



## Knowledge of Respiratory Disorders among Petrol Pump Workers in Erbil City

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### Abstract

**Objectives:** Exposure to gases and vapors of volatile organic compounds is one of the factors affecting the health of workers in the oil industry. This study was conducted to determine the level of awareness of respiratory disorders in gas station workers in the city of Erbil, Iraq.

**Methods:** This research was a cross-sectional descriptive design. This study was conducted in all (146) gas stations under the management of the Ministry of Natural Resources in Erbil city. To collect data were used a checklist made by the researcher was used, which includes three sections Socio-demographical characteristics, a Questionnaire to assess the knowledge of workers regarding respiratory morbidities, and Peak Flow Metry to assess Peak Flow Rate.

**Result:** This study shows that almost all pump worker stations have moderate knowledge. Inhaling pollutants, overcrowding, oil fumes, continuous exposure to pollutants, respiratory problems. Bronchial asthma was named the most common respiratory disease. Cough and wheezing were mentioned as the first symptoms. People believe that changing the workplace of employees is an advantage of timely diagnosis and treatment, and long-term exposure to these pollutants causes lung diseases. There were highly significant differences between the mean of Peak Flow Metry with Marital Status and having covid-19 before ( $p < 0.0001$ ).

**Conclusion:** It was proved that the awareness of respiratory disorders among fuel-filling workers in gas stations is influenced by many factors including demographic and environmental variables. It was also proven that workers used poor protective measures despite their knowledge of the adverse health effects of gasoline.

**Keywords:** *Cross-sectional study knowledge peak expiratory flow rate petrol pump worker respiratory morbidity*

## Introduction

The work setting creates an important part of man's total environment, so health to a large extent is influenced by work conditions. Though some types of environments exist, it is the physical environment that plays an important bearing in health. Air, noise, heat, and radiation are the chief sites of environmental pollution, and this is more so in urban regions (Nnaemeka, 2020). The number of gasoline and gas vehicles in the country is increasing each day, which in turn causes the expansion of gas stations and enhances the amount of fuel supply per day (Latif et al., 2019). Therefore, the air of cities is becoming directly and indirectly more polluted. This is an environmental problem in developing countries that has dangerous consequences for human health and the environment (Kerchich and Kerbachi, 2012).

Exposure to gases and vapors of volatile organic compounds is one of the factors affecting the health of workers in the oil industry. Benzene, toluene, ethylbenzene and xylene (BTEX) are among these volatile compounds and can expose workers in petrochemical and petroleum products such as gas station workers (Mehta et al., 2017; Dacherngkhaio and Chaiklieng, 2019). Xylene (dimethyl benzene) is a clear and sweet solvent and its vapors can be very irritating to the eyes, nose, throat, skin and mucous membranes and can also affect the respiratory system and reduce Forced expiratory volume in one second (FEV1) and Forced vital capacity (FVC) levels in functional indicators of the lung (Baer, 2020). Toluene (methyl benzene) may cause fatigue, headache, anxiety, confusion and respiratory problems (Abdel Rasoul et al., 2017; PARK, 2021). Inhalation exposure to low levels of toluene vapors also causes changes in airway diameter, inflammation of the upper respiratory tract, and a decrease in FEV1 (PARK, 2021).

Petrol is a combination of volatile hydrocarbons, while diesel fuel contains paraffin's, alkenes and aromatics. Petrol and diesel are the most commonly used automobile fuels in Zambia. A long term exposure to the air contaminants may lead to ill health on the respiratory functions (Shonga and Siziya, 2015). The International Agency for Research on Cancer (IARC) and the American Conference of Governmental Industrial Hygienists (ACGIH) place benzene in Group 1 (definitely carcinogenic to humans) (Megahed and Ghoneim, 2021, Yang et al., 2020).

Constant exposure of gas station workers to gasoline and diesel vapors affects lung function. The severity of respiratory distress depends on the duration of exposure (Rattanajongjitrakorn and Prueksasit, 2014). Identification of risks and diseases is a prerequisite for the prevention and control

of occupational health problems that lead to improved working conditions and the implementation of occupational preventive measures (Nwanjo and Ojiako, 2010).

