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Research Article

Tattooing in Young Adults: Patterns, Complications and Reasons for Dermatological Consultation at a Tertiary Care Center

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Abstract

Background: A tattoo is a dermatological procedure in which pigmented dyes are injected into the dermis using needles or a tattooing device, leading to permanent or semi-permanent skin pigmentation. This process may trigger an immune response and can potentially cause dermatological issues such as allergic reactions, granuloma formation, or Koebnerization in susceptible individuals. It is an ancient practice observed across various cultures for religious devotion, cosmetic enhancement, identification of prisoners, criminals and slaves and even for therapeutic pain relief.

Objective: This study aimed to examine the diverse tattoo patterns among individuals and analyse the underlying reasons for their visits to the dermatology department in tertiary care center. Methods and Results: A total of 63 patients with tattoos, who sought tattoo removal at the dermatology department, were enrolled between February 2023 and January 2024. The majority sought removal due to rejection in medical examinations for Army or SSB recruitment. Informed consent was obtained from each participant and clinical photographs were captured using a high-resolution 16-megapixel camera. These images were analysed to study tattoo patterns, associated conditions and complications due to pigment innoculation. The majority of patients were aged 21-30 years (n=41), predominantly Hindu males, mostly students and urban residents. The most common tattoo designs included names of loved ones (n=20), followed by religious symbols like “Om” or “Trishul” (n=16) and "Ma" (n=14). Most patients sought removal due to job requirements (n=24) or changes in relationship status (n=9) while remaining others (n=16) due to poor quality or desire for a new tattoo. The remaining cases (n=14) experienced complications related to tattoos and sought treatment.

Conclusion: Given the limited sample size, further research with a larger population covering a wider age range is recommended.

Keywords: Skin Pigmentation; Adults; Tattooing; Tattoo Patterns

Antimicrobial Activity of Propylene Glycol

Tattooing, derived from the Polynesian word "tatau," meaning "to strike" or "to mark," is the process of inserting pigmented dyes into the dermis through the skin’s outer layer, either manually or using a tattoo gun, to create permanent body modifications [1]. It is an ancient practice observed across different cultures and regions worldwide, holding varied significance. Historically, tattoos have been used as religious symbols, expressions of affection, cosmetic enhancements and identifiers for prisoners, criminals and slaves [2]. Over the last few decades, tattoos have gained widespread popularity and are now frequently seen among individuals from diverse social classes [3].

Despite its artistic and cultural significance, tattooing is not without risks. Mild symptoms following a tattoo procedure include

redness, swelling, itching and raised pink, red, or purple discoloration in the tattooed area. However, more severe side effects can arise due to allergic reactions or hypersensitivity to certain ink pigments [4]. Long-term complications include keloid or hypertrophic scar formation, both of which involve excessive scar tissue development in response to skin trauma [5]. Additionally, the phenomenon of Koebnerization can occur, triggering dermatological conditions such as psoriasis, lichen planus, or warts at the tattoo site [6].

Infections, particularly bacterial or viral, are also concerns in tattooing, especially when hygiene standards are compromised. Hepatitis B and C, as well as other blood borne diseases, have been reported in cases where non-sterile needles were used [7]. Some inks, particularly those containing heavy metals, may cause systemic toxicity or delayed hypersensitivity reactions [8]. Furthermore, phototoxicity reactions can occur when certain tattoo pigments react to UV light, leading to inflammation or fading of the tattoo over time [9].

In our study, the majority of participants reported getting tattoos primarily for fashion or fun, influenced by friends who had tattoos. However, many later regretted their decision due to various reasons, including poor-quality tattoos, fading over time, personal regret, medical fitness requirements for jobs (especially in the military and law enforcement), changes in relationship status or marriage and evolving fashion trends [10].

Tattoo removal procedures, such as laser treatment, dermabrasion and surgical excision, are often more painful and expensive than the original tattooing process [11]. Additionally, removal can lead to scarring, pigmentation issues, or incomplete removal, leaving behind residual ink particles [12]. The rise in tattoo regret and subsequent removal cases highlights the need for individuals to make informed decisions before getting a tattoo, considering both aesthetic desires and potential long-term consequences [13].

