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THE OCCUPATIONAL RISK FACTORS FOR CANCER: A SURVEY AMONG THE ARTISANS IN THE CITY OF FEZ (MOROCCO)

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ABSTRACT
Cancer is the second leading cause of mortality in Morocco. Data on occupational exposure related to cancer are still lacking. The objective of this study was to determine the frequency and the significance of the exposure to the occupational risk factors related to cancer in the population of artisans living in the city of Fez in Morocco. **Methods:** A cross-sectional survey was conducted on a representative sample of artisans from four sectors: wood, leather, copper and pottery in the city of Fez during March and April 2008. A questionnaire was administered to each of the artisans to collect sociodemographic data, the job description, working conditions and all the current chemical exposures in the workplace as well as the protective measures used. Exposures were then listed and classified according to the IARC Monographs on the evaluation of carcinogenic risks to humans. **Results:** A total of 400 artisans were interviewed. The average mean age was 33.24 ± 13.2 years and 94.3% were male. Among the study subjects, 95.9% lived in urban areas, 20.1% in precarious housing, 35.1% of them were illiterate and 45.1% had completed primary study. The monthly household income was less than the minimum wage for 60.8% of the artisans. Exposure to wood dust classified as "1" was observed in 100% of wood artisans, 21% of copper craftsmen and 45% of potters. Exposure to certain paintings classified as "1" was found in 55% of copper craftsmen, in 45% of potters and in 37% of wood artisans. In addition, 21% of potters were exposed to lead classified as "Group 1", 62% of woodworkers were exposed to essences of painting classified as "Group 2A" or "Group 2B", 8% of the artisans in the leather sector are exposed to Chrome classified as "Group 1" by WHO. Finally, 65% of the artisans used no protection, this proportion ranged from 75% among woodworkers up to 96% in potters. **Conclusion:** This study highlights the importance of the occupational carcinogen exposure among craftsmen and consequently suggests more toxicological and epidemiological explorations in order to sensitize and guide health policy makers in Morocco.

KEYWORDS: occupational exposure, Cancer, Craft, Morocco.

INTRODUCTION
Cancer is a leading cause of death worldwide, with 14.1 million new cases and 8.2 million deaths in 2012.[1] It has been estimated that 3-6% of all cancers worldwide are caused by exposures to carcinogens in the workplace.[2][3] Moreover, among the 2.022.000 annually deaths linked to work-related diseases, the work-related cancer death represent 32 %.[4] On the other hand, the mortality attributable fraction of the work-related cancer is 8.4% (13.8% in male and 2.2% in female) of all cancer death.[5] In Morocco, a country undergoing an epidemiological transition, cancer is the second cause of death after cardiovascular diseases according to the ministry of health data.[6]

WHO, through the International Agency for Research on Cancer (IARC), has identified more than 400 agents, products and exposure situations as carcinogenic to humans and has compiled a list of these products as well as cancers that are connected.[7] The majority of known carcinogens are used primarily or solely in the workplace.[8]

Data on occupational cancers were collected mainly in developed countries.[9] In developing countries, research in this area is still inadequate or non-existent.[8] According to the SUMER survey (Medical Surveillance of Risk).[10] carried out and published in France in 2006 on the biological and chemical exposures, physical harm,

and organizational constraints that employees are subjected to, 2.3 million people are exposed to carcinogens or 13.5% of employees in France. 70% of exposed employees are workers and 20% belong to the middle management of the industry and the health sector.

Social inequalities are present vis-à-vis the risk of cancer. For example, in France, the workers and employees have a death rate due to cancer ten times higher than for managers and professionals (Cosmop survey 2006).[11] IARC reports that the proportion of cancers attributable to occupational exposures in developed countries is estimated at between 4 and 5%[8] and according to the "Institut de Veille Sanitaire in France" (INVS)[11], the occupational cancers appear to be strongly suspected in 4 to 8.5% of cases, with an estimated 11,000 to 23,000 new cases per year. In Morocco, the number of cases of occupational cancer would be between 3,000 and 6,000 new cases annually, if we extrapolate from international data.

Crafts in Morocco are a very common occupation. Indeed, the statistics produced by the State Secretariat for craft in 2015[12] show that about 400,000 people who live in Morocco have a craft occupation and are spread over five regions including Fez, which is the most important region. This social category in Morocco works mostly in poor conditions. Occupational related cancer in Morocco remains to this day hided and poorly spot in general, especially for the category of artisans. A strategy for preventing these cancers requires prior knowledge of this occupational risk.

