

Scientific Misconduct in Asbestos-related Occupational Health Studies: A Literature Review on the Impact of Intellectual Dishonesty to Scientific Research

Hirzi Salsabil Zulkarnain, Dyah Ayu Pradnyaparamitha, Ray Wagiu Basrowi

Occupational Medicine Master Program, Department of Community Medicine, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia

Corresponding author: Dyah Ayu Pradnyaparamitha

Email: dyah.ayu18@ui.ac.id

Abstract

Introduction: The asbestos industry actively tries to delay adequate asbestos protection regulation in workplaces by systematic manipulation and scientific misconduct. This research aims to compile several of their efforts throughout the years to study their efforts and prevent them.

Methods: A literature review was conducted to explore instances of scientific misconduct in occupational health studies related to asbestos in November 2022. The sources were taken from Google Scholar and PubMed. From the entire search, 6 relevant studies were reviewed.

Results: Throughout the world, the asbestos industry has been responsible for delays in adequate asbestos regulations. Several systematic scientific misconduct regarding asbestos use happened in 1930s United States, as well as fraudulent research regarding asbestos in early 2000s Brasil. Scientific misconducts can directly influence the direction of occupational health research involving asbestos exposure, resulting in delays in adequate regulation implementation.

Conclusions: The dangers of asbestos to workers exposed is already firmly established. The asbestos industry has been deliberately manipulating scientific data to sway corporate and public views to prolong the viability of asbestos production and daily use. They achieved this using industry-backed scientific discourse, direct manipulation of research data, as well as direct manipulation of research data publication.

Keywords: asbestos, asbestos exposure, conflict of interest, occupational health research, scientific misconduct

Abstrak

Pendahuluan: Industri asbestos secara aktif berusaha menunda regulasi perlindungan penggunaan asbes di tempat kerja dengan manipulasi secara sistematis dan perilaku ilmiah yang tidak etis. Studi ini akan menjelaskan beberapa upaya mereka selama bertahun-tahun agar dapat dipelajari dan dicegah. Tinjauan literatur dilakukan untuk menemukan kasus yang didalamnya terdapat perilaku ilmiah yang tidak etis dalam studi kesehatan kerja yang terkait dengan asbes.

Metode: Pencarian literatur dilakukan pada bulan November 2022 dengan menggunakan sumber dari Google Scholar dan PubMed. Dari seluruh hasil pencarian, 6 studi yang relevan telah ditinjau.

Hasil: Di seluruh dunia, industri asbestos bertanggung jawab atas penundaan regulasi asbes yang memadai. Beberapa perilaku ilmiah yang tidak etis terkait penggunaan asbes terjadi di Amerika Serikat pada tahun 1930-an serta tindakan manipulasi pada penelitian terkait asbes di Brasil pada awal tahun 2000-an. Perilaku ilmiah yang tidak etis dapat secara langsung mempengaruhi arah penelitian kesehatan kerja yang melibatkan paparan asbes dan menyebabkan penundaan dalam implementasi regulasi yang memadai.

Kesimpulan: Bahaya asbes bagi pekerja yang terpapar, sudah terbukti. Industri asbes dengan sengaja memanipulasi data ilmiah untuk mempengaruhi pandangan perusahaan dan masyarakat agar produksi dan penggunaan asbes dapat terus berlanjut. Mereka mencapai hal ini dengan menggunakan wacana ilmiah yang didukung oleh industri, manipulasi langsung data penelitian, serta manipulasi publikasi data penelitian.

Kata kunci: asbes, paparan asbes, konflik kepentingan, penelitian kesehatan kerja, perilaku ilmiah yang tidak etis.

Introduction

Asbestos is composed of heat-resistant, strong fibers of hydrated magnesium silicate. Asbestos can be morphologically classified as amphibole (crocidolite), serpentine (chrysotile), amosite (cummingtonite-grunerite asbestos), actinolite asbestos, anthophyllite asbestos, and tremolite asbestos.¹ It is fibrous, silicate material used globally as a fire-retardant coating for buildings and for industrial sites.^{2,3}

Asbestos can cause adverse health effects to humans exposed to them. It is established that there is a dose-response effect between the quantity of asbestos inhaled and fibrotic lung disease severity. Asbestos is also classified as a carcinogen, and prolonged exposure is associated with increased risk of lung cancer, laryngeal cancer, mesothelioma, as well as ovarian cancer.^{1,2}