Although researchers have conducted numerous studies in this regard in different countries, but in relation to the proposed subject, according to the researcher's internet and library searches, there is little researches on gas station among workers in Iraq, and especially in the Kurdistan region. Therefore, with considering the importance of the subject, this study was conducted to determine the level of awareness of respiratory disorders in gas station workers in the city of Erbil, Iraq.

### **Material and method**

This research is a cross-sectional descriptive design. This study was conducted in all (146) gas stations under the management of the Ministry of Natural Resources in Erbil city. This study was conducted between 2021 and 2023. The target community includes employees of gas stations under the management of the Ministry of Natural Resources of Erbil. According to the lists obtained from the Presidency of the Council of Ministers of the Kurdistan Region/Ministry of Natural Resources/Directorate of Oil and Minerals a total of (568) Pump workers were present in the Fuel full station. The entire popular staff of Pump workers in Fuel full station in Erbil city was considered for the study.

The total numbers of pump workers during data collection were (568) but (50) pump workers were excluded because of their participation in the pilot study and (10) pump workers refused to participate in the study and also (8) pump workers were unavailable during data collection because of their sick leaves. Finally, the sample size of the study became (501) pump workers. Since the entire population of pump workers staff was considered for the study, the sample estimation was not required. The sampling method is the census method. Inclusion criteria: Workers who have had service in this field over five years, working in petrol pumps in urban areas and Engaged in fuel filling and vehicle oil replacement work. Exclusion criteria: Workers who have served in this field under five years, Who are of age below 18 years, Who have a childhood history of respiratory diseases, Working in the petrol station as a gas station cashier, cleaner, clerk, customer service representative and supervisors, Unwillingness of workers to participate in this study. Smoking workers.

To collect data from pump employees and gas station employees, a checklist made by the researcher was used.

Section 1: Socio-demographical characteristics.

Section 2: Questionnaire to assess the knowledge of workers regarding respiratory morbidities. This part includes items to assess the knowledge of workers about respiratory disorders related to their occupations, which are divided into five sections such as: Causes of respiratory morbidities, Effects of environmental pollution and petroleum fumes on the respiratory system, Signs and symptoms and complications of respiratory morbidities, Diagnosis and treatment of respiratory morbidities and Prevention. Categorization of worker according to knowledge scores: Adequate knowledge: 70% - 100% (22 - 30), Moderate knowledge: 35% - 69.99% (11 - 21) and Inadequate knowledge: 0 – 34.99% (0 - 10).

## Result

Table.1 show information about Socio-demographical characteristics of Petrol Pump Workers in the study a According to result the mean of age was 26.38 years, Most of the workers were in the age group of 23-27 years(54.1%) and most of them were single (65.5%). Most Economic status of the workers were Earnings equal to expenses (61.7) .52% of the workers had shift at night. 81.6% of workers had 6-7 years of work experience, most of them worked 40-60 hours a week.

**Table.1. Socio-demographical characteristics of Petrol Pump Workers**

Variable	Frequency	Percent
Age Group		
18-22	90	18
23-27	271	54.1
28-32	53	10.6
33-37	55	11
38-40	32	6.4
Marital Status		
Single	328	65.5
Married	173	34.5
Economic status		
Earnings higher than expenses	68	13.6
Earnings equal to expenses	309	61.7
Earnings lower than expenses	124	24.8
Shift status		
Morning	80	16

Afternoon	160	32
Night	261	52
Years of Education		
Less than 6	58	11.6
7-12	300	59.9
13 and above	21	4.2
Working by years		
5-6	409	81.6
7-8	71	14.2
9 and above	21	4.2
Working hours per week		
40-60	275	54.9
61-80	135	26.9
81-100	34	6.8
101 and above	57	11.4
Total	501	100.0

Table.2. provides us with information about the knowledge of gas station employees about respiratory disorders about the causes of respiratory complications. According to the results of this table, gas station workers (65.1%) and street sweepers (34.9%) are more exposed to oil fumes and air pollutants than others. Therefore, according to the results, it makes them more prone to inhaling pollutants (56.3%) and lack of rest (30.9%). It was proved that overcrowding with (41.1%) has the greatest impact on aggravating the effects of air pollution. Environmental pollution and, most importantly, oil smoke with (42.5%) are the most predisposing factors in the lung function of gas station workers due to constant exposure to pollutants (76.6%). Along with the involvement of other body systems, the most involvement is in the respiratory system, which accounts for 81.2% of the share. The results showed that factors can accelerate this breathing disorder, the most important of which is smoking (97.4%).

