# Traffic Police Knowledge Awareness, Attitude and Practice on Motor Vehicle Pollution City of Nairobi-Kenya

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**Abstract** People's knowledge of awareness, attitudes and practices towards motor vehicle emissions that are dangerous and a requirement is paramount for reducing exposure among people, their impact and response of interventions that are aimed at encouraging behavioral change. This study evaluated the knowledge, awareness, attitude and practice on motor vehicle pollution among the traffic police officers in Nairobi city. The study was directed by the following the objectives: To appreciate the level of knowledge among the traffic police officers about and attitudes towards motor vehicle air pollution and associated health effects. The survey interviewed a purposive and non-random stratified sample of 127 police officers, according to their seniority, years of employment and work experience, from the target population of traffic police working in major road junctions within the CBD, Nairobi Kenya. The sampled junctions were Kamukunji, Railways terminal, University way and Uhuru Highway roundabouts. In addition, from the leadership rank, five (5) key informants were also interviewed. Data was collected using self-administered questionnaires. Discussions were held with the key informers. The study found that majority 40.2% said that they had a good knowledge of the issue. 96.3% indicated they had Knowledge of the laws on traffic related pollution and traffic regulations training. 98.1% had attended a traffic management course. 76.6% indicated that they had usefulness of motor vehicle air pollution information. The study concludes that motor vehicle air pollution affects the day to day operation of the officers; especially those working in the traffic department.

*Keywords*: *knowledge, awareness, attitude, motor vehicle pollution*

## 1. Introduction

Occupational health risks and hazards due to polluted environment have become a serious public health concern where there is unplanned urbanization. Contamination due to road traffic is a solemn health hazard, thus persons like traffic police who are constantly unprotected may be at an augmented threat [1]. The traffic police suffer a physical pressure in an atmosphere contaminated by fumes emitted from tail pipe of vehicles, use of blustering horns, emission from nearby brick factories, and discharge of dust in the air by a speeding vehicle [2].

The traffic volume in Nairobi metropolitan CBD has been accumulating year after year and the situation is worsening due to the industrial and commercial development in the sub-urban areas [3].

An estimated amount of about 90% of urban ambient pollution in emerging cities of developing nations can be accredited to motor vehicle emissions [4]. The swelling traffic overcrowding in Nairobi, which is dominated by a number of old and poorly maintained motor vehicles, poor road networks and impure or low quality fuels further

exacerbate this problem. Nairobi roads are journeyed by a mixture of ever increasing numbers of passenger cars, light duty trucks, heavy duty trucks, minibuses and other types of vehicles. The heavier vehicles (Buses and trucks) rely on fuel diesel that leads to high particulate matter emissions. In addition, most newly registered vehicles are imported as used vehicles which further increase their pollution capacities [5]. The high number of roundabouts and junctions on the city roads leads to slowing of vehicles and high congestion which leads to more air pollution.

Previously, slight consideration has been paid to many issues touching the police service. Although a number of reforms have been undertaken within the police force, much still remain to be done. Behind this backdrop, it was anticipated that the level of sensitization, training and the mandate of the entire Police force in addressing health concerns of its members is low. In addition to low level of awareness and knowledge about motor vehicle air pollution, it was anticipated that traffic police officers did not have the right perception or attitudes when it comes to motor vehicle air pollution [3].

There is limited evidence on traffic police knowledge, attitude, awareness and practices of motor vehicle

pollution in Kenya. Such data is required to inform reform in training curricula and police practice after graduation. It will also inform future larger studies seeking to further clarify effects of motor vehicle pollution on people. Consequently, the objective of the study was to evaluate the knowledge, attitudes and practice among the traffic police in Nairobi city Kenya. This study provides insights into traffic police perceptions on motor vehicle emissions and what they consider to be their role in addressing air pollution.

