Gaster, Gaster, 23(2) 2025, 177-187
https://journal.aiska-university.ac.id/index.php/gaster
e-ISSN: 2549-7006; p-ISSN: 1858-3385
DOI: https://doi.org/10.30787/gaster.v23i2.1964

**Original Research**

# Pulmonary Complaints Among Gas Station Operators: A Descriptive Study in Klaten Region

**Sri Handayani[1*], Ratna Agustiningrum[1], Nur Wulan Agustina[1], Rheni Haryanti[1]**

[1] Faculty of Health and Technology, Universitas Muhammadiyah Klaten, Klaten, Indonesia

## ABSTRACT

***Background*** *Gas station environments pose a high risk for exposure to vehicle emissions, which may lead to respiratory health issues due to the accumulation of hazardous pollutants. Continuous exposure, particularly among gas station operators, increases susceptibility to pulmonary disorders.*

***Objective*** *This study aimed to describe the prevalence and characteristics of pulmonary complaints among gas station workers in the Klaten region.*

***Methods*** *A descriptive study was conducted at two gas stations (44.57406 and 44.57403), both located on major traffic routes and operating daily. The total sampling technique was employed, involving 51 workers. Data were collected using structured questionnaires that assessed personal characteristics, smoking habits, mask usage behavior, and respiratory symptoms. Descriptive statistics using frequency distribution were applied in the data analysis.*

***Results*** *Findings showed that 41.2% of respondents experienced pulmonary complaints. The most frequently reported symptoms included shortness of breath while walking briskly, shortness of breath after physical exertion, productive cough, and persistent coughing throughout the day. Contributing factors identified were long working hours, smoking behavior, and inconsistent use of face masks.*

***Conclusion*** *A significant proportion of gas station operators reported respiratory complaints potentially linked to prolonged exposure to vehicle emissions. Additional risk factors such as smoking and improper personal protective equipment use may further compromise respiratory health. These findings underscore the need for preventive measures, including occupational health education, routine screening, and environmental interventions.*

**ARTICLE HISTORY**
Received : 26 March 2025
Revised : 4 April 2025
Accepted : 26 April 2025
Avaliable Online : 10 August, 2025
Published : 25 August 2025

**KEYWORDS**
Respiratory Tract Diseases, Occupational Health, Petroleum Exposure, Air Pollutants

**CONTACT**
Sri Handayani
handa@umkla.ac.id
Faculty of Health and Technology, Universitas Muhammadiyah Klaten, Jawa Tengah, Indonesia

Cite this as: Handayani, S., Agustiningrum, R., Agustina, N. W., & Haryanti, R. (2025). Pulmonary Complaints Among Gas Station Operators: A Descriptive Study in Klaten Region. *Gaster*, *23*(2). https://doi.org/10.30787/gaster.v23i2.1964

Gaster, Gaster, 23(2) 2025, 177-187
https://journal.aiska-university.ac.id/index.php/gaster
e-ISSN: 2549-7006; p-ISSN: 1858-3385
DOI: https://doi.org/10.30787/gaster.v23i2.1964

## INTRODUCTION

Gas stations are among the transportation facilities that pose a significant risk of air pollution from motor vehicle emissions. Vehicle emissions contain hazardous elements, including heavy metals, such as lead (Pb), nitrogen oxide (NOx), carbon monoxide (CO), sulfur dioxide (SO2), and particulate matter (PM) (Manisalidis, I., Stavropoulou, E., Stavropoulos, A., & Bezirtzoglou, 2020)(Sompornrattanaphan et al., 2020). The buildup of emission from vehicles is hazardous to both human health and the environment. Public gasoline filling station operators, as a category of workers, are particularly exposed to motor vehicle pollution.

