



STUDY OF TATTOO PATTERN IN MEDICOLEGAL AUTOPSIES IN CENTRAL INDIA

Vipul N. Ambade	M.D., L.L.B., Professor & Head, Department of Forensic Medicine, Government Medical College, Gondia.(Pin Code-441601), Maharashtra State, India.
Hemlata Ambade	M.D., Associate Professor, Department of Anatomy, Government Medical College, Gadchiroli, Maharashtra.
Manu Sharma	M.D., Assistant Professor, Department of Forensic Medicine, Government Medical College, Gondia.(Pin Code-441601), Maharashtra State, India.
Sharon G Samuel	Resident Doctor, Department of Forensic Medicine, Government Medical College, Gondia. (Pin Code-441601), Maharashtra State, India.
Saurav Mundra	Resident Doctor, Department of Forensic Medicine, Government Medical College, Gondia. (Pin Code-441601), Maharashtra State, India.
Lokesh Sachdeva*	Resident Doctor, Department of Forensic Medicine, Government Medical College, Gondia. (Pin Code-441601), Maharashtra State, India. *Corresponding Author

ABSTRACT

Background: Tattoos are the imprint on the body made by inserting the indelible ink into the dermal layer of the skin. It has been practiced since ancient times, but the trend of tattoos on the body has not been studied. Present study is undertaken with a view to study the pattern of tattoos in medicolegal autopsies in central India populations from a forensic point of view. **Materials And Methods:** This is the cross-sectional observational study based on the postmortem examinations, where all the postmortem reports, inquest papers and ancillary reports were retrospectively examined for the presence and absence of at least one tattoo on the body. **Results:** Tattoos were commonly encountered in low socio-economic status and less educated individuals. Usually the single tattoo (72.0%) and on the forearm (64.3%) was commonly noted. Textual tattoo (51.9%) was the commonest type followed by traditional design (21.1%) on the body. **Conclusions:** The present study has identified the patterns of tattoos in autopsy cases in central India.

KEYWORDS : Tattoos; body designing; patterns; autopsy; types of tattooing.

INTRODUCTION:

Tattoos are design imprinted on the body surface which may be either temporary or permanent in nature. Temporary tattoos can be drawn, painted or air-brushed as a form of body painting by using ball point pens, brush or application of henna. Temporary tattoos can be washed off at the wearer's discretion or left to fade at its own natural rate. Nowadays, tattooing is perceived by many people as body decoration. Sometimes, they are used to cover or hide the body disfigurement. Tattoos are the imprint on the body made by inserting the indelible ink into the dermal layer of the skin by means of needles or penetrating tools dipped in colouring material either mechanically or by electrical device. The word tattoos or tattoo firstly used in the 18th century from the Samoan word "Tatau" which is believed to derived from 'ta' (to draw) and 'toua' (spirit) linking the art form to the spiritual world.¹ It has been practiced since ancient times. The dissemination and transformation of tattooing techniques occurred worldwide through trade, exploration, and cultural interchange.²

The resurgence of tattooing emerged in the late 19th and early 20th centuries with Samuel O'Reilly's invention of electric tattoo machine in 1891.³ In Indian tribal culture, the process of tattooing is also known as 'Gudna'.⁴ They are simple or elaborate in the form of name, symbols for expression of love, religious inclination, traditional culture, and sexual interest. Sometimes, it is associated with self-destructive behaviour or self-harming behaviour and punishment. Braithwaite et al.⁵ (2001) found the relationship of tattooing with harmful behaviour, suicidal tendencies, drug abuse, addiction and alcoholism. Such people may have tendencies to adopt risky tasks or may have psychological problems, personality disorders and behavioural disorders.

Tattoos are valuable for identifying deceased individuals due to their unique designs, symbols or text. They are particularly useful when traditional identification methods like fingerprints or dental records are unavailable or compromised.³ Their uniqueness and permanence make them a significant piece of evidence in many forensic investigations. Present study is undertaken with a view to study the pattern of tattoos in medicolegal autopsies in central India populations from a forensic point of view.

