

REFLECTION PAPER

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Asbestos in Colombia: Industry versus science and health

Asbesto en Colombia: industria versus ciencia y salud

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| Abstract |

The usefulness of an industrial product must be measured both in economic profitability and product safety terms, and the social benefit it represents. In the case of asbestos, due to its harmful effects on human health, its use, handling and production has been banned in high-income countries thanks to the efforts carried out by their oversight bodies. Worldwide, the industrial use of this mineral has been associated with high morbidity and mortality rates, hence the importance of denouncing the health effects of asbestos.

Asbestos is a term used to refer to six naturally occurring silicate minerals that are used in the manufacture of building materials, such as asbestos-cement, and automotive components, including brake linings and brake pads; however, it has been proven that inhaling asbestos microscopic fibers can lead to the development of lung diseases (pneumoconiosis) and cancer. In many cases, these diseases are caused by a short occupational or environmental exposure to it, but their clinical manifestation occurs several years after the first time of exposure.

The main objective of this paper is to reflect on the hazards related to the use of asbestos and to influence public health policies addressing this problem in Colombia, so that by means of the newly adopted law banning the use of this mineral in our country, significant progress is made in aspects such as the identification and the monitoring of people who were exposed to it, and the handling, removal and final disposal of materials containing asbestos.

Keywords: Asbestos; Pneumoconiosis; Occupational Medicine (MeSH).

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Introduction

In Colombia, the use of asbestos at industrial scale dates back to 1942, when it started to be used in the first Eternit facility established in the country. However, currently there are no reliable reports and data on how Colombian workers' health has been affected by being exposed to this mineral, and the few existing reports are filed in the

| Resumen |

La utilidad de un producto industrial se debe medir tanto por su rentabilidad económica, como por su seguridad y beneficio social. En el caso del asbesto, debido a sus efectos adversos sobre la salud, su uso, manipulación y producción se ha prohibido en países de altos ingresos gracias a esfuerzos realizados por sus respectivos entes de control. A nivel mundial, el uso industrial de este mineral se ha asociado con altas tasas de morbilidad y mortalidad, de ahí la importancia de denunciar sus efectos para la salud.

El asbesto comprende un grupo de seis minerales fibrosos de origen natural que la industria utiliza en la fabricación de materiales de construcción en fibro-cemento y frenos de automóviles; sin embargo, se ha demostrado que la inhalación de sus fibras microscópicas puede producir enfermedades pulmonares (neumoconiosis) y cáncer. En muchos casos, estas enfermedades son causadas por una corta exposición laboral o ambiental al material y se manifiestan años después.

El principal objetivo de este documento es reflexionar sobre los peligros del uso del asbesto e influir en las políticas de salud pública al respecto, esto para que con la recién aprobada ley que prohíbe el asbesto en Colombia se logren avances significativos en temas como la identificación y el seguimiento de las personas que estuvieron expuestas, y el manejo, remoción y eliminación de los productos que contienen el mineral.

Palabras clave: Asbestos; Neumoconiosis; Medicina ocupacional (DeCS).

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archives of companies, government institutions addressing health and labor affairs, and labor risk insurance companies. In addition, this situation is worsened by the fact that, so far, there has not been any interest in systematizing this information, even though this data can play a key role to understand the history of occupational medicine in the country. (1) On the other hand, the international literature on health risks derived from occupational use and exposure to asbestos

has been permeated by several studies that have been conducted with the sole purpose of improving the public image of this mineral to support the claim that the controlled use of asbestos is possible and safe; unfortunately, such studies have influenced the planning and implementation of public policies regarding asbestos use in several countries, including Colombia. (1)

The objective of this reflection paper is to emphasize, based on a brief literature review conducted using the “Asbestos”, “Pneumoconioses”, and “Occupational Medicine” terms, that the well-being and health of a community must prevail over the interests of the industry, and that, therefore, healthcare oversight bodies must, on the one hand, be consistent with their public health responsibility in the case of industrial use of asbestos, as it has been associated with high morbidity and mortality rates, and, on the other, start implementing regulations aiming at achieving the complete prohibition of asbestos use in the different industries, such as Law 1968 of 2019 (2), which was recently passed by the Colombian congress.

What do international occupational health and safety standards state on the use and exposure to asbestos?

