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Symptoms, Pathologies, Accidents and Expectations, Regarding the Occupational Doctor and Safety Technician, in a Representative Sample of Portuguese Tattoo Artists

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Abstract

Introduction/Objectives: As Tattoo is being more accepted, more professionals dedicate to it. A study was designed with the aim of analysing the perception of Tattoo Artists regarding their Occupational Health/Safety team (opinion about the support provided); as to find out what type accidents, symptoms and occupational diseases they have, in order to provide a better service. **Methods:** This is a mixed exploratory study, containing a quantitative observational (analytical, cross-sectional) and a qualitative component (Case Study). For the statistical analysis, predominantly non-parametric tests were used. The project was approved by the Ethics Committee and informed consent was obtained. **Results:** In terms of symptomatology/illnesses, musculoskeletal pathology is the most reported. In terms of accidents, cuts stand out. Several statistically significant relationships were found between the variables analysed. **Discussion/Conclusions:** The Occupational Health and Security services are considered insufficient by most of the Tattoo artists. It would be desirable that the Occupational Doctor has concrete knowledge regarding Tattooing, in particular semiology/pathology; makes recommendations in pharmacology and/or indicates which exams could be useful. In relation to the Safety Technician, it would be desirable also to have specific knowledge about the sector, making plausible suggestions for improvement.

Keywords

Tattooing, Tattoo Artists, Occupational Health, Occupational Medicine, Occupational Safety

1. Introduction

Tattooing consists of the permanent introduction of a pigment into the dermis by means of a needle [1] [2] [3]. It is a booming activity in the last decades, as it has been progressively accepted by the society, in most countries. The increase in demand for Tattoos, which covers all strata of society, ages and genders, has driven the growth of supply, multiplying the number of studios and Tattoo artists. In Portugal, for example, in the nineties there were two [4] [5] or three [6] [7] studios, all in Lisbon; currently, the National Statistics Institute (INE) revealed that in 2019 (data available in 2021), 800 workers were registered in the tax authorities with the Economic Activity Code (CAE) associated with Tattooing.

The exponential expansion of the sector was not, however, followed by the development of Occupational Health and Safety knowledge adapted to this sector, and it is common for some companies to provide generalist basic services, which contribute to the development of an idea that these have little practical use, existing only due to a legal imposition. From this perspective, it is not surprising at all that some Tattoo studios devalue the work of the Occupational Doctor and Safety Technician [1].

The available literature regarding Tattooing focuses almost entirely on the existing risks for the tattooed person and not for the Tattoo Artist, with few articles describing specific aspects, such as symptoms existing in the last ones related to their professional activity, but there are no generalized studies of the sector, that can give a global view of it.

2. Objective

Taking into account these premises and given the scarcity of data on these items in the scientific literature, a study was designed with the aim of analysing the perception of these professionals regarding their occupational Health and Safety; for example, to find out what type of occupational accidents they have, as well as what symptoms and occupational diseases they perceive, in addition to their opinion of the services provided by the Occupational Doctor and the Safety Technician, in order to improve the services done by the Health and Safety team.

3. Methods

This is a mixed exploratory study, containing a quantitative observational component, analytical and cross-sectional, with a qualitative side, where a Case Study was conducted. Initially, it was constituted an online survey created by using the Google Forms tool, which was available between April 2020 and March 2021. Its dissemination was carried out through contact with companies/professionals providing this service; as well as the main national magazines of the sector, companies supplying products and equipment of the sector and organizing committees of the main national annual congresses of Tattooing. Based on

the number of professionals registered, it was made an attempt to obtain a representative sample of the population under study, considering a sampling error of 5% and a confidence range of 90%. For the statistical analysis, after checking the normality of the variables with the Shapiro-Wilk test, predominantly non-parametric tests were used. In a more advanced phase, a Case Study was structured, using interview techniques with the Tattoo artists, to deepen the questions related to their perception about the occupational Health and Safety services.

The research project was approved by the Ethics Committee of the Faculty of Arts of the University of Porto (Portugal) and informed consent was obtained.

As inclusion criteria, were considered age equal to or greater than 18 years old, working as a tattoo artist and mastering the Portuguese language, regardless of nationality. As exclusion criteria were considered the failure to fill in more than half of the questions and the insertion of contradictory answers.

