

# Science on the Development of Standards and Their Compliance in a Representative Sample of Portuguese Tattoo Artists

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**How to cite this paper:** Santos, M. (2022) Science on the Development of Standards and Their Compliance in a Representative Sample of Portuguese Tattoo Artists. *Open Journal of Preventive Medicine*, 12, 127-140. <https://doi.org/10.4236/ojpm.2022.127010>

**Received:** April 15, 2022

**Accepted:** July 28, 2022

**Published:** July 31, 2022

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## Abstract

**Introduction:** The number of Tattoo artists has been increasing and there are important Occupational Risks associated. The aim of this article was to describe the position of these professionals regarding the Recommendations and to analyze their compliance when working alone or accompanied. **Methodology:** It is a Mixed Exploratory Study, involving a quantitative component (Observational Analytical of transversal nature), operated through an online survey and, in a second phase, a qualitative one (Case Study), through the use of interviews. A representative sample of the population under study was obtained, considering a 90% confidence interval. The research project was approved by a Ethics Committee and informed consent was obtained. **Presentation and Discussion of the Results:** The sample considered 207 questionnaires and nine interviews. The compliance with Standards increases with experience; those who reported that they do not always comply are those who use less the Personal Protective Equipment ( $t = 2.659$ ;  $p = 0.008$ ). Compliance is also influenced by the Perception of Risk, information, social pressure (more accentuated by COVID19) and motivation to increase profit. Those who considered the Recommendations to be adequate were statistically associated with compliance with Collective Protection Measures. Regarding the compliance when working alone or not, 86.0% stated that they maintained the same posture; of those who answered the opposite, 85.7% complied more alone. Those with less education were statistically associated to less compliance with the rules when alone ( $\chi^2 = 12.763$ ;  $p = 0.005$ ). **Final Considerations:** Previously unpublished data has been obtained, valuable to act effectively in this professional sector. It is fundamental to invest in training, as well as to elaborate Standards (developed jointly by Doctors/Safety Technicians and Tattoo artists). The organization of the Conventions should

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guarantee adequate conditions (area, access to disinfection/sterilization methods) and share Standards, promoting inspection and punishments for non-compliance, since they are the most unsafe places.

## Keywords

Tattooing, Tattoo Artists, Occupational Medicine, Occupational Safety

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## 1. Introduction

In the nineties, there were two [1] [2] or three [3] [4] studios in the country, all of them in Lisbon; two decades later, there were thirty, distributed nationally, [1] [2] with 50 and 77 Tattoo artists, in 2007 and 2010, respectively [3] [4]. According to the National Institute of Statistics, in the years 2017/2018/2019 (data available in 2019/2020/2021), there were 519/650/800 individuals registered, respectively. It is believed that the evolution was increased by the internet and television channels from countries where it was more prevalent, particularly in music/cinema worlds [5].

Despite this growth, there are no standards regulating training [6]. If previously the art was taught through master-apprentice, nowadays social networks encourage the sharing of information [7]. The creation of national Conventions (where foreign professionals came) and international (where Portuguese professionals participate), have contributed to motivate the sharing of technical data, in order to be recognized among colleagues, clients and society in general as competent and original, in a relaxed environment. Guest-spots are also frequent: accept an invitation to go to another studio to share technical knowledge and/or work together with another colleague(s) [3].

The practice of the profession implies several risks. Tattoo artists are exposed to chemical agents [8] [9] [10] [11] [12] (mainly pigments and cleaning products), which may cause dermatological, otorhinolaryngological or even oncological alterations [10] (although not all researchers agree with the last one) [8] [13] [14]. Biological risk arises, essentially, due to contact with blood (cutaneous/mucosal/percutaneous routes), especially for HIV (Human Immune Deficiency Virus) and Hepatitis B/C [8] [10] [14] [15] [16] [17]. Long shifts, associated to extensive tattooing and/or several consecutive appointments, lead to repetitive movements (tattooing and cleaning the skin of excess pigment, hundreds of times, for each client) and forced/maintained postures, which may lead to orthopedic pathologies. With inadequate lighting, ocular fatigue and/or decrease in acuity may occur. Although the electrical machines are improved, there is still the production of noise [10] [16] (in the order of 15 decibels) [10] and vibrations [10] [16] [18], possibly for long periods, which may lead to hearing loss and vascular/neurological alterations, respectively. There may also be stress associated with appointment management, lack of clients and/or client dissatisfac-

tion with a process that cannot be completely reversed.

