coal for cooking or heating purpose was at the top of the list followed by Ghaziabad **22%**, Noida **18.7%**, Gurgaon **14.7%** and Delhi **15.2%**.



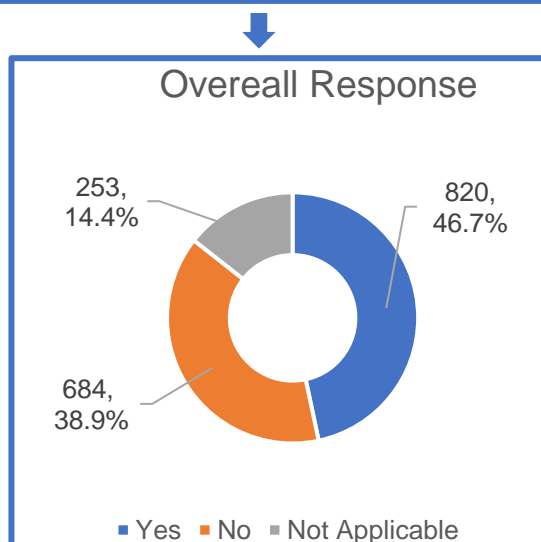
Do you exercise to improve your health? If so, do you plan exercise activities according to air pollution?



48.9% of the respondents said that they never exercise while **24.8%** said they always did and **24.1%** said they exercise sometimes to improve their health.

Out of **859 respondents** who exercise 528 (**61.5%**) did not plan their exercise activities according to air pollution. Only 331 (**38.5%**) planned exercise activities accordingly.