## 2. Material and Methods

### 2.1. Study Area

The study was carried out in the city of Nairobi, the capital city and the largest urban centre in Kenya and the one having the highest number of motor vehicles. The city is situated 140 kilometers south of equator and 500 kilometers west of the Indian Ocean at $1°17'S36°49'E$. It occupies $696km^2$ at an altitude of 1,661 meters above sea level (Nairobi county website, 2016).

### 2.2. Study Population

The descriptive exploratory study was targeted the traffic police working within the CBD and its outskirts. Severely congested roundabouts, within the CBD and its outskirts, were selected purposefully for the study. These are the Kamukunji, Railways terminals, University way and Uhuru Highway roundabouts manned by a population of 127 traffic police officers. Self-administered questionnaires were distributed to all the 127 participants. In addition, five (5) senior ranking officers participated in a key informant discussion. All the officers participated in the study. For the proposed study, the researcher enlisted the services of traffic police leaders that is, the Base Commanders to help in the identification of the Traffic police officers according to their seniority of year of employment and work experience. It provided for equal chances of selection of individuals of similar level of experience.

### 2.3. Survey Instrument

The study used a self-administered English language questionnaire to collect data, all traffic police officers being sufficiently literate as evidenced by the entry qualifications. The questionnaire was pretested with 8 traffic police officers of Kamukunji police Station who were not used in the actual study. The pretesting feedback helped establish internal consistency of the questionnaire.

Before the self-administering of the questionnaires, traffic police officers were briefed on the purpose of the study. Thirty to forty five minutes were allowed for each respondent to fill in the answers in the presence of the researcher and his assistants. The questionnaires were collected immediately they were filled and validated and where necessary clarification sought from the respondent.

## 3. Data Analysis and Results

### 3.1. Knowledge and Attitudes towards Motor-Vehicle Pollution and Health

To understand how well the respondents understand about motor-vehicle pollution the respondents were asked to rate themselves between very good, good, poor and very poor. Most of them (40.2%) said that they had a good knowledge of the issue. Those who rated their knowledge as very good were 19.6%, poor (13.1%) whereas 27.1% of the respondents rated their knowledge as very poor. (See Table 1).

### 3.2. Levels of Knowledge on Motor-vehicle Pollution

To further understand their knowledge of the laws on traffic related pollution they were asked if they had ever detected motor vehicle emissions violations in their work period and in the past thirty days. (See Table 2).

They were further asked if they had ever attended any traffic management course. The findings revealed that most of them (98.1%) had attended a traffic management course. The study also wanted to know if the respondents had been trained on motor vehicle air pollution in the course they attended. It was noted that 67.3% reported to have been trained in that area whereas 32.6% had not been trained on motor vehicle air pollution. This is as shown in Table 2.

The study went further to ask the respondents to rate level of usefulness of the information on motor vehicle air pollution were. This was measured in four categories (very important, important, moderately important and not important), the results revealed that most of the respondents (80.4%) considered the information as very important.

The respondents were also asked to rate how difficult it was for them to access motor vehicle air pollution related information. This was measured in four levels which were; very difficult, difficult, easy and very easy. In this section, 52.3% said that it was easy, 29.9% (difficult), 11.2% (very easy) and only 6.5% said it was very difficult. (See Table 3).

**Table 1. Knowledge and attitudes towards motor-vehicle pollution and health**

| Source of information | Proportion of respondents | Response | % of respondents |
|---|---|---|---|
| Observation | 75.7 | Very good | 19.6 |
| Television and radio | 9.3 | Good | 40.2 |
| Newspapers | 6.5 | Poor | 13.1 |
| Magazines | 4.7 | Very poor | 27.1 |
| Scientific journals & publications | 2.8 | | |
| Others | 0.9 | | |
| Total | 100 | Total | 100 |