In 1986, after the adoption of the ILO Convention C162, the Asbestos Convention (3), the industrial sector began working on the controlled use of asbestos theory. (4,5) This convention was the result of agreements between pro-asbestos countries and those who were in favor of its banning, somehow a misinterpretation of the convention allowed those in favor of using chrysotile asbestos to state that, based on unreliable studies, the use of this type of asbestos was possible as long as factories implemented industrial safety measures. These measures were supported by 3 basic facts: 1) airborne levels of asbestos fibers lower than those established by international standards, which currently are 0.1 fibers per cubic centimeter of air (0.1 f/cm³)—workers can't be exposed to higher concentration levels for 8 hours—; 2) use of personal protective equipment, especially masks, filters and protective clothing, and 3) engineering controls to reduce asbestos concentration levels in work environments. (6)

At present, the main problem that needs to be tackled in countries that keep using asbestos is that they minimize the public health risks that its use implies. (7)

Use of asbestos in Colombia and current situation

Some historical data on the occupational use, consumption and impact of asbestos in Colombia can be found in the documents introduced at the meeting on asbestos and health in Latin America organized by the Pan American Health Organization (PAHO) and the World Health Organization Health (WHO), held in Mexico City in 1985. (8)

According to the minutes of this meeting, in 1957 the Instituto Nacional para Programas Especiales de Salud (National Institute for Special Health Programs), now known as Instituto Nacional de Salud (National Health Institute), conducted the first epidemiological and air quality study in the Eternit Colombiana company (8); likewise it was also stated that before the meeting, only five studies (1957, 1963, 1964, 1973 and 1984) addressing the use of asbestos in the Colombian industry had been carried out. In this regard, the study conducted in 1973 reported that in a sample of 337 workers exposed to this mineral, 83 had developed a disease related to asbestos exposure, that is, a prevalence of 25%. In addition, in a follow-up study conducted in 110 workers from the same company, it was found that the asbestosis prevalence rate increased from 15% to 52% between 1957 and 1973, which brings to light the role that latency

play in relation to occupational exposure to this mineral and the importance of epidemiological follow-up. (8)

Another study carried out between 1989 and 1992 in 853 workers belonging to the asbestos-cement, automotive components (brake linings and brake pads), and textiles manufacturing industries and who were exposed to asbestos reported the following findings: 25 cases of asbestosis, 9 of pleural disease associated with asbestos exposure and 8 cases where both conditions were developed. (9) It is worth noting that out of the 853 participants, 639 were workers of a single company that used asbestos for manufacturing asbestos-cement products, and that the prevalences of asbestosis in this group was 6.5%.

Nonetheless, in 2016, Mejía-Mejía & Rendón (10) reported that after assessing 183 workers of a company that used asbestos for manufacturing cement in Manizales, Colombia, none of the participants showed signs of having developed any disease related to the exposure to this mineral. However, after having analyzed these results in detail, it is possible to conclude that in this study the Guidelines for the use of the ILO (International Labor Organization) classification of radiographs (11) were not properly used, as they determined that radiographs classified in the 1/0 subcategory or below should be considered as negative cases, and that those classified in the 1/1 subcategory or higher subcategories or those showing pleural plaques should be considered as suspected cases, which render these results unreliable.

On the other hand, it should be noted that the Universidad de los Andes has financially supported several relevant studies aiming at measuring the impact of asbestos exposure in Colombian workers' health in different industries, such as the work conducted by Cely-García *et al.* (12), who concluded that brake mechanics have a high risk of developing asbestos-related diseases since they are exposed to extremely high asbestos concentration levels. (12)

At this point it is worth mentioning the case of Ana Cecilia Niño, a patient who was diagnosed with mesothelioma (pleural cancer) as a result of her non-occupational exposure to asbestos during 17 years. Unfortunately, she died due to this condition, but her death gave rise to a campaign that aimed at the banning of asbestos in Colombia and that drove the adoption of regulations banning the use of this mineral in the country (13), which eventually was achieved with the adoption of Law 1968 of 2019. (2)

Bill 61 of 2017 (14) took into account the ample evidence regarding morbidity and mortality cases caused by exposure to asbestos. Fortunately, and despite the fact that there is still a some scientific ignorance in this regard, the bill was passed and was adopted on July 11, 2019 as Law 1698 of 2019. (2) In this sense, one of the challenges of this law is that it seeks to provide more support to healthcare oversight bodies so that they can conduct more studies on asbestos-related pathologies.

