

# Sociocultural overview and predisposing factors of body art in a health promotion perspective: survey on a sample of Italian young adults

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## Abstract

**Background.** The body art (tattoos, body piercing and other aesthetic practices) is increasing at global level and involves different aspects of public health, from epidemiological feature to cultural and psychosocial determinants and regulatory issues. The study is aimed at estimating the prevalence of tattooed and pierced in youth, focusing on emerging profiles.

**Study design.** A cross-sectional study has been conducted on 575 students at the first year of degree courses of an Italian University.

**Methods.** Students were asked to fill an online questionnaire. Logistic regression models were evaluated in order to identify predictive factors and determinants of practice (tattoos, piercing, body art).

**Results.** The 41.9% of participants underwent at least one body art intervention, with a higher prevalence in females. Multivariate logistic regression suggested an association of body art practice with type of school and university course, as well as lifestyle characteristics (smoking, alcohol abuse). In addition, the intention to undergo to body art intervention in the future appeared significantly higher in women and more frequent in apparently 'protected' categories such as medical students and non-problematic alcohol users.

**Conclusions.** The study confirmed the importance of the surveillance and social and behavioural research on body art practice and suggested different health promotion perspectives, such as early intervention towards adolescents and late intervention towards young adults belonging to lesser risky population groups.

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## Introduction

The so-called ‘Body Art’ phenomenon, that is the use of tattoos, body piercings, and other aesthetic practices such as scarification (1), is increasing at national and international levels. This study subject presents evident relationship with health, psycho-social, cultural, and regulatory aspects. Body art practices are associated with communicable and not communicable diseases, with a chronic and acute course and different levels of severity.

Using cross-sectional or prevalence designs, observational studies were conducted on the general population over the past fifteen years, in specific settings such as educational institutions, clinical dermatological areas, jails, military barracks, and sports settings.

Internationally, the prevalence of people piercing their bodies ranges from 8.2% to 41.0% (2-8). However, surveys on the young population in Italy showed homogenous results ranging from 20.0% to 25.4% (9-11). Studies on tattoos are more than those on body piercings and document an international prevalence of tattooed people that ranges from 4.3% to 44.0% (2, 3, 5-8, 12, 13) and from 4.8% to 31.7% in Italy (9-11, 14-19). In almost all the studies that examined both piercings and tattoos, the prevalence of tattooed people has been lower than that of body piercings (2, 3, 5-7, 9-11). Body art practice, especially having tattoos, is more frequent in the age group from 20 to 40 years (7, 8, 13, 18, 20) and among women, with a rate (F:M) ranging from 1.5:1 to 4.5:1 for body piercing (3, 4, 6, 7, 10, 11) and from 1.1:1 to 2.6:1 for tattoos (3, 4, 6, 8, 10, 11, 13, 16, 18, 21-24), even if not all studies are consistent about this relationship (5, 19, 25, 26).

Differences in gender have been detected in the motivations for undergoing body art intervention: among women, the motivation is frequently aesthetic, or conformity to fashion trends; while, for men, it is for a more

powerful and manly appearance (6-8). The geographical context and the study settings bring out different reasons (5, 8, 27). Over time, the use of body art has been decreasingly linked to “a risk” profile for unhealthy behaviours (e.g. smoking, alcohol abuse, use of illegal substances) or social deviations (28) and has been increasingly related to aesthetic choices, bringing about less stigmatization and discrimination in the workplace (23). It has come to be a representation of the desire for self-affirmation and disengagement, especially in women, from traditional cultural models (6).

This study aims to estimate the prevalence of tattooed and pierced people in a sample of university students and to define the target population for health promotion intervention, in particular sanitary risks associated to its practice, in the light of the socio-cultural evolution of the body art phenomenon. Attention will be focused on emerging risk profiles in relation to life steps and personal and socio-economic determinants.