A study of gas station workers in Khon Kean province, Thailand, found that benzene emissions caused five significant negative symptoms, including weariness, headaches, dizziness, stuffy nose, and runny nose (Tongsantia et al., 2021). Research on public gasoline filling station workers in Rio de Janeiro, Brazil discovered that, while benzene exposure was still below the biological indicator limit of exposure (BEI), it constituted a danger to workers' health. Workers with greater levels of t,t-MA tended to have symptoms such as nosebleeds (epistaxis) and weariness (Geraldino et al., 2020). Gas station workers had significantly lower FVC, FEV1, and PEFR compared to the control group ($P < 0.05$). Gas station workers had significantly higher systolic and diastolic blood pressures, as well as respiratory symptoms, than the control group ($P < 0.05$). Moreover, coughing and chest discomfort were the most common symptoms reported by gas station staff (Okemuo et al., 2020)

According to research conducted at public gasoline filling stations in Seberang Ulu II District, Palembang, the most prevalent health issues reported by workers were exhaustion, headaches, irritability, sleep difficulties, and trouble focusing(Fajar et al., 2021). Sulfur dioxide ($SO_2$) levels at public gasoline filling stations in Ogan Ilir Regency were 30.0 µg/m³, surpassing the Environmental Health Quality Standard (SBMKL) guideline of 150 µg/m³. Lung function tests revealed that 93.6% of responders had poor lung function. However, according to the study's findings, there was no significant association between the length of exposure and decreased lung function (Cahyono & Sunarsih, 2024). There is a significant difference in the concentration of $SO_2$ and $NO_2$ between mountainous and urban areas (P value of $SO_2$ = 0.001 and P value of $NO_2$ = 0.001). Additionally, $SO_2$ concentration has a significant effect on respiratory complaints in public fuel filling station operators in both mountainous and urban areas (P value = 0.004; Exp.B = 1.859) (Mendrofa et al., 2025).

In Medan, 82.2% of gas stations had benzene levels above 20 µg/g (Susilawati & Rahma, 2023). According to research (Dorus et al., 2023), motor vehicles play a role in raising concentrations of PM10. PM10 may irritate the upper and lower respiratory tracts, exacerbate asthmatic and chronic bronchitis symptoms, as well as induce acute respiratory illnesses such as coughing, shortness of breath, and wheezing. National data (Kementerian Kesehatan RI, 2018) reveal that the prevalence of air particulate-related disorders, such as ARI, is as high as 9.3%, Asthma, 2.4%, and Pneumonia, 4.0%. While data for Central Java Province show a prevalence of up to 8.5% for ARI, 1.8% for Asthma, and 3.4% for Pneumonia, this demonstrates that illnesses caused by air pollution remain prevalent.

Air pollutants are known to have short-term health effects, but they can also induce chronic obstructive pulmonary disease (COPD) and lung cancer in the long run. Furthermore, it has been observed that many operators of public gasoline filling stations are still working without masks. (Ginting et al., 2022) found that 61.3% of public

Gaster, Gaster, 23(2) 2025, 177-187
https://journal.aiska-university.ac.id/index.php/gaster
e-ISSN: 2549-7006; p-ISSN: 1858-3385
DOI: https://doi.org/10.30787/gaster.v23i2.1964

gasoline filling station operators do not wear masks while working. Based on the description above, the purpose of this study was to describe pulmonary problems among gasoline filling workers.

## METHOD

This current research is a descriptive research that seeks to describe respiratory issues among operators of public fueling stations. This study was approved by the UMS Faculty of Health's Health Research Ethics Committee (KEPK) under Ethics Eligibility Letter number 5206A / B1 / KEPK-FKUMS / IV / 2024. The study was carried out at gas stations 44.57406 and 44.574.03, which are located on the major route and provide fuel filling services daily. The research sample included all operators at gas stations 44.57406 and 44.574.03 by employing total sampling method, involving 51 workers. Data was collected from May 14 to June 10, 2024.

A questionnaire from (Kementrian Kesehatan RI, 2010) called Baseline Data Survey of Non-infectious Disease Risk Factors was utilized as the study tool. The data obtained included respondent characteristics such as age, length of employment, gender, education, smoking habits, and mask wearing habits. Data on respiratory problems included coughing, phlegm, shortness of breath, and wheezing. The data were examined using a frequency distribution.

## RESULTS

**Table 1.** Distribution of Respondents Based on Age and Duration of Service

| No | Characterize | Min | Max | Mean ± SD |
|---|---|---|---|---|
| 1 | Age | 20 | 55 | 39.51±10.296 |
| 2 | Duration of service | 1 | 28 | 11,96 ± 8.239 |

Source: Primary Data

The study found that respondents have an average age of 39.51 ± 10.296 years, and duration of service of 11.96 ± 8.239 years. Table 1 presents the whole data.

