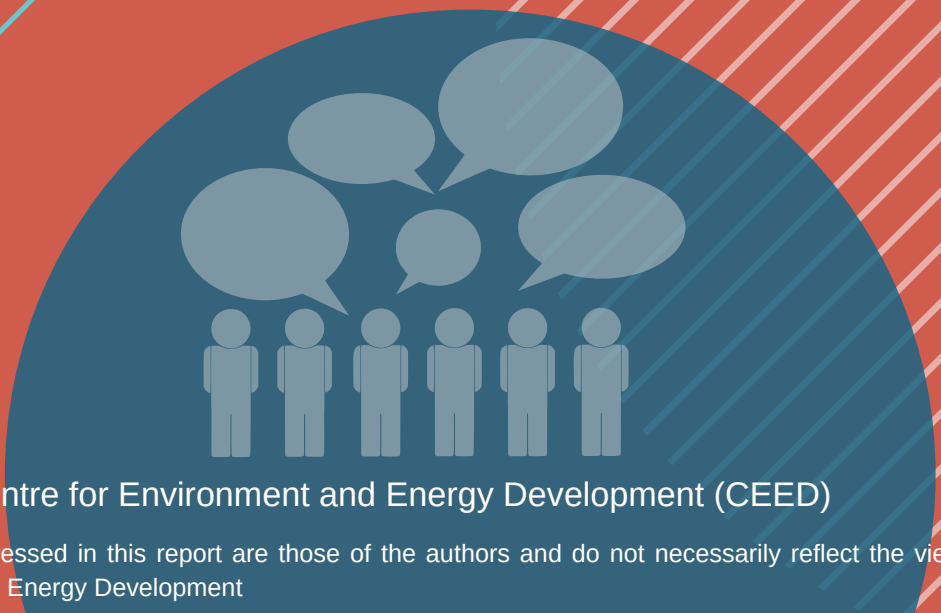
Centre for Environment and Energy Development
INSPIRING. EMOTIVE. RESPONSIBLE

PUBLIC PERCEPTION ON AIR POLLUTION

JUNE 2021



Author: Ankita Jyoti

EXECUTIVE SUMMARY

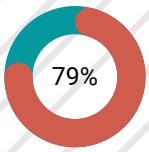
Air pollution is the greatest environmental risk to human health and it has increasingly become a major public health hazard in states like Bihar. A series of efforts have been made by the Bihar Government to reduce the air pollution in the state. Among the many measures, the Clean Air Action Plan, which aims to limit air pollutant emissions, is an important step. The success of any action plan to limit pollutant emissions also requires the acceptance and participation of the general public and this is emphasized in Patna's Clean Air Action Plan prepared by Bihar Government. The action plan talks about educating the public about several ways to reduce pollution, including the provision of access to air quality data and it also puts a grievance cell for the residents to register complaints for any visible polluting sources.

There has been a recent increase in research related to air pollution but studies on public perception and scale of awareness about air pollution and governmental efforts to control pollution are very limited. Thus, the present study is an attempt to present the perception and awareness of citizens of Patna about the sources of air pollution, air quality (AQ) scenario and the measures taken by the government.

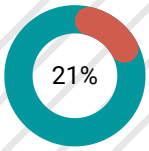
The survey was conducted in the Patna urban agglomeration area (PUAA) and seeks to take a representative sample from most parts of the city so that it can represent the total population. The survey was conducted between March and April in the suburban and central city of Patna. It was intended to cover heterogeneous population groups and target different stakeholders with different backgrounds and socio-economic statuses.

Data was collected from 1235 individuals. A total of 17 survey questions were asked, including demographic information (gender, age and occupation). The semi-structured questionnaire consisted of four parts. The first part was related to the personal information of the participants. The second part addressed participants' basic understanding of AQ-related information, and the next part included questions about the health effects of air pollution in the city and monitoring mechanisms. The last part of the questionnaire tries to understand the perception and awareness on the actions taken by the State Government.

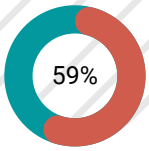
KEY FINDINGS-I



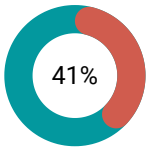
Respondents are not aware of the Patna' Clean Air Action Plan and its importance



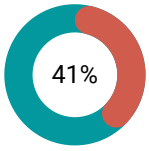
Respondents are aware of the Clean Air Action Plan



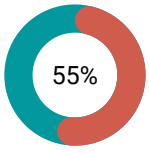
Respondents are not aware of any other action on air pollution control in Patna nor do they believe that the government has made efforts on pollution control.



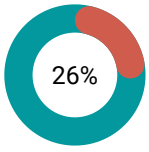
Respondents are aware of the actions taken by the government.



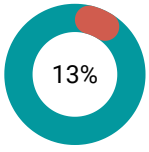
Respondents in the 15-30 years of age category have the highest level of awareness on government efforts as compared to other age groups.



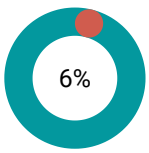
Among those who are aware of government actions to control air pollution majority of the respondents are not satisfied with the action taken by the government to control air pollution



Respondents said that the efforts are satisfactory

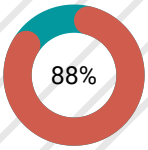


Respondents have no opinion on the government actions to control air pollution

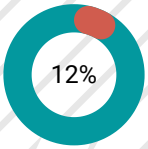


Respondents believe that efforts to control pollution are good

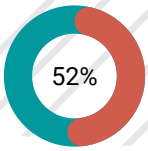
KEY FINDINGS- II



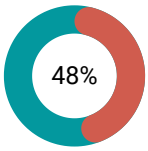
Respondents are not aware of any grievance redressal cell and have not registered a complaint about any pollution source



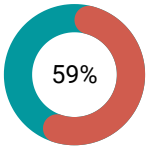
Respondents are aware of grievance redressal cell and have tried to register a complaint is.



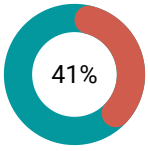
Respondent are aware of the air quality monitoring mechanism in Patna



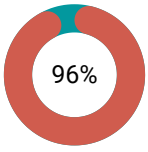
Respondents are unaware of air quality monitoring efforts.



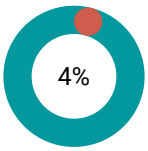
Respondents have never seen any of the monitors installed in the city nor know the specific locations out of the total respondents who know about air quality monitoring in Patna



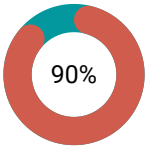
Respondents know the specific locations of AQ Monitors



Respondents felt that pollution had affected their life

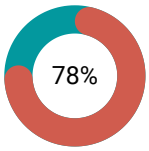


Respondents said that they are not affected by pollution at all

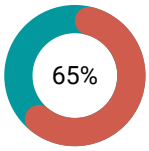


Respondent believes that the issuance of health advisory is very important to reduce the exposure

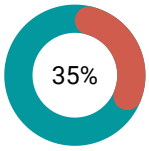
KEY FINDINGS-III



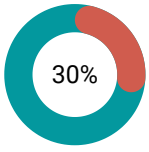
Respondents have never seen any public health advisory on air pollution



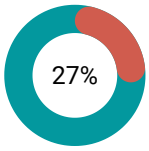
Respondents are aware of Air Quality Index (AQI) in Patna



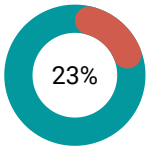
Respondents are not aware of AQI.