OBJECTIVE

The main objective of this study was to estimate the prevalence of exposure to the major occupational risk factors for cancer in the population of artisans from the city of Fez in Morocco.

The specific objectives were to.

- To describe the main carcinogens used in commercial systems
- To evaluate the degree of occupational exposure in the population of Moroccan craftsmen.
- To show the sociodemographic and behavioral characteristics of the craft population in Morocco.

MATERIALS AND METHODS

1. Study design and population

This is a cross-sectional study on a samples of specific populations working in the handicrafts sector in Fez during March and April 2008. The city is at the origin of about 40% of craft production, it houses 53,000 artisans. About 260,000 people in the city of Fez live directly or indirectly from the craft, which accounts for 27% of the total population of the city and over 70% of the population of the old Medina.

The sample size was calculated based on data from the 2006 summary report on the activity and employment from the Department of Statistics, the High Planning Commission in Morocco. The following formulas and conditions were used: For a desired proportion of occupational exposure $\Pi = 50\%$, a number of artisans in the city of Fez $Q = 53.000$, error risk $\alpha = 0.05$ (5%) and an imprecise gap 5%, the number to be included in the study was: $N = 381$, which was rounded to an overall 400 subjects; 100 subjects for pottery, 100 tanning, 100 brassware and 100 for carpentry.

For each type of craft, there are one or more quarters in the old medina. From the map of the craft from the office of handicrafts in Fes, common craft neighborhoods (eg there are neighborhoods carpenters, tanners etc) in the old medina were identified. Thus, four major craft sectors have been identified: wood crafts, leather crafts, brassware, and pottery. One or more areas of each craft sector were drawn. All workshops of the district (or districts) were chosen (s) at random and were included in the study. All subjects working in these workshops were interviewed until we reach the size required. If we were unable to see shop workers, or in the case of refusal, that shop was not included and the next shop was included.

2. Data collection

A questionnaire was used to collect sociodemographic data, the description of the workplace and working conditions as well as precautionary measures, alcohol-tobacco habits, and personal and family history of cancer. Sociodemographic data included age, sex and origin of the patient (regions, provinces, middle). Data concerning the profession were the type of profession, position, seniority in the position at the time of the investigation, the business name, and the use of different substances handled by the artisan including: the frequency and duration exposure, precautionary measures used (gloves, mask, boots). The ventilation quality at the workplace were also collected.

3. Classification of different substances handled according to IARC Monograph

The different substances used were identified posteriori from commercial names and products declared or presented by the craftsmen at the time of the survey. The collection of information on the substances handled by artisans allowed us to list these products and classify them according to the classification of carcinogens established by the WHO and listed below.

Group 1: The agent is carcinogenic to humans.
Group 2A: The agent is probably carcinogenic to humans.
Group 2B: The agent is possibly carcinogenic to humans.
Group 3: The agent is not classifiable as to its carcinogenicity to humans.
Group 4: The agent is probably not carcinogenic to humans.

For each substance handled by the study subjects, a

thorough search based on IARC data for potential risks of cancer connected for each substance was performed.

The study was conducted by investigators with a higher level of education and who have been previously trained for this purpose. A pilot survey was conducted among a random sample representing the various craft sectors (leather, wood, copper and pottery). It helped to clarify the different existing positions in each craft industry, the conditions of the professional activity in the field, and helped to finalize the questionnaire.

4. Statistical analysis

Data were entered and analyzed using Epi Info version 7. Recoding work was performed to classify the different products handled according to IARC monograph. The data collected allowed for a description of the study population in relation to the various work activities, potential related carcinogens to which workers are exposed, and the level of protection against the various expositions.

Ethical Considerations

The local ethic comity research approbation was obtained before the study start. Informed consent was also obtained from each participant in the study. In addition, questionnaires were anonymous and all confidentiality measures were complied with.

RESULTS

Sociodemographic data

The average age of the respondents was 33.2 ± 13.2 years with a range of 12 to 74 years. The majority of them (94.3%) were male, 95.9% lived in the urban areas, 3.1% in the suburban areas and 1% in rural areas. Regarding the type of housing, 5.5% were living in modern apartments, 8.9% in the new medina, 63.3% in the old medina, 20.1% in precarious housing or slum, and 2.2% lived in a rural housing.