As a research question, it was stipulated: What are the symptoms, pathologies and accidents existing in Tattoo Artists and what are their expectations towards the professionals of the Health and Safety at Work team?

4. Presentation and Discussion of the Results

Around 26% of the population of registered Tattoo artists in Portugal answered the survey, with a total of 207 validated questionnaires. Table 1 shows the main socio-demographic and professional characteristics of the sample.

These professionals are young workers (M = 33.67 ± 7.04 years) and, as shown in the literature, are predominantly male (66.7%). In terms of education, prevails the secondary education (59.4%), although there is a significant number of Tattooists with higher education (30.0%); Portuguese nationality is the majority (91.8%), although the remaining ones work in Portugal and speak fluent Portuguese.

At a professional level, more than half have been working for less than five years as a Tattoo artist, although there are also individuals who have been doing it for more than twenty years. The majority of the professional practice is carried out in their own establishment (72%), with Tattooing being seen by the majority as an exclusive job (60.9%); however, those who have another job also normally consider Tattooing as their main activity (69.1%).

4.1. Work-Related Accidents, Symptomatology and Occupational Illnesses

Table 2 summarises the main characteristics of the sample regarding the occurrence of accidents at work, symptomatology associated to work activity and occupational disease.

Regarding accidents, the ones that happen due to cutting seem to be the main problem, something already experienced by more than half of the individuals in the sample; follows chemical agent spillage and lastly, in a residual manner, a burn was reported. The vast majority (74.24%) had no work restrictions after the

Table 1. Sociodemographic variables.

Variables		n	% valid
Age	[20 - 29 years old]	63	30.7
	[30 - 39 years old]	98	47.8
	[40 - 49 years old]	42	20.5
	[50 - 60 years old]	2	1.0
Gender	Female	69	66.7
	Male	138	33.3
Schooling	Primary education	22	10.6
	Secondary education	123	59.4
	Higher education	62	30.0
Nationality	Portuguese	190	91.8
	Non Portuguese	17	8.2
Professional experience	0 - 5 years	109	52.0
	6 - 10 years	59	18.9
	11 - 15 years	13	6.4
	16 - 20 years	15	7.3
	>20 years	11	5.4
Exercising another profession	Yes	81	39.1
	No	126	60.9
If yes, is being a Tattoo artist the main activity?	Yes	56	69.1
	No	25	30.9
Places where they work as a tattoo artists	Own establishment	149	72.0
	Establishment of others	65	31.4
	Studio society with others	21	10.1
	Conventions	5	2.4
	Guest-spots	10	4.8

Table 2. Characterisation of accidents at work, symptomatology and occupational disease.

Variables		n	% valid
Occupational accidents	Cut	117	56.52
	Chemical spillage	14	6.76
	Other: burn	1	0.48
If yes, have you been left with any work limitation?	No	98	74.24
	Yes, but soft	20	15.15
	Yes, mild	2	1.51
	Yes, serious	1	0.76
	No Answer	11	8.34

Continued

Work-related symptoms	Breathing difficulties	9	4.3%
	Eye fatigue	149	72.0%
	Eye irritability	78	37.7%
	Muscle pain	157	75.8%
	Nasal irritability	17	8.2%
	Coughing	8	3.9%
	Stress	85	41.1%
	Headaches	3	1.4%
Diseases associated with professional activity	Eczema/dermatitis	4	1.9%
	Rhinitis	6	2.9%
	Musculoskeletal injury	93	44.9%
	Asthma	3	1.4%
	Depression/burnout/anxiety	29	14.0%
Illnesses that worsen with professional activity	Eczema/dermatitis	13	6.3%
	Urticaria	4	1.9%
	Rhinitis	12	5.8%
	Asthma	2	1.0%
	Musculo-skeletal injury	113	54.6%
	Herniated disc	48	23.2%
	Depression/burnout/anxiety	37	17.9%
Have a declared occupational disease	I do not have any illness that could be considered an occupational disease	183	88.4%
	I have, but it has not been declared	13	6.3%
	It was not recognised as an occupational disease by Social Security	2	1.0%
	It has been recognised as an occupational illness by Social Security	3	1.4%

accident, although there were some situations in which there was a moderate or severe limitation (Table 2), from the Tattoo Artist's subjective perspective and without specifying the limitation in a concrete way.