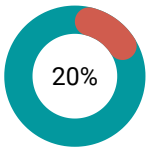
Respondents said that they never check the air quality level



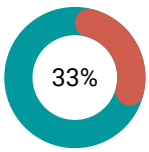
Respondents say that they seldom check air quality level



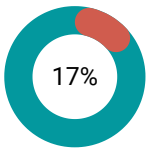
Respondents check the air quality level often



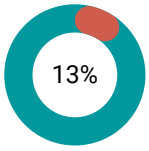
Respondents check the air quality level on a weekly basis.



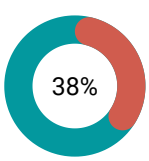
Respondents believed that motor vehicles contribute the most to air pollution in the city



Respondents believed road dust as the second most source



Respondents believed open waste burning as a major source of air pollution



Respondents believed construction activities, cigarette smoke, industries, use of biomass in cooking, waste disposal and burning of agriculture residue as a source of air pollution in Patna

OTHER FINDINGS

- Female **(46%)** respondents have a higher awareness than male (37%) respondents on government efforts to control pollution

- Of the total respondents **(21%)** who are aware of the Clean Air Action Plan, media (81%) respondents have shown a high level of awareness in all the defined categories. **23%** of Academicians, **10%** of Government service sector, **42%** of health practitioners, **9%** of Home makers, **42%** of Social activists, **18%** of street vendors and **20%** of the student respondent are aware of the clean air action plan

- **37.5%** of respondents rate air pollution in the city as 'Very Poor' . About **29%** of the respondents perceived air pollution level in the city to be severe, **22%** believed that the level is in Poor category; **9%** responded that pollution is moderate and only **2%** responded that air quality is healthy to breathe.

- Around **20%** of the total respondents believe efficient public transport as an important measure to improve AQ in Patna. The waste to Energy plants has been seen as another important measure by **20%** of the respondents. Almost **17%** respondents recommended Non-Motorized transport, cycling and pedestrian track as a means to reduce pollution, **13%** of respondents pitched for low emission vehicles, while **12%** recommended stringent implementation of Construction & Demolition Waste rules-2016 and **11%** believed renewable energy efficient in controlling air pollution. Only **7%** of people recommended clean cooking solutions for better air quality

- Concern for the senior citizen was perceived by the largest number of respondents **(32.5%),** followed by concern for the person with medical history **(25%)**, while **22%** were concerned for the newborn, **11%** were concerned for pregnant women, and around **6%** believes that air pollution health impact is a matter for concern for everyone. Around **3%** of respondents do not see pollution as a problem at all

MAJOR RECOMMENDATIONS

This survey study shows that citizens of Patna are aware of air pollution and strongly advocate for good air quality. However, it has been found that little understanding prevails on the sources of pollution or the presence of air quality monitoring in the city. The study indicates that a majority of the respondents considered vehicular pollution and road dust as the most polluting sources and interestingly, this result does not match with the emission data of Patna, which ranked biomass cooking as the most important source of air pollution in the city. It indicates that the results of such research have limited penetration into the public domain and the public is largely unaware of them. The survey clearly states that many people perceive the negative health effects from air pollution, but have no understanding of the daily air quality level nor do they understand the basic aspects of AQI.

The study also found a low level of awareness of the action plan and most people do not believe that the government has spent enough on air pollution measures. A complaint cell has been set up in Bihar to address the complaint of any pollution violation. It was made for the general public to ensure their participation in control measures, but most people do not know about this cell.

- **The study suggests greater transparency and public awareness on government efforts, particularly on the Clean Air Action Plan.**
- **There should be increased public awareness to fix accountability for the measures to control air pollution under clean air action plan.**
- **Awareness campaigns should be planned targeting all sections of the population. The study reveals that street vendors, rickshaw/auto drivers are less aware of air pollution and its health effects as compared to other respondents. This indicates that more awareness activities should be intensified for people with low education levels.**
- **Strengthen the knowledge on air quality monitoring and AQI in order to empower the public and ensure active citizen participation.**
- **More effective programs involving citizens for better education to raise environmental awareness should be developed.**

Table of Contents

List of Figures

CHAPTER-I

1. INTRODUCTION & OBJECTIVES

Air pollution is the greatest environmental risk to human health and it has increasingly become a major public health hazard in the state of Bihar. In the last few years the State government has shown some commitments and taken few steps to reduce the air pollution. In 2019, the Bihar government released the Clean Air Action Plan (CAAP)[1] of Patna, which has a set of strategies and commitments to reduce air pollution by 20-30% in the next five years. In the action plan public awareness and greater citizen participation have been placed as an important strategy for controlling the air pollution.

Citizens with greater access to information and understanding can demand, support and contribute to the required actions. A better citizen involvement toward air quality management and regulation is also critical for a shift toward new technologies and management alternatives to take place. Further, the level of air quality has a impact on the health and well being of sensitive populations and therefore it is also important to understand how they are affected, how they can minimise these impacts, and how they can influence decision makers for ensuring good air quality.

However, despite being so crucial factor, there is a little public understanding and engagement on air pollution in the city. And also very few studies and surveys have been conducted in the state to systematically study public perceptions related to air pollution.

Centre for Environment and Energy Development (CEED) conducted a survey in the month of March-April, 2021 to understand the extent of knowledge regarding the basic aspects of air pollution and information on various control measures taken in the city, such as:

1) How and to what extent does the public understand air quality?

[1] https://shaktifoundation.in/report/comprehensive-clean-air-action-plan-for-the-city-of-patna/?psec=NQ==#MTE5Mzc=

2) What does the public understand about the causes of air pollution and their associated health effects?
3) What is the public perception and awareness about the steps taken to control air pollution in the city?

This study aims to measure the level of public awareness about air pollution and it will assist in raising awareness, determining public attitudes and perception for improving the air quality situation in Patna.

The report is divided into three chapters, where the first chapter briefly states the objectives of the survey and methodology adopted while Chapter 2 presents the results of the study. Lastly, Chapter 3 & 4 presents the study's discussion and recommendations.

2. RESEARCH METHODOLOGY

2.1 Study Area and Sampling Strategy

The survey was conducted in the Patna Urban agglomeration area and it attempts to get a sample from most parts of the city so that it can represent the total population. It targeted both suburban and central city regions of Patna, between March and April month of 2021. The study aimed at engaging heterogeneous population groups and the survey targeted different stakeholders with diverse opinions, different socio-economic and educational backgrounds to make it more comprehensive (Table 1). The study also ensured gender representation for a better picture.

The respondents were surveyed at public locations in Patna. An online survey questionnaire was available for respondents from all locations.

