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February 6, 2023, Asbestos (Amyant-White Soil) Awareness and Knowledge Level of the People of the Region After the Earthquakes Centered in Kahramanmaraş

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Asbestos Awareness and Knowledge Level of the People of the Region After February 6, 2023, Turkey-Centered Earthquake Debris

Thousands of aftershocks were recorded after the 7.7 and 7.6 magnitude earthquakes that occurred in Türkiye on February 6, 2023. As a result of these large earthquakes, it has been clearly seen that disasters pose significant risks to public health and the environment. The impact of asbestos (released by disaster debris and the subsequent demolition of heavily damaged buildings) on human health, will also be great in the coming years.

The aim of this study is to increase the knowledge levels and awareness of the participants about asbestos exposure from debris and demolition works in the provinces affected by the 6 February 2023 Kahramanmaraş-based earthquakes.

Method

This study is a cross-sectional, descriptive study. The population of 13.5 million living in the affected provinces after the February 6 Kahramanmaraş-based earthquakes was accepted as the study universe. For the research, approval was received from the Ethics Committee of Non-Interventional Clinical Research (2023/ 4865). Participants answered survey questions on a voluntary basis via Google survey with snowball sampling method. The collected data were summarized as median (minimum - maximum) and number (percentage). The suitability of the data to the normal distribution was tested by the Kolmogorov Smirnov test. The Mann Whitney-U test, Kruskal Wallis test, and Pearson Chi-Square test were used where appropriate. A value of $P < 0.05$ was considered statistically significant. SPSS (Statistical Package for the Social Sciences) 26.0 (IBM Corp., Armonk, New York, USA) program was used in the analysis. Ethical issues (including plagiarism, informed consent, misconduct, and data fabrication, as well as double publication and/ or submission, redundancy, etc.) have been completely checked by the authors.

Results

A total of 417 people participated in the study, of which 259 (62.11%) were female and 158 (37.89%) were male. The mean age of the participants was 38 ± 10 years. 190 (45.56%) were single and 227 (54.44%) were married. 231 (55.40%) of the participants had no children. A hundred and sixty-six participants (39.81%) were health workers, 47 (11.27%) were non-health workers, 68 (16.31%) were teachers, and 33 (7.91%) participants were students. Also, 28 (6.71%) were housewives, and 75 (17.99%) were from other occupational groups. Three hundred and twenty-nine (78.90%) people stated that they did not have a chronic disease that they were followed up for before the earthquake, and 32 (7.67%) people stated that they had a chronic disease that they were followed up for before the earthquake. Three hundred and forty-four (82.49%) people were caught in the earthquake in their own homes. The building where 16 (3.84%) people were at the time of the earthquake collapsed, and 2 (0.48%) people were trapped under debris. Sixty-one (14.63%) people participated in the search and rescue efforts and 272 (65.23%) people lived close to the debris area after the earthquake. While 104 (24.94%) participants were partially exposed to the debris dust released during the post-earthquake debris studies, 200 (47.96%) participants were fully exposed. A total of 312 (74.82%) people did nothing to protect themselves from debris dust after the earthquake, while 105 (25.18%) people stated that they used masks.

Table 1. Distribution of participants' responses to asbestos-related questions

		Count	Percentage (%)
Asbestos is a powder that causes lung and lung membrane (mesothelioma) cancer.	Yes	328	78.66
	I have no idea	85	20.38
	No	4	0.96
There are 2 types of asbestos, "Serpentine" and "Amphibole."	Yes	139	33.33
	I have no idea	271	64.99
	No	7	1.68
Asbestos is considered an occupational disease.	Yes	197	47.24
	I have no idea	173	41.49
	No	47	11.27
Asbestos is structurally resistant to heat, abrasion, chemicals.	Yes	185	44.36
	I have no idea	213	51.08
	No	19	4.56
In our country, there is no harm in using asbestos, also known as white soil and molasses soil, as an insulation material, especially in homes.	Yes	40	9.59
	I have no idea	181	43.41
	No	196	47.00
In building demolition and renovations, the separation of asbestos-containing insulation materials from rubble and excavation should be conducted on site.	Yes	93	22.30
	I have no idea	123	29.50
	No	201	48.20
Asbestos exerts its effect immediately.	Yes	35	8.39
	I have no idea	147	35.25
	No	235	56.35
The combination of smoking and asbestos increases the risk of developing lung cancer.	Yes	312	74.82
	I have no idea	95	22.78
	No	10	2.40
Gloves used in asbestos studies, etc., are disposable.	Yes	227	54.44
	I have no idea	173	41.49
	No	17	4.08
Asbestos waste should be disposed of in big-bag bags and packaged.	Yes	189	45.32
	I have no idea	219	52.52
	No	9	2.16

The distribution of participants' answers to questions about asbestos is shown in Table 1.

Those exposed to debris dust during post-earthquake debris studies were aware that the separation of asbestos-containing insulation materials from rubble and excavation during building demolition and renovations should not be done on site ($P = 0.014$) (Table 2).