MATERIALS AND METHODS:

This is the cross-sectional observational study based on the postmortem examination conducted in the department of forensic medicine at Government Medical College, Nagpur. All the postmortem reports, inquest papers and ancillary reports were retrospectively examined for the presence of tattoos during the period Jan-2017 to Dec-2017. Data was entered in the excel sheet as per the standard proforma designed to collect the information about the tattoos. Out of the total 2795 medicolegal autopsies conducted during the study period, 304 cases (10.8%) have been identified to have at least single tattoo. Skeletonised/ dismembered bodies were excluded from the study. Tattoos were classified into following types: textual (name, number, etc); traditional design; pictorial/ religious (pictures of idols, celebrated person); symbolic (heart, om, sun, etc.); and animal. Location and number of tattoos on the body was also noted. The tattoos were then analysed based on age, gender, socio-economic status, educational status, manner of death, location and number of tattoos on the body; and types of the tattoos.

RESULTS:

Almost 12% of the medicolegal autopsies shows some forms of tattoos on the body during the study period. Table 1 shows age and gender distribution of tattoo cases. The age ranged

between 16-81 years in males and 18-74 years in females with male: female ratio of 3.1: 1. The maximum number of cases were from age group of 21-30 years (33.9%) followed by 31-40 years (28.6%). As per table 2, 42.3% of tattooed individual had studied up to matriculation and 26.0% had studied up to higher secondary school. The graduated individuals were noted in 25.3% tattoo cases.

Table 1: Age And Gender Distribution

Age Group	M	%	F	%	Total	%
< 10 years	0	0.0	0	0.0	0	0.0
11-20 years	7	3.1	6	8.0	13	4.3
21-30 years	84	36.7	19	25.3	103	33.9
31-40 years	66	28.8	21	28.0	87	28.6
41-50 years	38	16.6	11	14.7	49	16.1
51-60 years	13	5.7	9	12.0	22	7.2
>61 years	21	9.2	9	12.0	30	9.9
Total	229	100.0	75	100.0	304	100.0

Table 2: Distribution As Per Educational Status (ES)

ES	M	%	F	%	Total	%
<Matriculation	100	43.7	30	40.0	130	42.8
HSSC	58	25.3	21	28.0	79	26.0
Graduation	58	25.3	19	25.3	77	25.3
Not known	13	5.7	5	6.7	18	5.9
Total	229	100.0	75	100.0	304	100.0

Table 3: Distribution of Socio-economic status (SES)

SES	M	%	F	%	Total	%
Low	161	70.3	54	72.0	215	70.7
Middle	48	21.0	13	17.3	61	20.1
High	7	3.1	3	4.0	10	3.3
Not known	13	5.7	5	6.7	18	5.9
Total	229	100.0	75	100.0	304	100.0

Amongst the study population, 70.7% belonged to low socio-economic status and 20.1% belonged to middle SES. (Table 3).

Table 4: Distribution Of Manner Of Death In Tattoo Cases

Manner	M	%	F	%	Total	%
Natural	60	26.2	12	16.0	72	23.7
Suicidal	52	22.7	16	21.3	68	22.4
Homicidal	16	7.0	3	4.0	19	6.3
Accidental	99	43.2	44	58.7	143	47.0
Not known	2	0.9	0	0.0	2	0.7
Total	229	100.0	75	100.0	304	100.0

Table 4 shows the distribution of manner of death in tattooed individuals. The maximum number of cases were of accidental manner (47.0%) followed by natural (23.7%), suicidal (22.4%) and homicidal manner (6.3%).

Table 5: Distribution of colour of tattoo

Colour	M	%	F	%	Total	%
Bluish green	92	40.2	21	28.0	113	37.2
Green	67	29.3	26	34.7	93	30.6
Black	51	22.3	19	25.3	70	23.0
Blue	17	7.4	9	12.0	26	8.6
Red	2	0.9	0	0.0	2	0.7
Total	229	100.0	75	100.0	304	100.0

Table 6: Distribution of identity of cases

Identity	M	%	F	%	Total	%
Known	196	85.6	65	86.7	261	85.9
Unknown	33	14.4	10	100.0	43	14.1
Identified	23	69.7	5	50.0	28	65.1
Unidentified	10	30.3	5	50.0	15	34.9