## Materials and methods

### *Study design and sampling*

This cross-sectional study was conducted on a non-probabilistic sample of students enrolled in their first year of degree courses at the University of L’Aquila. Students were contacted through the University Mailing System and asked to fill an online questionnaire. Before data collection, several meetings were organized for students, in which objectives and methods of this study, along with the instruction to log in and fill the questionnaire, were illustrated. The Internal Review Board of the University of L’Aquila gave its approval (response n.10.10.2017 17/17). Consent to inclusion and data treatment was acquired in electronic format. 575 questionnaires were filled in and privacy was guaranteed through the anonymity of the person who filled the questionnaire.

### *The Questionnaire*

The questionnaire was divided into several sections: General information, Socio-demographic and Academic data; Awareness about risks related to body art (tattoos and piercings) and Health and hygiene practices to reduce them; Experiences or Willingness to have tattoos or piercings; Attitudes and knowledge on intervention methods (location, information sources, and counsellors in case of complications; motivations; involvement of significant others); Knowledge of the procedure for removing tattoos and piercings; Other lifestyle habits (alcohol consumption, smoking, sports practicing). In defining piercings, ear holes have been considered only for men as in previous literature (9).

### *Statistical analysis*

Descriptive statistics were used to describe sample characteristics. Participants were classified based on having tattoos, piercings, or one of the two types of body art intervention. Frequency and percentage mean and standard deviation were used to describe categorical variables and continuous variables, respectively. The  $\chi^2$  test was used to verify the associations between categorical variables. Statistical tests were two-tailed and statistical significance was set to  $p$ -value<0.05. Multiple, univariate, and logistic regression models were elaborated to identify predictive factors of undergoing intervention outcomes (tattoos, piercing, body art) and results were expressed as odds ratio (O.R.) and confidence interval (95% CI). Predictive factors significantly associated with the outcome variable ( $p$ <0.05) were included in the multivariate logistic regression model.

Data were coded on an electronic sheet and statistical analysis was performed with SPSS v.19 (IBM Corp., Armonk, NY, USA).

## **Results**

Five-hundred and seventy-five questionnaires were completed. Table 1 summarizes the sample composition based on socio-demographic characteristics, the attended degree program, and some features

Table 1 - Sociodemographic and lifestyle characteristics of the sample (N=575).

Females, n (%)	396 (69.7)
Age in years, mean (SD)	21.5 (4.1)
Citizenship, n (%)	
Italian	544 (94.6)
Dual (both Italian and foreign)	4 (0.7)
Foreign	18 (3.1)
Residence area, n (%)	
City	203 (36.1)
Town	107 (19.0)
Small town	239 (42.5)
Rural	13 (2.3)
Educational area, n (%)	
Medical	24 (4.2)
Health	62 (10.8)
Scientific-technological	203 (35.5)
Humanistic-social	283 (49.5)
Upper school attended, n (%)	
High school	414 (72.6)
Technical school	134 (23.5)
Professional school	22 (3.9)
Smoking habit, n (%)	
Current	249 (43.5)
Former	86 (15.0)
Never	237 (41.4)
Alcohol consumption, n (%)	
Habitual	116 (20.2)
Occasional	141 (24.6)
Rare/never	316 (55.1)
Alcohol abuse, n (%)	
Never	257 (44.9)
1-2 times per year	168 (29.4)
More than 2 times per year	147 (25.7)
Regular physical activity, n (%)	233 (40.8)
Competitive physical activity, n (%)	64 (27.5)

related to students' lifestyle (smoking, alcohol consumption, physical activity). Particularly, among the responding students, the majority was represented by females (69.7%), living in small towns (42.5%), who attended high school (72.6%) and were enrolled in social-humanistic degree programs (49.5%) which include Economics, Psychology, Educational Sciences, and Philosophy. Regarding lifestyle, smoking was frequent (43.5%), less than half of the sample declared having habitual (20.2%), or occasional (24.6%), alcohol consumption and alcohol abuse episodes more than two times per year (25.7%). Less than half of students declared practicing physical activity (40.8%), only partially at competitive levels (27.5%).