Analysing the symptoms associated to the professional activity, the main complaints reported were myalgia, visual fatigue, stress and eye irritability; less frequently: nasal irritability, cough and headache. Therefore, it is not surprising that they consider that the professional activity aggravates some disease situations they experience, such as musculoskeletal pathology (Herniated Disc) and mental disorders (Depression/Burnout and/or Anxiety), with Eczema, Rhinitis,

Urticaria and Asthma also appearing with less relevance. At the same time, they also consider it likely that some of these illnesses may have appeared due to the effects of work on health, essentially in terms of musculoskeletal pathology and mental illness (Depression, Burnout and/or Anxiety), in this line of thought and on a residual basis, Rhinitis, Eczema and Asthma also appear, with the absence of any reference to pathologies caused by biological agents. However, the vast majority do not consider being in a situation of suffering from an occupational illness, something which was only recognised by Social Security in three cases (Table 2).

After the descriptive analysis of the variables under study, some relationships were explored (Table 3). On this table it is possible to verify that there were no relevant statistical differences that allow associating the occurrence of occupational accidents or the resulting limitations with the different socio-demographic and professional characteristics of the Tattoo artists.

The number of years working as a Tattoo artist stands out as a preponderant factor for both the symptoms experienced and the situations of suspected occupational disease. Thus, the statistical differences identified highlight that the ones who have worked for more years ($p = 0.004$), frequently report muscle pain, complain of musculoskeletal pathology, referring that the professional activity not only makes the situation worse ($p = 0.011$), but may also be in the origin of this problem ($p < 0.001$); this last inference is also shared by older Tattoo

Table 3. Relationship between socio-professional characteristics of Tattoo artists and their safety and health.

	Age	Years in the profession	Gender	Nationality	Accumulation of tasks
Accident: Cut	p = 0.911*	p = 0.756*	p = 0.166***	p = 0.957***	p = 0.729**
Accident: Chemical spill	p = 0.983*	p = 0.111*	p = 0.480***	p = 0.440***	p = 0.254***
Accident: Occupational Limitation	p = 0.598**	p = 0.484**	p = 0.062***	p = 0.882***	p = 0.169***
Symptom: Eye fatigue	p = 0.151*	p = 0.662*	p = 0.465***	p = 0.375***	p = 0.211***
Symptom: Eye irritability	p = 0.773*	p = 0.817*	p = 0.936***	p = 0.861***	p = 0.084***
Symptom: Muscle aches	p = 0.995*	p = 0.004*	p = 0.248***	p = 0.034***	p = 0.290***
Symptom: Nasal irritability	p = 0.003*	p = 0.040*	p = 0.006***	p = 0.682***	P = 0.205***
Symptom: Stress	p = 0.940*	p = 0.331*	p = 0.086***	p = 0.353***	p = 0.036***
Origin of Musculoskeletal injury	p = 0.003*	p < 0.001*	p = 0.715***	p = 0.045***	p = 0.081***
Origin of depression/burnout	p = 0.066*	p = 0.029*	p = 0.903***	p = 0.700***	p = 0.211***
Worsens Musculoskeletal injury	p = 0.266*	p = 0.011*	p = 0.116***	p = 0.058***	p = 0.766***
Worsens herniated disc	p = 0.839*	p = 0.600*	p = 0.158***	p = 0.061***	p = 0.029***
Worsens depression	p = 0.192*	p = 0.801*	p = 0.762***	p = 0.850***	p = 0.074***
Reported occupational illness	p = 0.074*	p = 0.038*	p = 0.272***	p = 0.930***	p = 0.609***

*Mann-Whitney U-test; **Kruskal-Wallis test; ***Ki-square test.

artists (p = 0.003). In other words, the older the body and/or the more years and/or hours per day of exposure to Forced/Maintained Postures and/or Repetitive Movements, the more likely will be the emergence and/or worsening of Musculoskeletal pathology and associated symptoms [8] [9] [10]; in this logic can also be included the perception that the work contributes to the worsening of the herniated disc pathology, associated specially with Tattoo artists who work exclusively (p = 0.029). The exception appears in workers of foreign origin who, unlike the Portuguese, do not see themselves following this theory: not only do they report less pain symptomatology (p = 0.034), but they also do not consider Tattooing to be the cause of musculoskeletal injuries (p = 0.045); this may perhaps be explained by a different attitude of the majority of migrant workers, who value more the advantages of having a job (monthly income, economic stability) than the disadvantages (symptoms, pathologies).

