

HOW AWARE ARE MEMBERS OF THE MEDICAL UNIVERSITY COMMUNITY OF THE RISKS AND CONSEQUENCES OF SKIN TATTOOING? RESULTS OF THE ONLINE SURVEY

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This article presents the results of an anonymous online survey on skin tattooing conducted in the community of medical students and professors. The article covers issues of tattooing from medical and sociocultural perspectives. The survey was carried out in Pirogov Russian National Research University and included 210 participants of different ages. The results demonstrate the insufficient knowledge of medical indications, contraindications and potential complications associated with tattooing. The obtained data can be a good starting point for developing programs aimed at raising awareness among young people, especially in higher medical institutions. The opinion expressed in this article is not necessarily shared by students and professors from other institutions for higher medical education and does not necessarily reflect the level of expertise in other medical communities. This work is an example of how socially oriented practical training can be organized for the 3rd- and 4th-year students of the Faculty of General Medicine at Pirogov Russian National Research University.

Keywords: tattoo, tattooing, online survey, medical students, medical contraindications, dermatologic complications

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КОМПЕТЕНТНОСТЬ СООБЩЕСТВА МЕДИЦИНСКОГО ВУЗА В ВОПРОСАХ РИСКОВ И ПОСЛЕДСТВИЙ ТАТУИРОВАНИЯ КОЖИ ПО РЕЗУЛЬТАТАМ ОНЛАЙН-АНКЕТИРОВАНИЯ

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В статье представлены результаты анонимного онлайн-анкетирования студенческого и преподавательского сообществ медицинского вуза по вопросам, связанным с татуированием кожи. Освещены проблемы нанесения тату-изображений с медицинской и социокультурной точек зрения. В опросе, проходившем в РНИМУ им. Н. И. Пирогова, приняли участие 210 респондентов различных возрастных групп. Анкетирование выявило недостаточный уровень знаний участников о медицинских показаниях/противопоказаниях и потенциальных осложнениях при проведении тату-процедур. Полученные данные являются достаточным основанием для начала формирования программ повышения специализированной грамотности в молодежной среде, особенно в медицинских учреждениях высшего профессионального образования. Мнение, выраженное в публикации, не обязательно отражает точку зрения и уровень знаний студенческих и преподавательских сообществ других вузов. Работа представляет собой вариант организации и проведения социальной практики для обучающихся 3-го и 4-го курсов лечебного факультета РНИМУ им. Н. И. Пирогова.

Ключевые слова: тату, татуирование, татуировка, онлайн-анкетирование, студенты медицинского вуза, медицинские противопоказания, дерматологические осложнения

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Adorning the body with images dates back centuries. Such images vary by geographical location or between ethnic groups, are used for identification and as a decoration, provide information about the wearer, or have religious meaning. Tattooing is a kind of the avant-garde art and a way to change one's appearance. Tattooing is performed by various piercing tools that break skin integrity and inject ink into deeper skin layers thus creating an indelible (permanent) image.

We do not know exactly when the first tattooing procedure was performed. Polynesian tattoos originated in the 3rd-2nd millennium BC in the Lapita archaeological culture on Santa Cruz Island (Solomon Islands, Melanesia) [1]. The earliest evidence of tattooing among Europeans dates back to the early XVIII century when tattooed people demonstrated their skin adornments at fairs [2]. The history of mankind has numerous examples of using tattoos to mark offenders. Prisoners

of concentration camps were branded with identification numbers. Tattoos often indicate a rank in the criminal hierarchy [3-6].

We live in the era of tattoo renaissance, when skin adornment, once bizarre, has become quite common, especially among young people of 18 to 30 years of age. Tattooing has lost its rudimentary pagan flavor and its shady criminal reputation.

Considering a lasting interest for tattooing, we should elucidate the questions of contraindications, consequences and safety for future generations of doctors [7]. On the one hand, to run the procedure smoothly, one should clearly understand its sanitation requirements; on the other hand, medical personnel should be aware of the legal liability that ensues from performing the procedure in spite of contraindications. Unfortunately, this fact is often ignored by both the customer and the tattoo service provider.

Contraindications for tattooing are diabetes mellitus, blood clotting disorders, diseases of blood-forming organs, anamnestic immune response to metals or their chemical compounds, blood thinning therapies, epilepsy, systemic autoimmune disorders, cancer, acute bacterial and viral infections. Other contraindications include alcohol or narcotic intoxication, pregnancy and lactation. Up to now, in the Russian Federation whole blood and component donors must specify in the blood donor screening questionnaire whether they have a tattoo. Having a tattoo is also a temporary contraindication to being a donor (Addenda 1 and 2 to Order 364 of the Ministry of Health of the Russian Federation dated September 14, 2001 "On approval of rules for medical examination of whole blood and component donors"). Worldwide, potential donors can be deferred or rejected if they have a tattoo, due to a supposedly high association between tattooing and some transfusion-transmitted infectious diseases [8-10].