**Table 2. Knowledge of the laws on traffic related pollution and traffic regulations training**

| Question | Yes, % | No, % |
| --- | --- | --- |
| Have you EVER in your daily traffic duties detected a case of motor vehicle emissions violation? | 96.3 | 3.7 |
| Have you in the LAST ONE MONTH (30 days) in your daily traffic duties detected a case of motor vehicle emissions violations? | 74.8 | 25.2 |
| Have you ever attended any traffic management course? | 98.1 | 1.9 |
| In the course, were you trained on motor vehicle air pollution? | 67.3 | 32.6 |

**Table 3. Importance of motor vehicle air pollution information and ease of its access**

| Rating of the need of information on motor-vehicle pollution | | Rating of ease of access of the information | |
| --- | --- | --- | --- |
| Response | Proportion of respondents, % | Response | Proportion of respondents, % |
| Very important | 80.4 | Very difficult | 6.5 |
| Important | 15 | Difficult | 29.9 |
| Moderately important | 2.8 | Easy | 52.3 |
| Not important | 1.9 | Very easy | 11.2 |
| **Total** | **100** | **Total** | **100** |

## 3.3. Usefulness of Motor Vehicle Air Pollution Information

The research also sought to find out if the respondents would exactly know motor vehicle air pollution information. Majority of them (76.6%) responded 'Yes' to this question whereas only 23.4% answered 'No.' They were further asked to say how that information would have looked like, they had the following to say: The information will be in the form of documentaries; The information would come in the form of pamphlets and fliers; The information would have come in the form of television and radio advertisements; The information would have been packaged in the form of lectures; The information would come in the form of police magazines and Publications of information in the local dailies.

Lastly the respondents were asked to suggest ways in which information on motor vehicle air pollution can made more accessible to the traffic police, they had the following to say: A data base of information should be created and made accessible to the police. Topics on motor vehicle air pollution should be integrated in the traffic course; There should be more of information aired on television to sensitize the public; There should be a partnership with National Environmental Management Authority (NEMA) in the development of training materials; Regular seminars should be organized for the police officers and the public on motor vehicle air pollution; Creating a special unit to deal with the dissemination of information on motor vehicle air pollution information etc.

## 3.4. Further Knowledge on Motor Vehicle Air Pollution

After responding to all the questions seeking to measure their knowledge of motor vehicle air pollution, the research asked the respondents to give some suggestions on ways of making traffic management duties safer from exposure to motor vehicle pollution. The following suggestions were put forward: Measures should be put in place to protect the officers working in the traffic department;

There should be a crackdown of un-roadworthy vehicles; Giving the officers protective gears such as face masks to lessen the risk of their exposure to motor vehicle air pollution; Decongestion of traffic from the central business district; Ensuring there is regular inspection to eliminate unfit vehicles from the road; Regular maintenance of the streets and cleaning to reduce on the amount of dust emitted; Construction of proper road networks to decongest the city and Sensitization of the public about the effects of motor vehicle air pollution

## 3.5. Causes of Motor-Vehicle Air Pollution

The research was also interested in finding out the causes of motor vehicle air pollution. The respondents were therefore asked to list some of the causes that they were aware of. This was also done qualitatively by making them respond by filling in a list of causes they were aware of. What came out most common was the traffic congestion in the city and the many unroad worthy vehicles that are still allowed to operate. However that was not the only one, the following causes were also mentioned:

Additional objective of the study was to find out the attitudes of traffic police officers on motor vehicle emission contamination and the health effects associated with it. Ajzens theory of planned behaviour publishes in 1986 [6] states that beliefs – such as espoused in attitudes, are the greatest predictor of behaviour. This means that attitudes not only define priorities but also determines problem solving activities. As such, traffic police officers were asked Likert-scale type questions on whether they felt that the police administration was taking adequate measures to protect officers from mv air pollution. 56.6% said that they strongly disagreed that adequate measures were being taken, 32.1% said they disagreed while only 5.7% agreed that the police administration was taking adequate measures to protect police officers from mv air pollution. On the statement that traffic police officers take precautionary measures to protect themselves from mv air pollution, 39.6% disagreed, 34.9% strongly disagreed, 19.8% were not sure while 0.9% agreed with the statement. (See Table 4).

