



## RESEARCH PAPER

# Awareness, knowledge and training gaps regarding asbestos among General Practitioners: a pilot study

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## Keywords

Asbestos exposure • Central Italy • Continuing medicine education • General practitioners • Occupational diseases

## Summary

*General Practitioners (GPs) have good knowledge of health status and sociocultural backgrounds of their patients, thus could be decisive in early detection of cases of asbestos-related diseases (ARDs). In this cross-sectional pilot study, we investigated perception and knowledge on asbestos risk amongst a sample of GPs practicing in Molise region, central Italy, who have anonymously completed a 29-items questionnaire specifically developed for this research. Based on GPs' answers, we obtained scores and classified awareness and knowledge into four percentage quartile classes including inadequate (0-24%), poor (25-49%), moderate (50-74%) and high (75-100%), and scarce (0-24%), sufficient (25-49%), good (50-74%) and optimal (75-100%), respectively. Twenty-eight GPs (median age 63 years; 82% male) participated.*

*Perception and knowledge among participants varied from 62 to 84% and from 18 to 42%, respectively, with 65 and 42% showing an adequate level, respectively. Our survey revealed a satisfactory perception and knowledge of general features about this topic, while a poor awareness of detailed aspects, underlining the need of continuing medical education in the field of occupational medicine. The study remarks that criteria for ARDs diagnosis should be better specified, introducing a detailed list to harmonize medical protocols for symptoms identification and patients' examination. Hence, increasing awareness of asbestos risk and ARDs among GPs represents a crucial opportunity, because of their prominent position to promptly take care of patients and provide targeted information.*

## Introduction

Asbestos-related diseases (ARDs) represent a public health challenge, due to their silent clinical evolution and associated medical and social costs [1]. Multiple studies have reported the risk of developing cancers due to occupational and non-occupational asbestos exposure [2, 3]. The International Agency for Research on Cancer stated that asbestos fibres are carcinogenic for humans [4], with sufficient evidence for cancer of the larynx, lung, malignant mesothelioma and ovary, and limited evidence for cancer of the stomach, colon rectum and pharynx. Malignant pleural mesothelioma represents the foremost pathology characterized by a long latency before onset [5].

In Italy, physicians with occupational expertise realize the surveillance activities in the workplaces, although General Practitioners (GPs) must report any diagnosed or suspected case. Because GPs have good knowledge of health status and familiar/sociocultural backgrounds of their patients, could be decisive in detecting early cases [6].

Therefore, increasing their awareness of asbestos risk and ARDs represent a crucial opportunity, because of the prominent position to inform and promptly take care of patients. In a previous survey [7], we found that only 70 and 50% of GPs had knowledge of patients' occupational history and environmental exposure, respectively, suggesting the need to study level of awareness and experiences in ARDs diagnosis and management.

In this pilot study, we examined asbestos risk perception, knowledge and experiences in diagnosing ARDs among a sample of GPs practicing in Molise region, central Italy.

## Methods

This pilot survey addressed a sample of GPs in Molise region, central Italy. In our study, a formal institutional review board was not required, since no experimental/clinical/diagnostic procedures were applied to GPs after being informed on the survey aims. A trained person went to clinics of GPs, obtained a signed consent and collected the questionnaires that were anonymously self-completed.

We developed a 29-items questionnaire for addressing the study aims, which consisted of three parts. The first section comprised 7 questions about GPs' sociodemographic characteristics, education and practiced patients. The second section included 12 questions, 4 single-choice and eight as 10-items Likert-scale to evaluate degree of an opinion from "Strongly disagree" to "Strongly agree" (questions Q1-Q6 and Q8; Tab. I). The third section comprised 10 questions exploring knowledge on epidemiological/clinical aspects, and responsibilities in diagnosis of asbestosis (Q9-Q18; Tab. II). We customised some questions from previous studies, including those on asbestos risk for human health [8], certificates for occupational

diseases in the past years [9], and patients' occupational activities [10].

A validation step was carried out by administering the questionnaire to a restricted number of GPs, to obtain critical comments, evaluate comprehension of the content, verify the correct reading of the questions, and highlight the degree of reliability.