Among interviewed students, 30.5% had tattoos, 23.7% had piercings, and 41.9%

had at least one body art intervention (tattoo and/or piercings) with a lower mean age for the first piercing ( $15.7 \pm 4.0$ ) than for the first tattoo ( $18.3 \pm 2.5$ ;  $p = 0.00$ ) (Table 2). Among the reasons for body art use, the most frequent was "remembering events or people" (56.5%), followed by the "desire to improve self-image" (30.1%). The majority of those who underwent tattooing and piercing were informed about the possible risks associated with the practice (85.7%) and the information was received mainly from the tattoo/piercing performers (72.3%), while all other ways of obtaining information were less widespread; and only 55.9% signed a consent. Significant differences were observed between subgroups based on socio-demographic characteristics (Table 3): tattooing is significantly more common among females (33.1%  $p = 0.04$ ), among

Table 2 - Sample characteristics about having undergone body art, reasons, and collected information\*.

Have tattoo, n (%)	174 (30.5)
Age in years at first tattoo, mean (SD)	18.3 (2.5)
Have piercing, n (%)	136 (23.7)
Age in years at first piercing, mean (SD)	15.7 (4.0)
Have at least one tattoo/piercing	241 (41.9)
Reason to undergo body art, n (%)	
Esthetical	72 (30.1)
Persons or events memories	135 (56.5)
Emulation	3 (1.3)
Not specific reason/Do not know	29 (12.1)
Collected information about connected risks, n (%)	
Yes	204 (85.7)
No	29 (12.2)
Do not know/Do not remember	5 (2.1)
Information collected from, n (%)	
Body art maker	167 (72.3)
Other persons/friends	61 (26.4)
Media	43 (18.6)
Internet	81 (35.1)
Healthcare workers	60 (26.0)
Signed an informed consent, n (%)	
Yes	133 (55.9)
No	99 (41.6)
Do not know/Do not remember	6 (2.5)

\* totals are higher than 100% because more than one answer was allowed

those who attended vocational institutes in secondary school (63.6%  $p < 0.001$ ), while those differences were not found among people who underwent piercing. Conversely, tattooing and piercing are significantly more frequent in subgroups with risky lifestyles: tattoos and piercings

are more common among smokers (44.6% and 34.9%  $p < 0.001$ ) and among those who declared practicing alcohol abuse (40.8% and 35.4%  $p < 0.001$ ). Considering cumulative outcomes, the prevalence of “body art” (tattoos, piercing and body art intervention) is confirmed higher among

Table 3 - Sociodemographic characteristics stratified according to having undergone body art.

	Tattoos			Piercing		
	N	%	P-Value**	N	%	P- Value**
*Total	174	30.3		136	23.7	
Gender						
Female	131	33.1	<b>0.04</b>	99	25.0	0.23
Male	42	24.4		35	20.3	
Residence area						
City	70	34.5	0.13	48	23.6	0.74
Town	29	27.1		21	19.6	
Village/Rural	70	21.7		60	25.0	
Upper school attended						
High school	119	28.7	<b>&lt;0.001</b>	86	20.8	0.08
Technical school	38	28.4		40	29.9	
Professional school	14	63.6		6	27.3	
Educational area						
Medical	2	8.3	<b>&lt;0.001</b>	2	8.3	0.22
Health	19	30.2		18	28.6	
Scientific-technological	43	21.2		45	22.7	
Humanistic-social	107	37.9		70	24.8	
Smoking habit						
Current	111	44.6	<b>&lt;0.001</b>	87	34.9	<b>&lt;0.001</b>
Former	26	30.2		18	20.9	
Never	37	15.6		31	13.1	
Alcohol consumption						
Rare/never	83	26.3	<b>&lt;0.001</b>	68	21.5	0.38
Occasional	41	29.1		38	27.0	
Habitual	50	43.1		30	25.9	
Alcohol abuse						
Never	57	22.2	<b>&lt;0.001</b>	50	19.5	<b>&lt;0.001</b>
1-2 times per year	57	33.9		34	20.2	
More than 2 times per year	69	40.8		52	35.4	
Regular physical activity						
Yes	78	33.5	0.18	52	22.3	0.50
No	96	28.2		84	24.7	