About a third (35.1%) of the study participants were illiterate, 45.1% had a primary study level, 15.1% secondary, and 1.3% of them had a high school level. Regarding marital status, 52.9% of the artisans were married and 46.3% single. The monthly household income was less than 2000 DH for 60.8% of the artisans, ranging between 2000 and 5000 DH for 8% of cases, and 30.7% had no idea about their income.

Family history of cancer was reported in 14% of the artisans. 6.7% had health problems at the time of the study, 9.7% of which were allergies.

Alcohol and tobacco consumption

The proportion of artisans who have ever smoked cigarettes, cigars or pipes during their lives was 36.9% and 28.2% were current smokers. The average duration of smoking among smoker artisans was 11.57 ± 14.62 years; with a range of [1-40 years] and the average number of cigarettes smoked per day was 14.26 ± 5.15 cigarettes; with a range of [1 to 20 cigarettes per day]. In addition, 8.4% of the artisans were current or former past drinkers, among them 8.5% were still consuming. For current consumers, the average duration of alcohol consumption is 11.31 ± 8.12 years; [2-24 years] and the average amount of alcohol consumed per day was 2.34 ± 1.17 lenses; [1-5 glasses a day]. Former drinkers had stopped to drink on average since 5.16 ± 4.51 years; [1-14 years]. Before their resignation from alcohol, their average alcohol consumption per day was 4 ± 1.43 lenses; [2 to 4 glasses per day].

The occupation's description

Each studied craft is composed of several complementary tasks ranging from handling the raw material to the preparation of the finished product. Depending on the practiced craft, the artisans were divided into four main areas:

Wood crafting consisted of 68 (67.3%) carpenters, 10 (9.9%) sculptors, 8 (7.9%) zeouaks (designers), 7 (6.9%) cutters, 7 (6.9 %) lakhret (turners) and a collector of wood dust. From the craftsmanship of leather and leather goods, 98% reported a position of "Debagh" (tanner), 1% position of "lebate" (skin cleaners). Copper crafts has a significant number of different reported types of employment; the most common were: "Twayri" (calibration) (11.3%), "Ghatass" (diver) (9.3%), "Barad" (cooler) (8.2%), "Kaway" (Welder) (6.2%). From pottery crafting, several types of positions have also been reported by workers in this sector; the most common were "Fekhar" (clay manipulator) (55%) and "Zawak" (decorator) (19%). The other (26%) were unknown. The average occupation duration was 16.67 ± 13.11 years with a range from less than one year to 60 years. The average number of work hours was 8.41 ± 1.50 with a range from 5 to 16 hours per day and the average number of days worked per week was 6 days.

The products handled

A number of products handled were classified according to their carcinogenic risk by the IARC monograph.[7] Thus, 100% of the wood artisans were exposed to wood dust which is classified as carcinogenic to humans (Group 1), and about a third were exposed to paints also classified as carcinogenic (Group 1). Furthermore, 62% of them were exposed to some paint products that are classified as 2A and 2B. Regarding leather artisans, 100% were exposed to mineral tannins classified as (Group 1) and about half to the paints witch are also classified as (Group 1). The artisans of copper are exposed to many carcinogens (Group 1), the most frequent being: wood dust (20.5%), ethanol (18%), sulfuric acid (17.3%) and Nickel (8.4%). Finally, 45% of potters are exposed to wood dust and 44% to paints. See Table 1.

Other products handled by artisans in each sector which are not listed by IARC monograph are presented in Table

2. These products are likely to be carcinogenic and require further exploration.

This study showed also that 65% of the artisans did not use any protection means (see Table 3), this proportion ranged from 75% for wood craftsmen up to 96% of the pottery workers.

Table 1: Exposure of the study population to the products handled in the various artisanal sectors in Morocco and their carcinogenic classification according to the IARC monograph.