**Table.2. Knowledge regarding respiratory disorders among petrol pump workers about causes of respiratory morbidities**

causes of respiratory morbidities	Frequency	Percent
The population who are continuously exposed to petroleum fumes and air pollutants are		
Petrol pump workers	326	65.1
Shop keepers	0	0
Pedestrians	0	0
Street sweepers	175	34.9
A person is more prone to get respiratory disorders by		
Inhaling pollutants	282	56.3
Drinking contaminated water	3	0.6
Consumption of alcohol	61	12.2
Lack of rest	155	30.9
Among the following, the factor that worsens the ill effects of air pollution is		
Pollution from garbage	115	23
Presence of open drainage	36	7.2
Exhaust fumes in the work environment	144	28.7
Overcrowding	206	41.1
Petrol pump workers are more susceptible to impaired lung function because of		
Automobile pollution	72	14.4
Environmental dust	36	7.2
Petroleum fumes	213	42.5
All of the above	180	35.9
A major cause of respiratory morbidities among petrol pump workers is		
General weakness	79	15.8
Constant exposure to pollutants	384	76.6
Inadequate food intake	0	0
Poor sleep	38	7.6
Petrol pump workers are more at risk for developing		

Cardiac problems	36	7.2
Gastro intestinal problems	25	5
Kidney problems	33	6.6
Respiratory problems	407	81.2
A person's habit which increases the risk for respiratory morbidity is		
Smoking	488	97.4
Alcoholism	3	0.6
Daily exercises	6	1.2
Eating fatty foods	4	0.8

The results of the investigation of knowledge variables about respiratory disorders in gas station workers / the effects of environmental pollution and oil fumes on the respiratory system are listed in Table3. According to the results, exposure to these pollutants affects the lungs more, which in the long term affects the airway, which has the greatest effect on dilation (with 35.3%). Also, Bronchial asthma was the most common complication among gas station employees with 54.5%. It was proved that the most common symptoms of respiratory complications among employees are cough (56.1%), weakness (30.9%), headache (7.4%), and abdominal pain (5.6%). Long-term exposure to these pollutants has potential side effects, which were the most common, respectively, difficulty breathing (63.1%) and loss of appetite (29.3%). We also examined the time required for symptoms of respiratory disease to appear, which showed that people develop symptoms of respiratory disease within a few months (50.3%) and a few weeks (31.1%).

**Table.3. knowledge regarding respiratory disorders among petrol pump workers/ effects of environmental pollution and petroleum fumes on respiratory system**

effects of environmental pollution and petroleum fumes on respiratory system	Frequency	Percent
The exposure to petroleum products and environmental pollution for a prolonged period may lead to diseases of		
Lungs	446	89
Brain	3	0.6
Kidney	52	10.4
Liver	0	0
Prolonged exposure to pollutants will make airway		
Wide	44	8.8
Loose	177	35.3
Narrow	128	25.5
Rupture	152	30.3
The most common respiratory disorder associated with inhalation of pollutants is		
Bronchial asthma	273	54.5
Pneumonia	96	19.2
Tuberculosis	35	7
Lung cancer	97	19.4
The most common symptom of respiratory morbidity is		
Cough	281	56.1
Head ache	37	7.4
Abdominal pain	28	5.6
Weakness	155	30.9
Constant exposure to air pollution may lead to		
Hair loss	37	7.4
Difficulty Breathing	316	63.1
Loss of appetite	147	29.3
Loss of memory	1	0.2

The time taken for a worker to experience symptoms of respiratory disease, following constant exposure to pollutants and petroleum fumes is within few		
Months	252	50.3
Weeks	156	31.1
Days	36	7.2
Hours	57	11.4

In Table.4., the results of the examination of knowledge variables related to respiratory disorders among gas station workers regarding signs and symptoms and complications of respiratory are mentioned. According to the results, the first symptoms that a person shows include cough (39.3%), wheezing (30.9%), chest tightness (29.1%), and bloody sputum (0.6%), respectively. Most of the participants (56.9%) believed that if they experience coughing and difficulty in breathing, they should consult a doctor, and most (53.9%) believed that the lung function test is the best diagnostic method. According to the results, asthma (with 65.3%) was the most important complication that may occur in gas station workers due to their work environment.