Tattoo artists that practice professional exclusivity are more likely to perceive Stress (p = 0.036). Perhaps this result can be understood on the basis that those who practise another profession may have less exposure to the labour Risk Factors of Tattooing and/or, since they have an alternative activity, feel more fulfilled and/or economically safe, in case of something less positive happens in one of the sectors. However, the more experienced, Tattoo artists consider that the origin of problems affecting mental health (Depression/Burnout) may be at work (p = 0.029). Simultaneously, those who are employed by others, are also more likely to report Depression/Burnout and/or Anxiety that starts (p = 0.030) or worsens with work (p = 0.042); perhaps because they have less autonomy to direct tasks.

This study also evidences nasal irritability, a symptom associated to older tattoo artists (p = 0.003), more professionally experienced (p = 0.040) and female (p = 0.006), possibly since male gender is generally more reluctant to mention/value symptoms.

The existence of declared Occupational Illnesses is associated to Professional Experience (p = 0.046), meaning that an organism that is more aged/fragile and/or exposed for more years to the same labour Risk Factors will more likely meet the conditions to develop some pathological conditions that may reach the legal status of work-related illness. Most Occupational Illnesses need several decades after the beginning of exposure to be diagnosed (between 20 and 40 years, in most cases) [8] [9] [11].

4.2. Interaction with the Occupational Health and Safety Team

The main characteristics of the interaction between the Tattooists and the Occupational Health and Safety teams can be consulted in **Table 4**. Afterwards, several professionals were interviewed in order to get their more detailed opinion about the Occupational Health and Safety Doctors and Technicians, to know their expectations and their evaluation of this performance, as well as to register what they would consider to be an ideal Occupational Health and Safety service.

Table 4. Interaction between Tattoo artists and occupational health and safety teams.

Variables		N	% valid
Examinations/check-ups with the Occupational Doctor	Never happened	67	32.4%
	Sporadically	29	14.0%
	I have exams every year or every two years	107	51.7%
	No answer	4	1.9%
Contribution of the Occupational Doctor for your working conditions	I consider that it worsens working conditions	2	1.0%
	I consider that it does not change working conditions	72	34.8%
	I consider that it slightly improves working conditions	36	17.4%
	I consider that it significantly improves working conditions	24	11.6%
	No answer	73	35.3%
Job evaluation by the Safety Technician	Never happened	65	31.4%
	Sporadically	60	29.0%
	I have exams every year or every two years	77	37.2%
	No answer	5	2.4%
Contribution of the Safety Technician to your working conditions	I consider that it worsens working conditions	3	1.4%
	I consider that it does not change working conditions	40	19.3%
	I consider that it slightly improves working conditions	42	20.3%
	I consider that it significantly improves working conditions	50	24.2%
	No answer	72	34.8%

Analysing the interaction with Occupational Medicine, although the majority stated that they have regular examinations (51.7%), it should be noted that almost one third of the workers have never had access to a check-up, often associated with a lack of professional information/training, which also allows to see the lack of regulation associated with the sector:

> (…) I don't have a work/occupational doctor… I want to normalize the situation… I've already had check-ups, but in my previous work… I think the doctor should do blood and lung tests to see if I'm fine… to check my posture (…)
>
> (…) I haven't had check-ups with a work doctor… after having heard in the training courses what the work doctor should and can do, I already have another idea… before the training I had no idea what to expect, apart from taking the vital parameters and checking if everything was ok… that's what

I would expect from what you hear that is done, whether in my profession or in any other (…)

About the opinion on the performance of the Occupational Doctor, taking into consideration those who had never had contact or who had and chose not to answer (35.3%), were few who considered their intervention positive (29.0%); in fact, most of those who answered are of the opinion that it is an innocuous interaction (34.8%), not causing any change in working conditions or in the health of the Tattoo artists, as demonstrated by some testimonies:

(…) my first check-up with the work doctor was worse than the second… I came in… he said: I see you have glasses… can you see?… then it's OK… you can leave… the second one was better… he even measured my blood pressure and all that stuff… they asked a few questions and that was it… I expect an occupational doctor to evaluate the conditions in which the professional works… in order to warn him about some things that may be incorrect, whether they are positions, or movements, and how we can improve them… he can advise on how to do things better… it is important not only the physical aspect, but also the psychological and mental aspect… in terms of stress… evaluate a little… and also warn about lifestyle… try to manage the agenda differently (…)