Out of the total cases, 37.2% of tattoos were bluish green in colour followed by greenish colour (30.6%) and black colour (23.0%). In studied population, only 14.1% of tattooed cases were unknown. Out of these unknown individuals, 65.1% had been identified by means of tattoos during medicolegal autopsies. (Table 5 and 6)

Table 7: Distribution Of Number Of Tattoos On The Body

Number	M	%	F	%	Total	%
One	167	72.9	52	69.3	219	72.0
Two	55	24.0	26	34.7	81	26.6
Three	11	4.8	6	8.0	17	5.6
Four	9	3.9	3	4.0	12	3.9
Five	4	1.7	2	2.7	6	2.0
Six	4	1.7	0	0.0	4	1.3
>Seven	0	0.0	1	1.3	1	0.3

In 304 cases included in the present study, a total of 390 tattoos were noted in males and 151 tattoos in females. Single tattoo on the body was the commonest number shown in 72.0% cases followed by two tattoos on the body in 26.6% cases. Five to eight tattoos were seen in only 3.6% cases. (Table 7).

Table 8: Distribution of location of tattoo on the body

Location	M	%	F	%	Total	%
Forearm	280	71.8	68	45.0	348	64.3
Arm	46	11.8	5	3.3	51	9.4
Hand	34	8.7	58	38.4	92	17.0
Thigh	0	0.0	3	2.0	3	0.6
Legs	0	0.0	14	9.3	14	2.6
Chest	30	7.7	0	0.0	30	5.5
Abdomen	0	0.0	0	0.0	0	0.0
Face	0	0.0	3	2.0	3	0.6
Back	0	0.0	0	0.0	0	0.0
Total	390	100.0	151	100.0	541	100.0

As per table 8, forearm (64.3%) was the commonest location/place of tattoo, mostly right forearm. This is followed by hand (17.0%) and arm (9.4%), mostly on right side. Tattoos on the chest region were seen in 5.5% cases. Tattoos were not seen on abdomen, back and genitals in any case in the present study.

Table 9: Distribution of types of tattoo on the body

Types	Sub-types	M	%	F	%	Total	%
Textual	Self names	104	26.7	16	10.6	120	22.2
	Initials	40	10.3	5	3.3	45	8.3
	Surname	33	8.5	2	1.3	35	6.5
	Spouse name	16	4.1	8	5.3	24	4.4
	Lover name	7	1.8	1	0.7	8	1.5
	Other name	27	6.9	7	4.6	34	6.3
	Numbers	2	0.5	0	0.0	2	0.4
	Indistinct	11	2.8	2	1.3	13	2.4
	Total	240	61.5	41	27.2	281	51.9
Design	Dotted	1	0.3	27	17.9	28	5.2
	Lines	0	0.0	12	7.9	12	2.2
	Zig-zag	0	0.0	5	3.3	5	0.9
	Flower	3	0.8	31	20.5	34	6.3
	Indistinct	13	3.3	22	14.6	35	6.5
	Total	17	4.4	97	64.2	114	21.1
Figure/Religious	Hanuman	23	5.9	0	0.0	23	4.3
	Durga	4	1.0	0	0.0	4	0.7
	Krishna	4	1.0	0	0.0	4	0.7
	Shiv	1	0.3	0	0.0	1	0.2
	Saibaba	1	0.3	0	0.0	1	0.2
	Jesus	1	0.3	0	0.0	1	0.2
	Buddha	2	0.5	0	0.0	2	0.4
	Angel	1	0.3	0	0.0	1	0.2
	Ambedkar	3	0.8	0	0.0	3	0.6
	Total	40	10.3	0	0.0	40	7.4
Symbolic	Love/Heart-♡	8	2.1	0	0.0	8	1.5
	Heart + Arrow-	20	5.1	1	0.7	21	3.9
	Trishul-	12	3.1	1	0.7	13	2.4
	Om-	22	5.6	3	2.0	25	4.6
	Sun-☀	6	1.5	0	0.0	6	1.1
	Jaima	1	0.3	0	0.0	1	0.2
	Mard	2	0.5	0	0.0	2	0.4
	Jaibhim	1	0.3	0	0.0	1	0.2
786	Swastik-卐	1	0.3	0	0.0	1	0.2
	Total	2	0.5	0	0.0	2	0.4