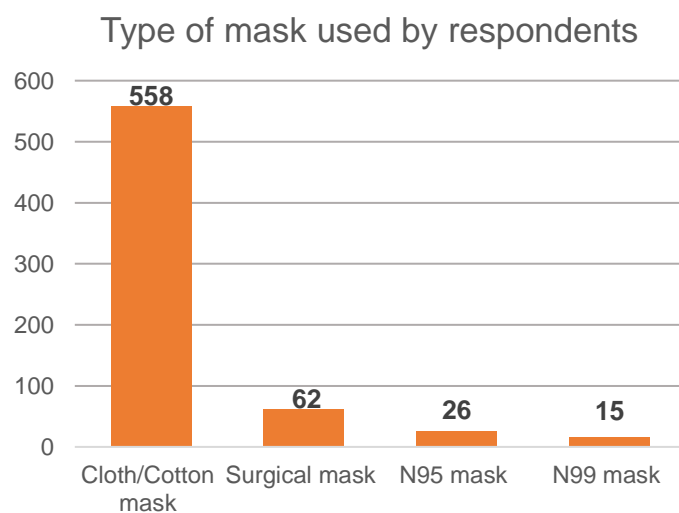
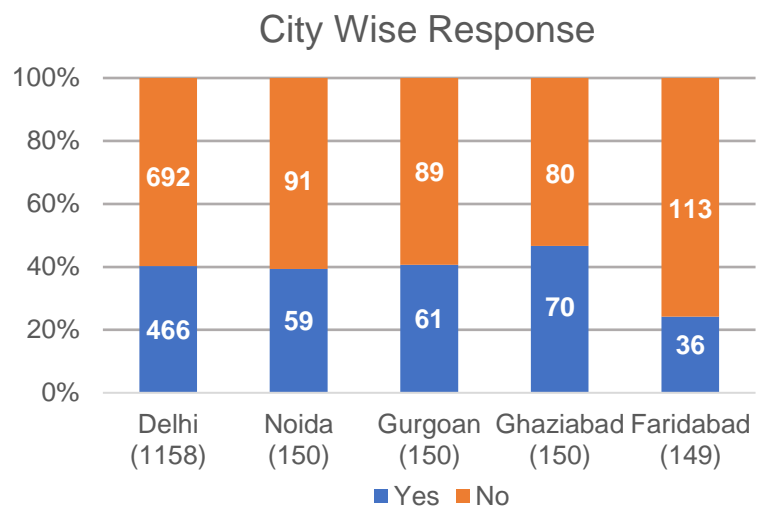
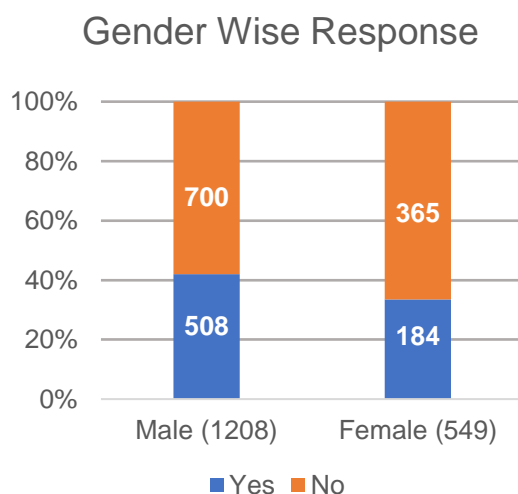
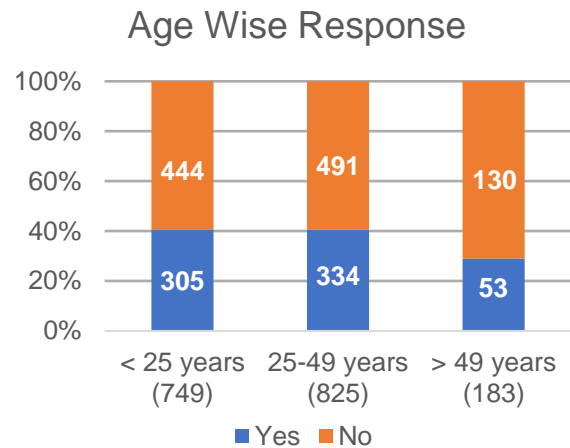
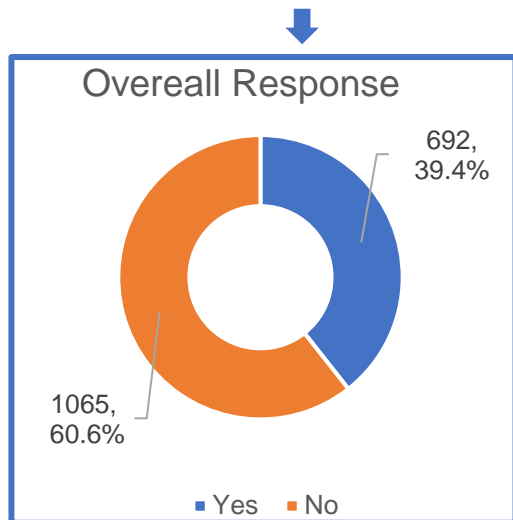
Have you reduced times of opening windows to air the room, due to air pollution?



Nearly half of the respondents (**46.7%**) had reduced times of opening windows to air the room, due to air pollution. **38.9%** of the respondents had not reduced times of opening windows, they still open the windows in the same way as they used to do previously.



Do you regularly use a mask to protect yourself? If Yes, what type of mask do you use?

