



## TO STUDY OCCUPATIONAL HAZARDS AND KNOWLEDGE OF SAFETY MEASURES IN FILLING ATTENDANTS AT PETROL PUMPS OF BHOPAL CITY

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**ABSTRACT**

**Introduction:** Petroleum industry has over the past few years attracted the attention of a great deal of investors both locally and internationally. There are about 250 petrol pumps in Bhopal city. Apart from providing readily available fuel retail points for the general public, the proliferation of these stations have also contributed to employment generation. Nevertheless, there are pressing concerns about the health and safety standards at fuel station. Inhalation of petroleum vapors will curtail the carcinogenic, mutagenic effects as well as adverse effects on the human reproductive system known to be associated with long term exposure to petroleum vapors.

**Objectives:** 1) To study the occupational hazards and health effects on petrol pump attendants. 2) To study the knowledge regarding safety measures of pump attendants.

**Material & Methods:** A cross-sectional study was conducted among 123 filling attendants of selected petrol pumps of Bhopal city for the duration of two months. A questionnaire was administered and obtained data were collected and analyzed statistically by simple proportions.

**Results:** Maximum filling attendants were young male. Exposure to extreme weather conditions, inhalation of vehicle fumes and vapor of petrol and fire accidents were the top occupational hazards in filling attendants. Common illness in filling attendants are all work related like musculoskeletal disorder > low back pain > headache > dizziness. Pre and post work medical examination habits was not so good. Although all stations had firefighting equipment training in their usage was highly associated with work experience of pump attendants; most newly employed attendants (<5years work experience) are not trained in their usage.

**Conclusion:** Filling attendants in Petrol Pumps are predisposed to dire health risks due to their working conditions and require urgent measures to protect them. Medical examination and proper training related to safety measures needs to be proper implementation.

**KEYWORDS :** Petrol pump, Fuel filling attendants, Occupational hazards, Bhopal city**Introduction**

Petrol is a mixture of volatile hydrocarbons, while diesel fuel contains paraffin's, alkenes and aromatics.<sup>[1]</sup> Both petrol and diesel undergo combustion in automobile engines and give rise to combustion-derived nano particles (CDNPs). Diesel exhaust particles are the most common CDNPs in the urban environmental air. These particles are highly respirable and have a large surface area where organic materials can be adsorbed easily. The particles which are generated from diesel exhaust are sub-micronic by virtue of their greater surface area-to-mass ratio- and can carry a larger fraction of toxic hydrocarbons and metals on their surface. They can remain airborne for longer time periods and can be deposited in greater numbers and deeper into the lungs than the large-sized particles.<sup>[2]</sup> Petrol-pump workers who are exposed to the petrol fumes exhibit a number of clinical signs and symptoms which may be due to benzene toxicity. Improvement in the engine design, soot filters and fuel modification may provide the best approach to control the exposure to these fumes.<sup>[3]</sup>

**Objectives**

- 1) To study the occupational hazards and health effects on petrol pump attendants.
- 2) To study the knowledge regarding safety measures of pump attendants.

**Material & Methods**

The study was a cross-sectional study carried out among 123 filling attendants of selected petrol pumps of Bhopal city near Gandhi Medical College area for three months. Purposive sampling method used and the study tool was semi-structured questionnaire. Data collection was carried out both in the morning and afternoon in petrol pumps where shift duties were observed. All consenting attendants were selected from each petrol pump until all the 15 petrol pumps were covered. Filling attendants who were working more than 1 years and willing to participate were included in the study and those who were working less than 1 years and not willing to participate were excluded from the study. Obtained data were collated and analyzed statistically by simple proportions. Each completed questionnaire was coded on pre arranged coding by the principal investigator to minimize errors.

Data were analyzed using Microsoft excel windows 2007 and Epi info7 software. The descriptive analysis including proportions, percentages, frequency distribution and measures of central tendency was done. Participation was entirely voluntary. No names were used to ensure confidentiality.

**Observations & Results**

A total of 123 respondents participated in the study. Maximum (40.6%) of filling attendants were belonging to age group 26 to 30 years. All filling attendants were male and of them 56.9% were married, 41.5% were single and 1.6% were divorced. Maximum (66.7%) filling attendants had the higher secondary education. 65% attendants had the work experience less than 5 years. Exposure to extreme weather conditions, inhalation of vehicle fumes and vapors of petrol and fire accidents were the top occupational hazards in filling attendants. Common illness in filling attendants are all work related like musculoskeletal disorder > low back pain > headache > dizziness. Pre and post work medical examination habits was poor. Although all stations had firefighting equipment training in their usage was highly associated with work experience of pump attendants. Most newly employed attendants (<5years work experience) are not trained in their usage.

