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## Assess the knowledge regarding ill-effects of ammonia among workers of selected ice factory and cold storage plant

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### Abstract

Ammonia is a chemical which is very soluble in water. Because of its exothermic properties, ammonia forms ammonium hydroxide and produces heat when it contacts moist surfaces, such as mucous membranes. The corrosive and exothermic properties of ammonia can result in immediate damage (severe irritation and burns) to the eyes, skin, and mucous membranes of the oral cavity and respiratory tract. In addition, ammonia is effectively scrubbed in the nasopharyngeal region of the respiratory tract because of its high solubility in water. The present study aims to assess the knowledge regarding ill-effects of ammonia among ice factory and cold storage plants. The research design was descriptive research design. Non probability convenient sampling technique was used to select samples. Structured interview was used to collect background variable and knowledge question. Data were collected to 60 samples. The study result showed that most of the workers 25(41.6%) were aged below 30 years, 41(68.3%) were male, 23(38.4%) had primary education, 24(40%) had 5 – 6 years of experience, 34(56.7%) were residing in rural area, 43(71.7%) had no previous exposure. The knowledge shows that 33(55%) had inadequate knowledge, 24(40%) had moderately adequate knowledge and 3 (5%) had adequate knowledge on ill-effects of ammonia. The mean score of knowledge was 10.38 with standard deviation 2.57 with minimum score of 6 and maximum score of 17.0.

**Keywords:** Ill-Effects, Ammonia, Ice Factory, Cold Storage Plant

### Introduction

Ammonia is a colorless, corrosive, alkaline gas that has a very pungent odor. The odor detection level ranges from 5 to 53 ppm. Ammonia is used as a compressed gas and in aqueous solutions. It is also used in household cleaning products, in fertilizers, and as a refrigerant. Exposure to ammonia occurs as a result of accidents during highway and railway transportation, accidental releases at manufacturing facilities, and farming accidents.

When the liquid ammonia is released it may mix with air and behave as a dense gas. Because of its strong and pungent odor it create breathing discomforts, ammonia can be usually detected at concentrations in the range of about 5 to 50 parts per million (ppm). Concentrations above about 100 ppm are uncomfortable to most people; concentrations in the range of 300 to 500 ppm will cause people to leave the exposed location immediately. Exposure to liquid ammonia is not common at ammonia refrigeration facilities. If it does occur, severe injury can result, including frostbite and corrosive burns. Symptoms of mild frostbite include numbness, prickling and itching in the affected area. In case of severe frostbite the symptoms include a burning sensation, stiffness of the affected area, waxy white or yellow skin, Blistering, tissue death and gangrene may also develop.

A lifelong non-smoker who was the victim of a massive accidental exposure to anhydrous ammonia gas was followed up for 10 years. In the acute phase the patient presented with severe trachea-bronchitis and respiratory failure, caused by very severe burns of the respiratory mucosa. After some improvement he was left with severe and fixed airways obstruction. Isotope studies of mucociliary clearance, computed tomography, and bronchography showed mild bronchiectasis. It is concluded that acute exposure to high concentrations of ammonia may lead to acute respiratory injury but also to long term impairment of respiratory function.

Exposure to a low concentration of ammonia vapor can:

- Irritate the nose, mouth, and throat;
- Irritate the lungs, causing coughing and or shortness of breath;

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- Irritate the eyes and skin, causing a burning sensation;
- Cause headache, nausea and vomiting;

Exposure to higher concentrations of ammonia vapor can:

- Irritate and burn the skin, potentially leading to permanent damage;
- Cause permanent eye damage or blindness;
- Cause long-term respiratory system and lung disorders, including buildup of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath and tightness in the chest. The symptoms of pulmonary edema (tightness in the chest and difficulty breathing) may not develop for 1-24 hours after an exposure to a high concentration;

Huda Mohamed *et al.*, (2018) [6] conducted a cross sectional study in a Ammonia factory. The sample size was about 62 workers, the data was collected by using questionnaire method, and this information was analyzed by using SPSS software. The findings of the study indicated that about 38.7% of the sample have nose irritations, 37.1% have throat irritation, and 27.4% and 12.9% for eye and mouth irritations. In addition, There are relationship between years of experience and eye, nose irritation, while study showed that no relation between years of experience with mouth and throat irritation. Furthermore, there are no correlation between qualification level, smoking and working hour with irritation effects of ammonia. The study concluded that exposure to ammonia gas causes irritation to the upper respiratory tract system and eyes, therefore, suitable personal protective equipment for ammonia exposure must be worn.