(…) is a little distant, although I go there once a year to do one or another analysis… I would first of all expect him to find out about our work: how we work, how it can help us more; that would be a broader check-up and not so vague as it has been… that he would ask specific questions that have to do with our work, for example, if there are muscular pains and where they exist… at eye level, vision… I think the work doctor should be that… first the doctor should always inform himself before dealing with a patient… and as an occupational doctor I think he should inform himself specifically about the work he is going to analyse… I feel that the occupational doctors I've met so far don't know much about Tattooing nor do they make an effort to understand… besides questioning symptoms I would expect him to advise methods that would help recovery… I don't know if the occupational doctor would be obliged to pass exams or not, but I think he could at least advise… say maybe you should make an appointment with your family doctor and do an examination of this or this, because I think it's better for you… that you should have a check-up not like when you go to a family doctor or a general health check-up… I would expect more advice (…)

(…) basically he pricks me, weighs me, measure my blood pressure and if it's fine, I'm ok… there's no point of complaining about back pain or wrist pain or eyesight… it's the same… I think the occupational doctor really has to follow us… we may have various health problems… the issue of the spine, the issue of the wrist… even stress… I think we are really affected by stress… I've never had an eye exam with the occupational doctor and I

> think it's one of my main tools… I think the occupational doctor lacks a lot (…)

The regular evaluation made by the Safety Technician is even scarcer (37.2%), although sporadic visits are made in greater numbers. Besides that, according to some of the interviewees, the services provided are normally far from the expectations, factors that contribute to the sector's low receptiveness towards these services:

> (…) the safety technician is also a slightly distant figure… he is concerned with the technical parts at the level of space: if there are the signs, the fire extinguishers, the first aid box (if it is up to date or not) and that's it… honestly I don't know what would be a good performance of the Safety Technician… I don't really know how a Health and Safety Technician works… I think that they should be concerned if we have the hospital trash up to date, if everything is right, if the containers, needles and so on are well positioned, close or far away… if there is no cross contamination and so on… I think that would be more important but, honestly, I don't know if the skills of a Security Technician reach there… I have the feeling that they also don't know much about Tattooing (…)
>
> (…) the Safety Technician in my studio will only say what I already do… practically he will only see what is out of date… most have already told me that my studio is one of the best equipped… that it is within the rules… most Tattoo artists are not worried about that (…)
>
> (…) he handed me some papers to fill in… even the COVID protocol I said I had already done… and I never saw him again… I even asked him for the procedures manual… currently I work by myself and I know how to proceed, but if I have other colleagues they will have to know how to proceed… they will have to know what to do in case of a prick… in case of a liquid spillage on the skin… and to this day I am still waiting (…)

Anyway, the number of Tattoo artists who had never contacted the Safety Technician is also high. In this case, the lack of training is also the main cause for their absence, as one of the interviewees states:

> (…) I don't have a safety technician… before the training I thought he worked only on checking fire extinguishers (…)
>
> (…) say that the safety technician went there! No, he didn't… the help he could give is to be aware of what is required from the sector and point out the non-conformities… and not do what I know he does nowadays, which is to stir up trouble: look, this is not right… you have to buy more of this and this… it is a coercive help: you have to have more of this and "that" (…)
>
> (…) for now you have to be informed and updated about the needs of the studio, because I've heard a lot of comments from Tattoo artists who have complained that they are going to inspect the studio and are not even aware

> of what is needed… they want to complain about things they don't even know what they are talking about… they should analyse what exists and give advices to improve… it would be in the sense of making constructive criticism (…)

The evaluation of the overall performance of the Safety Technicians is positive in some ways, namely in the improvement of working conditions (44.5%), as some have mentioned:

> (…) I had another company where the safety technician was exemplary… he asked me to assist a Tattoo because he had no idea of how it worked and then assessed the light, my working position, from the table to my stool, all the signals, but the company, in the meantime, closed down and I had to look for another one… this one I have now—zero! (…)
> (…) the security technician was important for me to be sure that I had everything as it should be (…)
> (…) they came just before we closed (second quarantine) and have already sent me the plan: I have to change lots of things… it's going to be a long list… good thing they are not that restricted… otherwise at the minimum thing we would close… the lady got there, talked to me a little bit and was attentive to things I didn't even know I needed to have and then she said she would send everything by email and after a few months she did… what I expected was for them to tell us what we had to change according to the law and everything else … I had no idea that I needed to have a cover with a data sheet about each ink … I think that if a policeman went there, not even he would know that I had to have that … people let it go a little … it's important but not that important … not having the deposit for needles was more serious (…)

On Table 5 are represented the main relationships between the Tattoo artists' opinion on Health and Safety services and the main socio-professional characteristics.