Animal	Waheguru-ੴ	1	0.3	0	0.0	1	0.2
	Moon-☾	1	0.3	4	2.6	5	0.9
	Total	77	19.7	9	6.0	86	15.9
	Snake	7	1.8	0	0.0	7	1.3
	Scorpion	3	0.8	1	0.7	4	0.7
	Peacock	1	0.3	1	0.7	2	0.4
	Crab	1	0.3	1	0.7	2	0.4
	Lion	1	0.3	0	0.0	1	0.2
	Bull head	2	0.5	0	0.0	2	0.4
	Fish	1	0.3	0	0.0	1	0.2
	Sparrow	0	0.0	1	0.7	1	0.2
	Total	16	4.1	4	2.6	20	3.7
Sum Total		390	100.0	151	100.0	541	100.0

Table 9 shows the distribution of different types of tattoos on the body in the form of textual tattoo (51.9%), traditional design (21.1%), pictorial/ religious tattoo (7.4%), symbolic tattoo (15.9%) and animal tattoo (3.7%). Amongst, the textual (writing) tattoo, name of the person was noted in 22.2% cases, initials of person in 8.3% cases and surname in 6.5% cases. Marathi/ Hindi (75.8%) was the most-commonest language used in textual tattoo followed by English language (18.9%). Picture/ figure of lord hanuman (4.3%) was the commonest type of religious tattoo. Picture of goddess Durga, lord Krishna, Shiv, Buddha, Ambedkar, etc. were the other religious tattoo in the studied cases. Design of 'flower' (6.3%) and 'dotted' design (5.2%) was the most common type of traditional design tattoo. Picture of 'heart' (5.4%) and 'Om' (4.6%) was the most common type of symbolic tattoo. Picture of 'snake' (1.3%) and 'scorpion' (0.7%) was the most common type in animal tattoo. Picture of lion, crab, peacock, bull head, fish and sparrow were the other type in animal tattoo.

DISCUSSION:

Traditionally tattoos have forensic significance for the establishment of identity. It has been practiced since ancient time.⁶ However, the pattern of tattoos on the body has not been studied. In the present study the tattoos were noted in almost 12% of the medicolegal autopsies. Although the prevalence of tattoos was found to be 10-16% in adults in studies, it was understood that this rate increased to 25% in some age groups.^{6,8} Bardale and Ninal¹⁰ (2020) noted tattoos in 19.4% cases of medicolegal autopsies. Tattoos are seen across all age groups in both sexes. In the present study, maximum cases were observed in age group of 21-30 years (33.9%) followed by 31-40 years (28.6%). These findings are consistent with that of Ozturk et al¹¹ (2025). However, Bardale and Ninal¹⁰ (2020) noticed the tattoos commonly in age group of 21-30 years (26.02%) followed by 41-50 years (23.04%).

Usually, the tattoos have been associated with lower socioeconomic status of person and deviance behaviour. But this perception is now changing as tattoos become more perceived as body decoration. While some studies still show higher prevalence among lower socioeconomic groups and less educated individuals, and many factors contribute to an individual's decision and perception to get a tattoo on the body.¹² Also, tattoos are used by many persons to cover or hide body deformity and disfigurement.¹³ In the present study too, the tattoos were commonly encountered in low socioeconomic status (70.7%) and less educated individuals (62.9%).

Tattoos are usually associated with high-risk behaviour like substance abuse, violent nature, sexual abuse, antisocial behaviour or relations with some gangs.^{7,14} Dhassche et al¹⁵ (2000) stated that tattoos may be the possible markers for lethality from suicide and accidental deaths. In the present study, maximum number of deaths were of accidental manner (47.0%) followed by natural (23.7%). Suicidal and homicidal deaths were encountered in 22.4% and 6.3% cases with tattoos respectively. These findings are consistent with that of Bardale

and Ninal¹⁰ (2020) and Ozturk et al¹¹ (2025). Stephenson et al¹⁶ (2019) also noted no association between tattoos and manner of deaths. However, Shoham E¹⁷ (2010) explored the meaning of different tattoos picture on the body. For example; images of dagger and skull - pride in the use of violence, ankle chains - imprisonment, flowers on the forearm - adoption of criminal lifestyles. Thus, elucidating the meaning of tattoo pictures will also help to approach cases in clinical forensic medicine.