\* totals for each variable may vary due to missing data

\*\*  $\chi^2$

females vs. males (44.4% vs. 36.6%  $p = 0.08$ ), among students who were enrolled in vocational secondary institutes (68.2%  $p = 0.00$ ), among smokers (58.2%  $p = 0.01$ ), among people who were used to alcohol consumption (50.9%  $p = 0.01$ ) or with a more marked tendency to getting drunk two or more times a year (53.7%  $p = 0.00$ ). Multivariate logistic regression confirmed those associations expressing them through O.R., including only variables that resulted statistically significant in univariate analysis. Being enrolled in a high school (lyceum)

(O.R. 0.30, C.I. 0.11-0.81  $p=0.02$ ) or in medical (O.R. 0.14, C.I. 0.39-0.51  $p = 0.00$ ) or scientific-technological (O.R. 0.49, C.I. 0.33-0.75  $p = 0.01$ ) courses was associated with a lower probability of getting body art. Among lifestyle characteristics, people who do not smoke (OR 0.28, C.I. 0.18-0.43  $p = 0.00$ ) or who quit smoking (O.R. 0.53, C.I. 0.31-0.89  $p = 0.02$ ) and those who have not abused alcoholic beverages (O.R. 0.38, C.I. 0.19-0.76  $p = 0.01$ ) have lower probabilities of getting body art (Table 4). In addition to previous tattoos or piercing

Table 4 - Sociodemographic and lifestyle characteristics according to having undergone body art\*.

	Undergone body art (N=575)**						
	YES (N=241)		NO (N=334)		Multivariate logistic regression		
	N	%	N	%	OR	95% C.I.	P- Value
<b>Gender</b>							
Male <sup>a</sup>	63	36.6	109	63.4	1		
Female	176	44.4	220	55.6	1.38	0.96-2.00	0.83
<b>Upper school attended</b>							
Professional school <sup>a</sup>	15	68.2	7	31.8	1		
Technical school	61	45.5	73	54.5	0.42	0.15-1.17	0.09
High school	161	38.9	253	61.1	0.30	0.11-0.81	<b>0.02</b>
<b>Educational area</b>							
Humanistic-social <sup>a</sup>	139	50.7	143	49.3	1		
Scientific-technological	69	34.0	134	66.0	0.49	0.33-0.75	<b>0.01</b>
Health	27	42.9	36	57.1	0.75	0.41-1.35	0.34
Medical	3	12.5	21	87.5	0.14	0.39-0.51	<b>0.00</b>
<b>Smoking habit</b>							
Current <sup>a</sup>	135	58.2	104	41.8	1		
Former	36	41.9	50	58.1	0.53	0.31-0.89	<b>0.02</b>
Never	60	25.3	177	74.7	0.28	0.18-0.43	<b>0.00</b>
<b>Alcohol consumption</b>							
Habitual <sup>a</sup>	59	50.9	57	49.1	1		
Occasional	62	44.0	79	56.0	0.84	0.49-1.46	0.55
Rare/never	120	38.0	195	62.0	0.91	0.53-1.56	0.72
<b>Alcohol abuse</b>							
More than 2 times per year <sup>a</sup>	79	53.7	68	46.3	1		
1-2 times per year	74	44.0	94	56.0	0.59	0.31-1.13	0.11
Never	88	34.2	169	65.8	0.38	0.19-0.76	<b>0.01</b>

<sup>a</sup> reference category

\* responders with at least one tattoo or piercing

\*\* totals for each variable may vary due to missing data

intervention, this study investigated the intention to undergo body art intervention in the future among those who had never had them before: differences between genders are confirmed with the majority of females (O.R. 2.04 C.I. 1.21-3.42  $p = 0.01$ ), a lower prevalence among high school students (O.R. 0.25 C.I. 0.07-0.88  $p = 0.03$ ), among non-smokers (O.R. 0.45 C.I. 0.28-0.75  $p = 0.00$ ) and among those who do not abuse alcohol (O.R. 0.38 C.I. 0.19-0.76  $p = 0.01$ ) (Table 5).