**Tabel 2.** Distribution of Respondents Based on Gender, Education, Smoking, Marital Status and Mask Wearing Habits

| No | Characteristics | F | % |
|---|---|---|---|
| 1 | **Sex** | | |
| | Male | 44 | 86.3 |
| | Female | 7 | 13.7 |
| 2 | **Education** | | |
| | High School | 48 | 94.1 |
| | Higher Education | 3 | 5.9 |
| 3 | **Smoking Habit** | | |
| | Yes | 26 | 51 |
| | No | 25 | 49 |
| 4 | **Masking Habit** | | |
| | Yes | 37 | 72.5 |
| | No | 14 | 27.5 |
| | Total | 51 | 100 |

Source: Primary Data

Gaster, Gaster, 23(2) 2025, 177-187
https://journal.aiska-university.ac.id/index.php/gaster
e-ISSN: 2549-7006; p-ISSN: 1858-3385
DOI: https://doi.org/10.30787/gaster.v23i2.1964

According to the study's findings, 86.3% of respondents were male, 94.1% had completed high school, 51% smoked, and 72.5% wore masks. Table 2 presents the whole data.

According to the study's findings, up to 41.2% of respondents had lung issues. Some of the lung issues reported by respondents included coughing, shortness of breath after heavy exertion, shortness of breath when climbing, and coughing/shortness of breath that had been increasing for at least three weeks. Tables 3 and 4 give complete data on lung problems reported by research participants.

**Table 3.** Distribution of Respondents of Lung Complaints in Gas Station Operators

| No | Respiratory Complaints | f | % |
|---|---|---|---|
| 1 | Yes | 21 | 41.2 |
| 2 | No | 30 | 58.8 |
| | Total | 51 | 100 |

**Table 4.** Distribution of Respondents Based on Type of Lung Complaints in Gas Station Operators

| No | Respiratory Complaints | F | % |
|---|---|---|---|
| 1 | Daily cough | 1 | 2 |
| 2 | Daily phlegm | 1 | 2 |
| 3 | Chronic cough with phlegm for at least 3 months in a year | 2 | 3.9 |
| 4 | Quickly feeling tired and short of breath when doing activities | 0 | 0 |
| 5 | Complaints of shortness of breath that last a long time | 2 | 3.9 |
| 6 | Shortness of breath when doing heavy activities | 8 | 15.7 |
| 7 | Shortness of breath when walking quickly/walking uphill | 14 | 27.5 |
| 8 | Walking slower due to shortness of breath | 1 | 2 |
| 9 | Stopping walking for a few minutes due to shortness of breath | 2 | 3.9 |
| 10 | Wheezing | 0 | 0 |
| 11 | Coughing/shortness of breath increases for at least 3 weeks | 5 | 9.8 |
| 12 | Frequent recurrent of Air Respiratory Infection | 0 | 0 |

## DISCUSSION

Respondents' ages varied from 20 to 55, with a working duration of 1-28 years. Age is one factors that might influence the body's resistance to hazardous material exposure in the workplace. Younger folks have greater lung capacity and endurance. However, lung capacity naturally declines with age, increasing the risk of respiratory illnesses caused by industrial pollution (Jett & Mason, 2020). According to the study's findings, the degree of exposure to contaminants in the workplace varies depending on the respondents' duration of service. Longer working hours are strongly linked to exposure to harmful substances, which can raise the risk of chronic lung disease. Research (Medyati et al., 2023) revealed that age, duration of service, and smoking practices were connected with subjective symptoms of respiratory illnesses, with length of service being the most prominent predictor.

Other characteristics of respondents include the fact that 51% smoke and 27.5% do not use masks at work. Smoking has been scientifically determined to induce bronchial

Gaster, Gaster, 23(2) 2025, 177-187
https://journal.aiska-university.ac.id/index.php/gaster
e-ISSN: 2549-7006; p-ISSN: 1858-3385
DOI: https://doi.org/10.30787/gaster.v23i2.1964

epithelial damage, persistent inflammation, mucus hypersecretion and pulmonary structural, as well as functional abnormalities. Furthermore, smoking impairs the body's reaction to airborne irritants found in petrol stations. Under normal circumstances, the lungs may remove hazardous particles using the mucociliary process. However, active smokers disturb this system, resulting in the buildup of harmful particles and persistent inflammation. According to research (Eviansa et al., 2022), work period and smoking are associated with reduced pulmonary function. Furthermore, according to Fentiana and Putri (2018), age, job time, smoking habits, and discipline in using personal protective equipment all have a strong association with respiratory tract illnesses.