It is therefore fundamental to have Standards/Norms that protect these professionals. However, an Australian study found that, even after the introduction of Recommendations (and some punishments for non-compliance), the situation did not improve significantly; even among professional Tattoo artists, prevention has to be adapted to individuals [9]. Besides that, some Tattoo artists do not care about details associated with the indications provided by Medicine. Because they consider that Tattooing is a “tribal knowledge”, Science should not interfere [19].

Risk Perception is the way an individual perceives vulnerability to harm; it depends on beliefs, attitudes, values and personality; therefore it is subjective [20]; Risk Assessment is more objective; the results of Perception are different from those of Risk Evaluation. The Perception of danger is inversely proportional to risky behaviors [21] and directly proportional to the compliance with Recommendations [19]. It is not the real Risk that modulates decisions, but Perception. The bigger the aversion to Risk, the more intense the Perception [22]. Understanding how the worker perceives will enable to manage the issue better [23]. A Risk that involves some reward is generally perceived as lesser, especially in more precarious jobs. Risks for which the individual volunteers are considered less serious. Women generally have higher levels of Risk Perception and less acceptability of danger; men, especially young, are more likely to feel omnipotent. More qualifications can either provide a greater ability to cope with danger or increase worry [22]. More experienced workers may feel safer and less vulnerable, or more susceptible due to ageing [24]. If there is a manager, his perception of the danger is often disseminated to the team; otherwise group integration may be compromised. Therefore, the greater the need to be part of the team, the lower the resistance [25]. Risk may also be devalued if the machine has a safety system [8] and/or if the worker uses Personal Protective Equipment (PPE) [26].

There are no mandatory national standards, nor recommendations consensually accepted as valid for all Tattoo Artists.

## 2. Objectives

Bearing in mind that the bibliography consulted was scarce or non-existent in relation to the way in which Tattoo artists perceive compliance to the Standards, an exploratory study was designed with the objectives of describing their position in relation to the Recommendations and analyzing the existence of behavioral discrepancies in relation to compliance, namely in relation to whether they work alone or accompanied.

## 3. Methodology

It is a Mixed Exploratory Study, involving a quantitative component (Observational Analytical of transversal nature), operated through an online survey and,

in a second phase, a qualitative one (Case Study), through the use of interviews, using online platforms, due to the national confinement associated to the SARS-COV2 pandemic.

The survey was available between April 2020/March 2021. Its dissemination was done through contact with companies/professionals providing this service; as well as national magazines of the sector, companies supplying products/equipment and organizing committees of the national congresses of Tattooing. A representative sample of the population under study was obtained, considering a 90% confidence interval, taking into account the number of professionals registered.

The survey collected data related to sex, age, marital status, nationality, qualifications; existence of another professional activity, why and which one is considered the main one; existence of technical training in Tattooing; how many years working as Tattoo Artist; workplace and work team; concern for good practice standards, compliance with them alone and accompanied by colleagues and appreciation of the science/medicine in their elaboration; risk perception and its valuation; use of collective and individual protection measures and their valuation; existence of symptoms associated with work and occupational diseases; existence of work accidents and possible work limitations; access to the occupational physician and safety technician and opinion; as well as training in the context of Occupational Health.

The questions were either multiple choice or short answer.

The Case Study aimed to clarify some results obtained in a preliminary analysis of the first phase of the research, which left doubts and to understand the interaction that the COVID19 pandemic may have had.

The research project was approved by the Ethics Committee of the Faculdade de Letras (Porto University).

On the descriptive statistical analysis was characterized the values of the variables in terms of central tendency and dispersion. The Chi Square ( $\chi^2$ ) test was used to test the existence of statistical associations between nominal and ordinal variables. For discrete variables, since the Kolmogorov-Smirnov test revealed that they did not have a normal distribution, the t-test was used to test associations between dichotomous variables and the non-parametric Kruskal-Wallis test was used for the remaining variables. Spearman's Coefficient was used to check for correlations.

#### **4. Presentation and Discussion of the Results**

The first phase sample considered 207 questionnaires, and the interviews of nine Tattoo artists (Case Study) were subsequently analyzed.

In the sample related to the online survey, ages ranged from 20 to 52 years; that is: 30.8 were on the 2nd; 47.8 on the 3rd; 20.5 on the 4th and 1.0% were in the 5th decades of life. The mode was 36; the average was 33.7 with a standard deviation of 7.0 and the median 34. The majority was male (66.7%). Regarding

marital status, 33.3% were single, 29.5% married, 30.9% living in a consensual union, 4.8% divorced and 1.4% widowed. About 91.8% reported being Portuguese, although all of them worked in Portugal and mastered the language. As for Academic Qualifications, 59.4% had concluded secondary education; 13.0% had a degree and 10.6% had basic education.