## Discussion

There are several observational studies about predisposition to body art on both the general population and specific subgroups according to socio-cultural or demographic criteria (7, 8, 13-15, 18, 23). These subgroups include national and international samples of high school or university students (4-6, 9, 11, 16, 19). In particular, the topic is highly investigated among freshmen (10, 17), as in the present study, giving rise to

Table 5 - Sociodemographic and lifestyle characteristics according to intention to undergo body art in the future\*.

	Intention to undergo body art (N=391)**						
	YES (N=181)		NO (N=210)		Multivariate logistic regression		
	N	%	N	%	OR	95% C.I.	P- Value
<b>Gender</b>							
Male <sup>a</sup>	57	41.3	81	58.7	1		
Female	123	49.6	125	50.4	2.04	1.21-3.42	<b>0.01</b>
<b>Upper school attended</b>							
Professional school <sup>a</sup>	9	69.2	4	30.8	1		
Technical school	44	48.4	47	51.6	0.28	0.07-1.05	0.06
High school	128	44.9	157	55.1	0.25	0.07-0.88	<b>0.03</b>
<b>Educational area</b>							
Humanistic-social <sup>a</sup>	85	47.5	95	52.8	1		
Scientific-technological	67	45.0	82	55.0	0.98	0.59-1.62	0.93
Health	21	52.5	19	47.5	1.31	0.62-2.76	0.48
Medical	6	70.0	14	30.0	0.57	0.19-1.67	0.30
<b>Smoking habit</b>							
Current <sup>a</sup>	93	62.0	57	38.0	1		
Former	25	13.8	32	15.2	0.54	0.28-1.04	0.07
Never	61	33.7	120	57.1	0.45	0.28-0.75	<b>0.00</b>
<b>Alcohol consumption</b>							
Habitual <sup>a</sup>	49	59.8	33	40.2	1		
Occasional	49	53.8	42	46.2	0.80	0.41-1.56	0.54
Rare/never	82	38.0	134	62.0	0.67	0.35-1.28	0.23
<b>Alcohol abuse</b>							
More than 2 times per year <sup>a</sup>	57	64.8	31	35.2	1		
1-2 times per year	61	49.6	60	50.4	0.59	0.31-1.13	0.11
Never	117	65.4	62	34.6	0.38	0.19-0.76	<b>0.01</b>

<sup>a</sup> reference category

\* responders with at least one tattoo or piercing

\*\* totals for each variable may vary due to missing data

a particularly broad and detailed literature. In this study, participants were involved through spontaneous participation and the gender distribution of the sample was not homogeneous, with a high prevalence of the female gender, as other population studies, and that was probably due to a greater propensity of women to participate (5-7, 10, 11, 22, 23, 29). The number of students enrolled in each academic area involved (medical, health, technical-scientific, and humanistic) was also heterogeneous, and determined a further source of heterogeneity of the sample, as opposed to other studies on university students, in which the stratification is more balanced (10).

In literature, the prevalence of the phenomenon is estimated considering the presence of tattoos or piercings alone, alternatively, or co-present. Overall, body piercing is more frequent than tattoos, as opposed to the results of our study, in which frequencies of these practices were 23.7% and 30.3%, respectively. However, these results are intermediate compared to ranges estimated in similar studies, both nationally and internationally, for the single practices (2-7, 9, 11, 12, 14-18, 23). A few studies report the prevalence of both body arts on the same individuals, while the alternative presence of tattoos and/or piercings was found in 24% to 50% of participants (4, 10), which is an interval that includes our results (41.9% of participants reporting body art). When assessing the consistency of data related to piercings, it is necessary to consider the difficulty in uniquely interpreting this practice, which should exclude the position in the earlobe ('earring'), although this clarification is not reported by all authors in the description of methods.

Demographic variables, i.e. age at first practice and gender, are relevant in describing the phenomenon, both to identify higher-risk population groups and to describe the evolution of the phenomenon. In our sample,

piercing practice was performed earlier (mean age of the first piercing 15.7 years) than the first tattoo (18.3 years) as in other studies on university students (10). Body art practice, particularly tattoos, is more common among young adults (between 25 and 40 years old) as revealed by population studies (7, 8, 13, 18) and reviews (20), and the likelihood to get a tattoo is significantly higher after 20 years of age compared to previous years (13).