Despite the known danger, production as well as usage of asbestos products continues around the world. Exposures continue to occur in construction, renovation of older buildings where asbestos is still present, exposure to older or imported asbestos-containing automotive products, etc.¹ Because the hazard from asbestos exposure is consistently ignored, asbestos is among the top causes of cancer worldwide. Despite various health regulations for asbestos use implemented around the world, 2020 data revealed about 125 million people worldwide are exposed to asbestos in their workplaces and approximately 107000 workers die from earlier exposures. These numbers are higher in developing countries, where management and public awareness regarding asbestos is poorer.²

Currently, the Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) for asbestos is 0.1 fiber per cc of air. Exposure to the PEL every day over a 45-year working lifetime has been estimated to be associated with an increased risk of cancer (gastrointestinal, lung, mesothelioma) of 336 cases per 100000 exposed persons and an increased risk of asbestosis of 2.50 cases per 100000 exposed persons.¹

Our current knowledge of the dangers of asbestos exposure as well as its corresponding regulation regarding asbestos prohibition does not come overnight.⁴ History shows that the first negative effect of asbestos to humans was reported soon after the mass production of asbestos. The first death due to asbestos exposure was reported in 1906.² Even though the first recognition of the dangers of asbestos exposure was found as early as the

1930s,^{2,4} the first record of some sort of recognition of the association between asbestos and cancer was acknowledged at 1949,² and adequate asbestos regulation was delayed until well into the 1990s.² The asbestos industry has been responsible for the delays, performing numerous scientific misconduct that directly influence the direction of occupational health research involving asbestos exposure.⁴

Currently, there is no agreed consensus regarding the definition of scientific misconduct. Various unethical activities are classified under the term “scientific misconduct,” such as fraud, plagiarism, multiple publications, harm to research participants, etc. The 1995 report of the Commission on Research Integrity in US defines scientific misconduct as intellectual property confiscation with the intention of deliberately hindering the progress of research at the risk of undermining the integrity of scientific records and practice.⁵ Examples of scientific misconduct was also elaborated, including plagiarism, interference, and misrepresentation.^{5,6} Whereas research misconduct was defined more succinctly by the US Office of Research Integrity in 2000 as ‘fabrication, falsification, or plagiarism in proposing, doing, reviewing, or reporting research’.^{5,7}

There are reasons to believe that instances of research misconduct will rise, posing risks to human subjects and harming medical science’s reputation. There seems to be more pressure on researchers to perform. These include the need to publish,^{5,8} bring in more funds, and fulfill government expectations, among others. It is difficult to tell if an increase in reports of research misconduct is due to greater detection or actual increased incidence.^{5,9}

Asbestos product companies have been conducting several industry-sponsored experiments, aiming to disguise the link between asbestos exposure and cancer. Several lobbying attempts, legal pursuit and manipulation of scientific literature by the asbestos-related industry severely hampered the progress on asbestos-related research so that they can further continue their business. Asbestos product companies orchestrated the manipulation of public opinion so that the public believed that there was a legitimate scientific debate about the asbestos-cancer link during the twentieth century, furthering the delay for adequate regulation as well as its implementation.⁴ In this literature review, we are presenting a few examples in which the asbestos industry meddles with the scientific process of occupational health research to delay the discovery of the true dangers of asbestos exposure to workers.

Method

A literature review was conducted in November 2022 which targeted manuscripts published between 2000 to 2022 related to the topic of scientific misconduct in occupational health studies related to asbestos. Only English-language reports were included. We search relevant topics such as ‘asbestos studies’, ‘scientific misconduct’ and ‘scientific misconduct in asbestos study’ in Google Scholar and PubMed. The focus of this review would be scientific or research misconduct in asbestos studies conducted by researchers, corporations, governments, and other entities involved. Six relevant studies were chosen to be reviewed.

Health Insurance Company for Asbestos-related Disease Claim

Confidential corporate records frequently show that product manufacturers, their insurers, and the scientists who worked for them were more knowledgeable about the toxicity of their products than the independent medical and scientific community. The first people exposed to asbestos and sickened due to the exposure were workers at these manufacturing firms, which led to insurance claims. The businesses and their insurers were not required by law to provide their information.¹⁰

The hidden awareness of these health hazards by insurance firms has largely gone unnoticed. Insurance companies are obligated by fiduciary law to evaluate risks and have full access to company information. As a result, they frequently discover problems before others, whether it is through inspections of potential clients or notices of legitimate death and health claims of people they insure. They were and still are in a unique position to observe trends of illness and mortality across entire industries, unlike individual businesses or even public health organizations. For instance, ten years before any medical articles on the subject were published, both Metropolitan Life Insurance Company (hereafter referred to as MetLife) and the Prudential Life Insurance Company researched the effects of asbestos on workers and gained knowledge regarding asbestos hazards.¹⁰