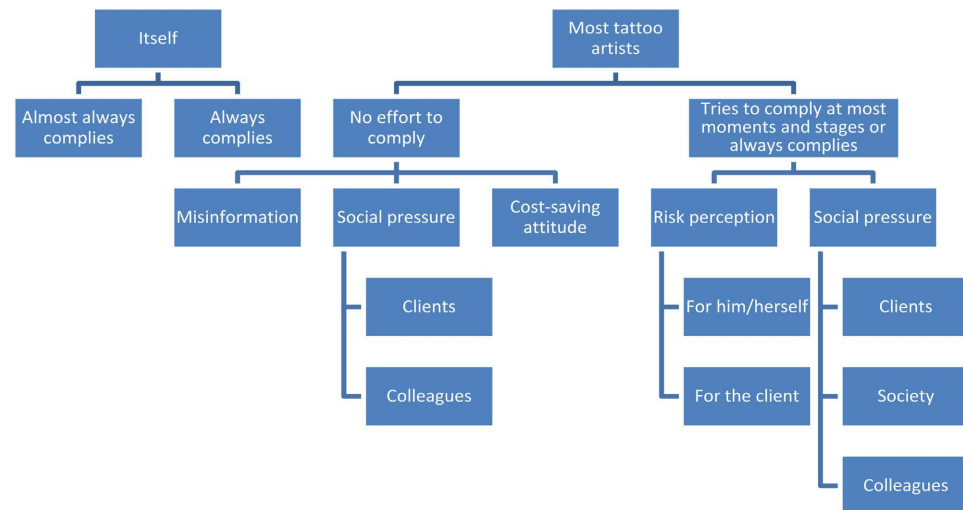
#### 4.1. Compliance with National/International Regulations

Most of the Tattooists (91.3%) answered that they were “always” concerned with the national Recommendations, being reduced those who claimed “frequently” (6.3%) and residual those who considered the answer “generally” (1.9%); by that, there were no answers that highlighted a conscious non-compliance. However, considering the scarcity of national guidelines, 84.5% stated that they looked and applied some international Standards, while 12.6%, although they found it relevant, had difficulty interpreting other languages and 2.9% did not consider it important.

Applying the t-test for independent samples, it was found that, on average, compliance with Occupational Health/Safety Standards increases as individuals acquire more professional experience, which contradicts some of the evidence consulted, which suggests that older/experienced Tattoo artists may be more resistant to norms [27]; on the other hand, it was also shown that critical sense towards the relevance and adequacy of the regulations is enhanced with age ( $t = -2.807$ ;  $p = 0.005$ ); that is, since Occupational Risks are cumulative/progressive and individuals evolve to a worse general medical level with age, it will make sense that as they acquire more professional experience and/or age, they will worry more about the Recommendations although, at the same time, experience will also allow them to be more assertive. In contrast, as they get older, they may feel more vulnerable [22] [24]. Regardless, it is observed that those who report that they do not always comply with the Standards are more likely to be those who use Personal Protective Equipment (PPE) less overall ( $t = 2.659$ ;  $p = 0.008$ ).

The analysis of the interviews brought some evidence on this (Figure 1), as the reasons given for not complying with the Standards are not only related to age or experience, but also to the Perception of Risks to oneself and customers and/or lack of information:

“(…) I am a bit obsessive with cleaning... when I started tattooing my problem was Hygiene and Safety... I know studios that are very good but I also know others that are not... where I notice that this is a problem is more with people who tattoo at home... I’ve also started this way... but I have a bit of a disease obsession... the materials I used at home are exactly the ones I use in the studio and I had my own room with everything... but most people who tattoo at home don’t really focus on that: just do it, just do it! ... I think this is half/half in relation to the concern with standards... I’ve spoken to studios here that didn’t even know they were obliged to have Health and Safety at Work teams (...)”



**Figure 1.** Compliance with standards/good practice recommendations.

“(…) I think that most people follow the rules because the other person does and not because they know what they are doing… if they knew what they were really doing and the risks that they were taking, then yes, everyone would follow the rules… in general, I think that everyone tries to follow, but because of that (…)”

“(…) I want to believe that the great majority complies… although the Tattoo artists do not have much information…there is a wide range of Tattoo artists that are not working in studios and there it becomes more difficult to say that they comply with these recommendations… there are still many people that do not comply (…)”.