We carried out data analysis using Statistical Package for the Social Sciences (SPSS®) Ver.25. Results were reported as absolute and relative frequencies, and calculated mean, median and standard deviation for quantitative variables.

In the section on perception, for Likert-scale question 16 and 160-points as minimum and maximum score, were assigned respectively: results were aggregated to allow classification into quartiles as inadequate (16-39 points), poor, moderate or high (120-160).

In the section on knowledge, questions included 22 correct and 34 wrong options, assigning 1-point for question correctly answered, while 0 and -0.25-points for the missing and wrong answers, respectively. To calculate level of knowledge we applied the following formula:  $[\text{number of correct options} + (-0.25 \times \text{number of wrong options}) / 22 \text{ correct options}] \times 100$ , which allowed classification into scarce (0-24%), sufficient, good or optimal (75-100%). For the statistical analysis, T-test for independent samples and one-way ANOVA were used to separately assess the association of perception/knowledge score with each question. Furthermore, the association between perception/knowledge score and GPs demographic and education characteristics was

also evaluated using Chi-square or Fisher's Exact test. Statistical significance for each test was established at  $p < 0.05$ .

## Results

For this pilot study, we initially identified thirty GPs, who were asked to complete the questionnaire; however, two questionnaires were discarded because were not fully completed (response rate 93.3%). Therefore, the final analysis was carried out on 28 GPs (median age 63 years; 82% males). Sixty-one percent of GPs had working experience  $\geq 30$  years, 65% had a medical specialization, and 75% practiced more than 1,000 patients. Fifty percent of GPs reported to be familiar to patients' work activities, 57% issued a certificate for occupational diseases in the last 5 years, and 10% visited patients affected by ARDs in the previous 12 months. Only 64% known that protection measures against asbestos were available, and the use of protective devices and wearing specific clothing were identified by 36 and 11%, respectively.

We found that 46% of GPs recognized the role of the secondary or familial exposure due to living with exposed workers as a risk factor for mesothelioma development (Tab. I). Only 69% reported that issuing of certificates for occupational diseases was included among their responsibilities, and poor knowledge of governmental procedures and lack of time was identified as the greatest and the least limiting factor for the reporting. Other

Tab. I. Awareness on asbestos risk and ARDs.

Item	Yes N (%)	No N (%)	Association with perception score
Q1 Is asbestos exposure harmful for human health?	28 (100)	0 (0)	0.30
Q2 Does asbestos exposure in living and workplace environments increase risk of mesothelioma development?	28 (100)	0 (0)	0.20
Q3 Which among the following GPs competences are related to occupational diseases?			
(a) Diagnosis	21 (75.0)	7 (25.0)	0.10
(b) Reporting	22 (78.6)	6 (21.4)	0.40
(c) Issuing medical certificates	19 (67.8)	9 (32.2)	0.20
Q4 Which types of exposure can induce mesothelioma development?			
(a) Occupational exposure	28 (100)	0 (0)	0.20
(b) Living with an asbestos exposed worker	13 (46.4)	15 (53.6)	0.60
(c) Environmental exposure	23 (82.1)	5 (17.9)	0.10
Q5 Which are the limiting factors for occupational diseases reporting?			
(a) Lack of knowledge of governmental procedures	23 (82.1)	5 (17.9)	0.08
(b) Lack of knowledge of diagnostic criteria	14 (50.0)	14 (50.0)	0.30
(c) Lack of time	6 (21.4)	22 (78.6)	<b>0.008*</b>
(d) Inadequate professional update	15 (53.6)	13 (46.4)	0.04*
(e) Complexity of the list of occupational diseases for which reporting is mandatory	20 (71.4)	8 (28.6)	0.60
Q6 Is the professional updating in occupational diseases adequate to address patients' questions on ARDs?	11 (39.3)	17 (60.7)	0.40
Q7 Is the quality of regional Continuing Medical Education on this topic appropriate?	4 (14.3)	24 (85.7)	0.10

\* significant association at  $p < 0.05$  using T-test for independent samples and one-way ANOVA.