**Table 4. Perceived causes of motor-vehicle air pollution**

| Causes of motor-vehicle air pollution | Frequency | percent |
|---|---|---|
| Excessive smoke emitted by motor vehicles. | 35 | 33.1 |
| Mixing of different types of fuel | 16 | 15 |
| Modification of exhaust pipes that tampers with normal air flow from the engines | 15 | 14.2 |
| Undisciplined public vehicle crew members who keep on hooting and making noise | 13 | 12.6 |
| Poor road conditions characterized by countless pot holes and dust | 11 | 10.2 |
| The use of low quality fuels that emit a lot of smoke during driving | 10 | 9.4 |
| Failure by motor vehicle owners to conduct routine maintenance of their vehicles | 6 | 5.5 |
| **Total** | **107** | **100** |

A statement was made that the time police officers spend on roundabouts is enough to make them experience effects of mv air pollution. 38.7% strongly agreed, 32.1% agreed, 17.0% disagreed while 6.6% strongly disagreed with this statement. Another statement was made that carrying out traffic duties has more benefits compared to exposure to mv air pollution. 47.2% strongly disagreed with this statement, 25.5% disagreed, 15.1% agreed while 7.5% strongly agreed with this statement. Respondents were asked ways to reduce traffic police officers' exposure to mv air pollution. 62.3% said that they should be issued with protective gear to wear during duty, 21.7% said that their working hours should be reduced, 17.9% asserted that they should have regular free checkups and treatment, 2.8% said frequent breaks would help while 1.9% said that there should be rotational duties. A statement that the risks posed by motor vehicle air pollution are greater than the risks posed by other police crime control duties was also made. 33% of the respondents said that they agreed with the statement, 27.4% disagreed, 21.7% strongly agreed while 13.2% strongly disagreed. On being asked to rate their police station's overall preparedness to mv air pollution, 47.2% of the respondents said it was not at all prepared, 33% said it was a little prepared, 8.5% said it was prepared and 5.7% said it was very well prepared. Overall, the general feeling of the respondents was that motor vehicle air pollution was a problem that traffic police officers are exposed to on their daily duties. There was also a general concern that not enough was being done to deal with this problem by police administration as well as individual traffic officers. Most of the officers were not confident in the measures already been taken to curb motor vehicle air pollution.

The study demonstrated that the traffic police were knowledgeable with respect to the adverse effects of air pollution on their health. The study showed they had knowledge that air pollution can cause trouble in breathing, wheezing sound, lung malignancy, skin ailment, bronchial asthma, and pneumonia. Studies directed in India have additionally discovered that there is expanded danger of getting distinctive respiratory issues when traffic police are presented to polluted air for a longtime. It is basic for traffic police to know about the issues particularly identified with breath in urban communities like Nairobi. A similar report affirms that there assist a prevalence of chronic bronchitis and asthma in traffic police presented to vehicle toxins in fixations higher than WHO prescribed rules, subsequently prompting noteworthy increment in respiratory problems [7]. Diverse inquiries in Ethiopia, Mozambique, and Kenya discovered fundamentally sophisticated cases of asthma in urban individuals

presented to activity contamination contrasted with rural child [8,9].

The present study exhibited that education affected the level of knowledge in prevention of respiratory health problems among traffic police. However, there was no association between education and level of practice to prevent respiratory problems. The poor practice of the traffic police, despite better knowledge, has not been fully understood. This study also showed that working experience had association with the level of practice but not with the level of knowledge.

The table above on cross tabulation indicates that areas with high pollution levels are railways and Kamukunji. In railways there is high concentration of *Matatu* (23) unladen (35.4%) and Large bus (45 seaters) unladen (31.2%). Kamukunji also had high concentration of *Matatu* (23) unladen (11.9%) and Large bus (45 seaters) unladen (16.5%) (See Table 5).