Objective

This study aimed to examine the diverse tattoo patterns among adolescents and young adults and analyse the underlying reasons for their visits to the dermatology department at a tertiary care center.

Methods

A total of 63 patients having tattoos on their bodies, who attended department of dermatology for tattoo removal, were enrolled over a period of one year from February 2023 to January 2024.

Informed consent was taken from each patients. Ethical approval was obtained from institutional review board and the official approval code for this study is PMC-EC/2025/023. Clinical and dermoscopic photographs of tattoos were taken from a high resolution 16-megapixel camera (OnePlus 7 Pro phone - manufactured by OnePlus Technology, China) and DermLite DL3N hand-held dermatoscope (manufactured by DermLite LLC, United State) respectively. Based on these photographs, pattern of various type of tattoos and its associated complications were studied and interpretation of data was done.

Results and Discussion

This study was conducted over a one-year period from February 2023 to January 2024, enrolling a total of 63 patients who sought tattoo removal at the dermatology outpatient department.

Demographic Characteristics

Among the study participants, the majority (65.08%, n=41) were aged between 21 and 30 years, with a mean age of 24.94 years. The youngest patient was 15 years old, while the oldest was 37 years. The male population accounted for the majority of cases, comprising 74.60% (n=47), whereas females represented 25.40% (n=16). The geographical distribution of cases showed that 35 patients (55.6%) were from urban areas, while 28 patients (44.4%) were from rural areas. Religious distribution showed that most patients were Hindus, comprising 92.06% (n=58), followed by Muslims at 7.94% (n=5).

Regarding educational qualifications, the largest group had completed matriculation (39.68%, n=25), while 36.51% (n=23) were pursuing college education. A smaller proportion (23.81%, n=15) had completed post-graduation.

Reasons for Tattoo Removal (Fig. 1).

The primary motivation for tattoo removal was medical clearance for Army or SSB exams, which accounted for 77.78% (n=49) of cases. Two specific subgroups had a pressing need for tattoo removal: 38.10% (n=24) required removal to meet medical fitness criteria for employment and 14.29% (n=9) sought removal due to changes in relationship status or impending marriage.

Additionally, 9.52% (n=6) of individuals were dissatisfied with their tattoo's appearance, either due to poor quality or fading over time. Another 7.94% (n=5) regretted their decision for personal reasons, while a similar proportion (7.94%, n=5) opted for removal due to evolving fashion trends or the desire for a new tattoo.

Medical complications associated with tattoos were another reason for removal. Allergic reactions to tattoo ink accounted for 9.52% (n=6) of cases, while keloid or hypertrophic scar formation was observed in 4.76% (n=3). Additionally, Koebnerization-related conditions were identified, including lichen planus (3.17%, n=2), warts (3.17%, n=2) and psoriasis (1.59%, n=1) (Table 1).

Tattoo Design Preferences (Fig. 2, Table 2)

Analysis of tattoo designs revealed that the most common tattoo type included names of loved ones, accounting for 31.7% (n=20). Religious symbols such as "Om", "Trishul" or depictions of Lord Krishna were the second most common, present in 25.4% (n=16) of cases. Tattoos bearing the word "Ma," symbolizing maternal love, were found in 22.2% (n=14) of patients. Other tattoo designs included hearts, stars and patterns inspired by movies or motivational quotes, observed in 20.7% (n=13) of cases.

These findings highlight the social, cultural and professional factors influencing tattoo removal decisions. The study underscores the need for greater awareness regarding the long-term consequences of tattooing, particularly for individuals considering permanent body modifications for aesthetic or trend-based reasons.

Figure 1: Pie chart showing statistical presentation of distribution of reasons behind removal of tattoos including the proportion of cases visited for the purpose of treatment of the complications associated with tattoos.