The workers' age ($p < 0.001$) and professional experience ($p = 0.002$) are statistically associated with the existence of regular surveillance by the Occupational Doctor, it means, older individuals and those who have worked for more years in Tattooing are more likely to have regular check-ups with the Occupational Doctor; the same happens regarding the Safety Technician ($p < 0.001$, for both situations). As mentioned before, those who have been working for more years, normally have their own legalized studio, making the effort to comply with all the legal requirements, including those related to Occupational Health. Eventually, factors such as increased risk perception, fragility regarding ageing [8] [9] and/or access to training may also contribute. Simultaneously, a moderate and positive statistical correlation can be observed which shows that those who have exams with the Occupational Doctor are more likely to also use the services of the Safety Technician ($rho = 0.519$; $p < 0.001$), especially because in

Table 5. Correlation between socio-professional factors of Tattoo artists and the perception of Occupational Health and Safety services.

	Age	Years in the profession	Gender	Nationality	Accumulation of tasks
Examinations/check-up with the Occupational Doctor	p < 0.001**	p = 0.002**	p = 0.006***	p = 0.239***	p = 0.352***
Contribution of the Occupational Doctor	p = 0.360**	p = 1.000**	p = 0.435***	p = 0.238***	p = 0.653***
Workplace evaluation by the Safety Technician	p < 0.001**	p < 0.001**	p = 0.147***	p = 0.458***	p = 0.286***
Contribution of the Safety Technician	p = 0.126**	p = 0.682**	p = 0.026***	p = 0.932***	p = 0.793***
Training in Occupational Health	p = 0.265*	p = 0.109**	p = 0.607***	p = 0.386***	p = 0.066***
Feel the need for more training	p = 0.314*	p = 0.028**	p = 0.002***	p = 0.327***	p = 0.162***
Adaptation of the Medicine/Science standards	p = 0.003*	p = 0.073*	p = 0.268***	p = 0.654***	p = 0.866***

*Mann-Whitney U-test; **Kruskal-Wallis test; ***Ki-square test.

most cases the commercial contract includes both services. When this doesn't happen, professionals sometimes resort to the family doctor, without, however, obtaining the necessary support:

> (…) what I have to resolve, I resolve with my family doctor… no one has ever told me, until today, that certain matters have to be resolved by an occupational doctor, so, what I need to do, I do with my family doctor… that we should really be accompanied by an occupational doctor: yes! But I'll be honest with you: I've had exams for occupational medicine for someone else, and, let's be honest, it's just a five-minute control and goodbye… you can't really value an occupational doctor's appointment like that… what I'd expect from an occupational doctor is help… for example, I suffer a lot from my back and I constantly have to go to masseuses… I'd like to have a doctor who tells me: … Look, perhaps is not the correct posture… I would like to have ergonomic support and medication… to be told that from time to time I should take this or that to ease the pain… and to have blood tests… I would like him to understand what "is going on in the area"… I would like him to not be concerned only with medicine in general, which is the normal… it is not my family doctor who is going to tell me what is going on at work; I would like to have a doctor who understands what is happening with the Tattoo artists (…)

Analysing by gender, we can see that women are more likely to have never attended an appointment with an Occupational Doctor (p = 0.006), to be more critical of the Safety Technician (p = 0.006) and to feel a greater need for training in Occupational Health (p = 0.002), so, the lack of access to these services makes

them less informed and perhaps therefore have greater difficulty in understanding the scope of action of the Safety Technician.

When analysing the training factor, a statistically significant association emerges between having regular consultations with the occupational doctor and having already had training in Occupational Health and Security ($p = 0.006$); consequently, we found that the most experienced in the profession are more likely to mention that they do not need further training ($p = 0.028$). These data may be interpreted both as a normal condition, resulting from learning over the years or as an indication of the lack of expectations regarding what is taught. On the other hand, those who feel the need for further training are more likely to value the performance of the Safety Technician ($p = 0.024$).