Tab. II. Knowledge on asbestos risk and ARDs.

Item	Yes N (%)	No N (%)	Association with knowledge score
<b>Q9</b> Does fibers presence in the sputum only indicate a previous asbestos exposure?	19 (67.8)	9 (32.2)	0.80
<b>Q10</b> Does exertion's dyspnoea followed by rest dyspnoea the represent main symptom of asbestosis?	13 (46.4)	15 (53.6)	0.05
<b>Q11</b> Should asbestosis be reported to the judicial authority in addition to Italian Workers' Compensation Authority?	13 (46.4)	15 (53.6)	0.05
<b>Q12</b> Is the latency period of mesothelioma typically longer than 25 years?	11 (39.3)	17 (60.7)	< 0.01*
<b>Q13</b> Does the computed tomography the represent medical examination for diagnosis and staging of pleural mesothelioma?	23 (82.1)	5 (17.9)	0.09
<b>Q14</b> Are asbestos and tobacco smoking synergic risk factors for the development of pleural mesothelioma?	20 (71.4)	8 (28.6)	0.38
<b>Q15</b> Is asbestos exposure permitted only in case of disposal of areas and/or artefacts containing asbestos?	25 (89.3)	3 (10.7)	< 0.01*
<b>Q16</b> Which diseases are associated with asbestos exposure?			
(a) Pulmonary asbestosis	26 (92.8)	2 (7.2)	<b>0.01*</b>
(b) Pleural plaques and/or thickness	18 (64.3)	10 (35.7)	0.18
(c) Pleural mesothelioma	27 (96.4)	1 (3.6)	0.7
(d) Pericardial mesothelioma	12 (42.9)	16 (57.1)	< 0.01*
(e) Peritoneal mesothelioma	12 (42.9)	16 (57.1)	<b>0.03*</b>
(f) Mesothelioma of tunica vaginalis testis	9 (32.1)	19 (67.9)	<b>0.03*</b>
(g) Lung cancer	20 (71.4)	8 (28.6)	<b>0.04*</b>
(h) Larynx cancer	8 (28.6)	20 (71.4)	<b>0.02*</b>
(i) Ovarian cancer	2 (7.2)	26 (92.8)	0.05
(j) <u>Meningioma</u>	0 (0)	28 (100)	nc
(k) <u>Hodgkin lymphoma</u>	5 (17.9)	23 (82.1)	0.29
(l) <u>Non-Hodgkin lymphoma</u>	3 (10.7)	25 (89.3)	0.17
<b>Q17</b> Which are the radiological signs of asbestosis?			
(a) Pleural plaques	17 (62.9)	10 (37.1)	< 0.01*
(b) Thin basal reticular aspects	11 (40.7)	16 (59.2)	0.10
(c) Diffuse reticular-nodular pulmonary framework	19 (70.4)	8 (29.6)	0.40
(d) <u>Air bronchogram</u>	2 (7.4)	25 (92.6)	nc
<b>Q18</b> From which anatomical structures does the malignant mesothelioma originate?			
(a) Pleura	28 (100)	0 (0)	nc
(b) Pericardium	27 (96.4)	1 (3.6)	0.06
(c) Peritoneum	27 (96.4)	1 (3.6)	0.06
(d) Tunica vaginalis	22 (78.6)	6 (21.4)	0.14
(e) <u>Lymph nodes</u>	14 (50.0)	14 (50.0)	<b>0.01*</b>
(f) <u>Meninges</u>	9 (32.1)	19 (67.9)	< 0.01*
(g) <u>Myocardium</u>	13 (46.4)	15 (53.6)	0.05

nc = non-computable; wrong options are underlined; \* significant association for p < 0.05.