**Table-1 Socio demographic characteristics of filling attendants (n=123)**

| Sociodemographic characteristics | Number | %    |
|----------------------------------|--------|------|
| Age group (in years)             |        |      |
| 20-25                            | 40     | 32.5 |
| 26-30                            | 50     | 40.6 |
| 30-35                            | 23     | 18.7 |
| >35                              | 10     | 8.1  |
| Gender                           |        |      |
| Male                             | 123    | 100  |
| Female                           | 00     | 0    |
| Marital status                   |        |      |
| Single                           | 51     | 41.5 |
| Married                          | 70     | 56.9 |
| Divorced                         | 02     | 1.6  |

|                 |    |      |
|-----------------|----|------|
| Education       |    |      |
| 10+2            | 82 | 66.7 |
| 10th            | 35 | 28.4 |
| <10th           | 06 | 4.9  |
| Work experience |    |      |
| <5 yr           | 80 | 65   |
| >5 yr           | 43 | 34.9 |

**Table-2 Occupational hazards and medical examinations habits among filling attendants (n=123)**

| Study parameter                 | Study variables                               | Frequency | %    |
|---------------------------------|---|-----------|------|
| Work related hazards            | Exposure to extreme weather conditions        | 121       | 98.4 |
|                                 | Inhalation of exhaust fumes and petrol vapors | 119       | 96.7 |
|                                 | Fire outbreaks                                | 02        | 1.6  |
|                                 | Customer confrontations                       | 53        | 43   |
|                                 | Armed robbery attacks                         | 02        | 1.6  |
| Pre & post medical examinations | Yes   | 00        | 0    |
|                                 | No  | 00        | 0    |
| Training of filling attendants  | Before employment                             | 00        | 0    |
|                                 | After employment                              | 13        | 10.6 |

**Table-3 Distribution of common illness among filling attendants (n=123)\***

| Type of illness         | No. | %    |
|-------------------------|-----|------|
| MSD                     | 111 | 90.2 |
| Headache                | 78  | 63.4 |
| Low back pain           | 58  | 47.1 |
| Dizziness               | 29  | 23.6 |
| Cough                   | 23  | 18.7 |
| Chest pain              | 09  | 7.3  |
| Ear diseases (Tinnitus) | 03  | 2.4  |

\*Multiple responses

Above table shows that majority of petrol pump filling attendants were had musculoskeletal disorders, followed by Headache (63.4%), Low back pack (47.1%), Dizziness (23.6%), Cough (18.7%), Chest pain (7.3%) and Tinnitus (2.4%)

**Table -4 Relation between work experience and training on fire safety (n=123)**

| Training aspects of fire safety | Work experience up to 5 years | More than 5 years |           |
|---------------------------------|-------------------------------|-------------------|-----------|
|                                 |                               | Trained           | Untrained |
| Use of fire extinguisher        | Trained                       | 49(39.8%)         | 41(33.3%) |
|                                 | Untrained                     | 31(25.2%)         | 2(1.6%)   |
| Fire emergency procedures       | Trained                       | 58(47%)           | 33(26.8%) |
|                                 | Untrained                     | 29(23.5%)         | 3(2.46%)  |

As the work experience increases the filling attendants found to be more trained (P<0.0321)

## Discussion

The distribution of gender, age and educational levels of the FSS attendants indicate a predominance of young adult single males with high secondary school education in this industry. This mirrors the findings of a similar study conducted by Ansah & Mintah<sup>[4]</sup> in the Central and Western Regions of Ghana and that of Afolabi et al.<sup>[5]</sup> in Nigeria. Perhaps, this could be due to the physical demands of the work and the long working hours comprising of both 12-hour diurnal and nocturnal shifts. Our study finding that most common occupational health hazards was MSD (musculoskeletal disorders) and this finding is consisted with a study by Tunsaringkarn et. al.<sup>[6]</sup> in Bangkok, it was concluded that, continued exposure to these compounds is

significantly associated with the prevalence of headaches, fatigue, dizziness, skeletal disorders and throat irritation while benzene, toluene, ethyl benzene and xylene found in gasoline has been shown to have potential of red blood cell toxicity<sup>[7]</sup>.

## Conclusion

Filling attendants in Petrol Pumps are predisposed to terrible health risks due to their working conditions and require urgent measures to protect them. Medical examination and proper training related to safety measures needs to be proper implementation. Petrol pumps attendants in this study were exposed to various occupational hazards and health problems. Education about occupational health hazards and uses of personal protective equipments (PPE), hand washing practices, availability of first aid boxes and conducting of medical examinations were all poor. Efforts should be made by the independent petroleum marketers association and other stakeholders to ensure that the owners of filling stations take responsibility for the health and safety of their workers.

## Limitations

Only small sample size of population could be selected because of the resources and time constraints. It was a cross-sectional study, so it is difficult to establish causal relationship between the dependent and predicting variables.

## Recommendations

The study proposes mandatory standardized training on health and safety standards at Petrol pumps for all filling attendants. Pre and Post medical examination should be compulsory for every worker of petrol pumps. Personal protective equipment such as nose masks and reflective safety vests should be provided and measures should be put in place to enforce their usage. Training of all petrol pumps filling attendant on the usage of fire extinguishers and comprehensive fire emergency procedures to be mandatory. Also shift duty after 8 hours for filling attendants to reduce exposure.

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