Academician	Social Activist/NGO
General Public	Street Vendor
Government Service	Student
Health Practitioner	
Home Maker	
Media	

The survey questionnaire was distributed to the public between the ages of 15–75 years in each of 9 different groups. Questions were asked in Hindi and English for better public participation and outreach.

2.2. Questionnaire and Survey Approach

A semi-structured questionnaire to conduct the perception study was designed to collect and record information and observe public opinion on air pollution related issues. It included a series of questions, alternative answers, and space for respondent's inputs. It adopted a cross-sectional survey method, which consisted of four parts. The first part related to the personal information of the participants. The second addressed the participants' basic understanding of air quality related information and the next parts consisted of questions regarding air pollution's health impacts and monitoring situation in the city. In the last part, the focus was to get the overall perception of the government actions to control air pollution. During the survey, a total of 17 questions were asked and data were collected from 1235 individuals.

CHAPTER – II

1. RESULTS

1.1 RESPONDENT'S DEMOGRAPHIC INFORMATION

1.1.1 Sex and Age Distribution of Respondents

The distribution of the characteristics of the respondents by age and gender is presented below in Figure 1. ***Out of a total of 1235 respondents, 58% were male and 42% were female. Majority of the respondents (51%) were in the 15–30 year age group, followed by 21% in the age group of 31–45 years, 10% in the age group of 46–60 years, 1% in the age group above 60 years. Around 17% of the respondents did not mention the age group.***

The study also classified stakeholders among total respondents (Figure 2). Around 7% of the total respondent were Academicians, 5% belonged to Government services (Banking Services and govt departments), 1% from Health Practitioners, 5% Home Makers, 5% Media, 1% Street Vendors, 26% Students and 1% CSOs among other respondents.

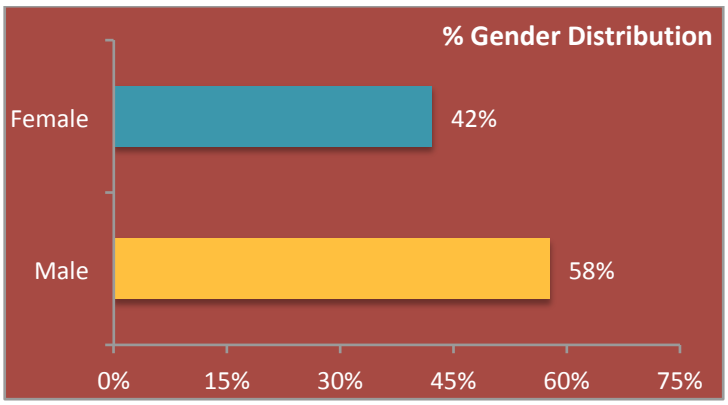


Figure 1: Gender wise distribution of respondents

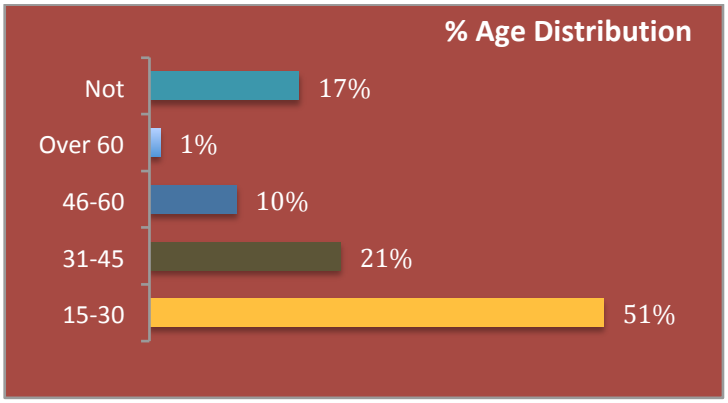


Figure 2: Age wise distribution of respondents

1.2. AWARENESS OF BASIC UNDERSTANDING ON AIR POLLUTION

The second section of the questionnaire tries to understand the level of public awareness on the basics of air pollution such as what are the sources of pollution in the city, the meaning of the term Air Quality Index (AQI) and other important basics. It presents an overall assessment of how much residents think about the prevailing air pollution in Patna.

1.2.1 Awareness on Air Pollution in the City

Figure 3 shows the awareness level on air pollution among the sample respondents. A high level of awareness has been observed, ***with 95% of all respondents saying they are well aware of air pollution. Only 5% are not aware of air pollution.***

The last few years have seen an increase in the level of awareness and validating the current findings with previous perception studies conducted by CEED also indicates this. A public perception survey conducted by CEED in the year 2016 suggested that about ***93% of the respondents are aware of the dangerous level of air pollution in the city and only 7% are not aware of it***.

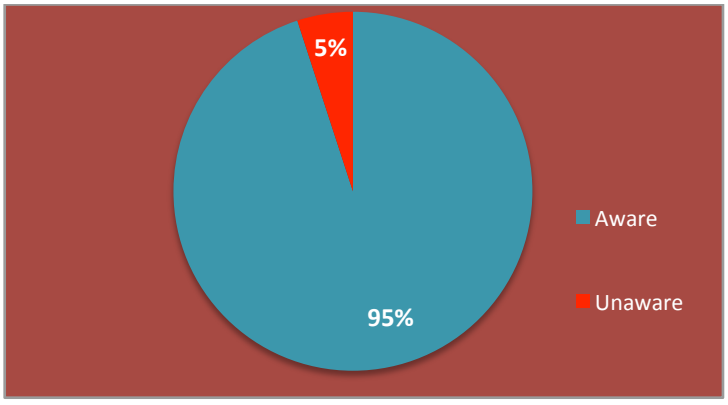


Figure 3: Awareness on Air Pollution

The distributed responses between different sex and various age groups have also been analysed in Figure (4). The level of awareness is almost the same in both the sexes, ***3% of men are not aware of air pollution and 97% are aware, while 4% of the total female respondents are not aware of air pollution and 96% are aware of it.***

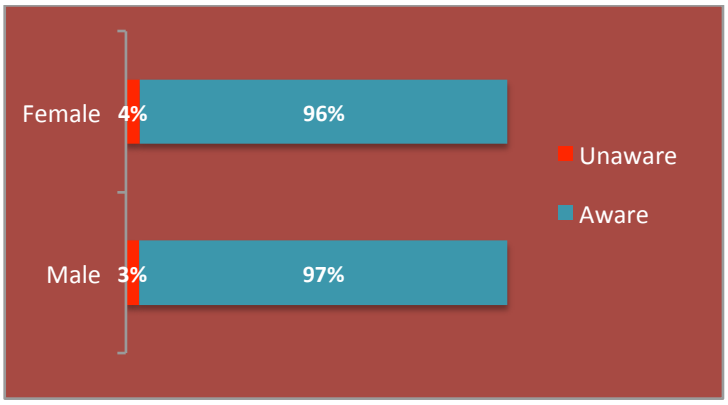


Figure 4:Gender Wise Awareness level on Air Pollution

Compared to the other age groups, ***the awareness level among respondents in the age group (45–60) showed the lowest (Figure 5), and it has been found to be maximum in the age group of over 60 years.*** This suggests that the understanding of air pollution is higher among younger respondents.