The study's findings revealed that 41.2% of respondents had lung symptoms. Operators of gas stations are among those who have a high risk of exposure to motor vehicle pollution. Combustion of fossil fuels emits pollutants including lead (Pb), nitrogen oxide (NOx), carbon monoxide (CO), sulfur dioxide (SO2), and tiny particles like $PM_{2.5}$ and $PM_{10}$ (Manisalidis, I., Stavropoulou, E., Stavropoulos, A., & Bezirtzoglou, 2020)(Sompornrattanaphan et al., 2020). These contaminants have the potential to penetrate the respiratory system and reach the lung alveoli, producing irritation and inflammation. Long-term exposure to these pollutants can impair lung function and heighten the risk of chronic respiratory disorders including bronchitis and asthma.

The study found that shortness of breath when walking in a hurry, shortness of breath when conducting heavy tasks, coughing, and persistent cough with phlegm are the most common lung problems among workers. Fine particles from car emissions can penetrate deep into the respiratory system and reach the lung alveoli. Particles cause inflammatory responses, oxidative stress, and damage to lung epithelial cells, prompting the body to create excessive mucus as a defensive response. This procedure causes people to cough and produce phlegm. A research (Cintya et al., 2020) found that breathed dust was linked to reduced lung function in permanent merchants at the Tegal City Terminal. Furthermore, nitrogen dioxide ($NO_2$) gas, produced by diesel and gasoline engines, is a major cause of respiratory tract irritation. Thus, $NO_2$ may harm the bronchial epithelium, increase mucosal permeability, and aggravate lung disorders including asthma and chronic bronchitis. Another research (Khomenko et al., 2021) also found that exposure to $NO_2$ from car emissions is linked to higher hospitalization rates for shortness of breath and asthma exacerbations, particularly in metropolitan areas.

Chronic phlegmy cough is one of the signs of respiratory system problems, particularly in the lower respiratory tract. While a chronic cough is defined as one that lasts more than eight weeks in adults and four weeks in children. This symptom may indicate a variety of conditions, including chronic bronchitis, bronchiectasis, pulmonary TB, or chronic obstructive pulmonary disease (COPD). Chronic phlegmy cough can also be characterized by clear, yellow, or even green phlegm, depending on the severity of infection or inflammation. Increased phlegm production implies a chronic inflammatory reaction in the respiratory system, resulting in increased mucosal discharge. Sufferers frequently report of difficulties doing tasks, odd breath noises, as well as shortness of breath (Global Initiative For Chronic Obstructive Lung Disease (GOLD), 2023)

Chronic coughing and extensive phlegm might impair lung function and air exchange. The accumulation of mucus in the bronchi narrows the airways, making it difficult for oxygen to reach the alveoli. As a result, when people engage in physical activity, their oxygen demands are not effectively supplied, causing feelings of

Gaster, Gaster, 23(2) 2025, 177-187
https://journal.aiska-university.ac.id/index.php/gaster
e-ISSN: 2549-7006; p-ISSN: 1858-3385
DOI: https://doi.org/10.30787/gaster.v23i2.1964

shortness of breath that interfere with mundane duties. Lack of oxygen caused by recurrent shortness of breath during exertion can result in weariness, reduced focus, and even diminished heart function, all of which can limit job productivity. Penelitian Amin et al. (2018) discovered a link between the length of exposure to air pollution and oxygen saturation in staff of public gasoline filling stations in Blitar Regency. Similarly, (Ganggut et al., 2018) discovered a strong link between exposure to motor emission dust and significant lung capacity change in public gasoline filling station workers in Kupang City.

Respondents' lung symptoms rose as a result of certain public gasoline filling station operators not wearing masks and smoking. Public gasoline filling station operators who smoke are more likely to suffer lung damage as a result of being exposed to dangerous compounds from two sources at the same time, namely cigarette smoke and motor emissions. Cigarette smoke includes harmful compounds such as nicotine, carbon monoxide, and tar, which can damage the respiratory epithelium and impair the lungs' capacity to clear foreign particles. Furthermore, operators' propensity of not wearing masks while working might exacerbate lung diseases. Many workers wear cotton masks or surgical masks that are not intended to filter volatile chemical compounds like benzene and toluene contained in gasoline. According to research (Fajar et al., 2021), 37.1% of public gasoline filling station officers failed to use personal protective equipment (PPE). This conclusion was supported by study (Ginting et al., 2022), which found a substantial link between PPE use and respondents' blood oxygen levels.