Or attributed to social pressure, more acute in this pandemic period:

“(…) I think that, in general, Tattoo artists care about standards… even though sometimes I see posts by colleagues on Facebook or Instagram where these good practices are not always followed, especially at this time of COVID, when a person has to be even more careful… and they post things… and one gets: ah!… That annoys me a little bit… but I think that, in general, they comply (…)”.

Social pressure, resulting from a professional culture traditionally reluctant to change, especially when associated with group phenomenon:

“(…) I think that the majority of Tattoo artists are not very concerned with the norms (…)”

“(…) I have visited several conventions in Portugal… in fact, I have visited all of them and I know that there are many situations in which the hygiene standards are a little bit denied and put aside… and the conventions are places where there are more tattooed people and Tattoo artists… more possibility of contamination… so the care for hygiene should be even more strengthened… I think that in the conventions some things could be im-

proved (...)."

As for the motivation to increase the profit margin (by decreasing the expenses required by some measures):

"(...) the Tattoo artists that I know care about... but others just want to make money... I think there are more Tattoo artists that want to do everything right (...)"

"(...) at a general level I think it is better... however I have also noticed that this is going a little off the rails... there are a lot of new people who want to be Tattoo artists and do it at home, at least in my area... and the lesser compliance with the norms I think happens more for economic reasons... I don't think that it is carelessness or lack of information, because nowadays a person goes to a studio and has notion of what he sees... and who starts in the Tattoos already went to a studio which is at least a bit professional... so he knows and has seen how it works... and even so they choose to be careless in these situations (...)"

#### **4.2. Compliance with Standards/Recommendations of Good Practice, Depending on Whether They Work Alone or in a Team**

We wanted to know if this fact changed the behavior towards the regulations and 86.0% answered no; of those who answered having a different behavior, 85.7% complied more when alone.

The Chi Square test showed that those with less education were statistically associated to the option of complying less with the rules when not accompanied by other Tattoo artists ( $\chi^2 = 12.763$ ;  $p = 0.005$ ), possibly due to the lesser understanding/perception of risk [23]. In addition, all the professionals who stated that they changed their Compliance with the Rules depending on whether they were working alone or with another colleague at the same time, were working as employees ( $\chi^2 = 4.262$ ;  $p = 0.047$ ), which may reflect a lower investment/performance in the activity.

The Case Study interviews revealed that this is a fractious issue in the sector, as while some stated that it makes no difference:

"(...) I follow the rules whether I am alone or not (...)"

"(...) speaking of myself, it's the same... speaking to others: I hope it's the same... for me it makes no sense to comply more when alone... if there was another person there, I would feel even more pressured to do everything right (...)"

However, other Tattoo artists answered the opposite:

"(...) it depends... I speak for myself... I work alone... and I believe that, maybe, we get into some habits... and if I'm with another Tattoo artist it can be something that I don't do so well... when we are alone we work more easily and, maybe, we do things more mechanized... and when we are

with another person there can be some nervous feeling... there isn't so much ease and that makes us make mistakes that we don't make when we are alone, because we get in the way (...)"

"(...) it shouldn't be, but I think that compliance is different... the mask issue was one of them: a Tattooist who already wore a mask, if he went to a Convention, he ended up not wearing it because some didn't wear it... there are things that will be left behind, because we don't want to be pointed at... maybe nowadays things are different because of COVID... I had clients who asked me why I wore a mask, cuff or apron... because other Tattoo artists didn't use... and I explained that it was for a question of the microorganisms and the scraping of the arm and the clothes, but people didn't understand... maybe nowadays people already associate it to the COVID, but it is not only the COVID... when we are with other Tattoo artists we leave some things behind so as not to be pointed out as being too zealous (...)"

When the participants were asked to analyze the fact that almost all the Tattoo artists, who in the online survey claimed different compliance, comply more when alone, the answers diverged. A fraction stated that this did not make sense and could not understand, as when we are observed by our peers, we try even harder to work more correctly:

"(...) I think it makes a difference... there can be more than one attitude... I think that most of them will comply more when they are with someone... in a certain way they feel 'watched'... it is more obvious to think that I try to comply when I have a person beside me 'watching' what I am doing, to see if I am doing it right or not... maybe they answered that way in the survey because alone there is that doubt in the air: will you do it? So I will say that I do it (comply with the norms) alone (...)"