According to the Colombian Ministry of Social Protection, now known as the Colombian Ministry of Health and Social Protection, (15) by 2010 there were 9 874 people working in the asbestos industry, of which 3 042 were directly exposed to it. Furthermore, in this industry there were 354 companies, classified in 25 economic activities, and 12 312 tons of asbestos were used. (15) Likewise, the average amount of asbestos used per year between 2011 and 2013 in Colombia was 18 375 metric tons. (16)

The “Asbestos Industry in Colombia” report, presented by engineer Jairo Novoa and physician Sigfrido Demner, on behalf of Eternit, at the aforementioned meeting held in México City, described the different engineering controls that had been implemented at the time to improve the working conditions in the companies that were part of the asbestos industry in the country, namely: in 1964 the first individual dust suction systems were installed on cutting equipment; in 1972

the Industrial Development and Safety Unit was created and the first occupational health programs were established; in 1976, a systematic medical surveillance strategy was established for all workers, which consisted of pre-employment health assessment, regular occupational health check-ups and a final medical examination to be performed at the time of quitting the company; in 1977 the mandatory use of disposable respiratory protective devices was established; in 1978 the installation of individual dust suction systems began, and in 1981 the installation of a central suction system (low vacuum/high flow, and high vacuum/low flow) connected to all the equipment involving the use of asbestos was completed. (8) Also, in 1981 the Center for the measurement of asbestos concentration levels began its operation, which later became the Fundación para la Protección del Ambiente y la Salud (Foundation for the Protection of the Environment and Health).

Interests of the asbestos industry versus occupational health

Taking the above information into account, this risk management model derived from a valid but wrong assumption, since it was believed that by reducing exposure levels to asbestos it was possible to control its negative impact on workers' health. For example, by the 1960s, in Canada, the main exporter of chrysotile asbestos in the world at that time, the general consensus was that —based on an objective assessment of the scientific evidence at the time and the implementation of appropriate regulations on exposure control—the risk associated with the extraction, milling, manufacturing, transportation and handling of chrysotile asbestos could be reduced if acceptable levels of exposure were achieved. (8)

Prolonged exposure to asbestos has been associated with different diseases, being the most frequent diffuse pulmonary fibrosis, also known as asbestosis, which is a condition that cannot be easily differentiated from idiopathic pulmonary fibrosis and therefore its early diagnosis constitutes a medical challenge; however, asbestosis can be diagnosed when, in addition to radiological findings, the patient has a history of a continuous exposure to asbestos ≥ 10 years. It is important to note that the quality of life of workers who develop this condition is seriously affected, since this is a chronic disease that may continue its course even if they are not exposed any longer to asbestos. (17-19).

The commercial interests of the asbestos industry were so strong and its benefits in different industrial applications were so important, that in financial terms thinking of a possible banning was perceived as an anathema. Somehow, the fight to ban the use of asbestos, which originally only had an economic purpose, began to permeate, in a slow and imperceptible manner, the scientific sphere and then it became an issue heavily discussed in the social policy spheres. (20)

Sometimes, scientific research can be influenced by several political, economic and social factors and the purpose to provide a fast, safe and reliable solution may be altered as a result of said influence; in the case of studies on the harmful effects of asbestos, some of them have been used to promote the production and continued use of asbestos in emerging market economies around the world. However, those in favor of banning its use, continue to claim, based on findings reported by studies different from those sponsored by the asbestos industry, that chrysotile is a threat to workers' health, that there is no such a thing as a safe exposure threshold, and that allowing its production in emerging economies countries, where occupational safety measures are typically lax, it is irresponsible. In this sense, Quezada-Zarate & Perdomo-Aldana (21), in a documentary review of regulations on the use of asbestos in work environments, emphasize that even the World Trade Organization, together with the WHO, have

stated that any country still using this mineral will have to face the high economic cost derived from direct or indirect exposure to it. (22)

An even more concerning issue is the fact that recently it has been found out that the asbestos industry economic interests have permeated scientific research in this area, and thus have influenced how results and findings are reported, which evidences a serious situation in which researchers have been hired to carry out studies where research ethics are no longer required or considered. (23)