Recently doctors, especially dermatologists, have started to pay closer attention to body tattoos because of a huge number of complications related to tattooing. Dermatologic complications of tattooing vary from acute short-term superficial inflammatory reactions that patients do not usually report to the doctor to infectious, persistent allergic or phototoxic reactions, granulomatous and lichenoid rashes [11-14].

Modern literature classifies tattoo-related medical complications as pyogenic infections (impetigo, furunculosis, cellulitis); non-pyogenic infections (syphilis, lepra, viral hepatitis); dermatologic manifestations of systemic diseases of unclear etiology in the tattoo area (psoriasis, lichen ruber planus, discoid lupus erythematosus); acquired hypersensitivity to tattoo ink (pigments); complex pathological states (keloids, erythema multiforme, lymphadenopathy) [15].

Inflammatory reactions are usually manifested by a localized edema, itching, hyperemia of various intensity, and papular rash in the tattoo area. According to the literature, the most common trigger for developing such complications is a red pigment that contains mercury and its sulfides [16, 17] (fig. 1). However, there is a growing number of reports on acute and subacute inflammatory response and even cancers associated with the use of modern organic pigments, such as Pigment Red 170 and 181 [18-21].

We distinguish between superficial and deep tissue infectious complications depending on the zone they affect, and between bacterial, viral and fungal complications depending on the etiological agent that causes them (fig. 2).

The number of scientific works that describe complications caused by various infectious pathogens during tattooing is growing. Along with such pathogens as *Saksenaea vasiformis*

[22] and *Molluscum contagiosum* [23], some others have been reported, such as *Mycobacterium fortuitum* [24, 25], *Mycobacterium chelonae* [26, 27], *Mycobacterium haemophilum* [28], *Aspergillus fumigatus* [29], and *Human papillomavirus* [30, 31].

No comprehensive and effective reorganization is possible in any management structure without proper personnel training. Medical students can be seen as a potential resource for health system; thus, they should be ready to convincingly promote the basics and principles of healthy and safe lifestyle in the future.

The aim of this work was to evaluate personal involvement of students and professors of a medical university into the problem of tattooing (the presence and nature of body tattoos and the reasons for having them) and to understand the general level of awareness of tattoo-related medical issues using an anonymous online survey.

METHODS

Using an anonymous online survey developed by the authors of this work, we collected and analyzed responses of students, medical residents, postgraduate students and professors of Pirogov Russian National Research Medical University who agreed to take part in the survey, submitted information on having a tattoo and shared their knowledge of medical indications/contraindications and possible complications following the tattooing procedure.



Fig. 1. Inflammatory response in the tattoo area (the dorsum of the right hand), still persistent 5 days after the procedure



Fig. 2. Mixed bacterial and fungal infection in the tattoo area (the inner forearm)

For our study, we decided on a one-off group online questionnaire and unselected participants. Such study design allows for the quickest collection of the initial data, its results are easy to mathematically process; it also allows to survey a large number of respondents within a short period of time, not to mention that this method is very cost-effective. The link to the online questionnaire was published on the web page of the dean's office of the Faculty of General Medicine, Pirogov Russian National Research Medical University, since it is the biggest faculty here, which would allow us to collect and analyze as much data as possible from target respondents within a short time period.

The data were collected within 30 days. An invitation to participate in the survey was sent over to the personnel and students of the Faculty of the General Medicine. The questionnaire consisted of 16 close-ended questions that limited possible answers to a number of choices (see the table below). Answers to key questions determined what question would be offered to the respondent next, as shown in fig.3. Anonymity of the participants was a prerequisite. To prevent respondents from filling out the survey form more than once, an IP filter for blocking repeated access attempts to the questionnaire was applied. The survey was approved by the university administration.

RESULTS

210 individuals took part in the survey. The majority of the respondents (140, or 66.7 %) were female. 198 (94.3 %) respondents were 19–24 years of age, 8 (3.8 %) respondents were 25–30 years of age, 1 (0.5 %) was 16–18 years of age, 3 respondents (1.4 %) were 30–40 years of age. According to the obtained data, 188 (89.5 %) respondents were undergraduate students; 7 participants (3.3 %) were postgraduates, 15 (7.1 %) participants had completed their secondary vocational education by the time of the survey.

As suggested by the results of our survey, only 16 (7.6 %) individuals were not aware of the complications that may occur during or after tattooing procedures. Three times as many respondents — 45 (21.4 %) did not know about contraindications that must be considered before tattooing. About one third of the respondents (68 individuals, or 32.4 %) did not even have basic knowledge about ink ingredients used for tattooing.