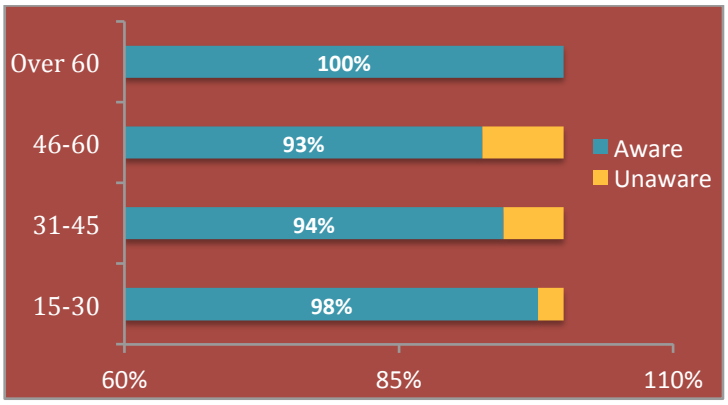


Figure 5: Age wise Awareness on Air pollution

1.2.2 Perception on sources of air pollution

Figure 6 presents the perceived ranking of contributions of sources to air pollution in the city. Vehicular pollution and Road Dust are considered as the most polluting sources, while agricultural activities and brick kilns have been seen as the least polluting ones. ***Maximum number of people (33%) believed that motor vehicles*** contribute most to the air pollution and the second leading cause was believed to be ***road dust as indicated by 17% of the respondents, followed by open waste burning 13%, construction activities (9%), cigarette smoke (7%), industries (6%), use of***

biomass in cooking (6%), Brick kilns (5%) and agricultural residue burning (4%) by them.

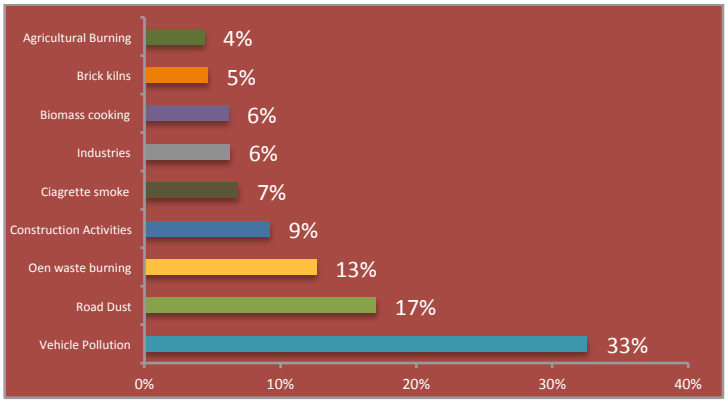
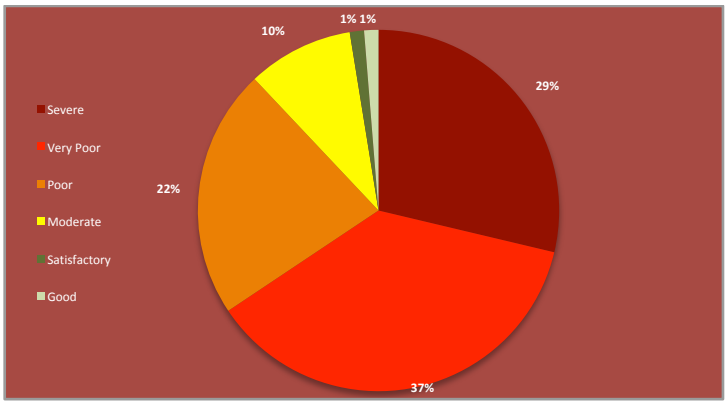


Figure 6: Most Polluting Sources of Air Pollution

The respondents believed biomass burning as the third least most significant source of air pollution, which is discrepant with emissions data showing that domestic sources ranked 1st in actual emissions[2]. Awareness of the source of pollution depends on whether a person has direct perceptual experience or risk and also the visibility of source emissions.

1.2.3 Perceptions on Air Pollution level in Patna

Figure 7 presents the results linking the respondents' understanding of the air pollution level in the city. A majority ***(37%) of respondents rate air pollution in the city as 'Very Poor'*** and this appeared to be consistent with the actual air quality situation in the city. About ***29% of the respondents perceived air pollution level in the city to be severe, 22% believed that the level is in Poor category; 9% responded that pollution is moderate and only 2%*** responded that air quality is healthy to breathe.



[2] https://www.cstep.in/drupal/sites/default/files/2020-02/CSTEP_RR_PCAAP_101219.pdf

Figure 7: Perceptions of Air Pollution level in Patna

***Male** respondents see air quality conditions worse than **females, which largely indicates** that **men** are more exposed to and concerned about environmental hazards than **women**.*

1.2.4 Awareness on Air Quality Index (AQI)

In 2015, the government developed Air Quality Index (AQI)[3] as a communication tool to provide information on the air quality of a particular place. It is calculated and based on eight major pollutants. Our survey intends to understand the level of awareness on AQI in Patna.

It can be seen (in Figure 8) ***that around 65% of respondents knew about the AQI in Patna though a significant percentage (35%)*** of respondents didn't know anything about the AQI.

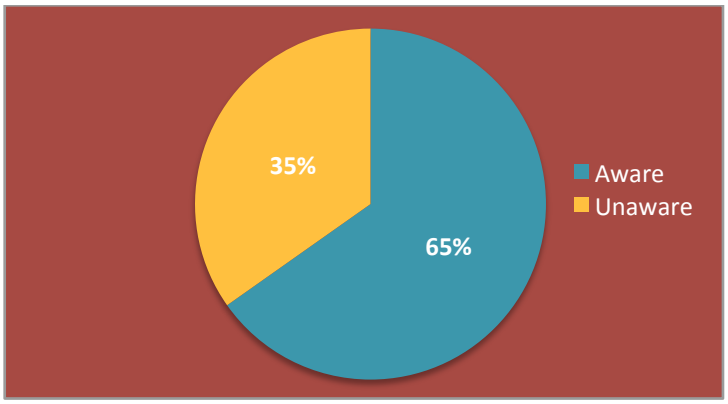


Figure 8: Awareness on Air Quality Index

The study shows that people are aware of air pollution but there is not enough understanding in the city about AQI and its importance. ***This indicates that a tool designed for day-to-day air quality communication in the city does not appear to be very helpful in Patna.***

The awareness level on AQI among ***female respondents (62%) is relatively low as compared to male respondents (69%).*** While analyzing the responses by age groups, not much difference was observed

Awareness about AQI and its relevance was ***maximum in the 31–45 years age group (68%), followed by the 15–30 year age group (67%). Around 62% of the respondent in the age groups of 46– 60 years know about AQI***. The maximum respondents who were neither aware of AQI nor its relevance have been found over 60 years of age.