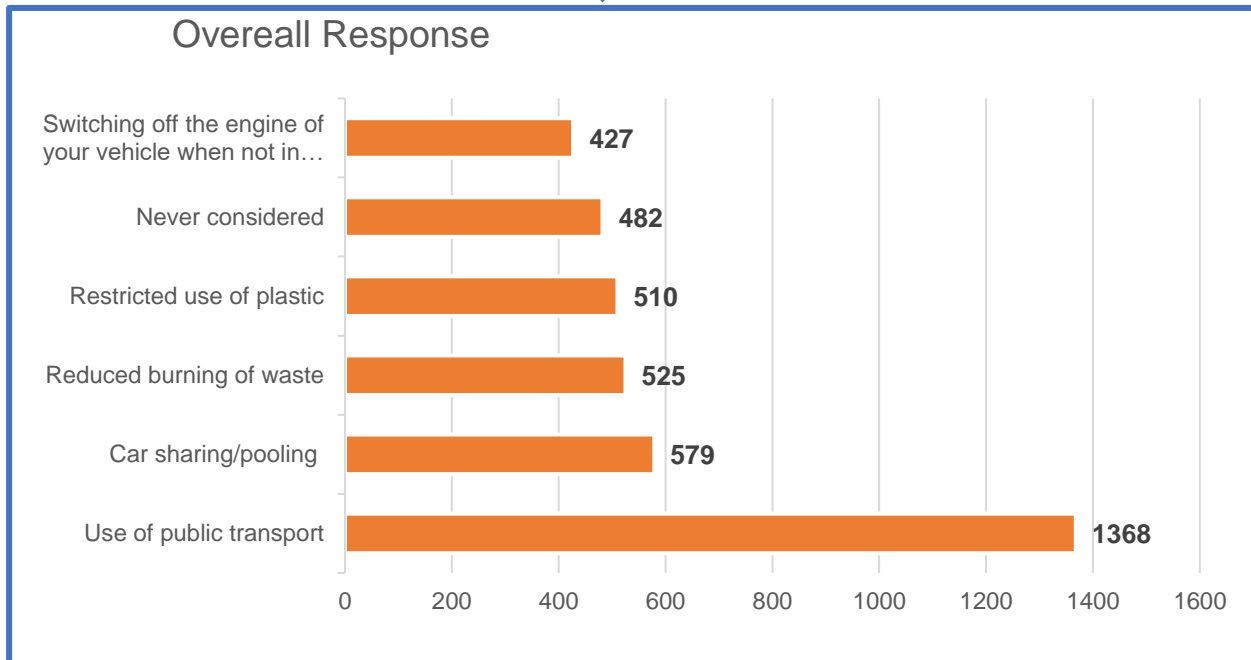


Air pollution has increased all over still people lack awareness regarding what protective/ preventive measures to be taken. Only **39.4%** of the respondents were regularly using a mask to protect themselves while the majority of them (**60.6%**) did not use a mask.

Only **0.8%** of the total respondents used a N99 mask, **1.5%** used a N95 mask to protect themselves. Most of the respondents **31.7%** used cloth/cotton masks to protect themselves.



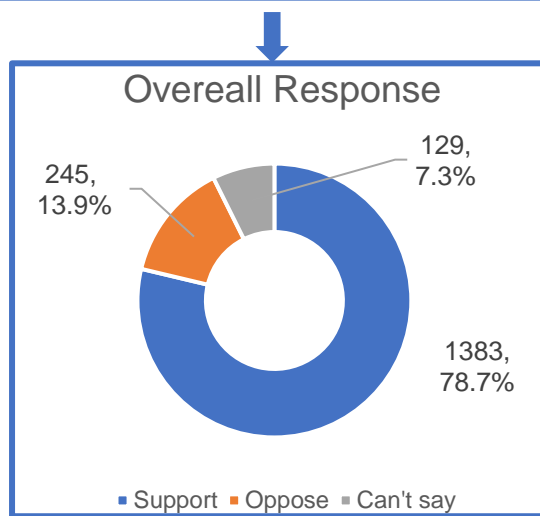
Have you, at any point, considered any of the following individual behavioral changes to reduce air pollution?



On an individual level as an effort to reduce air pollution, respondents highlighted that they had considered major behavioral changes such as the use of public transport (**1368**), car-sharing/pooling (**579**), reduced burning of waste (**525**), restricted use of plastics (**510**), switching off the engine of your vehicle when not in use or at the red-light signal (**427**).