**Table. 4. knowledge regarding respiratory disorders among petrol pump workers about signs and symptoms and complications of respiratory morbidities**

signs and symptoms and complications of respiratory morbidities	Frequency	Percent
The first sign a person manifests, of respiratory disease		
Cough	197	39.3
Bloody sputum	3	0.6
Chest tightness	146	29.1
Wheezing	155	30.9
If you experience cough and difficulty breathing, you may		
Take leave	139	27.7
Wait for recovery	4	0.8
Take your own treatment	73	14.6
Consult a doctor	285	56.9
Complication which may develop in petrol pump workers due to their working environment include all except		

Lung cancer	62	12.4
Addiction to smell of petroleum products	56	11.2
Myocardial infarction	56	11.2
Asthma	327	65.3
Lung function can be assessed using		
ECG	56	11.2
Blood tests	147	29.3
Lung function test	270	53.9
Scanning	28	5.6

Table.5. shows the results of the examination of the variables of knowledge related to respiratory disorders in gas station workers regarding signs and symptoms and respiratory complications. Based on the results of changing the worker's workplace (45.7%) and prevention of complications (41.9%), the biggest advantage is timely diagnosis and treatment. Based on this, workers must be medically examined at least monthly. The results showed that regular screening and use of protective masks (with 57.5%) is the most important step to prevent respiratory complications among workers. As mentioned, the best method of prevention is frequent washing of the face (57.3%) and the use of a mask (38.9%) was the easiest measure to minimize the entry of pollutants into the lungs in gas station workers. Workers did exercise to improve lung function, and deep breathing exercises (32.9%) and weight lifting (26.3%) were the most popular. Most people (55.1%) believed that exercising once a day is enough.

Table.5. knowledge regarding respiratory disorders among petrol pump workers about diagnosis and treatment of respiratory morbidities

diagnosis and treatment of respiratory morbidities	Frequency	Percent
Advantage of early diagnosis and treatment is to		
Prevent complications	210	41.9
Change the workplace of worker	229	45.7
Terminate the worker	62	12.4
Isolate the worker	0	0
The main step to avoid respiratory complications is		
Regular screening and use of protective mask	288	57.5
Use of medications even for minor ailments	122	24.4

Frequent absenteeism	84	16.8
Ignoring signs and symptoms	7	1.4
Petrol pump workers should undergo medical examination at least		
Monthly	347	69.3
Quarterly	101	20.2
Half yearly	40	8
Yearly	13	2.6
Exercise to improve lung function is		
Weight lifting	132	26.3
Deep Breathing exercises	165	32.9
Abdominal exercises	4	0.8
Cycling	200	39.9
Exercise to improve lung function should be done at least		
Once in a day	276	55.1
Once in two days	37	7.4
Once in a week	130	25.9
Twice in a week	58	11.6
The simplest action taken to minimize the entry of pollutants to lungs is		
Wash face frequently	287	57.3
Wash hands frequently	11	2.2
Wear protective face mask	195	38.9
Wear protective clothing	8	1.6
Total	501	100.0

Table.6. shows a questionnaire to assess the knowledge about the prevention of respiratory disorders in gas station workers. According to statistical estimates, most people (61.3%) believed that the face mask is the best mask that prevents the inhalation of oil fumes and air pollutants. In addition, 61.3% believed in using a mask during all working hours, and 36.7% believed in using a mask when there is heavy smoke. Most of the workers believed that the mask prevents dust particles from entering the lungs (56.7%) and some thought that the mask provides cool air for breathing (30.3%). In addition,

73.9% of the workers checked the tear and elastic band of the mask before wearing it. The most common consequences of not using a mask were cough and breathing problems (60.9%), headache (25.9%), vomiting (11.6%), and abdominal pain (1.6%). More investigations on the masks used by the workers showed that most workers (59.3%) believe that the mask should be well fixed on the nose and mouth. Also, changing it once a day (57.7%), and once in two days (39.7%) were the most frequently changing masks among the workers.