[3] https://app.cpcbccr.com/ccr_docs/FINAL-REPORT_AQI_.pdf

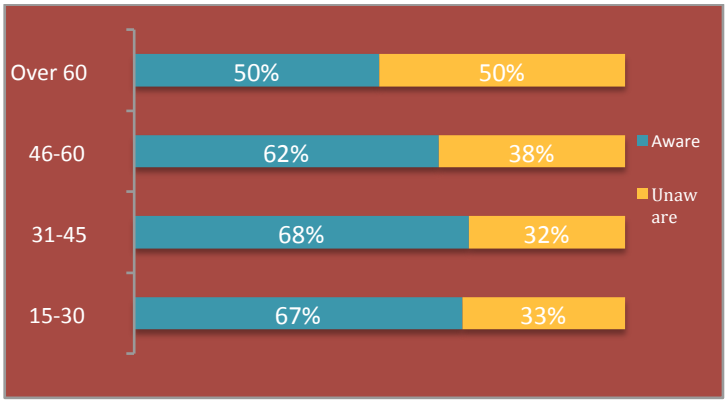


Figure 10: Age Wise awareness on AQI

1.3 PERCEPTION OF HEALTH IMPLICATIONS ON AIR POLLUTION

It is important to understand how local residents see and understand air pollution and its potential impact on human health. The section 3 of the questionnaire is designed to observe the level of awareness on the health implications of air pollution.

1.3.1 Perception of Risk due to air pollution

Various studies show that people in Patna consider air pollution as the major influence on human health and ***our analysis also suggests that a majority (82%) of the respondents felt that air pollution had affected their life while 14% felt that they are little affected. Only (4%) said that they were not affected at all (Figure 9)***.

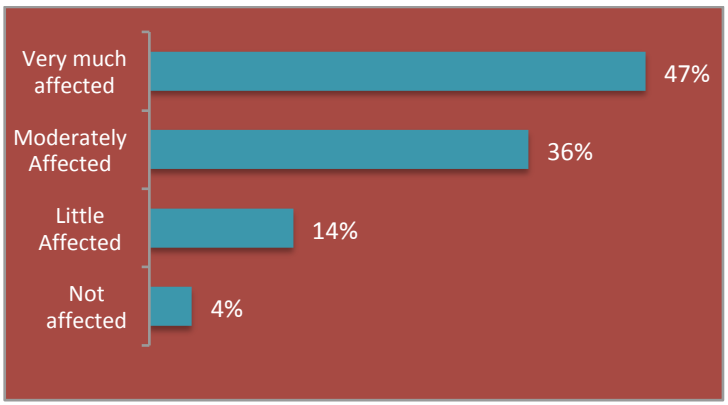


Figure 9: Perception of Risk due to air pollution

The health risks of air pollution are considered to be different due to different demographic characteristics. ***For example, Figure 10 suggests that men (51%) perceive higher levels of air pollution risk than women (38%). This may be due to exposure of pollutants during peak hours of traffic.***

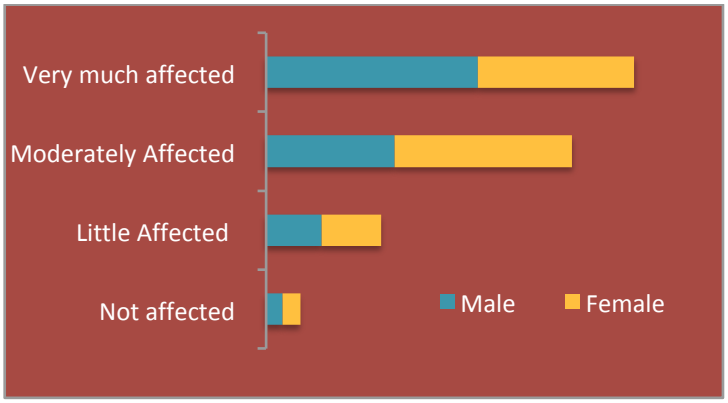


Figure 10: Gender wise Perception of Risk due to air pollution

The study has also indicated that elderly people pay more attention to health and safety to air pollution risks and perceives air pollution as a higher risk. Our analysis suggests higher risk perception of air pollution among middle-aged people as compared to young aged respondents.

1.3.2 Perception on who is at risk due to Air pollution

Studies have also tried to assess the notion of who is at more risk due to air pollution. Respondents were asked whom they see most vulnerable in the family affected by air pollution. The concern for the senior citizen was perceived by the majority of respondents (***32%), followed by concern for person with existing disease (25%), while 22% respondents were concerned for the newborn, 11% for pregnant women, and 6% people believe that air pollution related health impact is a matter for concern for everyone*** (Figure 12***). Around 3% respondents*** do not see pollution as a serious problem.

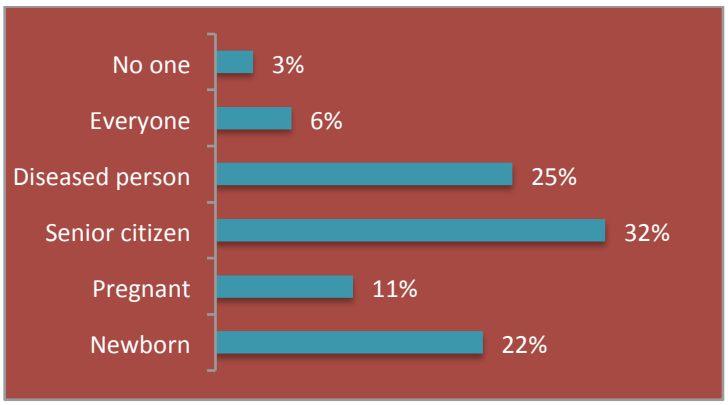


Figure 12: Perception on who is at more risk from Air pollution

1.3.3 Perception on importance of Public Health Advisory

A majority of people ***(around 90%) indicated that the issue of health advisory during peak air pollution days is very important to offset the ill effects while roughly 8 percent*** feel not required by (Figure 13). **The report also tries to understand whether the citizens of Patna have seen any public health advisories issued by the government in Patna. Findings suggests that 78% of respondents have never seen any public health advisory on air pollution, only 22% have seen.**

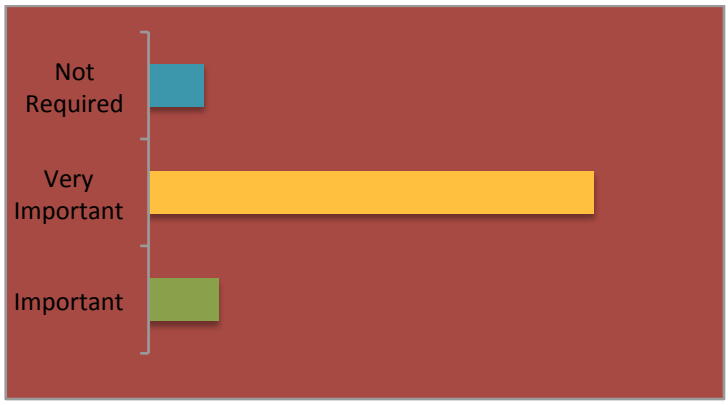


Figure 13: Importance of Health Advisory

1.4 AWARENESS ON AIR QUALITY MONITORING MECHANISM

An informed public on air quality monitoring often helps to increase public awareness on the severity of air pollution. Section 4 of the questionnaire tries to understand people's perception the same.