Likewise, scientific studies, public health education, as well as the medical practice, have become vulnerable to the influence of profit-driven corporate interests. Beside, measures such as the Declaration of Transparency or the Conflict of interests statement when authors have been funded by or have any labor relationship with a company have not been sufficient to mitigate the risk of bias in scientific literature, which in turn has a huge impact on the making of clinical guidelines and the implementation of public health policies. In fact, this situation has even been used in lawsuits filed by workers who seek a fair compensation for developing asbestos-related occupational diseases. (24)

According to Baur *et al.* (24), currently there are many examples of the commitment of the medical community with public health research, which is a branch of medicine that can have a great influence on public policy-making, but, unfortunately, in the case of the asbestos, tobacco, chemical, pharmaceutical and automotive industries, it has been ignored, or in many cases its findings have been refuted by reports biased by corporate or political interests. Some of these reports include misleading studies on pharmaceutical products sponsored by the very manufacturers of the products, as evidenced in the case of fenoterol and its link to the epidemic of asthma deaths in New Zealand (25) or the impact that the pharmaceutical industry has on the making of psychiatric (26) and pediatric (27,28) clinical guidelines.

In this sense, the chemical industry, for example, has often denied the risks of environmentally hazardous pollutants including agricultural pesticides, persistent organic pollutants, fossil fuel soot, benzene, phthalates, formaldehyde, trichloroethylene, silica, and lead. There are many other cases in which there is evidence that results reported by scientific studies have been subjected to corporate interests, a situation that must be addressed, since, ultimately, science cannot benefit humanity if it fails to find out and expose the truth. (29-31)

Similarly the warnings that have been made regarding the association of fossil fuels burning derived greenhouse gases and chlorofluorocarbon use derived gases with higher ozone depletion rates have been constantly ignored; furthermore, the fact that diesel pollution has contributed to the increase of morbidity and mortality rates in the general population has also been denied. Other examples include the denial by the chemical industry of the negative effects of certain chemical products such as those produced by endocrine disruptors on the central and peripheral nervous system (32,33), or the influence that this industry exerts on studies addressing the effects of carcinogenic chemicals in relation to the current war on carcinogens scenario (30), as recent academic scandals have evidenced. (31)

These examples are only the tip of the iceberg of such pernicious influences on public health research. Corporate influences also extend to traffic and transport regulations, the establishment of hazardous substances threshold values, the banning of hazardous materials, and the implementation of surveillance programs for at-risk or already affected workers. (34,35) Another example of biased research can be found in those studies reporting that exposure to cigarette smoke is not associated with developing lung cancer and that there are not negative effects involved in passive smoking, which were conducted with the sole purpose to question the validity and effectiveness of

the regulations that aimed at establishing free smoke environments. In the case of asbestos, there is evidence that the asbestos industry has provided financial support to conduct several studies reporting that the safe and responsible use of chrysotile is possible (35), in fact one of these studies has gone as far as to falsely claim that the WHO supports its use in Zimbabwe. (36)

These efforts aimed at promoting the misleading idea that this mineral can be safely used have been well planned, financed, and supported for decades by the asbestos industry scientific lobbyists.. (24)

Despite its recent banning in Colombia, it is necessary to understand that due to the strong influence that the industry has on occupational and environmental health research and on asbestos exposure control policy-making (37), there will be several challenges that will need to be overcome in order to successfully implement effective policies aimed at achieving the complete prohibition of this mineral in our country.

Conclusions

Without a doubt, since the Industrial Revolution took place, industrial sectors and their technological development have been fundamental for the progress of humankind, somehow the limits between what is productive or harmful can only be established by science. The introduction of a new product or material does not necessarily mean that living beings are not negatively affected by it; therefore, even if control measures have been established, when there is sufficient evidence to prove that the use or exposure to a given substance negatively affects the health and well-being of people, its use, in any form, must be officially banned, that is, the prohibition must be made by governments through the issuance of official regulations.

Life and health must always prevail over any economic interest, especially when there is sufficient reliable scientific evidence on the negative effects that the exposure to minerals such as asbestos has on the health, quality of life and well-being of people. In this sense, it is really important to understand that some public health studies on this topic may be permeated by economic or political interests that, in some cases, may introduce biases into these studies, thus researchers must always be prepared to detect such situation in order to report unbiased results.

Finally, and despite the influence of the industry on public health policy-making, Colombia has taken a significant step by officially banning asbestos and is now in the process of implementing effective strategies to eradicate any form of use or exposure to it in agreement with Law 1968 of 2019. (2)

Conflicts of interest

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