**Table.6. knowledge regarding respiratory disorders among petrol pump workers about prevention**

prevention	Frequency	Percent
The mask that protecting from inhalation of petroleum fumes and air pollutants is		
Handkerchief	5	1
Cloth mask	7	1.4
Anti-pollutant mask	182	36.3
Face mask	307	61.3
Mask should be used		
Throughout duty hours	307	61.3
Sometimes, if desired	0	0
When heavy smoke is present	184	36.7
When cough is present	10	2
Mask is useful for		
Preventing dust particles into lungs	284	56.7
Providing cool air to breath	152	30.3
Protecting eyes from dust	58	11.6
Preventing	7	1.4
The health problems that may arise, when mask is not being used		
Headache	130	25.9
Vomiting	58	11.6
Cough & breathing difficulty	305	60.9
Abdominal pain	8	1.6

Before wearing the mask		
Check whether mask is torn and elastic band is proper	370	73.9
Check the cost of mask	10	2
Check the condition of the environment	119	23.8
Check the color of the mask	2	0.4
The mask should be placed		
Only covering the mouth	4	0.8
Covering the nose	166	33.1
Loosely over the nose and mouth	34	6.8
Fitting well over nose and mouth	297	59.3
Frequency of changing mask should be at least		
Once a day	289	57.7
Once in two days	199	39.7
Twice a day	7	1.4
Once a week	6	1.2
Total	501	100.0

The result of examining the variables of levels of knowledge among participants at gas station showed that 393 people (78.4%) had moderate knowledge and 102 (20.4) high knowledge and 6 (1.2) low knowledge(Figure 3-1).

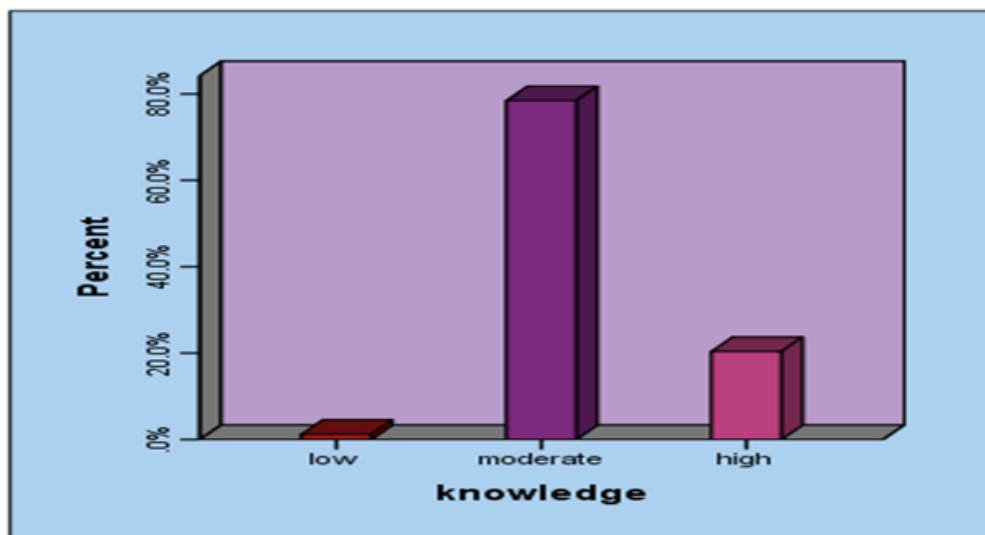


Figure 3-1. Knowledge regarding respiratory disorders among petrol pump workers

## Discussion

The present study focuses on the evaluation of knowledge about respiratory problems among employees of gas stations under the management of the Erbil Ministry of Natural Resources.