1.4.1 Awareness on air quality monitoring in Patna

Respondents were asked if they know or heard about the air quality monitoring stations in the city. The study found that a considerable proportion of the respondents did not know how the air quality in the city is being monitored. As the Figure 14 tells, a sizeable number of people, ***52% of the total respondents, are aware of air quality monitoring in Patna, while the rest (48%) are unaware of air quality monitoring.***

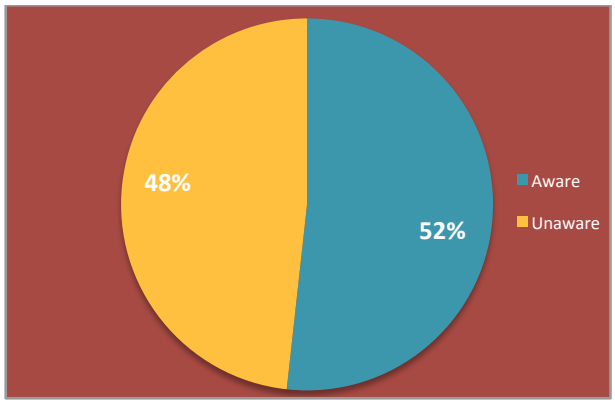


Figure 14:Awareness on AQ monitoring

Our analysis also suggests that female respondents were less aware of air quality monitoring than male respondents. **Around 54% of male respondents are aware of air quality, while only 49% of females are aware of it (Figure 15).**

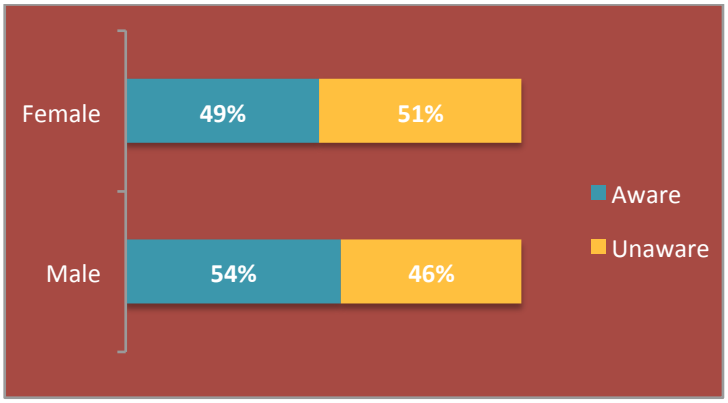


Figure 15: Gender Wise Awareness on AQ monitoring

1.4.2 Awareness on location of Air Quality Monitoring

The study also tries to understand the awareness level of those 52% of the respondents who know about the air quality monitoring about the location of air quality monitoring in the city or if they have ever seen any air quality monitors in the city.

Of the total respondents who know about air quality monitoring in Patna, ***59% have never seen any of the monitors installed in the city nor know the exact locations, although around 41% respondents are aware of*** (Figure 16).

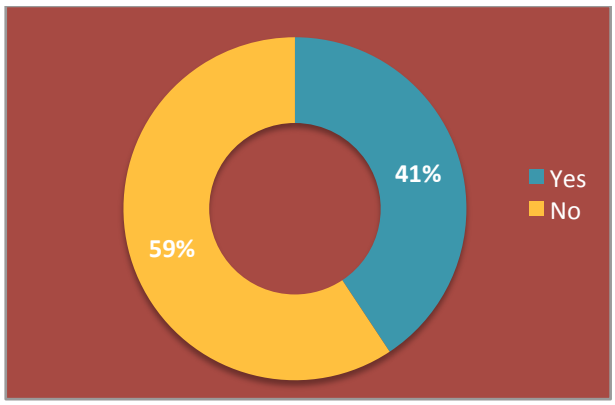


Figure 16: Awareness on Location of Air Quality Monitoring

Our analysis tries to look at the awareness level in different categories of heterogeneous groups. And it suggests (Figure 17) that the major awareness on air

quality monitors among the categories is: ***media (89%), academicians (68%), and government employees (60%). The least awareness is among the street vendors (18%), home makers (25%) and students (35%).***

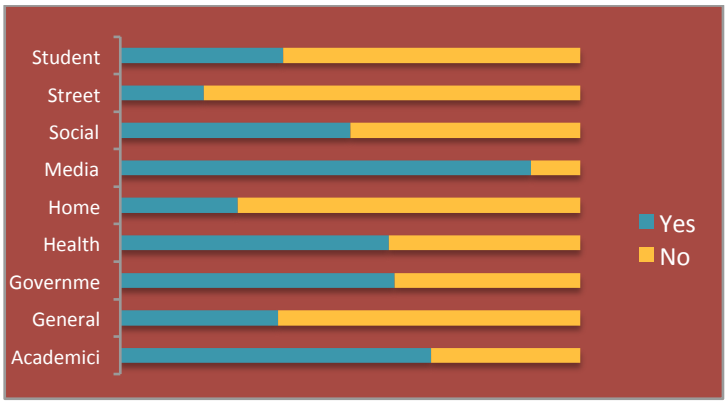


Figure 17: Awareness on Location of AQ Monitoring among various respondent' group

1.4.3 Perception on checking the Air Quality Information

The study also tries to understand how often respondents try to find out the air quality level of the city. Four different options were given to understand the frequency (Often, Weekly, Seldom and Never). ***Around 30% said that they never seek information on the air quality level, while 27% indicated that they seldom check. Only 23% check the air quality level often while 20% respondents looks at on a weekly basis (Figure 18).***

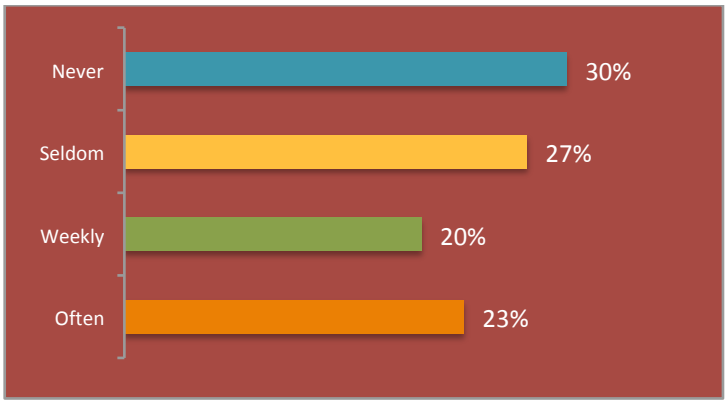


Figure 18: Perception on getting the Air Quality Information

1.5 PERCEPTIONS ABOUT GOVERNMENT ACTIONS AND POLICIES

The government has made few initiatives to improve the air quality and it is important for the general public to have proper awareness of these policies and actions to support them. An informed public often helps achieve strong public demand to address the issue, pushing for changes in individual behavior and

government efforts to control pollution. Section 5 of the questionnaire tries to understand the awareness level on government efforts.

1.5.1 Awareness about the policies implemented by the government for air pollution control

Our analysis of public understanding on policies and controls for air pollution found it to be relatively low in the city. It was found that, around ***59% of participants were not aware of such actions or did not believe that the government spent enough on environmental protection (Figure 19). Only 41% know about the few*** actions taken by the government.