Only 15 participants (7.1 %) disclosed that they had a tattoo. Interestingly, most of them (9 participants) were female. 10 (67 %) respondents with tattoos had some understanding of what chemical components the ink is made of; all of those respondents had searched for the relevant information before they got a tattoo.

10 (67 %) of the respondents had only one anatomical region covered with tattoos. 5 (33 %) respondents had two or more anatomical regions covered with tattoos. 9 (60 %) of those respondents had a monochrome image.

Respondents were asked to specify the reasons that had motivated them to get a tattoo. 9 (60 %) participants saw their tattoos as a modern body adornment; 4 (47 %) respondents said their tattoos reminded them of some important event in their life or were a way to celebrate romantic relationship; few respondents — 1 (7 %) for each answer option — viewed tattoos as a symbol of being a member of a specific social group, or used them to mask their birth- or acquired defects and to cover up the previous body image.

Only 3 (20 %) respondents with tattoos thought about removing them: 2 were unsatisfied with the way the tattoo looked (the image looked faded and distorted), 1 respondent had personal reasons and either was bored with it or found it inconsistent with his current social status.

Only 38 (18 %) respondents gave a positive answer to the question “Are you planning to get a tattoo?”; none of them had had a tattoo before. For the majority of the respondents (20 individuals), the key motivating factor for getting a body image was aesthetics; they saw a tattoo as a modern body adornment. Among other motives were: cosmetic corrections (masking skin defects, old tattoo improvement, covering up old images) specified by 3 participants; personal reasons (tattoos being a reminder of romantic relationship or important event) specified by 11 individuals; social reasons (being a member of a certain social group or a subculture) specified by 3 individuals; ethnicity-related or religious reasons specified by 3 people.

DISCUSSION

According to the literature, up to 15 % of the world population have at least one tattoo [32]; 10 to 30 % of young people have at least one body image; half of those who still have not received a tattoo, are planning to have it done [33, 34]. Unfortunately, there are no accurate statistical data on the number of people with tattoos in the Russian Federation, on their age and social status.

Results obtained in this study do not differ drastically from the data provided by various research works. Only 7.1 % of the respondents had body tattoos at the time of the survey. Interestingly, there were only few participants (5) who had more than one tattoo, and there were no respondents who considered getting another tattoo. These data allow for a supposition that in nonverbal communication, ideographic body marks do not have any value as an adaptation tool or as a means of establishing authority in the student community of a higher education institution (which is the social group we studied)

The survey showed that 18 % of the respondents do not exclude the possibility of getting a tattoo in the future, and only 9.5 % see the esthetical aspect of tattooing as attractive. Such result indicates the absence of growing interest in the decorative meaning of tattooing among the educated youth.

Although most of the respondents (92.4 %) were aware of the complications that can occur during or after the tattooing procedure, 21.4 % of participants (1/5 of all respondents) did not know about medical contraindications to getting a permanent body image, and 32.4 % of the respondents did not even have a general idea of what ingredients the tattoo ink consists of. Considering that the survey was conducted in the higher education institution, where the primary goals are to give and receive medical education, the authors of this work expected that respondents' awareness, that is, basic theoretical knowledge of indications, contraindications, complications, and safety arrangements during the procedure, should be higher than it actually was.

Changing one's appearance by permanent skin images is challenging. Still, thinking that tattoo will always remain an element of skin adornment is misleading. People often feel the need to get rid of the tattoo to conform to the company's image, for example, to observe a dress code when applying for a position in a bank, a law enforcement agency, state media. According to the scanty data available at the moment, almost