Craft activity	products handled	Exposition Rate	IARC Classification	Linked Cancer
	Paint petrol	62.2		
	- Petroleum refining (occupational exposures in)		2A	
	- Petroleum solvents		3	
Wood	- Gasoline (NB: Overall evaluation upgraded from 3 to 2B with supporting evidence from other relevant data)		2B	
	- Engine exhaust, gasoline		2B	
	- Fuel oils, distillate (light)		3	
	- Fuel oils, residual (heavy)		2B	
	- Jet fuel		3	
	Paint	37.8		
	- Painter (occupational exposure as a)		1	
	- Paint manufacture (occupational exposure in)		3	
	Wood Dust	100	1	Sino nasal cancer
	Mineral tannins	100	1	Sino nasal cancer
Leather	**Paint** - Painter (occupational exposure as a) - Paint manufacture (occupational exposure in)	55	 1 3	
	Chromium - Chromium [III] compounds - Chromium [VI] - Chromium, metallic	8	 3 1 3	Lung Cancer
	Wood Dust	20,5	1	Sino nasal cancer
	Ethanol	18,1	1	
	Sulfuric Acid	17,3	1	Lung and sino nasal Cancer
	Nickel	8,4	1	
Copper	**Sulfate**	4,9	2B	
	Paint - Painter (occupational exposure as a) - Paint manufacture (occupational exposure in)	3,7	 1 3	
	Houille Brais de houille - Coal dust - Coal gasification - Coal-tar distillation - Coal-tar pitches - Coal-tars	1,2	 1 3 1 1 1	Skin cancer, bladder cancer and lung cancer
	Fer	1,2	1	
	Essence de peinture - Petroleum refining (occupational exposures in) - Petroleum solvents - Gasoline (NB: Overall evaluation upgraded from 3 to 2B with supporting evidence from other relevant data) - Engine exhaust, gasoline - Fuel oils, distillate (light) - Fuel oils, residual (heavy) - Jet fuel	1,2	 2A 3 2B 2B 3 2B 3	
	Wood Dust	45	1	Cancer du nez et sinus

Pottery	**Paints** - Painter (occupational exposure as a) - Paint manufacture (occupational exposure in)	44	1 3	
	Plomb - Lead compounds, inorganic - Lead compounds, organic	21	2B 2A 3	Cancer of the brain

Table 2: Products handled by the Moroccan artisans in each sector and not listed in IARC monograph.

Wood		Leather		Copper		pottery	
Products handled	***Exposure Rate (%)***	***Products handled***	***Exposure Rate (%)***	***Products handled***	***Exposure Rate (%)***	***Products handled***	***Exposure Rate (%)***
Wood glue	80.5	Gypsum	75	Silver	24.7	Clay	54
Varnish	62.2	Bran	69	Oil Kitchen	21.0	Amurca	44
Alcohol	15.9	Pigeon Waste	62	Blue paste	13.6	Ceramic	19
Oxygen	14.6	Taghawt	39	Red paste	13.6	Gold	18
Mastic	2.4	Bark Of Oak Fruit	33	Glue	9.9	Copper and other metal	9
Ammonia	2.4	Grenadine Bark	33	Sandpaper	8.6	Sbika	4
The combination of varnish and paint	2	Tan	32	Ammonia	7.4	Magnet	3
		Sulfuric acid	32	Chiffoune	6.2		
		Sodium Hydrate sulfate	24	Copper Debris	4.9		
		Sulfate	20	Carbonate	4.9		
		Calcium oxide	16	Al Abrad	4.9		
		Bicarbonate	14	Copper Cyanide	3.7		
		Oil Aroutanage	12	Sand	3.7		
		Formic Acid	11	Silver Cyanide	2.5		
		Néosinate	10	boric acid	2.5		
		Resin	10	Sbika	2.5		
		Soap	9	oxygenated water	2.4		
		Asseria Oil	6	Soap	1.2		
		Mimosa Brasil (Debagh)	5	Mastic	1.2		
		Confit + Meta	3	Bronze	1.2		
		Sulfate of ammonia	2	Varnish	1.2		
		Cy - Rs Oil	2	Tungsten	1.2		
		Wood Charcoal	1	Sodium Hydrate sulfate	1.2		
		Confit + Meta	3	Disodium phosphate	1.2		
		Alum	1	Sodium Cyanide	0		
		DA Oil	1				
		Cheratigé	1				
		Limipo Oil	1				

Table 3: Protection means used by artisans in Morocco and their respective frequencies.