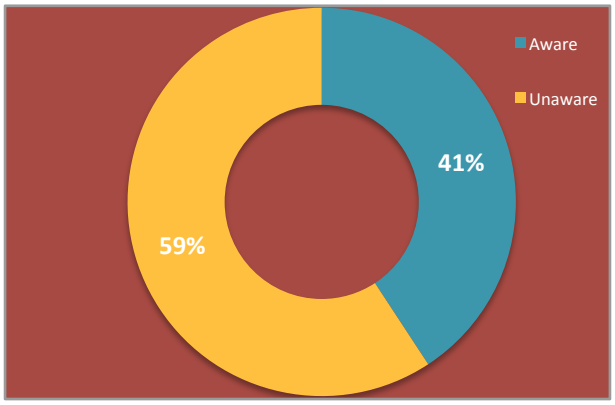


Figure 19: Awareness on the Government policies/actions

Participants who were in the 15-30 years age group are the most likely to have a ***high awareness level (41%) about government actions*** compared to other age groups. Interestingly, among the gender classification female (46%) respondents have a high awareness level of government actions as compared to male (37%) respondents (Figure 20).

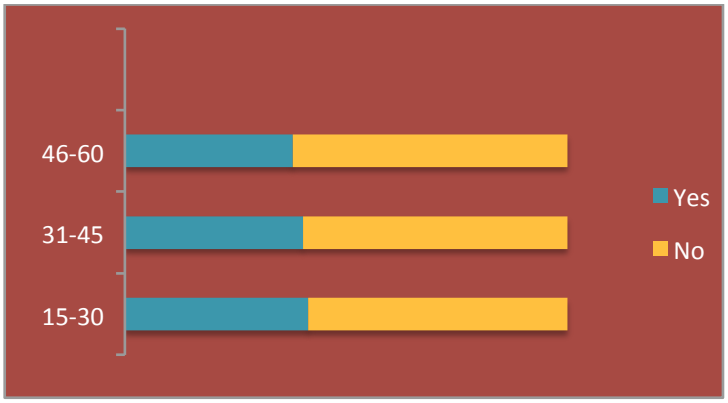


Figure 20: Age Wise Awareness on the Government policies/actions

1.5.2 Popular action amongst masses

The government has made few initiatives to improve AQ, such as ban on old diesel vehicles and polluting brick kilns, introduction of CNG vehicles, waste to energy generation plants, increased monitoring stations, etc. As a follow-up to the question above the participants were asked about which of these governmental actions they know or hear about.

As the Figure 21 indicates that introduction ***of CNG vehicles are perceived as the most popular governmental actions, while 'Waste to Energy Plant' are seen as the least popular ones (6%).*** The ban on old polluting diesel vehicles was the second most popular initiative in these government actions.

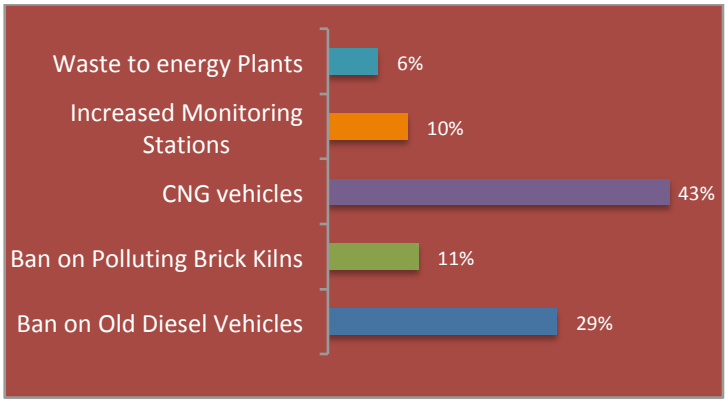


Figure 21: Popular action amongst masses

1.5.3 Awareness on Clean Air Action Plan

The Bihar government has prepared a Clean Air Action Plan for Patna in the year 2019 and the study tries to understand the level of awareness on this plan. The analysis indicates (Figure 22) that about ***79% of the respondents do not know about the clean air action plan and its importance in controlling the air pollution in our city. Merely 21% of the respondents know about the clean air action plan.***

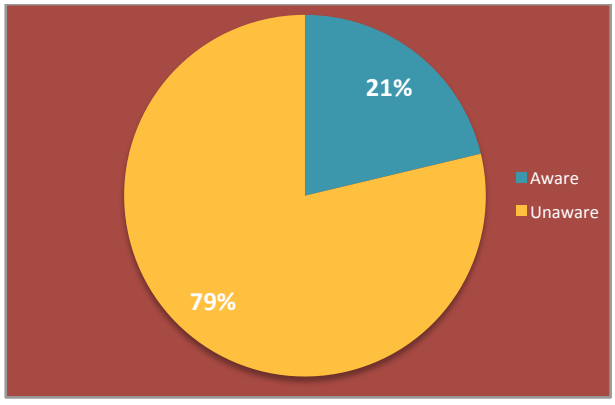


Figure 22: Awareness on Clean Air Action Plan

Of the total respondents (21%) who are aware of the Clean Air Action Plan, media (81%) respondents have shown a high level of awareness in all the defined categories. 23% of Academicians, 10% of Government service sector, 42% of health practitioners, 9% of Home makers, 42% of Social activists, 18% of street vendors and 20% of the student respondent are aware of the clean air action plan (Figure 23).

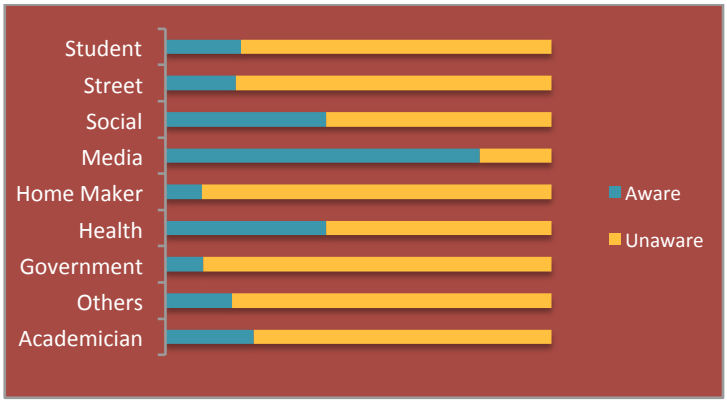


Figure 23: Category wise Awareness on Clean Air Action Plan

1.5.4 Awareness on Complain on Redressed Cell

Under the Clean Air Action Plan, a Grievance Redressal Cell has been set up to lodge complaints of any sound or polluting sources. Our study tried to understand the public awareness level of such action. ***Around 88% of the respondents do not know about such a cell and has not complained about any polluting sources, while roughly 12% responded knows about it and has made an effort to lodge complaints (Figure 24).***

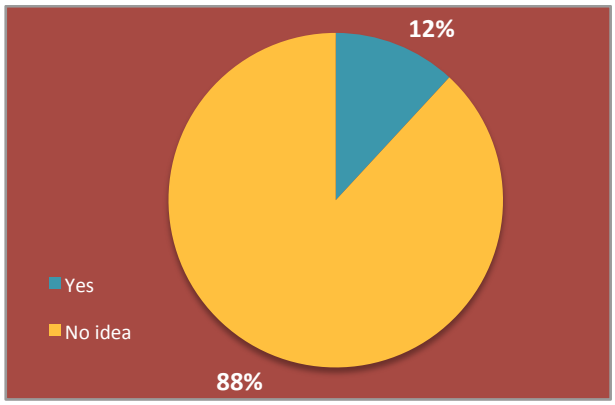


Figure 24: Awareness on Complain on Redressed Cell

1.5.6 Perception on Government's efforts to control pollution

This study has also attempted to assess people's perceptions about governments'

interventions. How successful were these interventions in terms of either process or output this can be slightly assessed from Figure 25.