Loftus C *et al.*, (2015) [8] conducted a study to describe spatial and temporal patterns in ambient ammonia concentrations in an agricultural region, and to investigate associations between short-term fluctuations in ammonia and subsequent changes in respiratory health in children with asthma. Methods: For 13 months in the Yakima Valley of Washington State, 14 monitors sampled ammonia in outdoor air for 24-hour periods every 6 days. School-age children with asthma (n = 51) were followed for two health outcomes: biweekly reports of asthma symptoms and quick relief medication usage, and daily measurements of forced expiratory volume in 1 second. We assessed associations between each outcome and ammonia using generalized estimating equations. The findings revealed that twenty-four-hour ammonia concentrations varied from 0.2 to 238.1 µg/m3 during the study period and displayed a strong correlation with proximity to animal feeding operations. The percentage of forced expiratory volume in 1 second was 3.8% lower (95% confidence interval = 0.2, 7.3) per

interquartile increase in 1-day lagged ammonia concentration and 3.0% lower (95% confidence interval = 0.5, 5.8) for 2-day lagged concentration. We observed no associations between self-reported asthma symptoms or medication usage and estimated ammonia exposure. The study concluded that ammonia concentrations were elevated in this community and strongly predicted by proximity to animal feeding operations. Ammonia’s association with acute lung function decrements in children with asthma in the surrounding community may be causal or, alternatively, ammonia may be a marker for other pollutants from animal feeding operations associated with respiratory effects. The purpose of the study was 1. To assess the level of knowledge regarding ill-effects of Ammonia among workers of Ice Factory and Cold Storage Plants.2. To associate level of knowledge regarding ill-effects of Ammonia among workers of Ice Factory and Cold Storage Plants with selected demographic variables.

**Methods and Material**

A descriptive study was conducted to assess knowledge regarding ill-effects of ammonia among workers of selected ice factory and cold storage plant. The main study was conducted on 4.3.2020 to 13.3.2020 at jayabharath Ice factory vellore (Both male and female). The 60 samples who met the inclusion criteria were selected by convenience sampling technique. The investigator induced and explained the purpose of the study to samples and the written informed consent. A questionnaire was divided into two sections which include, Section A -background variable and section B consists of questionnaire. The demographic data was collected using structured interview questionnaire. Data collection period was for 1 week

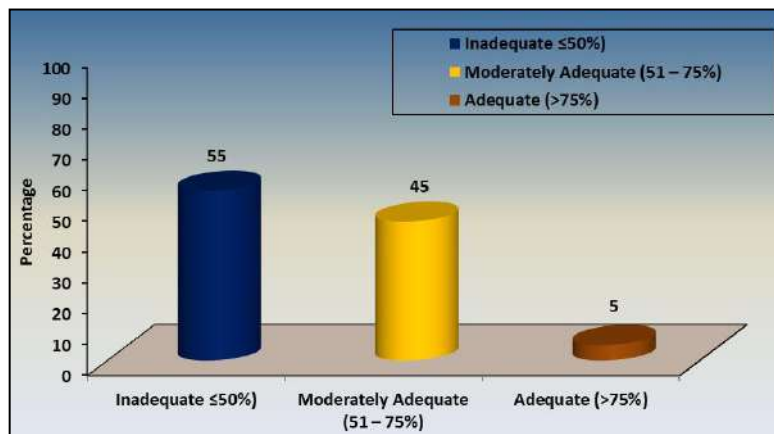
**Result and discussion**

**Section A: Description of the demographic variable of the rural and urban population**

The present study revealed that Frequency and percentage distribution of demographic variables shows that most of the workers 25(41.6%) were aged below 30 years, 41(68.3%) were male, 23(38.4%) had primary education, 24(40%) had 5 – 6 years of experience, 34(56.7%) were residing in rural area, 43(71.7%) had no previous exposure.

**Section B: Determine the level of knowledge on ill-effects of ammonia**

The present study revealed knowledge on shows that 33(55%) had inadequate knowledge, 24(40%) had moderately adequate knowledge and 3(5%) had adequate knowledge on ill-effects of ammonia.



**Fig 1:** Level of Knowledge

### Section C: Find out the relationship of mean and standard deviation of knowledge on ill – effects of ammonia among workers at ice factory and cold storage facilities

The present study revealed that Mean value of 10.38, Standard deviation of 2.57, Minimum score was 6.0 and Maximum score was 17.0

**Table 1:** The present study revealed knowledge and score

Knowledge	Score
Mean	10.38
Standard Deviation	2.57
Minimum Score	6.0
Maximum Score	17.0

### Section D: Association of level of knowledge with their selected demographic variable

The present study revealed that the demographic variables age and area of living had shown statistically significant association with level of knowledge on ill-effects of ammonia among workers at Ice factory and Cold storage facilities at  $p < 0.05$  level and the other demographic variables had not shown statistically significant association with level of knowledge on ill-effects of ammonia.

### Conclusion

The study indicated that nose and throat irritation effects were the more symptoms that workers suffered from, and then come eyes and lastly, mouth. Furthermore, it showed that there was a positive relation between years of experience and nose and eyes, while there no effect on mouth and throat. Moreover, level of education, smoking and working hours did not have a significant influence on the irritation effects of ammonia. In order to improve the awareness of workers about health effects of ammonia gas, the training programme should be introduced regarding safety policy at selected ice factory.

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