This section describes one of the earliest instances of corporate science manipulation in the 20th century, emphasizing MetLife’s crucial role. Beginning in the 1920s, silicosis and asbestosis claims and litigation

caused MetLife and businesses that bought its group insurance policies to sustain significant financial losses. In order to lessen their losses and “protect the interest of the industry,” MetLife and their corporate allies worked together to falsify scientific research on the health effects of asbestos and silica and to use their influence in politics and business to prevent workers from receiving benefits for illnesses that were brought on by their jobs.¹⁰

To maintain the viability of the silica and asbestos industries and to avoid prosecution and compensation, MetLife and its corporate allies utilized four main strategies: presenting themselves as an authority, establishing a network of scientific expertise, manipulating research, and influencing legislation and politics. These tactics came at a very real human cost, from fired Picher clinic employees to the crowds of silicotic and asbestotic workers who were prohibited from pursuing tort remedies but did not qualify for worker compensation. They also left a long-lasting impression on the scientific community, causing, for instance, a delay of decades in the open publication of asbestos’ actual health risks. The activities of MetLife also contributed to a lack of clarity in US regulations and government-issued health alerts.¹⁰

Systematic manipulation of public opinion of asbestos in 1930s United States

The American Conference of Governmental Industrial Hygienists (ACGIH) and the Industrial Hygiene Foundation (IHF), two of the largest association of industrial hygienist in the United States in the early 20th century, were working in concert with some of the largest asbestos industry players in the United States e.g., MetLife, the Asbestos Information Association of North America (AIA), Union Carbide Corporation, to manipulate science and law so that they can continue their business endeavor.⁴

The role of TLV

In 1930s North America, many asbestos-related companies understood that the TLV for asbestos is a somewhat arbitrary number based on the TLV of silica. And as for why a TLV of some other substance is used as a base for the TLV for asbestos, we will never know. We do know that several asbestos-related companies in North America understood that the original TLV of 5 mppcf

(millions of particulates per cubic foot of air) did not protect against asbestosis.⁴ Scientists disagreed with the standard, saying that the standard lacked demonstrable proof in preventing disease due to asbestos exposure, and added that the standard was based upon technological feasibility at the time over science. Legal counsel at that time argued that if there are no demonstrably safe level, then the current threshold should be deemed sufficient due to scientific uncertainty.¹¹

In the 1930s, the TLV for asbestosis in the United States was established by ACGIH, which is not a government agency. The ACGIH's asbestos TLV, like all other ACGIH guidelines, was not an official governmental standard. Therefore, it is not enforceable in any way by the government. The ACGIH explicitly stated that governmental standards should not be based on TLVs. Due to this sentiment, the asbestos industry did not have to follow a non-governmental, unenforceable recommendation, and government agencies rarely enforced them.⁴

Concealment of study results by industries

The asbestos industry was making a very large effort to maintain control of information regarding the harmful effects of asbestos by agreeing to finance studies on asbestos dust in the 1920s and the 1930s. The caveat is that the companies maintain complete control over disclosure of the results, but still hoped that the results would show asbestos was not dangerous.¹¹

Various studies commissioned by the IHF, MetLife, and asbestos manufacturer Johns-Manville, showed that asbestos was actually much worse than silica, due to asbestosis affecting both miners and workers regardless of compliance with established TLVs. The industry, however, suppressed the results and argued that asbestosis was not a serious disease and caused not by the asbestos fiber itself, but due to poor factory conditions and excessive smoking.^{11,12} Despite the efforts of asbestos industries to control the flow of information from asbestos studies, inhalation studies in the 1940s and 1950s began showing links between asbestos and cancer. Some results from studies commissioned by asbestos industries later unearthed during various litigation processes.¹²

The Braun-Truan Report

In 1957, Daniel Braun, back then working as the medical director of the IHF, discovered several published articles

connecting asbestos and cancer. These discoveries lead to the Braun-Truan report, which was extremely influential in promoting the idea that asbestos was not a carcinogen. This confusion is deliberate, and this contributes to the delay in the reduction of asbestos TLV in the United States.⁴

The first part of the Braun-Truan report consisted of a cross-sectional study under contract from the Quebec Asbestos Mining Association (QAMA) conducted between 1956 and 1957, looking at the rates of asbestosis and lung cancer in nearly 6000 miners, using the Quebec province mortality information as control. In the private report to QAMA, Braun stated that miners with asbestosis had a statistically significant increased risk for developing lung cancer. However, in the published paper, the authors reported the exact opposite.⁴

