

Investigation of Public Perception of Air Pollution and Life Quality in Tehran

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Abstract—This study was undertaken at four different sites (north polluted, south polluted, south healthy and north healthy) in Tehran, in order to examine whether there was a relationship between publicly available air quality data and the public's perception of air quality and to suggest some guidelines for reducing air pollution. A total of 200 people were accidentally filled out the research questionnaires at mentioned sites and air quality data were obtained simultaneously from the Air Quality Control Department. Data was analyzed in Excel and SPSS software's. Clean air and job security were of great importance to people comparing to other pleasant aspect of life. Also air pollution and serious diseases were the most important of people concerns. Street monitors and news paper services on air quality were little used by the public as a means of obtaining information on air pollution. Using public transportation and avoiding inevitable journeys are the most important ways for reducing air pollution. The results reveal that the public's perception of air quality is not a reliable indicator of the actual levels of air pollution.

Keywords—Air pollution, Quality of life, Opinion poll, Public participation.

I. INTRODUCTION

NOWADAYS, air pollution is one of the main atmospheric problems and environmental risks that world population faces with it. Due to the increasing urban population, uncontrolled urban and industrial expansion and excessive vehicle, air pollution known as a growing problem [1]. Therefore air pollution represents a completely social problem and if the aim is to improve this problem, changing public behavior towards sustainable life is essential. Official reports indicate that a sustainable world requires the participation of everyone in access to information, decisions and changing their daily life style [2]. It is obvious that controlling plans of air pollution could not be implemented without the participation of people, and the use of local forces creates the most complete, accurate and sustainable plans [3], furthermore it decreases cost of data collection, implementation and monitoring of projects. Encouraging and motivating people along with public awareness and education on different levels provides effective participation in decision making process.

A lot of researches and public opinion polls were carried out during 1950s and 1960s in the United States to evaluate public awareness about air pollution [4],[5].

In the 1970s and 1980s, few studies have been done, probably because the governments in developing countries

started formulating new policies and laws. In the 1990s a new trend formed based on public perception about pollution using qualitative methods which showed that politics and culture involved in the perception of pollution as well as the way of thinking and functioning [6].

Based on the sustainability indicators, among 146 countries Iran's environment is allocated 132 and its air pollution is 2.8 times more than the world standard. The main objective of this study is to provide a cultural and participatory approaches to reduce air pollution and its secondary objectives are to assessment importance of air pollution based on public perception, to evaluate the use of the air pollution data by people, to assess the relationship between air quality and public perceptions of quality of life and to assess attitudes toward air quality and reduce air pollution.

II. MATERIALS AND METHODS

In this study, according to data published by the Air Quality Control Company (AQCC) [7], the number and percentage of polluted days in 22 districts of Tehran were collected during six months (Table I) and based on them four areas was determined:

1. The northern polluted area (NP) (districts 3 and 7),
2. Southern polluted area (SP) (districts 11, 12, and 16),
3. Southern safe area (SS) (districts 18 and 17),
4. Northern safe area (NS) (districts 1 and 2).

Air Quality Control Company data is presented based on Pollutant Standard Index (PSI). The index is calculated based on the amount of carbon monoxide, sulfur dioxide, nitrogen oxide, particles and ozone in the air at regular intervals. PSI range represents safe and unsafe air is determined as follow: Clean: (50-0) safe (100-50), unsafe (200-100), very unhealthy (300-200) and dangerous (> 300).

III. RESULTS

A. Characteristics of the Study Areas

The questionnaires were filled out in four areas and fifty respondents were interviewed at each location by a trained researcher. Demographic data including age, sex, education level and occupation were gathered as well as the attitudes of people toward level and importance of air pollution, air pollution control methods.

All respondents aged over 18 years old of which 50 percent are 44-24 years. Totally 100 men and 100 women completed the questionnaires. 54 percent of respondent hold a high school diploma or less, 37% hold a bachelor degree and 9% of people hold MS and higher education.

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TABLE I
NUMBER AND FREQUENCY OF POLLUTED DAYS IN 22 DISTRICTS OF TEHRAN

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|---------|------|------|----|------|---|------|------|------|------|------|------|------|------|----|------|------|----|------|------|------|----|----|
| numbers | 1 | 5 | 64 | 7 | 0 | 73 | 135 | 36 | 17 | 18 | 87 | 90 | 26 | 40 | 28 | 76 | 24 | 9 | 33 | 38 | 0 | 0 |
| percent | 0.63 | 3.13 | 40 | 4.38 | 0 | 45.6 | 84.4 | 22.5 | 10.6 | 11.3 | 54.4 | 56.3 | 16.3 | 25 | 17.5 | 47.5 | 15 | 5.63 | 20.6 | 23.8 | 0 | 0 |

