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Metsovo Lung: History of Population Environmental Exposure

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Abstract

The historical course of the Metsovo Lung phenomenon began to be investigated in the 1980s when extensive pleural calcifications causing malignant mesothelioma appeared at a high frequency beyond expectation. It was not possible to explain their frequency. This finding reasonably raised the question of whether it was indeed tuberculous pleurisy or something else. The biopsies carried out confirmed that these were tremolite asbestos fibres. These fibres were derived from a shielding material containing asbestos. This is a global phenomenon according to which the entire population of

Metsovo was exposed to asbestos, without knowing it, from a traditional shielding material. The abandonment of the material and its non-use brought about a gradual reduction of the phenomenon, which also marks the reduction of mesothelioma.

Keywords: Metsovo lung, ,mesothelioma, asbestos, tremolite

1. General section

Introduction

The aim of this paper is to investigate the evolutionary course of the phenomenon of the " Metsovo lung " and its impact on the Metsovo population health.

The evolutionary course of the Metsovo Lung phenomenon began to be investigated in the 1980s when extensive pleural detritus appeared causing malignant mesothelioma at a high frequency beyond expectation. The biopsies carried out confirmed that these were tremolite asbestos fibres. These fibres came from a shielding material containing asbestos. This is a global phenomenon whereby the entire population of Metsovo was exposed to asbestos, without knowing it, from a traditional shielding material. The abandonment of the material and its non-use brought about the gradual reduction of the phenomenon, which also marks the reduction of mesothelioma disease.

2. Methodology

The method used to study the phenomenon was literature review. We collected data from all previous studies (scholar, pubmed). 60 articles on the <<Metsovo Lung>>> from 1987 to the present day were studied. In 30 of them there were simple references to the subject of our interest. Of the 30 that remained, those that were posted chronologically close to the present day were selected for our research as the most reliable (from (2017-2023) [see table 1].

As a result of this research-review, the phenomenon of " Metsovo lung " is examined and viewed from a different perspective. The main result observed was the gradual reduction of mesothelioma in Metsovo population after the limited use and then the abandonment of the whitewash (luto) used for painting the walls of the houses of Metsovo.

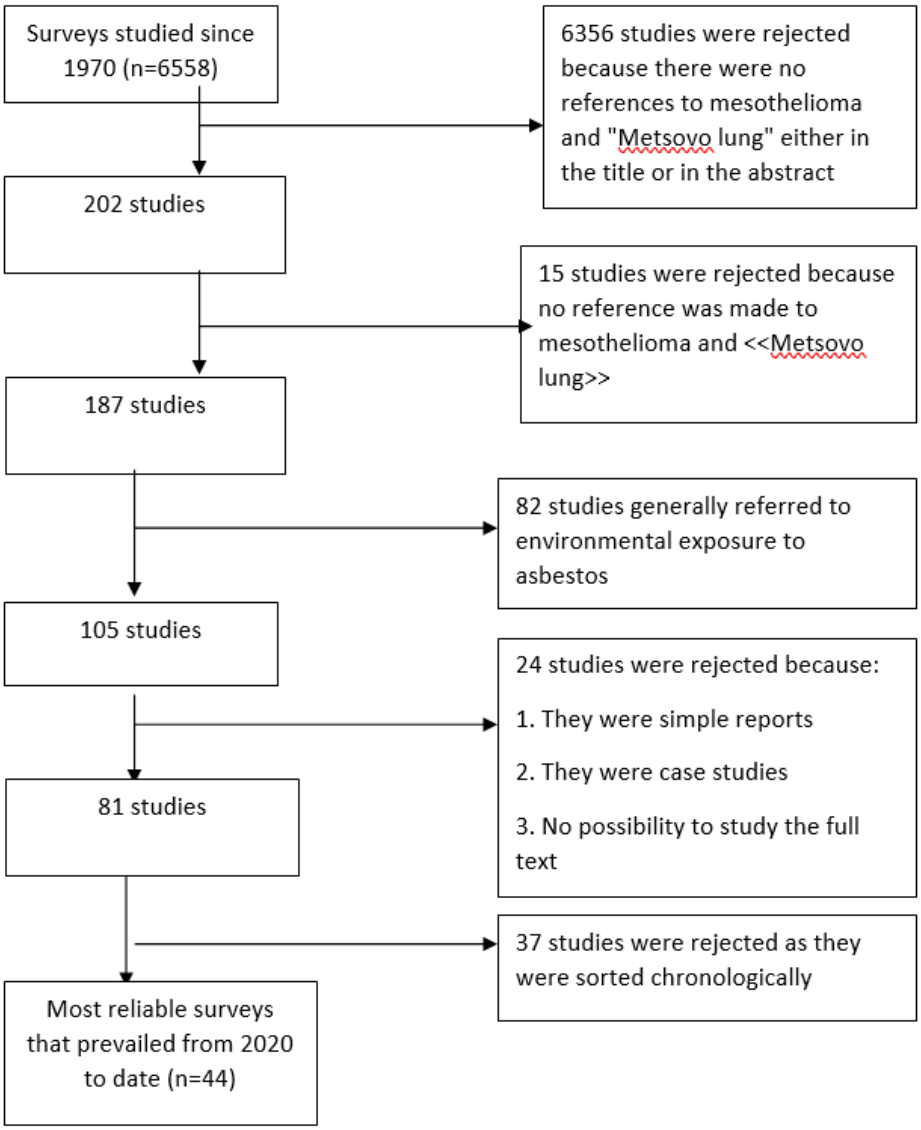

Table 1. Flowchart of literature research

2. Main part

A. Chronological history of " Metsovo lung disease"

After the 1970s in a mountainous area of northwestern Greece [Epirus], an increase in pleural calcifications [PCs] was observed in the inhabitants of Metsovo and neighbouring villages while in the 1980s the increase was 5% per year. Besides, after examinations carried out on 688 residents it was confirmed that 46,9 % (i.e. 323 residents) had PCs. For a

long time tuberculosis was thought to be the cause (since 1960), and there was no evidence of occupational exposure to asbestos.