This study's findings showed that the mean age of the workers was 26.38 years, which indicates that most of the population was working at gas stations at a young age. In the study of Desalegn Tetemke et al (2014) (D et al., 2014), the minimum and maximum age of the workers were 16 and 54 years, respectively, with an mean age of 24.45 years, which is close to our study. Similar to this study, the mean age in the study by Ajeet Jaiswal et al (2020), was 25.32 (Jaiswal, 2020).

The majority of respondents were single, according to the findings on their marital status. In the study of Desalegn Tetemke et al (2014), the number of single and married people was almost the same, and the number of single people was slightly more, which constituted 55.6% of the sample (D et al., 2014). Examining the results of the age variable in the study of Moneim et al (2023) showed that 87% of the participants are married people, which is contrary to our study. Marriage is a personal decision and many factors can facilitate the conditions of marriage or prevent it. This is the only convincing reason for this conflict in the results because these studies were conducted in different geographical areas (Abdel Moneim et al., 2022).

Because the volatile pollutants generated in petrol stations are lipophilic and their absorption is proportional to BMI and fat mass, body mass index (BMI) is one of the most critical determinants for pollutant absorption (Rahimi Moghadam et al., 2019). the BMI of workers in the study of Mandal et al (2020) (Mandal and Mukherjee, 2020), and Belal Rahhal (2022) (Rahhal, 2022), was equal to 24.52, and 26.68 kg/m<sup>2</sup>, respectively. The BMI of the first study is similar to our study, but the BMI of the second study is higher than the mean of our study. In Adeniyi et al.'s study (2014), BMI was equal to 22.7 kg/m<sup>2</sup>, which is lower than the mean of our study (Adeniyi, 2014). The reason for the inconsistency of the mean BMI in the studies can be attributed to the number of participants, the ratio of male and female workers, and the lifestyle pattern of the people.

Ifeyinwa et al (2016), conducted a study to investigate the risk of respiratory disease among fuel pump operators. They found that most of the employees' shifts are more than 8 hours per day, which is consistent with our study. These long work shifts can expose people to more pollutants, which creates more challenges to minimizing these complications in employees. Therefore, the government and interested officials should act to solve these challenges (Ifeyinwa et al., 2016).

In this study, it was proved that 52% of people are night shift, which is contrary to the study of Muhammad Mohsin et al (2022). The reason for this is that in the study of Muhammad Mohsin et al., most of the participants were married. But in our study, most of the participants were single, and single people choose the night shift more often. Because fewer drivers visit gas stations at night and it gives them more time to rest (Mohsin et al., 2022). Also, the results showed that most of the workers had 6-7 years of work experience and most of them worked 40-60 hours per week, which is not consistent with the study of Shambharkar et al (2021) (Shambharkar, 2021). Because their work shifts and working hours were different during the week.

In this study, we measured the variables of cough, chest tightness, coughing attacks and airway mucus, shortness of breath, wheezing in situations that patients can experience. The results of the cough variable showed that most of the patients cough and the cough is present on most days for more than 3 consecutive months. Examining the chest tightness variable showed that 16.4% of the employees felt chest tightness while resting, walking and while working. Regarding the phlegm elimination variable, a small percentage of people removed phlegm from their chest and had little awareness. The variable of coughing attacks and airway mucus showed that a small percentage of people experience coughing attacks and excessive phlegm secretion more than three weeks a year. Also, regarding shortness of breath, 28.5% of patients stated that they experience shortness of breath when walking fast on a flat surface or when climbing a gentle slope. And less than half of the people also claimed that they feel wheezing in their chest every day when they breathe. There are limited studies with which to compare these results. But in a study by Neghab et al (2012), they investigated the prevalence of respiratory symptoms in gas station workers. The results of the comparison between the control group and the case showed that the incidence of cough, sputum, and both together for 3 consecutive months or more in a year has a significant difference. Also, the occurrence of wheezing most days and nights, shortness of breath compared to the same age group were among the statistically significant parameters which are consistent with the results of our study (Neghab and Habibi Mohraz, 2012).