Over time, the frequency of body art phenomenon, particularly tattoos, has increased among the general population, as highlighted by reviews, including data from Europe, Australia and, particularly, the USA (20), where the frequency of the phenomenon doubled over a little more than 10 years (23), along with an increase of social acceptance of the practice (15, 18). The evolution of the phenomenon also implied changes in its gender distribution: in the past, the prevalence of tattooed individuals was higher among males than females but, since the mid-1990s, this proportion has reversed, particularly among young adults (20).

The observation of these epidemiological changes reflects the evolution of the sociological meaning of body art. In the ancient times, tattoos were considered therapeutic practices (e.g. to reduce joint pain), a symbol of being wealthy, and a high social status among Egyptians and typical in females (27). Particularly, they could be used as therapeutic strategies during pregnancy.

Nowaday, the art of body modification is more appreciated than in the past. According to the social learning theory, it is a positive reinforcement and, therefore, a stimulus to practice body art, like the influence of reference models (e.g. celebrities) (6). Furthermore, the greater supply of tattoo artists on the market may determine the perception of its safety, explaining, according to some authors, the significant increase in the prevalence of tattooed individuals (6).



Over time, tattoos gained greater acceptance, passing from being considered as a brand of risk attitude to beauty accessories of aesthetic value (23). In women, the prevalence of tattoos has been increasing, particularly in professional roles, e.g. among doctors, business managers, and lawyers, suggesting that the 'tattoo culture' has undergone socio-demographic changes and has also been less likely to determine negative consequences, regarding, for example, job acceptance and finding a job (23). The trend towards risky behaviour is also becoming less different between tattooed and non-tattooed individuals (23, 28). A different socio-cultural context could determine different influencing environments, such as in Turkey, where there is still strong conditioning from families, who, for example, show less acceptance of the tattoo than the piercing, because they consider the tattoo as less 'removable'. This is reflected in the lower prevalence of the practice compared to Western countries (5).

This study highlighted a higher frequency of both piercings (25.0% vs. 20.3%) and tattoos (33.1% vs. 24.4%) in females, which is consistent with the literature data on different population subgroups (3, 4, 6-8, 10, 11, 13, 16, 21-23, 26), despite some exceptions (3, 5, 19, 25, 26).

According to the theoretical models of the "Reasoned Action and Planned Behaviour" (30), among attitudinal variables towards a behaviour, 'intention to' is considered a predictor, i.e. a measure of the likelihood to implement the considered behaviour, such as body art practice for individuals that do not yet have piercings or tattoos. Our study highlighted that almost half of the respondents that had no piercings or tattoos (46.6%) had the intention to undergo a body art practice; this is similar to what was reported in other Italian studies (9-11), with higher frequency among females compared to males (49.6% vs. 41.3%), as also highlighted in the literature (11).

As reasons to get body art, more than half of the surveyed students indicated "persons' or events' memories" (56.5%), followed by "aesthetical reasons" (30.1%), confirming the results provided by other surveys (6-8, 10, 11, 22, 27, 31). In this regard, a few students indicated other reasons, which are instead obtained from at least a fifth of the participants of other studies, such as the desire for transgression or to stand out from other people (7, 8, 10, 11), curiosity (27), influence from fashion or peers (5), especially friends. In particular, a review conducted in 2015 highlighted that influence of friends was considered relevant; as opposed to influence of relatives, which was almost irrelevant (20).

Interestingly, 12.1% of our participants did not indicate a specific reason for getting body art. This was also highlighted in another study conducted among Italian students (10). In the literature, gender differences are also described as reasons to get body art: females usually pursue objectives related to beauty or fashion compliance, while males usually aim to appear manly, physically strong, and powerful (6). Gender differences were also documented regarding the type and localization of tattoos: females usually prefer less visible tattoos and frequently get 'cosmetic' tattoos, while males prefer more numerous and visible tattoos (20). Besides, a peculiarly 'erotic' reason was described about males getting piercings (7).