limiting factors were also recognized, including the complexity of the list occupational diseases and the lack of sufficient background on diagnostic criteria (Tab. I). Thirty-nine percent of GPs considered their knowledge on asbestos adequate for addressing patients' questions, and only 14% evaluated the quality of regional continuing medical education (CME) on this topic to be appropriate (Tab. I). We found an overall level of perception ranging from 62% to 84% (median: 71%), high and level of perception (score 120-160) was found only for 35%. A significant association was observed between perception and lack of time and inadequate professional updating for reporting ARDs (Tab. I). The question on the latency period of mesothelioma

showed the lowest knowledge score, followed by the question on radiological signs of asbestosis (Tab. II). ARDs other than pleural mesothelioma were under-reported. We observed an overall knowledge ranging from 18% to 42% (median 53%), and majority (42%) gained an adequate score level (50-74% score), while only 17% achieved an optimal (75-100%) level. A significant association between knowledge score and the latency period of mesothelioma, radiological signs of asbestosis, types of ARDs and of anatomical structures affected by mesothelioma comma was observed (Tab. II). Furthermore, evaluation of the association between awareness/knowledge score on asbestos risk and age, gender, year of graduation, and achievement of

a medical specialization did not provide any significant result among the study sample (Chi-square/Fisher's Exact test,  $p > 0.05$ ).

## Discussion

Asbestos exposure is still an ongoing risk, causing 1,200-1,500 mesothelioma cases per year in Italy [1]. GPs' role is significant for reporting undetected cases where the surveillance network could be poor, including those who occurring among people have retired or exposed to asbestos during work abroad, and cases in novel occupational settings, in the self or temporary employment.

In this pilot survey, we observed a satisfactory perception of general features about asbestos among recruited GPs in line with a previous study [8], reporting that family physicians were conscious of patients' exposure through knowledge of their workplace's history and experiences of issuing certificates for occupational diseases. However, exposure from living with asbestos exposed workers was not recognized as a mesothelioma determinant, even though fibers inhalation by clothes handling is a significant component in disease aetiology [11, 12].

Lack of knowledge of governmental procedures and complexity of diseases the list were the highest-rated limiting factors for their reporting, according to previous evidences [8], likely due to few opportunities to issue medical certificates [13]. GPs believed that they do not have an adequate background for replying to patients' questions on asbestos, as reported elsewhere [10].

Indeed, we found an incomplete knowledge of specific aspects, because ARDs other than pulmonary asbestosis and pleural mesothelioma were less linked to asbestos exposure. Concerns further emerged for mesothelioma onset, because GPs who selected erroneous symptoms obtained a low knowledge score. Therefore, a proper update and communication with patients can improve knowledge and case management in primary healthcare [14]. In our Region, courses on this topic in the last 10 years were not planned for GPs, suggesting that the need may be under recognised, and knowledge likely referred to self-study or medical academic background, although no statistical association emerged between knowledge/perception and demographic or education characteristics. Hence, training in occupational medicine and proper communication with patients can improve the management of work-related health problems in primary health care to improve long-term science knowledge retention, and CME may represent the most feasible solution to update and refresh acquired knowledge. GPs should also cooperate each other and with occupational medicine specialists [9, 15-7].

## Conclusions

This pilot survey has strengths. To our knowledge, studies reporting a questionnaire on this topic are not available, hence, this tool could be used elsewhere. Furthermore,

this is the first study carried out amongst GPs practicing in Molise region to investigate in-depth their level of perception and knowledge on asbestos and ARDs, which may represent an issue that does not receive adequate attention together with other work-related diseases in general practice. This was a pilot study aiming to test various aspects of the methods planned for conducting a larger, more rigorous, and confirmatory investigation. In conclusion, our survey revealed high perception and knowledge of general aspects related to asbestos amongst GPs, while a limited understanding of specific items emerged, supporting the need to update education and strategies to increase their awareness. Indeed, additional importance should be placed on training in occupational medicine and proper communication with patients for better management of work-related health concerns in primary healthcare.

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## Conflict of interest statement

The authors declare no conflict of interest.

## Authors' contributions

GR conceptualized and designed the study and participated in the critically editing of manuscript.

AS contributed to the development of the questionnaire, data analysis, and writing.

MLS helped in the questionnaire predisposition and manuscript writing.

MT contributed to the statistical data analysis and interpretation, writing and editing of the manuscript.

All Authors have read and approved the final version of the paper.

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