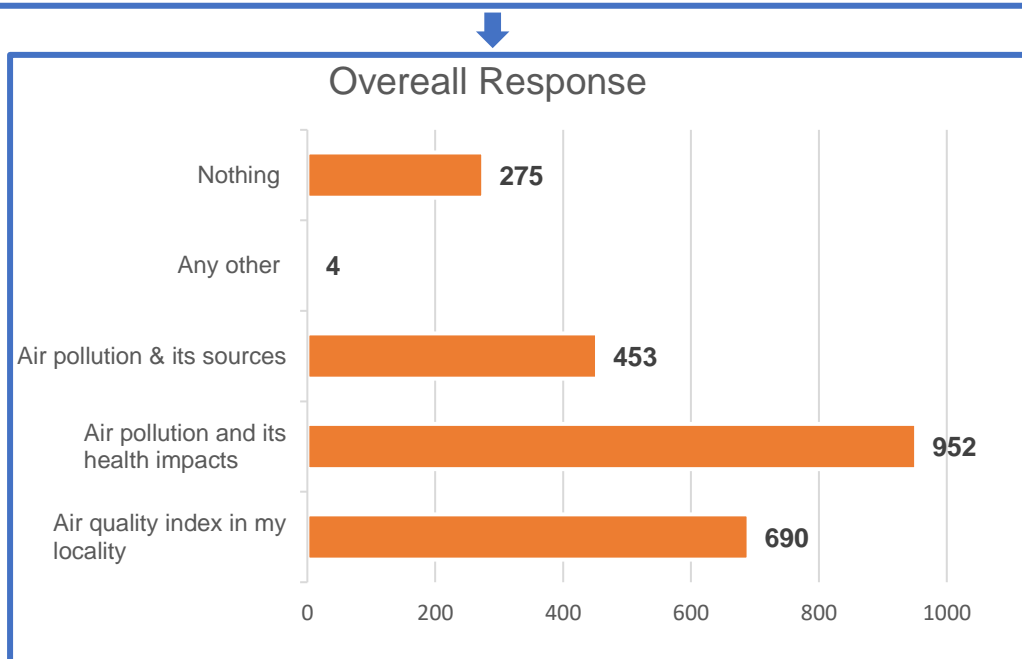


Would you support or oppose the steps taken by the Government to reduce air pollution? If the steps cause you inconvenience.



More than three fourth respondents (**78.7%**) 1383 out of 1757 would support the Government to reduce air pollution though the step might cause them inconvenience. While **13.9%** opposed the steps.

On what aspects related to air pollution do you wish to have more information? (Multiple Choices)



It was found that **54.2%** of the respondents wanted information on air pollution and its health impacts, **39.3%** wanted information on air quality index in their locality, **25.8%** on air pollution and its sources and **15.6%** did not want any information.



DISCUSSION

The study was conducted in Delhi-NCR among 1757 individuals to check their knowledge, attitude and perception level regarding air pollution. The majority of the respondents were males (68.8%) while 31.2% were females. Predominantly, Hindi was spoken by most of the people.

The study conducted by Xujun Qian et al in 2016 found that 5.80 % of the total respondents were satisfied with the air quality.¹¹ In another study, the majority (57%) of respondents rate the air quality in their city as acceptable or better.¹² One study showed that 3.0 percent of respondents in the total sample felt that the air quality in their cities is very good. Around 10.6 percent of the respondents believed that the air quality was toxic/hazardous.¹³

- In correspondence to other studies, our survey showed that the majority of respondents rate their city's air quality as **bad (36.2%) and very bad (21.5%)**. Only 1.2% of respondents felt that air quality is very good and 10.2% rated as good and 26.6% rated fair while 4.3% were not sure. This depicts people's understand about the poor air quality in Delhi-NCR, as can be seen from the result that most of them consider air quality to be bad and very bad.
- Study by C.M.S.R. Consultants and ASAR Social Impact Advisors Pvt. Ltd. showed that around 54.0 percent of the survey respondents had heard about the "Air quality index."¹³ while other study found that two-thirds of the respondents said they understand the concept of AQI.¹² Findings of the present survey are contrary to the studies mentioned above. Very few respondents were aware of the Air Quality Index (AQI). Less than one fourth (**16.4%**) respondents **were aware of the AQI**. The explanation may be as the current survey focused mainly on vulnerable populations who have a lack of information and understanding of air pollution.
- One study had also shown that awareness about the terms "PM2.5" and "PM10" was affirmed by 30.0 percent and 18.0 percent of the respondents respectively.¹³ In the present survey, **92.2% of respondents were not aware of the difference between PM2.5 and PM10.**
- The major sources of air pollution were motor vehicles, industries, burning of waste, cutting of trees, construction, and air conditioner.^{12, 13, 14, 15} Similarly in the current survey the three major sources were **vehicular emissions, waste burning, and industries/ factories.**
- Newspapers, T.V., Radio, social media, mobile and Internet ^{12, 13} were preferred mediums as per studies. The study conducted by Xujun Qian et al in 2016 found that television and internet resources have replaced books and newspapers as the primary sources for obtaining knowledge about haze and related protective measures.¹¹ In the current survey respondents rely mainly on **television, newspaper and internet** to get information regarding air pollution.