Questions and sets of answers used in the online survey

№	Question	Answer code	Sets of possible answers
1	Please, specify your sex		<ul style="list-style-type: none"> - Male - Female
2	How old are you?		<ul style="list-style-type: none"> - 16–18 years - 19–20 years - 21–24 years - 25–30 years - 31–40 years - 41 years or older
3	Please, specify your level of education		<ul style="list-style-type: none"> - Secondary vocational education - Undergraduate student - Higher education
4	Are you aware of the risks related to tattooing?		<ul style="list-style-type: none"> - Yes - No
5	Do you know about contraindications to tattooing?		<ul style="list-style-type: none"> - Yes - No
6	Do you know the ingredients of ink used for tattooing?	6.1 6.2	<ul style="list-style-type: none"> - Yes - No
7	Do you have tattoos?	7.1 7.2	<ul style="list-style-type: none"> - Yes - No
8	When did you decide to find out about the ingredients of ink used for tattooing?		<ul style="list-style-type: none"> - Before I had my tattoo done - During the tattooing procedure - After I had my tattoo done
9	Your tattoo covers	9.1 9.2	<ul style="list-style-type: none"> - One anatomical region - Two or more anatomical regions
10	Your tattoo is		<ul style="list-style-type: none"> - Monochrome - Color
11	You have		<ul style="list-style-type: none"> - Only monochrome tattoos - Only color tattoos - A combination of both
12	What reason did you have to get a tattoo? Several answers are possible		<ul style="list-style-type: none"> - Cosmetic (to mask skin defects, to cover up an old tattoo) - Esthetic (body adornment) - Personal (to celebrate a romantic relationship, to remind myself of an important person or event in my life) - Social (I'm a member of some social group or a subculture) - Ethnicity-related or religious (I'm a member of some ethnic or religious community) - It was a spontaneous decision
13	Have you ever thought of removing your tattoo?	13.1 13.2	<ul style="list-style-type: none"> - Yes - No
14	What are the reasons that made you consider removing your tattoo? Several answers are possible		<ul style="list-style-type: none"> - Cosmetic (the tattoo faded, the image got distorted) - Esthetic (I do not see my tattoo as body adornment; it does not match my current look) - personal reasons (I'm bored of it; it is not in accord with my new relationship) - Social (I'm reluctant to show that I belong to a specific social group or subculture) - Ethnicity-related or religious (I'm reluctant to show that I'm a member of some ethnic or religious community)
15	Are you planning to have a tattoo done?	15.1 15.2	<ul style="list-style-type: none"> - Yes - No
16	What reasons do you have to get a tattoo? Several answers are possible		<ul style="list-style-type: none"> - Cosmetic (masking skin defects, improvement of a previous image, covering up my old tattoo) - Esthetic (I see my tattoo as a modern adorning element) - Personal (I want to celebrate my romantic relationship or remember someone or some important event) - Social (I belong to a specific social group or subculture) - Ethnicity-related or religious (I'm a member of some ethnic or religious community)

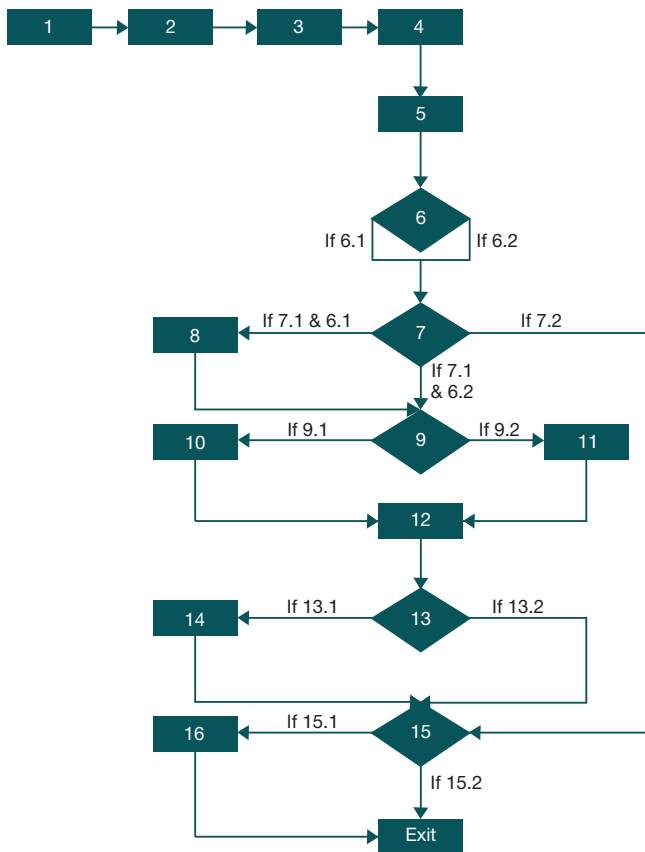


Fig. 3. Questionnaire flowchart.

half of tattoo studios' customers undertake an attempt to remove the tattoo within the first 10–12 years after receiving it [35]. Currently tattoos can be removed using various methods, such as dermabrasion, laser techniques, exposure to acids or liquid nitrogen, and surgical excision followed by suturing. However, a complete removal is not always possible, because there is still no ideal method or technology to extract the artificial pigment from deeper skin layers. Such methods are often painful, very expensive, lead to hypo- or hyperpigmentation of skin or scarring. It is necessary to emphasize that medical students or their teachers should be qualified enough to understand the issues of tattooing or tattoo removal, and to widely promote their knowledge.

CONCLUSIONS

The results of this study demonstrate that in general, the interest in skin tattooing among medical students is quite low. However, we should also acknowledge that although they will provide medical services in the future, their awareness of tattoo-related issues is also low.

We believe it sensible to introduce optional interdisciplinary (fundamental and clinical) courses into the curriculum starting from the first year of education that will engage experts from the esthetic medicine industry. Immersed into this kind of practical training, students will be able to form a holistic system of universal knowledge, to exploit "knowledge asymmetry" unlike students from other higher education institutions, and to adapt successfully to the society, considering real changes and needs of the medical service market.

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