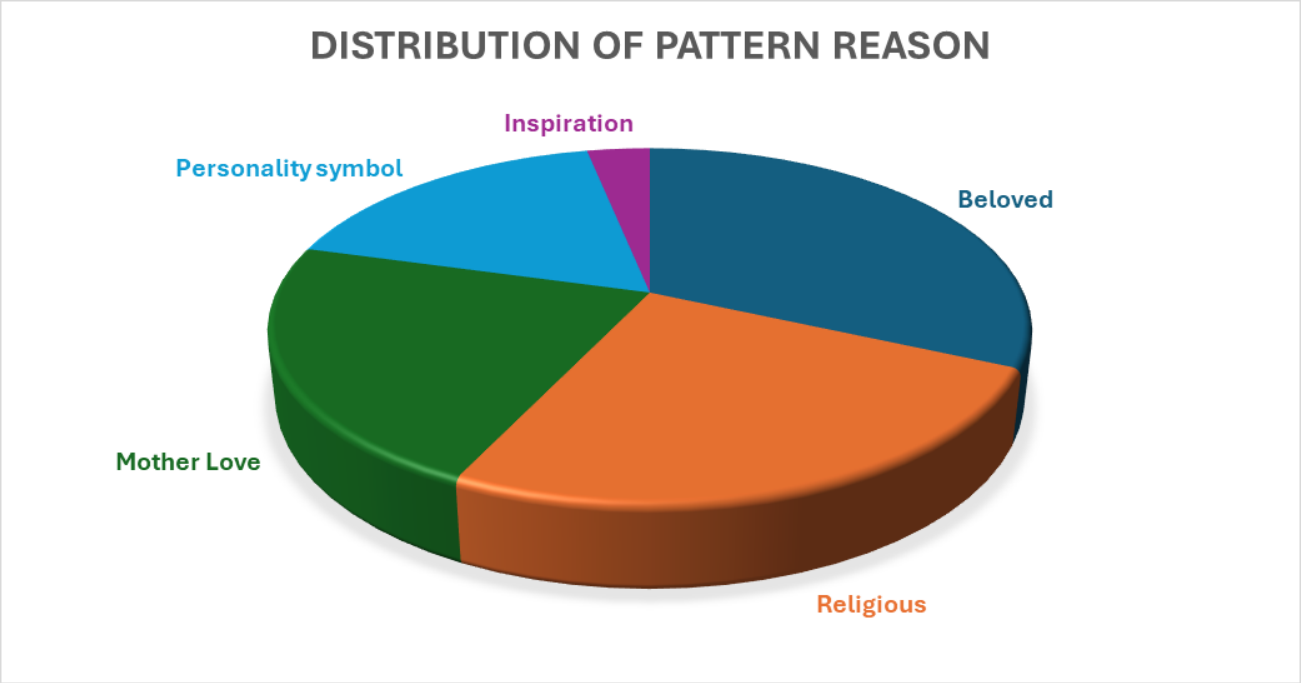

Figure 2: Pie chart showing statistical presentation of distribution of pattern of tattoos in various categories.

LICHEN PLANUS OVER TATTOO 	HYPERTROPHIC SCAR OVER TATTOO 
PSORIASIS VULGARIS OVER TATTOO 	VERRUCA VULGARIS OVER TATTOO 

Table 1: Showing the images of tattoos associated with complications in tabular form.

Category 1: Beloved 
Category 2: Religious symbols 
Category 3: Mother love 
Category 4 &5: Personality symbol + Inspiration 

Table 2: Showing the images of tattoos in each category in tabular form.

Discussion

Tattooing is an ancient practice that has evolved significantly over time, with motivations for getting tattoos varying across cultural, religious and social contexts [14]. Historically, tattoos have served as symbols of religious devotion, rites of passage, expressions of identity and even markers of social status [15]. It is still practiced in rural areas for the same reasons. In modern times, tattooing has become a form of self-expression, celebration and personal decoration, with increasing popularity among adolescents and young adults [16]. Many individuals obtain tattoos to commemorate relationships, showcase personal beliefs, or as an impulsive decision influenced by peer pressure and popular culture [17]. Urban populations are mostly influenced by such ideologies and get tattoos.

However, as the prevalence of tattooing has increased, so too have the cases of tattoo regret and subsequent removal. One of the primary reasons for tattoo removal is professional constraints, particularly in careers that emphasize discipline and uniformity, such as the military, law enforcement and corporate sectors [18]. In professions like the army, visible tattoos may conflict with the required dress code and can be perceived as undermining the image of discipline [19]. Some organizations prohibit tattoos altogether, while others enforce strict regulations on their placement and visibility. Consequently, individuals seeking job opportunities in these fields often opt for tattoo removal.