“On the basis of a careful and detailed study of what are believed to be complete and reliable data, it seems fair to conclude that the asbestos miners at Thetford Mines and Asbestos in the Province of Quebec do not have a significantly higher death rate from lung cancer than do comparable segments of the general population. Despite this, the results suggest that a miner who develops the disease asbestosis does have a greater likelihood of developing cancer of the lung than a person without this disease. We suspect, however, that under-reporting of asbestosis cases had led to a fallacious finding in this connection.” The above statement that was underlined in the original private report to QAMA, connecting asbestosis with lung cancer, was omitted in the final published paper by the authors Daniel Braun, the medical director of IHF, and T. David Truan.⁴

The Braun-Truan paper influenced other experts' views on the dangers of asbestos. Other scientists at the time viewed the Brown-Truan paper as a confirmation that the agreed conclusion at the time was that there was no association between lung cancer with asbestosis or the association was weak and doubtful at best.⁴

Research Falsification in the Brazillian Asbestos Case

Starting point: Asbestos in Brazil

In August 2017, Ministers of the Supreme Federal Court (SFC) of Brazil judged the Direct Action of Unconstitutionality against a state law from Sao Paulo, that resulted in an asbestos ban. In the venue there are

activists from the Brazilian Association of Asbestos-Affected, elderly ex-workers with asbestos-related disease (ARD), and widows of husbands who died from asbestos-related diseases. Opposing them on the venue, there were representatives of asbestos factory workers.⁽¹³⁾ At the time, the SFC made its decision to impose the ban, and the domestic market was contracting while exports were rising and accounting for 44% of Brazil's chrysotile production in 2016. India, Indonesia, Bolivia, Mexico, Vietnam, Malaysia, Ecuador, Colombia, El Salvador, Peru, Thailand, Sri Lanka, and the Philippines are among the countries that import asbestos from Brazil. Brazil was the third-largest exporter in 2018 and 2019, trailing only Russia and Kazakhstan in terms of exports, with 44 and 11 million dollars exported in each year.^{13,14}

Brazil first had reports of asbestos-related illnesses (ARD) in 1956.^{13,15} Scientists have been concerned about a significant underreporting since the 1970s. According to the opinions of former workers who were interviewed, even after the law that controlled the use of chrysotile asbestos and outlawed amphiboles asbestos in 1995, parties affected by the law did not always adhere to it.^{13,16} According to the Health Ministry's most recent epidemiological data, between 2011 and 2017, more than 700 Brazilians suffered and died from ARD. Underreporting is still a major concern, which makes it difficult to acknowledge asbestos as a public health risk.^{13,17}

The relationship between industry science and Brazil's asbestos prohibition through time

"The only difference between a poison and a medicine, according to the Renaissance Swiss physician Paracelsus, is in the dose. The public is normally exposed to dosages that are insufficient to cause the ailments that are frequently linked to the product."¹³

The aforementioned comment was audible in the SFC auditorium in August 2017. It was taken from a speech by Minister Marco Aurelio in his unsuccessful attempt to vote against a Sao Paulo state statute that had outlawed all forms of asbestos from that state due to Direct Action of Unconstitutionality. Foreign scientific experts who took part in a 2012 SFC public hearing were cited in the vote.¹³

"But, as Canadian epidemiologist [. . .] said in this House, "practically every product is carcinogenic. It is a matter of dose." In the medical field, in fact, it

is an axiom that what differentiates a medicine from a poison is the dose."

The second quote above was taken from a legislative committee report written by then Federal Representative Ronaldo Caiado in 2001. It was mentioned in a parliamentary debate within the legislative process of a bill proposed in 1996 to prohibit all types of asbestos in Brazil. Caiado's main arguments for successfully opposing the ban were drawn from a 1999 public hearing attended by foreign scientific experts. Those statements, which actually cite the same idea, are almost two decades apart: the use of the famous Paracelsus reasoning to support the safe controlled use of chrysotile asbestos in Brazil.¹³

Dr. David Bernstein is listed as having a "PhD in medicine and environmental toxicology at the New York University Institute of Environmental Medicine" in the 2017 SFC vote, and his thesis is summarized as follows: "[...] chrysotile asbestos is much less dangerous than the amphibole form and that, given the control and appropriate use in fiber cement, it does not present an excessive risk to the worker's health."