"(...) I think there is more compliance with colleagues... I speak for myself, it's like children: when they are alone they mess up more... because they don't have anyone watching... I find it strange that they comply more when they are alone... I can't explain why that happens... I'm not ashamed to say that, alone, there were moments when I went off the rails a little bit (...)"

However, others mentioned the situation at Tattoo Conventions, where it was usual to have many Professionals practicing in a small work area, with as many other individuals getting tattooed, so compliance with the Standards could be poor (also due to the confusion, party atmosphere/distraction and fear of being accused of being overzealous by colleagues).

"(...) people should always be careful... 100%... when there are more people, more possibility of contamination... it should be 120% or 200%... in the Tattoo conventions is where there are bigger gatherings of Tattoo artists and tattooed people... no matter how big a studio is, it will never have so many people... and the convention has a party atmosphere and



maybe people are a little bit taken by that... I feel more relaxation and I think they are a little bit careless with the rules... in the convention the space per Tattoo artist is very small and makes the organisation and hygiene difficult (...)"

"(...) two years ago I had my experience at a convention...and my concern there was to do well in hygiene and safety, because in those places is where there is less (...)"

"(...) I do a lot of guests, I go to other studios... and sometimes there are several Tattoo artists from three or four different places in the world... each one works at a different level of security... there are Tattoo artists who do not care nothing (...)"

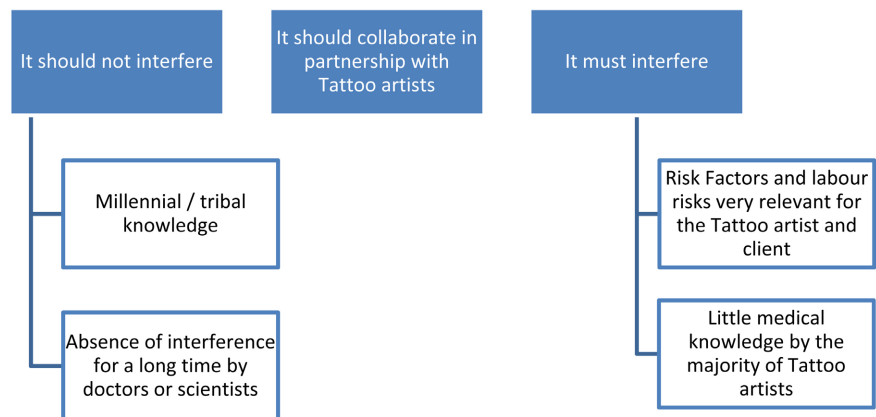
### 4.3. Perception of the Validity of Standards and Best Practice

The majority of Tattoo artists (84.5%) answered that the recommendations of Medicine/Science towards Occupational Health/Safety were adequate. Those who gave the opposite answer were given the opportunity to explain and, of these, 18.8% (or 2.9% in terms of the total sample) pointed out that they were not adequate because they would become costly, 18.8% because they were exaggerated, 12.5% (or 1.9% of the total sample) because they would be laborious and 12.5% because Tattooing is a tribal knowledge in which Medicine/Science should not interfere. Some mentioned that the demand for some Recommendations was exaggerated in some situations and insufficient in others.

The Chi Square test shows that the Tattoo Artists who considered the Recommendations adequate are statistically associated to the compliance with Collective Protection Measures, such as scheduling more complex and time-consuming procedures with other shorter and simpler ones ( $\chi^2 = 7.806$ ;  $p = 0.020$ ); besides this, they also privilege the use of Individual Protection Measures, such as Uniform ( $\chi^2 = 9.427$ ;  $p = 0.040$ ), Mask for Biological Agents ( $\chi^2 = 8.646$ ;  $p = 0.049$ ), Gloves for Biological Agents ( $\chi^2 = 13.695$ ;  $p = 0.004$ ), Gloves for Cleaning Establishment Surfaces ( $\chi^2 = 9.537$ ;  $p = 0.023$ ) and Cuffs ( $\chi^2 = 9.391$ ;  $p = 0.043$ ); that is, in general, the more the Tattoo Artist values the Standards, the higher the Risk Perception and the more Protective Measures he/she will adopt [19] [26] [28].