Discussion

Since the mid-1980s, the use of asbestos individually has been banned in the European Union and on January 1, 2005, the production and use of asbestos has been banned in all member states. In Turkey, the production and trade of asbestos and asbestos products is prohibited in accordance with the "Regulation on Health and Safety Measures in Work with Asbestos" published in January 25, 2013.¹

In this study, it was observed that those who lived close to the debris area after the earthquake had no idea about the duration of the effect of asbestos ($P = 0.023$). It is known that it takes 20 - 50 years after inhalation for asbestos to cause benign or malignant disease.² For this reason, it would be appropriate to take the

necessary precautions during the acute period of exposure and to carry out public education both in print and visually.

Asbestos exposure can occur through occupational or environmental means. Although its use in the field of industry is not very high in Turkey, environmental asbestos exposure is an important public health problem. For many years, it has been used primarily in the countryside, in the insulation of the roofs of houses, in plaster and whitewash, and on walls; as a floor material for side streets, as an additive to the material from which pottery and pottery are made, as children's powder, and as molasses soil.^{3,4}

When an asbestos-used building is demolished near an area, asbestos fibers can enter the atmosphere. During earthquakes, the number of asbestos fibers in the air increases. During the demolition of a building that has been used for asbestos-containing material, people present may inhale asbestos fibers. After the February 6 earthquakes, many buildings deteriorated and were severely damaged in the affected areas. Between 1930 and 1980 (until the use of asbestos was banned), asbestos material was used in buildings. Therefore, asbestos dust and fibers would be released from the collapsed and damaged buildings slated for demolition.⁵

It was observed that 65.23% of the participants lived close to the debris area after the earthquake, 24.94% were partially exposed to

Table 2. Evaluation of data according to exposure to debris dust generated during debris work after the earthquake

		Were you exposed to the debris dust that came out during the debris works after the earthquake?			P - value
		Yes Count (%)	No Count (%)	Partly Count (%)	
Gender	Woman	120a (60.00%)	71a (62.83%)	68a (65.38%)	0.645
	Male	80a (40.00%)	42a (37.17%)	36a (34.62%)	
What is your marital status?	Single	93a (46.50%)	50a (44.25%)	47a (45.19%)	0.925
	Married	107a (53.50%)	63a (55.75%)	57a (54.81%)	
Do you have children?	No	118a (59.00%)	56a (49.56%)	57a (54.81%)	0.269
	Yes	82a (41.00%)	57a (50.44%)	47a (45.19%)	
What is your educational background?	Lise	38a (19.00%)	17a (15.04%)	12a (11.54%)	0.123
	University	134a (67.00%)	71a (62.83%)	78a (75.00%)	
	Master's/PhD	28a (14.00%)	25a (22.12%)	14a (13.46%)	
What is your profession?	Healthcare Worker	75a (37.50%)	46a (40.71%)	45a (43.27%)	0.396
	Non-Health Worker Officer	30a (15.00%)	8a (7.08%)	9a (8.65%)	
	Teacher	30a (15.00%)	17a (15.04%)	21a (20.19%)	
	Student	13a (6.50%)	10a (8.85%)	10a (9.62%)	
	Housewife	13a (6.50%)	9a (7.96%)	6a (5.77%)	
	Other	39a (19.50%)	23a (20.35%)	13a (12.50%)	
Which group does your household's monthly income fall into?	11 400'den az	27a (13.50%)	11a (9.73%)	15a (14.42%)	0.594
	11 400 - 45000	125a (62.50%)	67a (59.29%)	64a (61.54%)	
	More than 45 000	48a (24.00%)	35a (30.97%)	25a (24.04%)	
Did you have any chronic illness that you were following up before the earthquake?	I don't have any disease.	151a (75.50%)	90a (79.65%)	88a (84.62%)	0.462
	Chronic Diseases	16a (8.00%)	9a (7.96%)	7a (6.73%)	
	Cancer	2a (1.00%)	2a (1.77%)	0 (0.00%)	
	Other	31a (15.50%)	12a (10.62%)	9a (8.65%)	
Where were you during the earthquake?	In my own home	171a (85.50%)	90a (79.65%)	83a (79.81%)	0.300
	Outside Your Own Home	29a (14.50%)	23a (20.35%)	21a (20.19%)	
Did the building you were in collapse during the earthquake?	Yes	8a (4.00%)	4a (3.54%)	4a (3.85%)	0.979
	No	192a (96.00%)	109a (96.46%)	100a (96.15%)	
Have you been trapped under the rubble?	Yes	01 (0.00%)	1a (0.88%)	1a (0.96%)	0.395
	No	2001 (100.00%)	112a (99.12%)	103a (99.04%)	
Have you participated in search and rescue efforts?	Yes	48a (24.00%)	2b (1.77%)	11c (10.58%)	< 0.001
	No	152a (76.00%)	111b (98.23%)	93c (89.42%)	
Did you live near the debris area after the earthquake?	Yes, I have	173a (86.50%)	29b (25.66%)	70c (67.31%)	< 0.001
	No, I lived far from the wreckage	27a (13.50%)	84b (74.34%)	34c (32.69%)	
What or what did you do to protect yourself from debris dust after the earthquake?	I didn't do anything	135a (67.50%)	98b (86.73%)	79a.b (75.96%)	0.001
	I used a mask	65a (32.50%)	15b (13.27%)	25a.b (24.04%)	
Asbestos is a powder that causes lung and lung membrane (mesothelioma) cancer.	Yes	160a (80.00%)	86a (76.11%)	82a (78.85%)	0.580
	I have no idea	37a (18.50%)	27a (23.89%)	21a (20.19%)	
	No	3a (1.50%)	01 (0.00%)	1a (0.96%)	
There are two types of asbestos, "Serpentine" and "Amphibole".	Yes	74a (37.00%)	38a (33.63%)	27a (25.96%)	0.355
	I have no idea	122a (61.00%)	74a (65.49%)	75a (72.12%)	
	No	4a (2.00%)	1a (0.88%)	2a (1.92%)	
Asbestos is considered an occupational disease.	Yes	92a (46.00%)	55a (48.67%)	50a (48.08%)	0.954
	I have no idea	83a (41.50%)	47a (41.59%)	43a (41.35%)	
	No	25a (12.50%)	11a (9.73%)	11a (10.58%)	
Asbestos is structurally resistant to heat, abrasion, chemicals.	Yes	85a (42.50%)	53a (46.90%)	47a (45.19%)	0.401
	I have no idea	102a (51.00%)	58a (51.33%)	53a (50.96%)	
	No	13a (6.50%)	2a (1.77%)	4a (3.85%)	
In our country, there is no harm in using asbestos, also known as white soil and molasses soil, as an insulation material, especially in homes.	Yes	21a (10.50%)	11a (9.73%)	8a (7.69%)	0.811
	I have no idea	89a (44.50%)	50a (44.25%)	42a (40.38%)	
	No	90a (45.00%)	52a (46.02%)	54a (51.92%)	