The frequency with which the Safety Technician's intervention is perceived, directly influences the Tattoo artists' perception of the quality of their performance ($rho = 0.253$; $p = 0.003$). This assessment is also directly proportional to the value given to the Occupational Physician ($rho = 0.406$; $p = 0.001$). Therefore, Tattoo artists who are more attentive and receptive to Occupational Health and Security, more easily simultaneously value the items included in it, such as training and the elements working in the team [12]. However, Tattoo artists with more schooling education were more likely to evaluate the Safety Technician's intervention as negative ($p = 0.010$) and more likely to consider that it does not change the context where they work ($p = 0.034$), while those with less schooling education were more likely to consider that it positively changes the work environment. It may be thought that individuals with more knowledge possibly have a better notion of the functions of the Safety Technician and, therefore, are more critical and demanding in relation to his/her performance. The same happens in relation to training, as can be seen:

> (…) I've only learnt what the occupational doctor is because of the Ink Talents training courses… I looked for and hired a company and now I have an occupational doctor… honestly I think it's a bit of a hurry… it was like measuring my blood pressure, looking at my eyes… it's that thing… if I really have a problem… if I say everything is fine with me, I will pass the check-up… for me an ideal occupational doctor would be to do more research… talk a bit about diseases and symptoms associated with Tattooing (…)

Finally, those who consider that the Medicine/Science standards are not adequate are more likely to think that the intervention of the Safety Technician worsens working conditions ($p = 0.014$).

5. Conclusions

This research combined quantitative and qualitative techniques in order to identify not only the profile of Portuguese Tattoo artists regarding the occurrence of occupational accidents, symptoms and occupational disease; but also to portray the occupational Health and Safety through the perception of the Tattooists.

In terms of accidents, cutting stands out; despite this, there is no evidence that there has been any type of disease associated to any biological agent in the evaluated sample.

In terms of symptoms and illnesses, musculoskeletal pathologies are the most common among workers, due to both repetitive movements and the forced postures maintained. In second place, but also with emphasis, are the emotional problems which, with the pandemic and the confinement, may have been intensified. Eye fatigue, a symptom mentioned by a large majority of individuals, should also be highlighted. However, evidence of the presence of declared occupational disease is vestigial.

Despite of being mandatory by law, many Tattoo artists have never had a consultation with the Occupational Doctor, nor have they submitted their workplaces to the evaluation of a Safety Technician; this situation is eased by both the lack of professional information/training, and because of the lack of preparation of the occupational services to properly monitor the needs of the sector, something that allows to keep a climate of mistrust/disbelief of the potential of these services.

Considering the Limitations of the investigation, taking into account the method used to obtain the sample, it is possible that the Tattoo artists who made up the sample are not totally representative of the professionals practising in Portugal, as the willingness to participate in the project may be associated to a greater concern with Occupational Health and Safety issues, and so, the Tattooists less compliant with the recommendations may not have been included.

Furthermore, it was not possible to confirm whether the individuals who responded to the survey were actually Tattoo Artists; however, completing the form took more than twenty minutes, so it would be unlikely that there were individuals who did not work in the sector and were motivated to do this procedure, as they would not have any benefit in doing so.

As for the number of individuals interviewed, this was small, so the results could be different, with a larger sample, although part of the answers has started to be repeated in some situations.

When discussing the data, it was rarely possible to compare with the literature, given the scarcity of published articles on the topic.

As for most of the companies providing external Occupational Health services, it would be desirable for the Occupational Doctor to have specific knowledge regarding Tattooing, namely associated semiology and pathology; as well as the possibility to make practical and effective recommendations in the context of eventual pharmacological support and/or which auxiliary diagnosis exams could be useful and how to obtain them, according to the legislation. On the other side, in relation to the Safety Technician, it would obviously be desirable that he also have specific knowledge in relation to the sector, making plausible suggestions for improvement of the workplace, based on a mathematical evaluation of risk, coherent and prioritising the most relevant areas to act in at the moment, according to the combination of criteria such as the gravity of possible conse-

quences of not correcting, the probability of occurrence of these consequences, the cost associated to correction and direct technical difficulties in alterations. There should also be a direct, routine and fast interaction between these two professionals, in order to provide a quality and effective service that motivates the customer to collaborate.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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