## CONCLUSION

The findings of a survey of public gasoline filling station operators in the Klaten area, 41.2% reported having lung issues such as persistent cough, phlegm, and shortness of breath. These problems are considered to be linked to prolonged exposure to motor vehicle pollution.

Other variables that worsen these lung conditions include a relatively lengthy working time (average 11.96 years), smoking habits (51% of respondents), and inadequate use of personal protective equipment (masks) (21.7% of respondents did not use masks while working). The combination of environmental and behavioral variables raises the risk of lung dysfunction in workers.

These findings highlight the need of preventative measures, such as enhanced personal protective equipment use, lung health education, frequent health checks, and emission control in the workplace to protect the health of gas stations' worker.

## ACKNOWLEDGEMENT

The author wishes to express his heartfelt appreciation to the leaders of petrol stations 44.57406 and 44.574.03, who have offered the chance and support for this research with different facilities required. The participation and collaboration of gas station owners and operators is critical to the success of this research. Furthermore, the researcher wishes to express his heartfelt gratitude to the Muhammadiyah University of Klaten for providing the necessary facilities and assistance to accomplish this research.

Gaster, Gaster, 23(2) 2025, 177-187
https://journal.aiska-university.ac.id/index.php/gaster
e-ISSN: 2549-7006; p-ISSN: 1858-3385
DOI: https://doi.org/10.30787/gaster.v23i2.1964

## REFERENCES

Amin, A., Yudiernawati, A., & Hariyanto, T. (2018). Hubungan Lama Paparan Polutan Udara Dengan Saturasi Oksigen Pada Karyawan Spbu Di Wilayah Kabupaten Blitar. *Jurnal Keperawatan Terapan*, *4*(2), 138–147.

Cahyono, R. T., & Sunarsih, E. (2024). *Environmental Health Risk Analysis Of Sulfur Dioxide (So2) Exposure In Ambient Air On Lung Function Of Officers And Communities Around Public Fuel Filling Stations (SPBU)*. *6*(December), 293–300.

Cintya, R. E., Budiyono, B., & Joko, T. (2020). Paparan Debu Terhirup dan Gangguan Fungsi Paru pada Pedagang Tetap di Terminal Kota Tegal. *Media Kesehatan Masyarakat Indonesia*, *19*(3), 189–194. https://doi.org/10.14710/mkmi.19.3.189-194

Dorus, M. M., Mangangka, I. R., & Legrans, R. R. I. (2023). Analisis Kadar Partikulat Matter (PM10) Dari Kendaraan Bermotor Pada Ruas Jalan Pierre Tendean Di Depan Mega Mall. *Tekno*, *21*(85).

Eviansa, A.Z., et al. (2022). Analisis Faktor Determinan Terhadap Gangguan Fungsi Paru Pada Pekerja SPBU Makassar. *Window of Public Health Journal*, *3*(3), 554–562. https://doi.org/10.33096/woph.v3i3.541

Fajar, F. M., Rosita, Y., & Pramayastri, V. (2021). Karakteristik Pekerja Spbu Dengan Keluhan Kesehatan Akibat Terpapar Timbal. *OKUPASI: Scientific Journal of Occupational Safety & Health*, *2*(1), 25–33.

Fentiana, N., & Putri, R. R. (2018). Kedisiplinan Penggunaan Apd, Kebiasaan Merokok Dan Pengaruhnya Dengan Gangguan Pernapasan Pada Polantas. *Jurnal Kesehatan*, *11*(2), 107–114. https://doi.org/10.24252/kesehatan.v11i2.6332

Ganggut, M. C. N., Manafe, D. R. T. M., & Sasputra, I. N. (2018). Long-term Relationship between Exposure to Motor Vehicle Dust and Vital Lung Capacity in Gas Station Operators in Kupang City. *Cendana Medical Journal*, *15*(3), 390–394. https://ejurnal.undana.ac.id/index.php/CMJ/article/view/671/605

Geraldino, B. R., Nunes, R. F. N., Gomes, J. B., Giardini, I., da Silva, P. V. B., Campos, É., da Poça, K. S., Hassan, R., Otero, U. B., & Sarpa, M. (2020). Analysis of benzene exposure in gas station workers using trans,trans-muconic acid. *International Journal of Environmental Research and Public Health*, *17*(15), 1–13. https://doi.org/10.3390/ijerph17155295