The implementation of the aesthetic practice and the collection of information about connected risks are critical issues due to health risks related to the practice, considering that only a fourth of the sample declared to have collected information about the topic from qualified professionals (i.e. healthcare workers) or to have signed the consent for the practice. These results agree with other Italian surveys (10, 32) but disagree with data from some other Countries, where a higher percentage of individuals (over 80%) declared to have

gone in authorized centres to get body art (5, 20).

Getting body art has been documented to be associated with specific socio-demographic characteristics (e.g. level of education, type of school attended or academic program) and other behaviours affecting health status, particularly recreational voluptuary habits (i.e. smoking, alcohol abuse, or use of illegal substances) (6, 20, 23). In particular, lower educational level and unemployment were documented to be associated with a higher prevalence of tattoo bearers (12, 20, 23). In surveys conducted on upper secondary school students, a significant association was revealed between attending technical programs and getting or 'intending' to get body art (11). This association was confirmed by our study, reporting significantly lower frequencies of body art among students who had attended high schools (38.9%), compared to students who had attended technical (45.5%) or professional (68.2%) schools.

Among university students, the higher frequency of body art among students in humanistic programs compared to students in technical-scientific or medical programs is confirmed by national (10) and international (6) studies, though without a complete consistency (19).

In our study, cigarette smoking habit and alcohol abuse were significantly associated with body art, as also reported in other studies on both smoking (5, 7, 12, 20, 23, 33) and alcohol abuse (4, 5), although the association with alcohol is less clear due to conflicting data, while a clear association between body art and illicit use of drugs was documented among both adults and adolescents (20).

In some studies, body art was revealed to be a marker of social deviance and was negatively associated with self-esteem and body satisfaction (28). Other features that differentiated tattoo bearers from non-tattooed persons include the need to stand

out from others, extroversion, expanding experiences with feelings (29, 34-37), episodes of fights and accidents, depression, unprotected sexual intercourse, multiple partners (5). However, the association with unhealthy or risky behaviours should be related to the type of sample and the recent evolution of the phenomenon. For example, in a review of epidemiological data from the USA, Europe, and Australia, tattooing at an early age (before the age of 18) can be considered an indicator of risk behaviours, while at a later age this was not observed (20). These data agree with the results of our present study, in which, the intention to get body art is more frequent in apparently 'protected' categories such as medical students (70.0%) and non-problematic alcohol users (65.4%). This could suggest that the choice to get tattooed or not is not definitive and the probability to get tattooed at an older age is not reduced by *a priori* protective factors, but the phenomenon seems to have a more generalized character with the age increase. This "delay" is very important, considering the greater social acceptability of body art practices, which can be drawn from the increase of its prevalence over time and its lesser association with deviant behaviour documented in recent studies. This implies interventions not only early in life, but also in older age, when it can be a support to a more mature decision, or promote a healthy approach and informed choice (f.e. to avoid sanitary risks by means of good hygienic practices). Probably, the psycho-social models underlying early and late interventions are different and should be differently investigated to be faced with different and multiple prevention strategies.

In the literature, the possible positive or negative association between body art and fitness/physical activity or sports has been little evaluated, and in our study this association was not significant.

## Limitations

This study has some limitations, such as a smaller sample size compared to most of the similar studies, which have double or triple samples. Moreover, some features of body practices were not evaluated, such as the number of tattoos and piercings (6, 10, 12, 23, 38), location and visibility (5-7, 12, 13, 23), dimension and content (that could be potentially offensive) (23), and colour (12). Some authors consider these features relevant, since they may lead to regret about the tattoo and the will to erase it (12), or they could be associated with a higher probability of deviant behaviours (4, 23, 38). A selection bias also affects the study, due to the spontaneous participation of students. This bias is evident in the composition of the sample. In fact, some subgroups, such as students in medical programs, are underrepresented. Moreover, compared to population studies, our sample was a selection of higher socio-cultural and economical level individuals (university students). For this reason, the association between body art and cultural or behavioural risk factors could have not been sufficiently highlighted.