(Continued)

Table 2. (Continued)

		Were you exposed to the debris dust that came out during the debris works after the earthquake?			P - value
		Yes Count (%)	No Count (%)	Partly Count (%)	
In building demolition and renovations, the separation of asbestos-containing insulation materials from rubble and excavation should be conducted on site.	Yes	46a (23.00%)	31a (27.43%)	16a (15.38%)	0.014
	I have no idea	52a (26.00%)	42a (37.17%)	29a (27.88%)	
	No	102a (51.00%)	40b (35.40%)	59a (56.73%)	
Asbestos exerts its effect immediately.	Yes	21a (10.50%)	7a (6.19%)	7a (6.73%)	0.473
	I have no idea	64a (32.00%)	45a (39.82%)	38a (36.54%)	
	No	115a (57.50%)	61a (53.98%)	59a (56.73%)	
The combination of smoking and asbestos increases the risk of developing lung cancer.	Yes	154a (77.00%)	80a (70.80%)	78a (75.00%)	0.607
	I have no idea	40a (20.00%)	31a (27.43%)	24a (23.08%)	
	No	6a (3.00%)	2a (1.77%)	2a (1.92%)	
Gloves used in asbestos studies, etc., are disposable.	Yes	114a (57.00%)	65a (57.52%)	48a (46.15%)	0.423
	I have no idea	78a (39.00%)	44a (38.94%)	51a (49.04%)	
	No	8a (4.00%)	4a (3.54%)	5a (4.81%)	
Asbestos waste should be disposed of in big-bag bags and packaged.	Yes	91a (45.50%)	56a (49.56%)	42a (40.38%)	0.509
	I have no idea	103a (51.50%)	56a (49.56%)	60a (57.69%)	
	No	6a (3.00%)	1a (0.88%)	2a (1.92%)	
		Median (Min - Max)	Median (Min - Max)	Median (Min - Max)	
Age		29a (12 - 65)	32a(22 - 68)	32a (21 - 61)	0.303

the debris dust during the debris works after the earthquake, and 47.96% were completely exposed. A total of 74.82% stated that they did nothing to protect themselves from debris dust after the earthquake. The low level of knowledge and awareness about asbestos can create deficiencies in taking protective measures. In the study conducted by Şenyiğit et al., the participants 173 (79.4%) stated that asbestos soil is not harmful to health.⁶

Conclusion

These results showed that the people of the region did not have enough information about the harmful effects of asbestos on human health. Since the results of asbestos are seen after many years and the number of buildings to be demolished is very high, increasing asbestos awareness levels will be beneficial for public health. Doing more work to increase awareness on this issue, creating a public spot to raise public awareness, and providing education about asbestos will provide vital benefits in terms of public health.

Authors contribution. STC conceived, designed, and did statistical analysis and editing of manuscript; BKT and SOT carried out data collection and manuscript writing; BA collected data; SY carried out statistical analysis; STC takes full research responsibility and is accountable for all aspects of the work in

ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All authors have revised the manuscript.

Competing interests. The authors declare that there is no conflict of interests.

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