		Never (%)	occasionally (%)	Always (%)
	Waterproof gloves	89.1	-	10.9
Wood	Mask	78.2	10.9	10.9
	protection bezel	86.1	9.9	4.0
	Bottes	99.0	-	1.0
	Ventilation of the workplace	99.0	-	1.0
	Waterproof gloves	11	25	64
Leather	Mask	96	-	4
	protection bezel	97	1	-
	boots	15	24	61
	Ventilation of the workplace	90	-	10
	Waterproof gloves	88.0	-	12.0
Copper	Mask	96.0	1.0	3.0
	protection bezel	94.9	-	5.1
	boots	94.9	-	5.1
	Ventilation of the workplace	70.0	-	30.0
	Waterproof gloves	99.0	1.0	-
Pottery	Mask	100	-	-
	protection bezel	100	-	-
	boots	98.0	-	2.0
	Ventilation of the workplace	100	-	-
	Waterproof gloves (n =401)	71.8	6.5	21.7
	Mask (n=401)	92.5	3.0	4.5
Total	protection bezel (n=398)	95.0	2.8	2.3
	boots (n=400)	76.5	6.0	17.5
	Ventilation of the workplace (n =398)	89.7	----	10.3

DISCUSSION

This is a cross-sectional survey conducted in 2008 in Fez on a representative sample of the Moroccan population working in the craft sector. The objective was to explore professional chemical exposures related to this sector and their potential carcinogenicity. The four sectors that were explored were wood crafts, leather, copper and pottery.

This study revealed a high exposure to known carcinogens and many products listed in the IARC monograph, the most frequently encountered are: the paint products classified as "Group 2A", some paints widely used in the work of wood, leather and pottery, which are classified as "Group I", salts (mineral tannins) used in leather work is classified as "Group I", wood dust in which are exposed craftsmen working in wood, copper, and pottery is also classified as "Group I". Exposures to sulfuric acid, chromium, lead, and cadmium were also linked to several craft tasks belonging to one sector or another. In addition, several other chemical exposures have been very commonly observed (glues, varnishes, Gypsum, pigeon waste, blue and red dyes ...) but they are not known as being or not risky for health. These substances are either not yet listed or have an unknown composition. Indeed, one of the difficulties in collecting data about products component used was identifying the substances. These products often had unknown origins or were artisanal manufactured hence there is a need for comprehensive laboratory investigations to further explore the total occupational expositions at the artisanal field in Morocco.

In 1995, the International Agency for Research against Cancer (IARC) concluded the carcinogenic effect of wood dust in humans.[7] Notably, the link to adenocarcinoma of the ethmoid sinus was established.

Two meta-analyses of the literature concerning exposure to paints and the risk of developing lung cancer have been published.[13] The first had included 39 studies including 23 case-control studies and 16 cohort studies[14], and had mentioned an overall relative risk of 1.29 (95% CI: 1.10 to 1.51). The second meta-analysis was performed by Guha et al[15], included 18 cohort studies and 29 case-control studies and showed a relative

risk (RR) of 1.35 overall (95% CI: 1.29 - 1.41). The RR was 1.13 (95% CI 0.77 to 1.65) for an exposure time <10 years and 1.95 (95% CI 1.26 to 3.02) for an exposure period of 10 years. Several meta-analyses have also shown a significant relationship between exposure to paints and the occurrence of bladder cancer.[16][17][18][19].

Mineral tannins used in leather work are classified by the IARC monograph as human carcinogens (7); our study showed a 100% exposition rate to Mineral tannins among the leather crafts surveyed. A case-control study in Italy[20] consisting of 96 cases of nasal cancer and 378 controls showed an excess risk (OR: 6.8; 95% CI: 1.9 to 25), the exposure studied was leatherwork. This profession is currently considered independently as a carcinogenic risk occupation considering the nature of the products that are constantly being handled.