Ginting, D. B., Santosa, I., & Trigunarso, S. I. (2022). Kadar Oksigen Darah Petugas Operator SPBU Kota Bandar Lampung Tahun 2022. *Jurnal Analis Kesehatan*, *11*(2), 104. https://doi.org/10.26630/jak.v11i2.3553

Global Initiative For Chronic Obstructive Lung Disease (GOLD). (2023). Global Initiative for Chronic Obstructive Lung. In *A Guide for Health Care Professionals* (Vol. 1, Issue 3).

Jett, J. R., & Mason, R. J. (2020). *Murray and Nadel's Textbook of Respiratory Medicine* (7th ed.). Elsevier.

Gaster, Gaster, 23(2) 2025, 177-187
https://journal.aiska-university.ac.id/index.php/gaster
e-ISSN: 2549-7006; p-ISSN: 1858-3385
DOI: https://doi.org/10.30787/gaster.v23i2.1964

Kementerian Kesehatan RI. (2018). Riskendas 2018. *Laporan Nasional Riskesndas 2018*, *44*(8), 181–222. http://www.yankes.kemkes.go.id/assets/downloads/PMK No. 57 Tahun 2013 tentang PTRM.pdf

Kementrian Kesehatan RI. (2010). *Kuesioner Survei Data Dasar Studi Kohor Faktor Risiko Penyakiit Tidak Menular*.

Khomenko, S., Cirach, M., Pereira-Barboza, E., Mueller, N., Barrera-Gómez, J., Rojas-Rueda, D., de Hoogh, K., Hoek, G., & Nieuwenhuijsen, M. (2021). Premature mortality due to air pollution in European cities: a health impact assessment. *The Lancet Planetary Health*, *5*(3), e121–e134. https://doi.org/10.1016/S2542-5196(20)30272-2

Manisalidis, I., Stavropoulou, E., Stavropoulos, A., & Bezirtzoglou, E. (2020). nvironmental and Health Impacts of Air Pollution: A Review. *Frontiers in Public Health*, *8*(February), 1–13. https://doi.org/10.3389/fpubh.2020.00014

Medyati, N., Irjayanti, A., & Isnaini, L. (2023). Faktor yang Berhubungan dengan Gejala Subjektif Gangguan Pernapasan pada Pekerja Industri Mebel di Distrik Abepura. *Jurnal Kesehatan Lingkungan Indonesia*, *22*(2). https://doi.org/10.14710/jkli.22.2.152-159

Mendrofa, I. J., Indirawati, S. M., & Ashar, T. (2025). *Comparison Of $So_2$ And $No_2$ Concentrations In Mountainous And Urban Areas In Relation To Respiratory Disorders Among Gas Station Operators*. *8*(January), 96–108.

Okemuo, A., Ominyi, L., Ojukwu, C., Uchenwoke, C., Chukwu, C., & Ezugwu, U. (2020). Assessment of respiratory symptoms and cardiopulmonary indices among petrol pump attendants in Enugu Metropolis. *International Journal of Medicine and Health Development*, *25*(2), 106. https://doi.org/10.4103/ijmh.ijmh_9_20

Sompornrattanaphan, M., Thongngarm, T., Ratanawatkul, P., Wongsa, C., & Swigris, J. J. (2020). The contribution of particulate matter to respiratory allergy. *Asian Pacific Journal of Allergy and Immunology*, *38*(1), 19–28. https://doi.org/10.12932/AP-100619-0579

Susilawati, S., & Rahma, A. (2023). Analisis Paparan Benzena Pada Petugas Opertaor Spbu Di Wilayah Kota Medan Kecamatan Medan Timur. *Zahra: Journal Of Health and Mendical Research*, *3*(4), 354–361. file:///C:/Users/Hewlett-Packard/Downloads/_Adelia+Rahma_+Jurnal+Isu+Mutakhir+K3-2.pdf

Tongsantia, U., Chaiklieng, S., Suggaravetsiri, P., Andajani, S., & Autrup, H. (2021). Factors affecting adverse health effects of gasoline station workers. *International Journal of Environmental Research and Public Health*, *18*(19). https://doi.org/10.3390/ijerph181910014