Case Reports and Reviews

Case Report


# Mini Review and Meta -Analysis for Incidence of Cancer Among Petroleum Industry Workers and Resident Living in Oil Producing Communities

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- Received Date: 05 Nov 2024
- Accepted Date: 21Nov 2024
- Publication Date: 10 Dec 2024



## Introduction

Cancer is the second most common cause of death in adult aged 25 years or older and is expected to soon be the leading cause of death in the United States [1,2]. Mass industrial production and exposure to potential carcinogenic compounds including pollutants from nearby oil refineries present as a public health concern [3].

Petroleum extraction and referring are major source of varies occupational exposures and of air pollution and may therefore contribute to global cancer burden. petroleum (Crude oil) is the origin of many complex mixtures such as petrol and diesel fuel and is via chemical process, used to produce plastic and other useful materials such as a textiles, pesticides, cosmetic, paints, and insulating materials.

Workers in the petroleum industry are exposed to variety of known or potential harmful substances and emission from oil and gas extraction are among the major source of air pollution in environments and communities where such facilities are situated and operate. These potential harmful exposures include, among other heavy metals and hydrocarbons such as benzene which is up 4g/l in crude oil. Asbestos which is known to be the cause for mesothelioma and cancer of the lung and ovary has been used extensively in petroleum industries. both benzene and asbestos are classified as Group 1 carcinogens by International Agency for Research on Cancer (IARC). The International Agency for Research on Cancer has recognized and identified important sources of emissions from the petrochemical industries as environmental carcinogens (IARC: monographs on evaluation of carcinogenic risks to human [4].

A recent systematic review and meta-analysis including studies published up to 2012 was based on data from 36 cohort studies assessed the meta -relative risk of 11 cancers among petroleum refinery worker [5] their results showed elevated meta-relative risks of mesothelioma ,malignant skin melanoma and acute lymphoid leukemia and no elevated risks of total leukemia ,acute non-lymphocytic leukemia ,chronic lymphocytic leukemia, chronic myeloid leukemia ,multiple myeloma, on -Hodgkin's lymphoma (NHL),and lung and kidney cancers .the most recent review of residents near petroleum industry sites has also found elevated risks for leukemia(the review only focused on hematological malignancy [6].

Oil and gas extraction activities, including fracking, drilling and production, can release radioactive materials that endanger workers, near communities, and the environment. radioactive elements are naturally present in many soils and rock formations, as well as in the water that flows through them. Oil and gas exploration and production activities can expose significant quantities of these radioactive materials to the environment, like Radium- 226 and Radium -228 which increased risk of cancer. Radium also decay int radon isotopes and, when inhaled, deposit radiation in lungs, causing lung cancer. Radon decay products including lead -210 and polonium -210, are also present in high levels in gas handling equipment and can further contribute to cancer risk. Improper disposal of oil and gas waste can spared un necessary exposure to radiation far beyond oil and gas site workers and into shrouding communities [7]. The study included 144 cases and 176 control; response rate was 98%. Residence within 2km from the center of the petrochemical plants was associated with 3-fold increase of odds ratios (OR) for lung cancer, which did not reach statistical significance. Living close to petrochemical plant was assiocted with moderate increase of OR for bladder cancer and lympheematopotic neoplasms which did not reach statistical significance.in conclusion the present study has shown moderate increase risk for lung , bladder and lymphohematopotic neoplasms in the population resident within 2 km from the center of petrochemical plant [8].

Citation: Saeed ASH. Mini Review and Meta -Analysis for Incidence of Cancer Among Petroleum Industry Workers and Resident Living in Oil Producing Communities. Case Rep Rev. 2024;4(3):1-3.

## Discussion

Occupational cancer is cancer caused by occupational hazards. Several cancers have been directly tied to occupational hazards, including chimney sweeps' carcinoma, mesothelioma, and others.

According to Lung cancer risk in relation to jobs held in a nationwide case–control study in Iran, we observed associations between working in the construction and petroleum industries and lung cancer risk in men as well as between working as farmers and as bakers and lung cancer risk in women, which remained after we controlled for tobacco smoking and opium consumption. These potential associations need to be replicated in further studies identifying the respective workplace exposure to provide evidence for plans regarding national regulations for worker protection [9]. We conducted a prospective case-cohort study to examine the risk of bladder cancer among male workers in the Norwegian offshore petroleum workers (NOPW) cohort, using industry-specific job-exposure matrices (JEM) for hydrocarbons, self-reported smoking habits, as well as high-quality incidence data by linkage to the Cancer Registry of Norway (CRN). Available JEMs included exposure to benzene, used earlier to identify expected benzene-related risks of lymphohematopoietic cancers [10]; exposures to crude oil; mineral oil for lubrication, hydraulic and drilling purposes; and diesel exhaust [11]. Our findings suggest that high cumulative exposure and long-term exposure to benzene may be associated with increased risk of bladder cancer. Our industry-specific JEM for benzene was developed by experts in the field, using a task-based semi-quantitative approach. Still, it was not possible to determine whether the effect can be ascribed to benzene only, or to other aromatic hydrocarbons, or bladder carcinogens that may follow the benzene fraction of the petroleum stream. Exposure to benzene, PAHs and aromatic amines merit further evaluation in petroleum workers, preferably with quantitative exposure data or biological markers of exposure. Further, additional studies of occupational exposure to benzene and bladder cancer are needed to determine if the association is consistent and to explore its biological plausibility.

This mortality update for a large Canadian cohort of petroleum workers was based on 16% more workers and 78% additional person-years of observation, allowing a better assessment of risks in this population. However, this is still a young population; thus, the accuracy of risk estimation, especially for rarer causes of death, is still relatively low. The percentage of deaths increased from 2% to 5.7% in this update. We believe it is advantageous to study inception cohorts (in this case, workers hired in 1964 or later) to improve the applicability to current workplace settings and to lessen the possibility of survivor bias influences on the results [12].

Wagner et al. reported the association between asbestos exposure and mesothelioma in 1960 [13]. The publication is widely cited as establishing the causative link between asbestos exposure and mesothelioma, although there had been several previous case reports of pleural cancer in subjects with asbestosis. Additional studies and reports have confirmed that asbestos exposure causes mesothelioma [14,15].

Mesothelioma can occur from brief exposures and at low doses [16,17]. There is no evidence of a threshold level of asbestos exposure in which there is no risk of mesothelioma.[18]. We report an increased risk for CKD and kidney dysfunction in populations residing near petrochemical plants, although from a limited number of studies. The scientific community needs to explore this environment and non-communicable disease relationship, particularly in vulnerable populations [19].

## Conclusions

In the absence of more complete information on the similarity of exposed and no exposed employees, this result cannot be ascribed with certainty to carcinogenic effect of petroleum. when refinery workers were compared with none refinery workers without consideration of exposure to petroleum in either group, the refinery workers were found to have twice the risk of cancer of intestines including rectum and other digestive organs. This present review warrants further studies on specific exposure levels and pathways among petroleum -exposed workers and resident living near petroleum facilities.

Many occupational cancers are preventable. Personal protective gear, workplace controls, and worker education can prevent exposure to carcinogens in the workplace

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