TABLE II
LEVEL, METHODS AND FREQUENCY OF PUBLIC PERCEPTION OF AIR POLLUTION IN TEHRAN

| Area | Pollution level | | | | Awareness methods | | | | Awareness frequency | | | |
|-------|-----------------|----------|------|-----------|-------------------|-------|---------------------|------------|---------------------|--------|---------|---------|
| | Low | Moderate | High | Very high | Monitors | Media | Personal perception | Newspapers | Daily | Weekly | Monthly | > month |
| NP | 0 | 40 | 38 | 20 | 11 | 23 | 56 | 10 | 62 | 32 | 4 | 2 |
| SP | 0 | 22 | 48 | 22 | 11 | 42 | 36 | 11 | 68 | 22 | 2 | 8 |
| NS | 0 | 38 | 30 | 20 | 10 | 42 | 46 | 2 | 46 | 42 | 10 | 2 |
| SS | 0 | 66 | 16 | 12 | 4 | 35 | 53 | 8 | 44 | 40 | 12 | 4 |
| Total | 0 | 41.5 | 33 | 18.5 | 8.87 | 35.5 | 47.6 | 8.06 | 55 | 34 | 7 | 4 |

TABLE III
FREQUENCY AND SCORE ALLOCATED TO PLEASANT ASPECTS OF LIFE BY INTERVIEWS

| Area | Job security | | Clean air | | Clean streets | | Access to Private car | | Access to Public transport | | Access to personal house | |
|-------|--------------|------------------|-----------|------------------|---------------|------------------|-----------------------|------------------|----------------------------|------------------|--------------------------|------------------|
| | F (%) | Importance score | F (%) | Importance score | F (%) | Importance score | F (%) | Importance score | F (%) | Importance score | F (%) | Importance score |
| NP | 12.8 | 2.74 | 11.9 | 2.48 | 19.1 | 4.1 | 22 | 4.56 | 22.3 | 4.62 | 11.9 | 2.48 |
| SP | 10.9 | 2.3 | 11.7 | 2.44 | 20.2 | 4.28 | 21.8 | 4.56 | 21.5 | 4.5 | 14 | 2.92 |
| SS | 13 | 2.78 | 11.2 | 2.36 | 18.2 | 3.78 | 20.1 | 4.22 | 22.2 | 4.66 | 15.2 | 3.2 |
| NS | 13.1 | 2.76 | 13.4 | 2.82 | 20 | 4.2 | 19.1 | 4.02 | 21.2 | 4.46 | 13.2 | 2.78 |
| Total | 12.5 | 2.61 | 12 | 2.53 | 19 | 4.05 | 21 | 4.34 | 22 | 4.56 | 14 | 2.85 |

TABLE IV
FREQUENCY AND SCORE ALLOCATED TO UNPLEASANT ASPECTS OF LIFE BY INTERVIEWS

| Area | Car accident | | Air pollution | | Serious Diseases | | Litter | | Losing job | | Street advertisement | |
|-------|--------------|------------------|---------------|------------------|------------------|------------------|--------|------------------|------------|------------------|----------------------|------------------|
| | F (%) | Importance score | F (%) | Importance score | F (%) | Importance score | F (%) | Importance score | F (%) | Importance score | F (%) | Importance score |
| NP | 16.4 | 3.44 | 12.8 | 2.68 | 18.6 | 1.79 | 8.4 | 3.9 | 16.8 | 3.52 | 27.1 | 5.68 |
| SP | 14.4 | 3.02 | 16.6 | 2.44 | 20.1 | 2.36 | 11.2 | 4.22 | 14.8 | 3.06 | 28 | 5.88 |
| SS | 12.2 | 2.56 | 11.7 | 2.46 | 19.4 | 2.66 | 12.7 | 4.06 | 16.9 | 3.54 | 27.2 | 5.7 |
| NS | 16.7 | 3.5 | 11.5 | 2.42 | 20.02 | 2.02 | 9.6 | 4.24 | 15.4 | 3.24 | 26.6 | 5.56 |
| Total | 15 | 3.13 | 12 | 2.5 | 20 | 2.2 | 10 | 4.11 | 16 | 3.34 | 27 | 5.71 |

B. Public Perception of Air Pollution

Interviewees were asked how they perceived the air pollution a week before interview, and how frequently they informed about air pollution data provided via media, newspapers, street monitors and their personal perception. As data shown in Table II 41.5 percent of the respondents thought that the air pollution was moderate compared to 33% of high and 18.5% of very high. In both polluted and safe areas people perceived air quality as polluted while based on PSI Index air quality in safe area was clean and in polluted area was very unsafe.

Totally about 50 percent of people rely on their personal perception of air pollution, 8.87% informed via street monitors, 8.06% via newspapers and 35.5% via media.

55% of Tehran residents concerned daily about air pollution data, 34% weekly and 7% monthly, which are the same in 4 distinct areas.