This survey has shown that the adoption of a ventilation of the workplace as a prevention way was lacking in 90% to 100% of cases dependently of the craft sector (see table3). As to the other recommended means of protection (masks, gloves, goggles….), about two-thirds of the artisans were not doing use. A survey of knowledge, attitudes, and practices of crafts for professional health hazards and especially carcinogenic risks is necessary. Furthermore, the simultaneous existence of others non-occupational risk factors for cancer such as smoking and alcohol consumption were noted in 29% and 8.5% of the artisans. These behavioral risk factors often act in synergy with occupational factors contributing to the increased risk of cancer occurrence.[21]

In Morocco, crafting is a gradually expanding occupational sector. Actually, this activity became the second largest employer after agriculture, employing nearly 20% of the working population. In 2010, the number of artisans increased by 4.6% in urban areas and nearly 4% in rural areas compared to 2009. A development plan for the craft sector[22] provides for the establishment of more than 117, 500 new jobs but has not yet defined bills concerning social security and risk pooling. Secondly, this occupational field remains however poorly explored in term of health occupational risk. Moreover, as the results of this study show, Craftsman are generally a socially disadvantaged class with high rates of illiteracy, poverty, and a near absence of insurance against work injury and occupational diseases and especially an absence of coverage by the occupational medicine at the workplace.[23]

In developed countries, especially the Scandinavian countries, there have been for decades legislative, regulatory, and technical supports for the prevention and remedying of occupational hazards. It is based on the existence of a body of occupational doctors, regulators and prevention organizations. Moreover, it has long been a trend to integrate the occupational health into public health policies. This cooperation between public health and working institutions had a purpose to create a better visibility of the epidemiological situation regarding occupational risks and to be able to implement an epidemiological surveillance, in order to illuminate and guide the prevention strategies as well as the global health policies towards the population. This allowed to establish, analyze and regularly disseminate reliable, relevant and reproducible indicators. In this context, epidemiological methods coupled to toxicological investigations are able to contribute to the mastery and continuous improvement of knowledge about occupational health risks, and therefore the real impact of work on health. Among these methods, is the monitoring of occupational exposures, which involves examining the frequency and distribution of these exposures in the population and crossing them with morbidity registers, for example in Finland this method is used for the study of cancers professionals. It is a surveillance method that requires a description of the distributions of various occupational exposures at the population level. This is the case of the Sumer survey[10] carried out regularly in France, or the job-exposure matrices MATGÉNÉ.[24] Moreover, and following the same trends, reforms in occupational medicine carried out in several developed countries aim to achieve effective realization of the third time for collective prevention purposes, including participation in risk assessment and epidemiological surveys. Thus, occupational physicians are subject to continuous training in public health and occupational health has become a component of all public health programs.[25]

This work made it possible to make observations which lead to the elaboration of immediate recommendations concerning the artisanal work field in Morocco. In the forefront, it is essential to reform occupational medicine in Morocco in order to enable it to play its preventive role fully towards the specific categories of workers, especially artisans. Among the effective means of prevention that the occupational physician can use is to make craftsmen aware about the health risks associated with their crafts in order to urge them to use recommended means of protection. To achieve this, it is very important to succeed in empowering workers for their own health and that of their colleagues. Indeed, it is well documented that the collective information meetings are an excellent way to strengthen solidarity among the participants and to develop their sense of responsibility to the community.[26] These collective information meetings in the company or workshop with the occupational physician must be placed in their proper context of prevention.[27] to ensure effectiveness. However, particularly in the case of single and small artisan workshops; it is difficult to reach them directly through these meetings; yet, it is still possible to do so indirectly through "opinion leaders". Indeed, American studies.[28] showed that it is more appropriate to consider the targeted employees or workers in their overall social group and act simultaneously towards them and their

fellow citizens and especially leaders of opinions identified in the local population, such local journalists, representatives and business managers "amine" union activists, religious leaders, health professionals, etc.[27] Moreover, the occupational physicians are able to also play an epidemiological and public health role if they are more aware of the importance of the issue and trained for this purpose, which will contribute to the expansion of knowledge about the hazards of occupational exposure in the Moroccan context.

It is for the public health authorities in Morocco to rethink this topic of occupational diseases, especially cancer, and to include it as a priority in health programs as in the case of what has been done in developed countries. The Moroccan national plan to prevent and control cancer 2010-2019[29] recognizes this. In fact, among the measures which advocates (measures 26 and 27) the monitoring of risks related to occupational exposure are the measuring of the prevalence of cancer risks specifically through the risk exposure surveys in craft occupations, agriculture, and construction.

CONCLUSION

This work highlight a current public health problem in Morocco, which is the occupational risk of cancer. The craft sector is particularly vulnerable from this point of view. This study also showed the magnitude of carcinogen exposure in craft and consequently suggests further toxicological and epidemiological explorations in order to acquire knowledge that will guide health policymakers in Morocco.

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Conflict of Interest: No.

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