**Table 5. Association between working experience and knowledge awareness on level of pollution**

| Road Junctions | High pollution, % | Low pollution, % |
|---|---|---|
| Kamukunji | 49.7 | 51.7 |
| Railways | 48.3 | 50.3 |
| Uhuru highway | 36.5 | 63.5 |
| **University way** | **27.9** | **72** |

Areas found to have low pollution were University way and Uhuru highway. University way has high concentration of Car & Taxi (46.8%) and large cars 4WD & Jeeps (25.8%). While Uhuru highway was found to exhibits high concentration of Car & Taxi (54.6%) and large cars 4WD & Jeeps (22.7%).

## 4. Discussion

This air pollution conveys critical vulnerabilities for both human wellbeing and the atmosphere at large. The health threats toward air pollution are prominently honest. Poor air quality increases respiratory ailments like asthma and bronchitis, increases the danger of life-undermining conditions like cancer and weights our health services framework with significant medicinal expenses. Particulate matter alone is in charge of up to 30,000 unanticipated deaths every year. Traveller vehicles are a pollution contributor, delivering huge measures of nitrogen oxides, carbon monoxide, and other contamination [10].

This study disclosed that the level of knowledge regarding the prevention of respiratory problems among

the traffic police was comparatively higher than the level of practice. Parallel results were achieved in a study done in India; which exposed that level of knowledge was found to be better in majority of traffic police while the level of practice was lower. This might be due to Police regulations CAP. 84 LOK paragraphs 8, force standing orders, which stipulate code of dressing in the entire police force. The entire population of traffic police at the city of Nairobi Never used masks to prevent respiratory problems in this study.

A study revealed that no such arrangement have ever been suggested nor implemented. In Nairobi city, vehicular emission is the major contributor to air pollution. In addition, at the time of this study, construction of roads was in progress in parts of the city street, intersections and Road junctions which could also be factor for contribution of higher particulate matter dynamic. This could have intensified the condition of air, eventually deteriorating the health of the traffic police. The good health of traffic police and city dwellers is ensured only if the government implements vehicle inspection and emission testing effectively and ban on polluting vehicles. A research work suggests that, with longer experience, people increase their level of performance. It is better to learn preventive measures against air pollution from experience and practice them in daily life.

This study shows that the Nairobi Central district is one of the highest urban center in terms of car population. Due to the high population there has been increased motor vehicle pollution in the city. The composition of traffic on city roads also affects emission. The future trend in vehicle growth can have serious implications and fuel consumption patterns. A large number of private vehicles for example, are two-wheelers, which are cheap and reliable but also high on emissions. Of significant concern are the abnormal amounts of suspended particulate matter inside the inhalable range. The mean $PM_{10}$ was $239\pm126$ $\mu g/m^3$ while the range was 66.66 to 444.45$\mu g/m^3$. These levels are high when contrasted with other contaminated urban communities like Bombay, London, Los Angeles and so on. As far as possible for $PM_{10}$ is 150 $\mu g/m$.

McGranahan, G., and F. Murray, eds. [11]. have contended at a similar assumption that ineffective conveyance is the noteworthy offender of air contamination representing more than 80% of aggregate air toxins. This is an unmistakable sign that vehicle emissions are a major source of encompassing ambient air pollution. The type of urban development in most creating nations has tended to build the utilization of mechanized transport, especially road transport, which prompts increment environmental effects.

Not all pollutants which is emitted from cars is the same; there are two sorts of contamination released by petrol vehicles. These incorporate; evaporative emissions, which happens when vapors of fuel are discharged into the climate, without being copied, and deplete outflows, including risky gasses, for example, carbon monoxide, oxides of nitrogen, hydrocarbons and particulates. The real poisons are particulate matter, hydrocarbons, nitrogen oxides, carbon monoxide, sulfur dioxide, perilous air toxins, and nursery gasses, all of which are to a great degree hazardous for people.