C. The Quality of Life

To estimate the relative importance of social issues and urban air pollution, interviewees were asked to rank two aspects of life: pleasant and unpleasant each included 6

aspects. The aspects of life selected are listed in Tables III and IV. In this ranking, number 1 and 6 indicate the highest and lowest level respectively. Naturally the lower points represent higher level of aspects. Data analyzing indicates three ranking domains: 1-2.66 (very important), 2.6-4.33 (important) and 4.33-6 (relatively important).

Result showed that clean air with 2.53 point indicated as the most important pleasant aspect of life. Generally clean air, secure job were the most important aspects of life, having house and clean streets are the important and access to private car and access to public transport are the relatively important aspects of the life. Also in four distinct area 94 % and 90 % of respondents ranked clean air and job security as very important and important respectively.

Generally serious diseases with 2.2 point ranked the most important unpleasant aspect of life. Air pollution, car accident, losing job, litter and street advertisement were ranked second to fifth respectively.

Data analyzing showed that air pollution and serious diseases with approximate frequency of 100% and 90%, respectively, are the most important concerns of people in

each area. Also, more than 90% of people in SP, NP and SS areas and 70% of people in NS area ranked car accident as important unpleasant aspects of life.

D. Air Pollution Reduction Strategies

Generally, people believed that using public transportation, avoid unnecessary travels, using fuel-efficient cars, using filters, using odd and even car number option and switching the cars off in long traffic are the strategies which ranked first to sixth respectively in order to reduce air pollution.

In each four areas, respondents stated that showing films, education in schools, street advertisement (broachers) and publishing booklets with 1.55, 2.2, 2.74 and 3.53 points are the most important strategies to increase public knowledge about the effects of air pollution respectively.

The results showed that from interviewee's point of view, four organization of automobile industry, Department of Environment (DOE), municipality and general public play an equal role in reducing the air pollution. But detail analysis indicates that the automobile industry, municipality, the public and the Department of Environment with 2.1, 2.51, 2.7 and 2.71 points have first to fourth role.

IV. DISCUSSION AND CONCLUSION

The findings showed that public perception of air quality in different districts of Tehran is different from the actual air quality data that is published by AQCC; therefore, public perception of air pollution may not be a reliable indicator. The same result obtained from a study carried out in urban (Wood Green) and suburban (Wimbledon) areas of London [7].

There is some evidence that personal behavior, habits, socio-economic factors and mass media affect on public perception of air pollution but people's use of different means of awareness is generally low. This study showed that people's use of AQCC data published on street monitors and newspapers is about 8%. The result either implies that the public are unconcerned about general levels of air pollution or that these mediums are not an effective means of disseminating air quality information. In the study in London, the data clearly showed that 86% of people do not use the TELETEXT/CEEFAX service which confirms current findings [8]. So, given that about 50 percent of Tehran residents refer to personal perception of air pollution, personal experiences and social interactions and communications play more important role in level of perception compared to media

The results of research on quality of life (studied through pleasant and unpleasant aspects of life) showed that having clean air in comparison with other aspects is the most important one. After clean air, job security is of secondary importance and 90% of people in Tehran are worried about losing their jobs 13. This figure is 65% in London. Also in Tehran people chose access to public transport as the last priority of good life, this may be due to lack of knowledge about the relationship between appropriate public transports and lower levels of pollution.

The findings represent that people believe that automobile industry and municipality are responsible in air quality

management. Other research showed that people think that the public and private sector have the equal responsibility for improving air quality, however distaste and dissatisfaction in changing personal behavior is seen [9]. Considering 81 study participants in air quality management in India showed that the lack of appropriate policies is the main obstacle in the efficient management of air quality and the second obstacle is the lack of information. The judicial system can play a more active role than the others, and then the government is responsible for air quality monitoring [10].

The result showed that although people place great value on healthy environment regardless their life style and welfare, one cannot rely on their perception of the amount of air pollution. Also most people believe that the government plays the most important role in controlling air pollution, but studies showed that the lack of seriousness in performing the relevant legal obligations and their poor performance on the prevention of air pollution have intensified the increasing risk of this trend. Furthermore, lack of a specific responsible in the management and control of air pollution and doing so by a committee of ten members named Executive Committee of reducing air pollution showed that due to the lack of efficiency, inappropriate decision making by some organizations, the decisions of the Committee have not been implemented which worsen the current situation. Therefore, it is inevitable to use public forces and their participation in decreasing air pollution along with other. The following suggestions to increase the role of citizens in the management of air quality provided:

1. To improve public awareness on environmental issues and air pollution and to make it as their main concern of daily life.
2. To publicize bicycle use and to rent it in crowded areas in Tehran.
3. To increase public awareness on the effects of air pollution and to provide accurate statistics of the number of deaths from air pollution and its other social and economic damage through media.
4. To institutionalize the use of air pollution monitors
5. To produce films and animations about air pollution.
6. To carry out extensive propaganda brochures and leaflets in the street
7. To set the vehicles completely (this is the easiest way to minimize the fuel consumption).
8. To clean exhaust filters continuously
9. To develop telecommuting options, such as work and education through the Internet.

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