Gas station workers may be impacted by a variety of health issues as a result of their employment; thus, they must be knowledgeable and aware of the impacts of gasoline and diesel. Knowledge is sometimes defined as an understanding of facts or practical abilities, but it may also refer to familiarity with items or circumstances. Workers who understand the effects of gasoline and diesel can protect themselves against sickness (Zins, 2007; Ebeid, 2021).

Statistical analysis showed that there is a statistically significant difference between the knowledge of gas station employees about the causes of respiratory complications, the effects of environmental pollution and oil fumes on the respiratory system, signs and symptoms and respiratory complications, and diagnosis and treatment of respiratory diseases with the age group.

These findings are not consistent with the study of Thomas et al (2020) (Thomas et al., 2020). Bhandari et al (2015) in their study, instead of comparing age groups, used the year of work as a criterion for comparison with the level of knowledge. They found that there is a statistically significant relationship between these two variables (Aryal Bhandari, Gautam, and Bhandari, 2015).

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The comparison of the above parameters with the economic status, work shift, years of Education, working by years, and working hours per week of people showed that there is a statistically significant relationship. Thomas et al (2020), concluded that education, higher monthly salary (>Rs. 5000), and longer work experience (>10 years) lead to increased awareness of occupational respiratory issues (Thomas et al., 2020).

A descriptive-analytical study was conducted by Okafoagu et al (2017), to investigate the determinants of knowledge and occupational hazard safety measures of workers. Found that workers with formal education are more aware of workplace hazards. And training enables workers to avoid occupational hazards and without training, they cannot understand and adopt occupational health measures. These findings are consistent with our study (Okafoagu et al., 2017). But Moneim et al (2023), in their study, concluded that the knowledge level of workers is largely unaffected by their education, which contradicts our findings (Abdel Moneim et al., 2022). The reason for this discrepancy can be that in the study of Moneim et al., most of the participants were poorly educated and did not have a university education. Because a professional degree is not required to be employed as a Petrol filler. This also depends on the policies of each gas station.

The Moneim et al (2023) (Abdel Moneim et al., 2022), investigation found that the majority of exposed individuals understood the name of the principal substance, despite the fact that only half of them had actual contact with it. Kaufman et al (2009) (Kaufman, Anderson, and Issaragrisil, 2009), discovered that 17% of the employees surveyed recognised gases originating from fuels, 20% recognised chemicals utilised in their industry, and 14% recognised vapours created by automobiles. These findings corroborated those of Abdel Monem et al (2010) (Mon et al., 2010), which found that staff were well-versed about the effects of gasoline on the environment and human health. However, the workers' level of knowledge was essentially unaffected by their schooling. This was reinforced by Abd ElAziz et al (2012) (E. A., M., and A.-E, 2012), who said that there was no significant relationship between worker knowledge and schooling. These findings are not consistent with our study.

We also compared these parameters with those before contracting covid-19 and the results showed that there is a significant statistical relationship. However, due to the fact that this disease became an epidemic in recent years, previous studies of Covid-19 were not used as a comparison criterion in order to identify similar and inconsistent studies with our study according to the available sources. Therefore, it can be said that this is another prominent point of our study.

## Conclusion

Gas station workers in Erbil are exposed to gasoline and vapors produced while filling cars and smoke from cars. It was proved that the awareness of respiratory disorders among fuel-filling workers in gas stations are influenced by many factors including demographic and environmental variables. It was also proven that workers used poor protective measures despite their knowledge of the adverse health effects of gasoline. This means that knowledge does not have much effect on practice. Common self-reported symptoms among gas station workers were headache, nausea, and shortness of breath. The prevalence of self-reported symptoms increased significantly with increasing years of working at the gas station. In general, prevention, intervention, and training programs regarding the use of protective measures, monitoring the health status, and increasing the knowledge of gas station employees should be implemented.

Limitation: This study has a few restrictions. The survey participants may have been affected by the "healthy worker effect" since some employees may have quit their jobs due to developing a handicap or experiencing worse respiratory problems as a result of exposure to gasoline fumes. It may be believed that certain employees who have a delayed reaction to gasoline fumes have healthy lungs.

Other limitations of this study include the researcher's time limit and the non-cooperation of some gas station operators

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### Conflicts of Interest

The authors declare that there are no conflicts of interest related to this work.

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