The documents show that this thesis supported the decision to continue using asbestos in Brazil for more than two decades. Because of the organized movement of asbestos victims, the ties between Bernstein and the industry were already known in 2010.¹³

Bernstein's Conflict of Interest related to the Brazilian Abestos Case

Relationship between corporate and scientists

While commenting on an article on chrysotile biopersistence, a scientist claims to be free of Conflict of Interest (CoI). It hints at a major point of contention: *who gets to decide what is true?*

Academic title or resume are incorrect answers here: the main disagreement was over the author's independence on the subject, the health risks of asbestos. An independent scientist is a person who has not been funded, commissioned, or hired by any governmental or non-governmental organization or company with national or international economic interests in asbestos mining, use, commercialization, transportation, exportation, or litigation. Industry-funded scientist is the polar opposite.¹⁸

Hiding conflict of interest is a scientific misconduct

In a previous study, Bohme lists the rules broken (written and unwritten norms of scientific publication), the authors (those with conflicts), the research misconduct (falsely claiming freedom from conflicts), and the victims—although strictly speaking, readers and researchers—as well. Hidden conflicts can also surface long later, via various mechanisms. In order to separate the conflict timeline from the article chronology, disclosures of CoI after publication might emerge in comments as well as in errata and corrigenda by the publisher or by the authors themselves.¹⁸

Consequences of scientific misconducts

The effects of misconduct in science on asbestos dangers have temporal dimensions. The actors are portraying the effects of projecting damage into the future when discussing the influence on political decisions of banning or not banning asbestos. When discussing possible court rulings in worker injury cases, they are highlighting the negative effects of ignoring harm from the past.¹³

There are also victims generated in the discourses in both temporalities. They are “workers in impoverished nations where a combination of unfavorable living and working conditions and subpar healthcare increases morbidity and death from exposure to chrysotile.”^{13,19} Along with being “workers whose jobs involved handling asbestos or asbestos-containing materials, but also for their families and people living close to facilities handling asbestos, as well as for future generations of workers and the general public who might come into contact with the legacy of the widespread usage of asbestos,” they are also “workers whose jobs involved handling asbestos or asbestos-containing materials.”^{13,20} Vulnerable individuals are depicted in both descriptions: the first reaching workers in the developing world. In the second, the number of victims is increased, extending into the past, present, and future and increasing exposure outside the mine or factory boundaries.

Future outcomes are more closely correlated with political choices made in the global South. When discussing historical repercussions and ex-worker compensation, workers from the global North who sustained injuries when asbestos use was still permitted are more frequently identified as the victims. Cullen noted that chrysotile is still regarded as a “good” form of asbestos by many otherwise knowledgeable medical

professionals and researchers worldwide, provided that contamination could be removed. From personal experience, Cullen mentioned that victims of this “excellent” version have had their compensation claims disputed or rejected since they were only exposed to chrysotile.^{13,21}

This comment, which was made twenty years ago, is still frequently cited because it asserts that “[science] will affect outcomes in the adjudication of asbestos-related sickness in the judicial system and that, as a result, the wounded worker will suffer unfairly and unjustly.”^{13,22}

The chrysotile lobby is influencing legislation and legal strategies involving lawsuits for avoiding recompense, eroding the integrity of science and environmental health practice.^{13,21} In addition to the human victims, it appears that science itself is also a victim of this process. Liability concerns allegedly having a direct impact on science is a common complaint. Litigation-driven research is actually a category that already exists for this kind of activity.^{13,18}

In addition, it is acknowledged that litigation’s effects have positive effects for science. First, in the US, “[...] manufacturers’ recognition of the potential for direct product liability led, in the 1970s, to the explosive growth of occupational medicine clinics, enhanced interest in environmental health among worker groups, and rapid substitution of alternative products for most asbestos uses.”^{13,21} Second, the necessity of sworn testimony in court has made it possible for advocates for a global asbestos ban to learn about the pernicious connections between science and business throughout the history of asbestos use.¹³

Conclusion

The dangers of asbestos to workers exposed is already firmly established. Not only that it can cause serious health problems, it also results in productivity losses in workplaces. For years the asbestos industry has been deliberately manipulating scientific data to sway corporate and public views to prolong the viability of asbestos production and daily use. They achieved this using industry-backed scientific discourse, direct manipulation of research data, as well as direct manipulation of research data publication. We have to be aware of the double-edged sword of scientific discourse; it can promote truth and useful information as well as spreading misleading information due to scientific misconduct and deliberate manipulation.

Due to the continuing corruption of science by groups involved, this translates into hundreds of thousands of preventable asbestos injuries and deaths worldwide and the human toll that results. If we want to improve current conditions, we have to consider how corporate power directs and controls the design and output of scientific resources, as well as manipulating parties involved such as experts, historical accounts, laws and policies.

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