- According to one study, 89% of the respondents were not aware of the Air Pollution Monitors installed in their area while 88% of the total respondents had not seen any L.E.D. screens showing the air quality as severe/good/bad.¹⁴ Similarly in the present survey **92.2% participant** were **unaware of the closest air quality monitor** in their area and **71% respondents had never seen the screen displaying severe/ poor/ good air quality**. This shows people don't know how, when and where to check about air quality.
- More than 50% of respondents adjudged that air pollution led to detrimental health.¹⁵ Similarly in the present survey **82.2% of respondents** said that air pollution has an impact on their health.
- Studies showed that around 37% to 48.5% percent^{11, 14} of the respondents reported wearing masks while going out. As per the study by Envecologic -Twenty-six percent of respondents indicated that they use masks or air purifiers regularly.¹⁶ In the current survey **39.4% (692) respondents use a mask regularly and 60.6% (1065) did not use a mask**. This shows that people are not taking preventive measures to protect themselves from the adverse effects of air pollution.
- The study by Shakti Sustainable Energy Foundation and Edelman India states that out of 1102 respondents, 2% of respondents do not seek any kind of information. 70% of the respondents are seeking information on air pollution frequently.¹² While in the present survey **more than half of the respondents** were willing to acquire more information on **air pollution and its health impacts** followed by information on air quality index in their locality (39.3%), air pollution and its sources (25.8%). This depicts people who are willing to acquire information on various aspects of air pollution.

The survey has given an insight into understanding the perceptions of the general public concerning air pollution and future studies can be done to understand the association of various diseases with air pollution.



Morsel team conducting the survey



CHALLENGES

We were aiming to have 50 percent of females respondents, but because of many factors we were unable to do so. Many females' refused to engage in a survey as they were reluctant, most of the women remain at their homes and they didn't come out were the few reasons we couldn't reach a target of 50 percent for females. We were able to collect 31.2% of data from females.

We initially decided to cover 250-meter vicinity in and around metro stations but we were not able to capture the data within this limited radius so we increased our coverage to 500 m to 1km.

We were able to collect data from 2 schools since the survey was conducted in January-February the students were busy with their exams at that time. It was difficult to get the date from other schools for conducting a survey.

CONCLUSION AND WAY FORWARD

- The survey was conducted among 1757 respondents.
- The survey showed that there was a massive lack of awareness among the public.
- This report will guide other organizations to establish an effective communication strategy to raise awareness and understanding among people about air pollution.
- This survey helped in understanding the awareness level of the respondents as well as in generating the evidence on the public's perception towards air pollution across all age groups in Delhi- N.C.R. Based on that, we can create a plan of action to combat air pollution and find an appropriate solution for it by changing the knowledge attitude and practice levels among the public.
- This project aims to develop a comprehensive, innovative and multi-pronged public education campaign to combat air pollution in the Delhi-National Capital Region (N.C.R.), based on U.S. and Indian expertise, experiences, and best practices in minimizing the adverse impact of air pollution on the health of citizens, especially the most vulnerable.
- This project will be a building block in ongoing mission programs and initiatives to address air pollution and likely increase India's capacity to improve the health of its vulnerable population.
- Air- Pollution Common-Actions for tomorrow **(A.C.T.)**.

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