Different dyes are used for tattooing to make different colours by means of needles or penetrating tools dipped in colouring material. The tattoo marks are distinct up to 10 years. Its appearance and longevity depend on specific skin tone, location, depth, exposure, friction and type of dye used.¹⁸ Black ink is the most common and fade-resistance tattoo. In the present study, 37.2% of tattoos were bluish green in colour followed by greenish colour (30.6%) and black colour (23.0%). Bardale and Ninal¹⁰ (2020) noted green colour tattoos in all the cases.

Commonly, single tattoo is made on the body in the form of either name or some figure/ design. Nowadays, multiple tattoos on different parts of the body are impregnated for decorating the body or to cover/ hide disfigurement of body. In the present study, single tattoo on the body was the noted in 72.0% cases followed by two tattoos in 26.6% cases. Five to eight tattoos were seen in only 3.6% cases. Bardale and Ninal¹⁰ (2020) noted single tattoo in 73.6% cases and maximum four numbers of tattoos were present. Tattoo marks may be present on any part of the body, but are commonly found on arms and forearm.¹⁸ The preferred body location for tattooing depends on individual's personal, social, or professional situations. While some people prefer exposed visible parts like forearm and hands, others may choose invisible areas like genitals or breasts to be more sexually attractive.¹⁹ It was observed that the most preferred location of tattoos in our study was the forearm followed by hand and arm, mostly on right side. Bardale and Ninal¹⁰ (2020) noted right forearm and forehead as the commonest location of tattoos. Kayser et al²⁰ (2013) observed that 60.6% of the tattoos were on the arm followed by hand (12.7%) and shoulder (10.1%). Tattoos were not observed on abdomen, back and genitals in any case in the present study.

Tattoos are the form of communication that people use to communicate or express them-selves.¹¹ As similar to that of Kayser et al²⁰ (2013), textual (lettering/ writing) was found to be the most common type of tattoo followed by traditional design (21.1%), symbolic (15.9%) and religious tattoo (7.4%). These findings are consistent with that of Bardale and Ninal¹⁰ (2020). Ozturk et al (2025) showed that the most common type of tattoo was shape, geometric or illustration. Nowadays, medical tattoos like 'No resuscitation', 'No life support', 'DNR', 'No PEG', 'S.O.S Scoline apnoea, diabetes etc. are inscribed for medical instructions which may assists during clinical management of the individuals.^{10,21-23} In Brookes and Thompson's study, tattoo marks are categorized as human forms, animals, plants, flags, objects, symbols, abstractions, and other images in an ANSI/ NIST ITL 1-2000 classification.²⁴ Bhargava et al¹⁴ (2016) found at least one lion tattoo in subjects taking steroids for bodybuilding and athletics. Also, tattoos of eagles were mostly observed in cannabis and narcotic abusers. Katsos et al²⁵ (2018) noted lion tattoos in heroin and cannabis users. Tattoo of lion, crab, peacock, bull head, fish and sparrow were present but no association with drug abuser were found in the present study.

CONCLUSIONS:

The present study has clearly classified the types of tattoos prevalent in central India along with its trends in the study population. It also provides significant forensic information like cultural or religious or behavioural background apart from identity of the individual when traditional methods of

identification are not available.

Conflict Of Interest: None

Source Of Funding: None

REFERENCES:

1. Samoa: Samoan tattoos. (n.d.). *Polynesian Culture Centre*. http://www.polynesia.com/polynesian_culture/samoa/samoan-tattoos.html
2. Martin, C. S. (2013). Tattoos as narratives: Skin and self. *Public Journal of Semiotics*, 4, 24–26.
3. Chaudhary, R., & Dhingra, V. (2024). A tattoo mystery. *IP International Journal of Forensic Medicine and Toxicological Sciences*, 9(3), 112–116.
4. Pragna, K. L., & Goswami, P. (2023). Analyzing the forensic significance of tattoos and their relevance in India. *Indian Journal of Forensic Medicine & Toxicology*, 17(3), 72–79.
5. Braithwaite, R., Robillard, A., Woodring, T., Stephens, T., & Arriola, K. (2001). Tattooing and body piercing among adolescent detainees: Relationship to alcohol and other drug use. *Journal of Substance Abuse*, 13, 5–16.
6. Byard, R. W. (2013). Tattoos: Forensic considerations. *Forensic Science, Medicine and Pathology*, 9, 534–542.
7. Carson, H. J. (2014). How tattoos correlate with early mortality. *American Journal of Clinical Pathology*, 142, 99–103.
8. Komar, D., & Lathrop, S. (2008). Tattoo types and frequencies in New Mexican White Hispanics and White non-Hispanics: Autopsy data from homicidal and accidental deaths, 2002–2005. *American Journal of Forensic Medicine and Pathology*, 29, 285–289.
9. Kluger, N. (2015). Epidemiology of tattoos in industrialized countries. *Current Problems in Dermatology*, 48, 6–20.
10. Bardale, R., & Ninal, N. (2020). Analysis of tattoos in an autopsy population: A two-year study. *Journal of the Indian Academy of Forensic Medicine*, 42(4), 296–299.
11. Ozturk Ata, H. K., Acar, K., & Dereli Kurtulus, A. (2025). Identification and classification of tattoos in autopsies: A retrospective study. *GMJ*, 35, 28–37.
12. Rout, D., Mishra, S. J., Sahoo, D., & Mishra, A. (2024). Perception of youth towards making body tattoos: A comprehensive study in Bhubaneswar, Odisha. *International Journal of Research in Management*, 6(1), 5048.
13. Phad, L. G., Tumram, N. K., & Dhawane, S. G. (2015). An unusual pattern of tattooing in the form of body designing: A case report. *Egyptian Journal of Forensic Sciences*, 5, 1–4.
14. Bhargava, S., Singh, R., & Kumari, K. (2016). Significance of tattoo marks in forensic psychology: A review. *International Journal of Current Advanced Research*, 5, 857–859.
15. Dhassche, D., Snell, K. S., & Lordier, S. (2000). A case-control study of tattoos in young suicide victims as a possible marker of risk. *Journal of Affective Disorders*, 59, 165–168.
16. Stephenson, L., & Byard, R. W. (2019). Causes, manner and age of death in a series of decedents with tattoos presenting for medicolegal autopsy. *Journal of Forensic and Legal Medicine*, 64, 49–51.
17. Shoham, E. (2010). Signs of honor among Russian inmates in Israel's prisons. *International Journal of Offender Therapy and Comparative Criminology*, 54, 984–1003.
18. Bardale, R. (2024). *Principles of forensic medicine and toxicology* (4th ed., pp. 103–105). Jaypee Brothers Medical Publishers.
19. Neluis, T., Armstrong, M. L., Young, C., Roberts, A. E., Hogan, L., & Rinard, K. (2014). Prevalence and implications of genital tattoos: A site not forgotten. *British Journal of Medical Practitioners*, 7, 732.
20. Kayser, A., Yavuz, M. F., Sam, B., & Yavuz, M. S. (2013). Evaluation of body tattoos from a forensic medicine perspective. *Turkiye Klinikleri Journal of Forensic Medicine*, 10, 44–50.
21. Aldasouqi, S. (2011). A medical alert tattoo. *American Family Physician*, 83, 796.
22. Barday, P., & King, H. (2002). Tattoo medi-alert. *Anaesthesia*, 57, 625.
23. Byard, R. W. (2015). Tattoos containing useful messages. *American Journal of Clinical Pathology*, 143, 908.
24. Brookes, G. K., & Thompson, T. (2019). The impact of personal perception on the identification of tattoo patterns in human identification. *Journal of Forensic and Legal Medicine*, 64, 34–41.
25. Katos, K., Moraitis, K., Papadodima, S., & Spiliopoulou, C. (2018). Tattoos and abuse of psychoactive substances in an autopsy population sample from Greece. *Romanian Journal of Legal Medicine*, 26, 21–28.