## Conclusions

In conclusion, research results confirmed the importance of observational studies on body art phenomenon at young age as well on determinants and risk factors. Monitoring the evolution of the phenomenon is desirable in view of its increasing trend documented in the literature. Furthermore, two intervention perspectives can be identified. The first one is an early prevention towards adolescents, when body art could cluster with other risk behaviours, such as smoking, alcohol abuse, and consumption of illegal substances, or more likely with psycho-social discomfort. The second one is a late prevention towards

young adults belonging to lower risk population groups.

A qualitative research approach on body modification should involve not only consumers of body art, but also professionals, to deeply investigate new patterns of sociability among young people (39). In youth, the body modification could be related to the desire of maintain a subjectivity and core identity, particularly as form of social recognition in an increasingly liquid and uncertain society (40). In this view, it is important to use evidence based strategies, in particular regarding educational interventions for young students, focused on applicable and realistic information before they are faced with decisions related to body art (41).

Health promotion interventions should be planned at different levels: guidelines and official controls of body art industry by the Local Health Authorities; training and certification of good hygienic practices for tattoo artist and other professionals; training for general practice physicians and dermatologists; school-based interventions about prevention of sanitary risks and correct informed choices; population-based communication campaigns; active epidemiological surveillance by integrating current population surveys on adolescents and adults (in Italy, for example Health Behaviours in School-aged Children HBSC; Progressi delle Aziende Sanitarie per la Salute in Italia PASSI).

These public health needs became even more urgent following the Covid-19 pandemic. Nationally, there has been a dramatic increase in the demand for tattoos by the population. According to data updated to summer 2021, in Italy during the last ten years the activities of tattoos and piercings have increased by 376% and there has also been an uncontrolled increase in abusive practitioners (42).

A similar phenomenon occurred in the United States, with a boom in tattoo demand

since the pandemic began: the \$1.4 billion tattoo artist industry is expected to increase its market size by 23.2% in 2021. “At a time when many people are experiencing hardship, loneliness and loss, getting tattooed seems to be providing some solace.” (43).

Declarations of interest: none

Data availability statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

## Riassunto

**Analisi socioculturale del fenomeno della body art e dei fattori predisponenti nell’ottica della promozione della salute: indagine su di un campione di giovani adulti in Italia.**

**Premessa.** La body art (tatuaggi, body piercing e altre pratiche estetiche) è in aumento a livello globale e coinvolge diversi aspetti della salute pubblica, dall’osservazione epidemiologica allo studio delle determinanti culturali e psicosociali fino alla regolamentazione normativa. Lo studio è finalizzato a stimare la prevalenza di portatori di tatuaggi e piercing in età giovanile, con particolare approfondimento di profili comportamentali emergenti.

**Disegno dello studio.** Una survey a disegno trasversale è stata condotta su 575 studenti immatricolati al primo anno dei corsi di laurea di un Ateneo pubblico italiano.

**Metodi.** I dati sono stati raccolti mediante questionario online. L’analisi statistica ha previsto la verifica di modelli di regressione logistica multivariata per identificare fattori predittivi e determinanti della pratica (tatuaggi, piercing, body art).

**Risultati.** Il 41.9% dei partecipanti ha subito almeno un intervento di body art, con una maggiore prevalenza nelle femmine. La regressione logistica multivariata ha suggerito un’associazione della pratica della body art con il tipo di corso scolastico e universitario, nonché con le caratteristiche dello stile di vita (fumo, abuso di alcol). Inoltre, l’intenzione di sottoporsi in futuro all’intervento di body art è apparsa significativamente maggiore nelle donne e più frequente in categorie apparentemente ‘protette’ come gli studenti di medicina e gli alcolisti non problematici.

**Conclusioni.** Lo studio ha confermato l’importanza della sorveglianza e della ricerca sociale e comportamentale sulla pratica della body art e ha suggerito diverse prospettive di promozione della salute, come l’intervento

precoce verso gli adolescenti e l’intervento tardivo verso i giovani adulti appartenenti a gruppi di popolazione meno a rischio.

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