Another significant factor contributing to tattoo removal is personal regret. Many individuals who initially get tattoos due to peer influence or emotional reasons later find that their aesthetic preferences change over time [20]. Relationship-related tattoos, such as the names of partners or symbols of love, frequently become sources of regret following breakups or changes in personal circumstances [21]. Similarly, evolving fashion trends often lead individuals to remove or modify older tattoos in favour of new designs that align with current styles.

Medical concerns also play a crucial role in tattoo removal decisions. Tattoos can lead to complications such as allergic reactions, infections and inflammatory conditions, including granulomas, keloids and Koebnerization-triggered diseases like psoriasis and lichen planus [22]. Allergic reactions, particularly to red pigments, remain the most frequently reported globally, accounting for approximately 12.12% of cases [23]. Our study found allergic reactions in 9.52% of cases, aligning with global observations. Keloid or hypertrophic scarring, though prevalence data is lacking, was noted in 4.76% of our cases, warranting pre-tattoo risk assessment. Additionally, we observed Koebnerization-induced lichen planus and warts (3.17% each) and psoriasis (1.59%), emphasizing tattooing as a potential trigger for chronic dermatoses. Large-scale epidemiological data quantifying the incidence of these complications remain sparse. These findings highlight the critical need for regulatory oversight, targeted public education and pre-procedural dermatological evaluation, particularly in individuals predisposed to adverse cutaneous reactions.

The use of non-sterile equipment increases the risk of bacterial and viral infections, including hepatitis B and C and HIV [24]. In the military and other physically demanding professions, these risks are particularly concerning, as skin infections can impair an individual's overall fitness [25].

Furthermore, tattoos are sometimes linked to unwanted social associations. In some societies, tattoos are still stigmatized and are associated with criminal activities, gang culture, or extremist groups [26]. Individuals seeking to dissociate from such affiliations often pursue tattoo removal as part of personal reinvention or societal reintegration [27]. Tattoo removal procedures, including laser treatments, dermabrasion and surgical excision, are often more painful, expensive and time-consuming than the original tattooing process [28]. Tattoo removal, particularly using Q-switched and picosecond lasers, is considered the most effective method due to its high success rate and low likelihood of scarring. These lasers operate by emitting intense light pulses that break down tattoo ink into smaller particles, which are then gradually eliminated by the body's immune system. Darker inks, such as black and blue, generally respond more effectively to laser treatment, although several sessions are typically needed for complete removal. Surgical excision can be effective for smaller tattoos but may result in more noticeable scarring. While methods like dermabrasion and chemical peels are occasionally used, they are less preferred because they are more invasive and carry a higher risk of skin pigmentation issues. In conclusion, laser removal remains the most popular option due to its precision and lower risk of complications [29]. Despite advancements in laser technology, complete removal is not always achievable and residual scarring or pigmentation changes are common [30]. These factors highlight the importance of informed decision-making before getting a tattoo.

Overall, while tattooing remains a widely accepted form of body modification, individuals must carefully consider its long-term implications. The increasing rates of tattoo regret and removal suggest a need for greater awareness regarding professional, medical and social consequences before undergoing tattooing. Future studies should further explore the psychological and socio-economic impacts of tattoos and their removal to guide better-informed choices.

Conclusion

This study highlights the various factors influencing tattoo acquisition and removal, including professional constraints, personal regret, medical concerns and social stigma. The findings underscore the need for increased awareness regarding the long-term implications of tattoos, particularly in career-oriented and health-related contexts.

The primary limitation of this study is the small sample size, which restricts the generalizability of the findings. A larger, more diverse cohort with broader age and gender distribution would provide a more comprehensive understanding of tattoo trends and removal patterns. Future studies should aim to include larger populations to derive more statistically robust conclusions and explore the long-term psychological and socio-economic impacts of tattoos and their removal.

Conflicts of Interest

The author declares no conflict of interest for this paper.

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