The present study exhibited that the traffic police had knowledge regarding the negative effects of air pollution on their health. They had knowledge that air pollution can cause difficulty in breathing, wheezing sound, lung cancer, bronchial asthma, and pneumonia. This study concurs with a studies conducted in India by Faucet and Sevingny [12] which have also revealed that there is increased risk of getting different respiratory problems when traffic police are uncovered to polluted air for a longer time. It is indispensable for traffic police to be aware of the problems especially related to respiration in Kenya. Although majority of the traffic police had knowledge that they need to use antipollution mask, fewer of them felt like going for regular health checkup. Regular checkups spare lives notwithstanding when there is no particular issue, since the nonappearance of symptoms does not really ensure that one is healthy. This is in accordance with ponders by Goldberget *et al.,* [13] and Rainham *et al.,* [14] who have likewise indicated diminished rates of intrusive growths and diminished mortality in individuals who experience consistent therapeutic checkup. Therefore, awareness creating activities and policies relating to regular health checkup and protection from polluted environment should be launched effectively.

In Kenya, traffic police department have presented that the level of knowledge regarding the prevention of respiratory problems among the traffic police is comparatively higher than the level of practice. Similar results were obtained in a study done in India by Babisch [15] and Fogari [16] that showed that the level of knowledge was found to be better in majority of traffic police while the level of practice was average. This criterion might have been due to financial difficulties faced by the traffic police as studies have suggested that socioeconomic factors play a role in the health seeking behaviors. In addition, in sufficient time management during duty periods could avert attending regular health checkup. Nonetheless, they should be motivated to have healthy and safe practice against the pollution. Furthermore, the government should draft sustainable policies addressing such issues.

The present study showed that education affected the level of knowledge in prevention of respiratory problems among traffic police. However, there was no association between education and level of practice to prevent respiratory problems. The poor practice of the traffic police, despite better knowledge, has not been fully understood.

The Kenyan government has been endeavoring in react to the ecological issues, in which a few successful contamination control measures were started. The measures point at exhaust gas emission controls as well as at the change of fuel and vehicle determinations, usage of being used vehicle inspection and support program, mass travel systems, and traffic management. In Kenya, legal Notice No. 60 of 2007 [17] provides the recommended long term exposure limits as follows, 50 ppm for CO, 5000 ppm for $CO_2$, 3 ppm for $NO_2$ while short term exposure limits are given as 300 ppm for CO, 15000 ppm for $CO_2$ and 5 ppm for $NO_2$ respectively. WHO (2000) also provides long term exposure limits for CO and $NO_2$ as 9 ppm and 0.072 ppm respectively while short term exposure limits for the

same gases are given as 26 ppm for CO and 0.12 ppm for $NO_2$.

# 5. Conclusions

It is conclusive enough that motor vehicle air pollution affects the day to day operation of the officers; more so those working in the traffic department. Police officers think that heavy traffic and the use of un-road worthy vehicles are great contributors to motor vehicle air pollution. It is evident that very little has been done to mitigate the effects of motor vehicle pollution.

It is noted that there is very little knowledge about motor vehicle pollution and its effects both to the public and the policemen. Little effort has been made to disseminate knowledge on motor vehicle pollution. Therefore recommends the following:

1. There should be more training to the policemen on motor vehicle air pollution through seminars and integration of the topic in the police course curriculum.
2. The public should be sensitized on motor vehicle air pollution prevention to reduce the risks to them as well as the police men. The information on motor vehicle air pollution should be packaged in such a way that they are easily accessible to the public and the policemen.
3. There should be structures to take care of police officers who have suffered from the effects of motor vehicle air pollution.

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# Competing Interests

The author has declared that no competing interests are in existence.

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# Ethical Considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/ or falsification, double publication and/ or submission, redundancy, etc) have been completely observed by the author.

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