Majority (55%) of respondents are not satisfied with the action taken by the government for controlling air pollution while 26% said the efforts are satisfactory. Around 6% of the respondents believe the efforts are good to control pollution. About 13% of the total respondents don't have any idea.

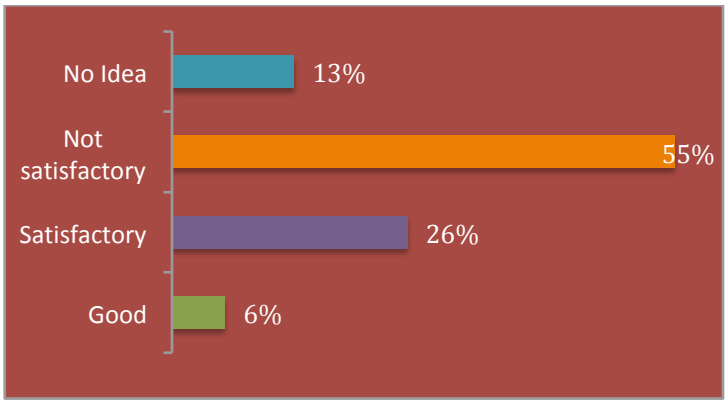


Figure 25: Perception on Government's efforts to control pollution

1.5.7 Perception on Popular measure to control pollution

The study also tries to understand public perception on various measures to control air pollution. About ***20% of the respondents see efficient public transport as in important measures to improve AQ in Patna***. The waste to Energy plants has been seen as another important measure to control the pollution ***by 20% of the respondents.*** **Around 17% people recommended Non-Motorized transport and cycling and pedestrian track as a means to reduce pollution.**

About ***13% of respondents called for pushing for low emission vehicles like CNG and Electric Vehicles (EV). A few respondents (12%) recommended that stringent implementation of Construction and Demolition Waste rules-2016 is required, while 11% people believed that renewable energy will be efficient in controlling air pollution. Only 7% people have recommended clean cooking solutions for AQ challenges*** *(Figure 26)**.***

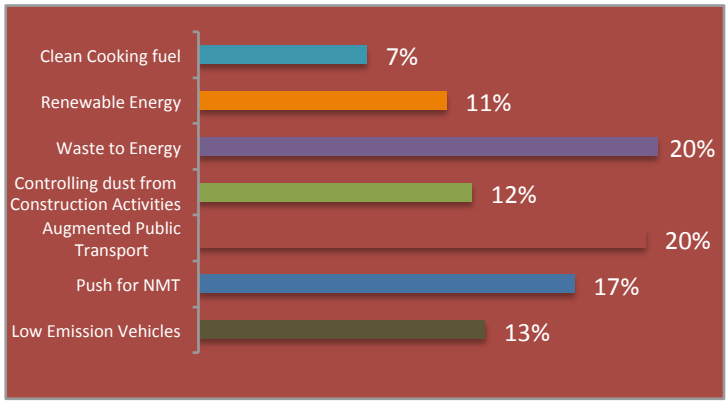


Figure 26: Perception on Popular measure to control pollution

CHAPTER-III

DISCUSSIONS

The perception study demonstrates that the citizens of Patna know about the air pollution and strongly advocate for good air quality. However, it has been found that a very little understanding on the sources of pollution or the presence of air quality monitoring in the city is prevalent in the city. The study indicates that the majority of respondents considered vehicular pollution and road dust as the most polluting sources of pollution, while biomass cooking, agricultural activities and brick kilns have been seen as the least polluting ones. Interestingly, this result is discrepant with Patna' emissions data which has indicated cooking on biomass as the most important source of pollution in Patna. This may further indicate that the results of such research have limited penetration into the public domain and the public is largely unaware of them. The other probable reason of such a result is the fact that awareness of the source of pollution depends on whether a person has direct perceptual experience or risk through and also the visibility of source emissions.

The survey results clearly state that many people in the city perceive and feel the negative health effects from air pollution, but have no proper understanding of the daily air quality level nor do they understand the AQI. Better communication on the daily AQI remains a major challenge in the city. A relatively high proportion of respondents do not know about air quality monitoring and have never seen any AQ monitor in the city though 6 monitors are installed in the city at major traffic junctions.

Among the innovative aspects of this study was the discovery of participants' awareness of the policies and actions taken by the government to control air pollution. Any action on air quality issues can be successful only if the general public gets good support from it. The Clean Air Action Plan prepared for Patna also emphasized public awareness on a large scale as an important measure. Surprisingly, the study found a very low level of awareness on the action plan. ***Merely 21% of the respondents know about the clean air action plan.***

It has been found in our study that the majority of respondents ***did not believe that the government has spent enough on air pollution measures.***

A complaint cell has also been set up in Bihar to lodge complaints of any violation related to air pollution under the Clean Air Action Plan. It was made for the general public to ensure their active participation in air pollution control, but the study shows that most of the people of Patna do not know about any such cell.

Last but not the least, this study tries to understand the public perception on the best measures to control air pollution in the city and calls for a better and efficient public transport Patna as a popular measure to improve the air quality in the city.

CHAPTER-IV

RECOMMENDATIONS

Air quality is a matter of grave concern and there is a perpetual need of more effort on sharing information and raising civic awareness on air pollution problems. Following are the main recommendations of the study:

1. **The study suggests greater transparency and public awareness on government efforts / Clean Air Action Plan.** The dissemination of government actions/measures to control air pollution is an essential feature of the relationship between effort and impact in air pollution control. These actions have to be mainstreamed into the public debate and have to be conveyed in an accessible format and easy-to-understand language. It has been observed that there is a greater public awareness of government actions to control pollution, it will help in changing the behaviour and attitude of the citizens and will also ensure public participation in the government efforts.

2. It is recommended to increase public awareness on fixing the accountability for mitigation measures to control air pollution.

3. It is recommended that awareness activities should be planned inclusive of all levels of populations. The study shows that street vendors and rickshaw / auto drivers are less aware of air pollution and its health effects than other respondents. This suggests that more awareness-raising activities should be accelerated for the people with lower education levels.

4. **It is recommended to strengthen knowledge on air quality monitoring and AQI in order to empower the public with more understanding on air pollution and ensuring citizen participation**.

5. It is recommended to develop more effective programs involving citizens for better education and more activities to raise environmental awareness.

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