It was observed that the main source was the domestic use of a traditional mineral material [luto] on a large scale for house whitewashing until 1940-1950 and it was verified that the rate of positive tests was proportional to age. The mineral soil contained tremolite fibres which was found to be responsible for the progression of the disease. What was worrying was that exposure to the material started at an early age and mainly during the crash and the preparation for whitewashing the walls. In studies carried out it was found that where traditional soil was used for whitewashing, tremolite had caused PCs in all inhabitants of Metsovo before 1940, whereas, where the soil was not used, no PCs was observed.

Another study showed that between 1981 and 1985 some patients from the Metsovo area developed malignant pleural mesothelioma. The twist in the investigation occurred when a team led by *Stavros Konstantopoulos* sent two x-rays of Metsovites to M. Sinai Hospital in New York for examination and analysis of their findings Tremolite samples tested in laboratories, its toxicity was measured and it was confirmed that tremolite fibres are responsible for the formation of tumours and the induction of chromosomal mutations. *Selikoff* analysed the imaged findings and suspected that the mesotheliomas that were imaged had asbestos fibres as their main source of formation.

After lung biopsies and their analysis at M. Sinai Hospital, asbestos fibers were found. In particular, 1-2 mesotheliomas per year were found in 5,000 inhabitants, while in the entire Greece of 10-11 million there were 10 mesotheliomas per year.

B. Results

During the investigation there were strong concerns and questions such as: Is it possible for asbestos to be found in Metsovo, i.e. in an mountain area where there is no environmental pollution and no occupational exposure to asbestos ? However, it was found that inhabitants of Metsovo were using the asbestos soil - 'luto' - to whitewash their houses. The use of this material was universal until 1940-1950, and it was gradually replaced by other materials in the early 1980s and later abandoned altogether. Usually the procedure followed was as follows: The material was collected from peripheral hills, compacted into balls and then pulverised, boiled and whitewashed and painted. During the pulverisation process, asbestos fibres of more than 200 fibres/ml were suspended in the atmosphere while in occupational setting is 1/ml. All Metsovo inhabitants from 1940-1950s were used whitewash [asprochoma, luto]. Afterwards, its use was gradually reduced.

The main result for the study of Metsovo lung phenomenon showed:

a) PCs was observed in Metsovo and in neighbouring villages, b) the extensive PCs in 47% of the population was not due to old tuberculosis, c) the cause was asbestos, which contained numerous tremolite fibres causing malignant mesothelioma of the pleura.

C. Conclusion

Metsovo lung is a case study of extra-occupational environmental domestic exposure to asbestos on human health. Looking at the results, a number of conclusions can be drawn:

a) below the age of 50 there is no evidence of exposure to asbestos since no use of the "luto" was made.
b) the main cause of exposure to asbestos in Metsovo was the mineral soil containing tremolite fibres.
c) once the use of this material was abandoned, asbestos exposure ceased.

D. Discusion

There are some positive elements that emerged from the research:

1. The abandonment of the "luto" marked the decline of mesothelioma, particularly in the 2000-2010s, since the use of the "lutos" was gradually abandoned after 1990.
2. No asbestos exposure was observed in Metsovo inhabitants under the age of 50 years since the use of "luto" was not practiced.

Metsovo Lung is of great interest in the research in the public health field, due to its rarity, although similar phenomena have been reported in other areas [Turkey, Italy, Spain, New Caledonia]. It should also be noted that the ignorance of the population of Metsovo about the health impact of the use of a "luto" existed in the area and was used for the whitewashing and beautification of houses was the basis for the creation of the phenomenon.

The positive development of Metsovo Lung disease does not mean that there should be complacency, because new cases of mesothelioma may appear in Metsovo inhabitants in the coming years since mesothelioma can be detected even after 60-70 years. Undeniably, however, it is certain that the cases will be very limited. it is estimated that the Metsovo lung effect will end in the 2020s-2030s. Further research on the evolution of the phenomenon is needed, as well as medical surveillance of the Metsovo population.

Conflict of Interest: The authors reported no conflict of interest.

Data Availability: All data are included in the content of the paper.

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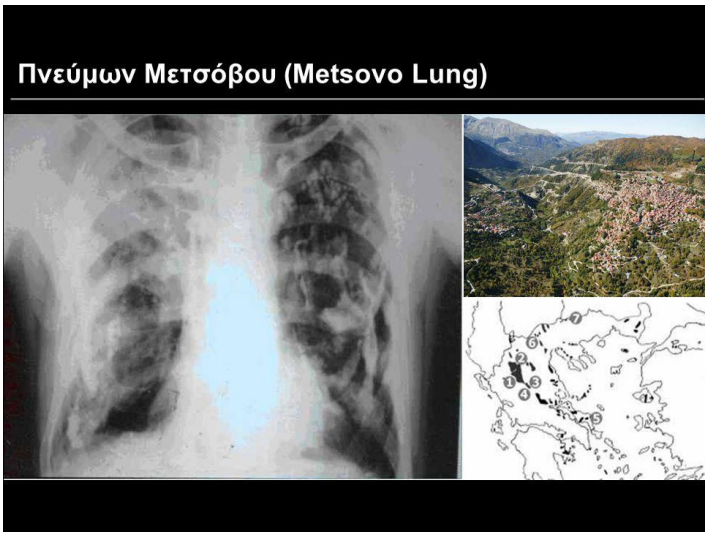
Appendix



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