Those who work in Society are more likely to state that the Recommendations are inadequate because compliance with them would be laborious ( $\chi^2 = 12.224$ ;  $p = 0.008$ ). Those who consider that the Standards are inadequate are more likely to think that the Occupational Doctor makes working conditions worse ( $\chi^2 = 8.002$ ;  $p = 0.042$ ), as does the Safety Technician ( $\chi^2 = 10.060$ ;  $p = 0.016$ ); in addition, they wash all work surfaces less ( $\chi^2 = 4.610$ ;  $p = 0.032$ ) and have greater difficulty in distinguishing Washing/Disinfection/Sterilization Methods ( $\chi^2 = 7.535$ ;  $p = 0.022$ ). In other words, perhaps the fact of working in a team provides a stronger notion of self-efficacy, which may justify greater confidence in challenging some Rules, valuing less the Recommendations.

The results of the analysis of the interviews (see **Figure 2**) revealed the



**Figure 2.** Interference of medicine/science in the development of good practice standards/recommendations.

existence of an agreement, among the different cases, in considering that Medicine/Science should be involved in the development of Standards, given the risk of diseases for the Tattoo artist and Client and the lack of medical knowledge of some professionals:

“(…) I think medicine and science should step in and they still do little (…)”

“(…) what the regulations ask for is not too much… I have had stories of clients who have come to my side telling me that another Tattoo artist used the same needle to get it cheaper… this to me is a lack of notion!… medicine and science… it has to be all interconnected (…)”.

Although they recognize that there are some Tattoo artists who consider that Medicine/Science should not interfere, as Tattooing is an ancestral “tribal knowledge”, without interference for almost all this time by doctors:

“(…) Tattooing is millennial… it comes from very ancient times… and at that time the care was little or none… I understand the part of some more conservative Tattoo artists, but I also accept that everything comes to improve… the Tattoo is in constant evolution… everything that can come to our benefit and to progress, I think is welcome (…)”.

One of the interviewees, however, pointed out that Medicine and Science should collaborate in this regard, but not without leaving room for the Tattoo artists:

“(…) all areas are connected… I think that medicine and science also have to give space to the Tattoo professionals and understand the other side… it has to be a partnership, a mutual help, a collaboration… Tattooing in Portugal is not a profession… it is an unregulated activity, which creates a gap here… it does not exist an entity to which one can appeal and give voice to the Tattoo artists… there is an Order of Doctors, for example… not an Order of Tattoo artists, nor anything similar… and perhaps the Tattoo artists

are a little disadvantaged (...)"

No studies were found (specific for Tattoo Artists) that allow the discussion of the aspects evaluated.

## 5. Limitations

The main weaknesses of the study is relate to the sampling technique, since, as it is an online survey, it was not possible to control whether all of them were effectively Tattoo artists; in addition, it is possible that the sample includes those who most value and worry about issues associated with Occupational Health/Safety. However, taking into account that the survey was extensive, it seems unlikely that there were individuals, not Tattoo artists, motivated to answer.

Regarding the Case Study, it should be added that the sample was very small, even though there was some repetition/saturation of information.

The discussion was very limited by the lack of published data on the areas studied, due to the scarcity of papers. However, this is also one of the advantages of the article, that is, allowing the publication of some data, filling this gap.

## 6. Final Considerations

The option for a mixed study allowed not only to analyze the perception/valuation and position of a significant sample of Portuguese Tattoo Artists on the compliance with Occupational Health and Safety Standards, but also, in its qualitative aspect, to further explore the data initially obtained through the survey and address initially unplanned issues, such as the possible interference of the SARS-COV-2 Pandemic in the overall Risk Perception and compliance with the Recommendations.

Overall, it was obtained very complete data on Occupational Health/Safety applied to this sector, part of which, to the author's knowledge, had not been published before, and which will certainly be an added value to act with more precision.

Although most of the Tattoo artists agree and intend to join the Standards, there are factors that may contradict this, such as the lack of information, resulting from the absence of certified professional training, historical and cultural weight of a profession that grew apart from science, social pressure from colleagues and/or clients, as well as economic demands.

It seems to be fundamental to invest in professional training, as well as to elaborate national Standards, developed by working groups composed by elements with training in Occupational Health/Safety (Doctors/Technicians of Safety at Work) and Tattoo artists, in a spirit of collaboration and equality.

In relation to the Tattoo Conventions, it now cancelled due to the pandemic, but increasingly attended before, as they are the most unsafe places for the client and professionals; the organization of the event should ensure adequate conditions (area, disinfection/sterilization methods) and disseminate a simple set of Standards, promoting inspection and sanctions for non-compliance.

## Acknowledgements

The author would like to thank Professors Maria Isabel Dias and Sílvia Fraga (both from the University of Porto, Portugal), for their support in guiding the global project that allowed the collection of the data treated here.

## Conflicts of Interest

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

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