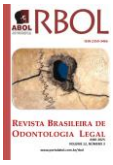
Revista Brasileira de Odontologia Legal – RBOL

ISSN 2359-3466 http://www.portalabol.com.br/rbol



Human identification

LONG-TERM ANALYSIS OF IDENTITY DETERMINATION OF TATTOOED CORPSES IN BRAZIL, FROM 2014 TO 2024, BY JOURNALISTIC NEWS.

Análise de longo prazo da determinação de identidade de cadáveres com tatuagem no Brasil, de 2014 a 2024, por meio de notícias jornalísticas.

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Information about the manuscript:

Received: November 10, 2025.
Accepted: December 23, 2025.

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ABSTRACT

Tattoos serve as valuable forensic tools for identifying victims of disasters and crimes due to their remarkable resistance to degradation. Given the higher margin of error associated with many secondary postmortem identification methods, tattoos offer a reliable and potentially primary means of identification, increasingly recognized for their uniqueness and growing popularity. This study aimed to investigate cases in Brazil over the past decade (2014–2024) where tattoos were utilized as either exclusive or auxiliary methods for identifying bodies involved in criminal contexts. Our retrospective methodology included a comprehensive literature review (PubMed and Bireme), complemented by data queries from official Brazilian police websites and Google News reports (journalistic news). Descriptive statistics were employed to characterize the patterns of tattoo use in identification. We analyzed 261 news stories, which revealed a significant increase in tattoo-assisted identifications over the years ($r = 0.941$; $p < 0.001$). Geographically, the Northeast region reported the highest number of cases (89), with Rondônia leading at the state level (30). Tattoos proved decisive in 61.4% of identifications, showing a higher prevalence among men (204) and individuals aged 20–29. The most common tattoo type observed was text-based (32.9%), predominantly located on the upper limbs (48.5%). In conclusion, the use of tattoos emerges as a rapid, cost-effective, and promising solution for victim identification, particularly relevant in cases of violent deaths and mass disasters. Popularizing this identification method can drastically reduce the number of unidentified individuals in Brazil.

KEYWORDS

Forensic anthropology; Tattooing; Victims identification.

INTRODUCTION

Certainly, tattoos have an undeniable impact on contemporary society. Even though there is still limited scientific data on the prevalence of tattooed people, in Brazil, some studies point to a significant increase in the number of tattoo studios[1]. Furthermore, a recent survey

conducted in five countries showed that 18.5% of the population of Brazil, China, France, Russia and the United States has at least one tattoo[2]. People get tattoos for a variety of reasons, ranging from embellishment and self-affirmation to expressing individuality, paying tribute and cultural or religious beliefs. The most common reasons mentioned are beautification, self-affirmation, and the pursuit of distinctiveness[1–3]. As a means of individual expression, tattooing also stands out as a relevant tool for studies in the field of forensic sciences, reinforcing its cultural and scientific importance.

Human identification is based on technical and biological factors. The biological foundations involve uniqueness, immutability, and perpetuity, whereas the technical foundations include practicability and classifiability. Uniqueness refers to individuality, i.e. the specific characteristics that set an individual apart from others[4]. This aspect is fundamental to the study of tattoos as a method of human identification. Human identification methods are classified by INTERPOL[5] as primary and secondary. Primary methods are those that define an individual's identity objectively due to their uniqueness. Using them eliminates the need for confirmation by other techniques. Primary methods mainly include DNA analysis, fingerprints, and forensic dentistry (examination of the dental arch). Recently, the serial number of medical prostheses was also included by INTERPOL as a primary method of identification. Otherwise, secondary methods are of an auxiliary nature, contributing to human identification. These methods include the analysis of clothing and physical characteristics such as beards, accessories like jewelry, and, especially, tattoos[5,6].

In this regard, tattoos have proven particularly valuable in large-scale disasters such as tsunamis, terrorist attacks and environmental crimes, significantly contributing to victim identification[7–11]. Considering tattoos are engraved in deep layers of the skin, they are highly resistant to burns and severe degradation, this makes them a crucial tool in situations where other identification methods are not feasible due to logistical complexity or the condition of the bodies[11–13].

On the other hand, post-mortem recognition using acquired physical characteristics, particularly when carried out by individuals familiar with the victim, is more susceptible to greater subjectivity and margin of error. Nevertheless, tools that assist in this process should not be disregarded. It is essential to explore the limits and potential forensic value of these approaches in order to improve their reliability and applicability[6,13].

Thus, given that tattoos are often used to distinguish individuals and are becoming increasingly unique among people, they could be considered as a primary method of identification, provided that a suitable methodology based on biological and technical principles is developed. Although research into the use of tattoos for identification purposes is still limited in Brazil, this paper aims to survey cases in which tattoos were used as the sole or auxiliary method for identifying bodies involved in crimes in Brazil over the last decade.

MATERIAL AND METHODS

We carried out a retrospective documentary study to describe the use of tattoos as a post-mortem identification tool in Brazil between January 2014 and August 2024. First, a literature review was carried out searching for articles published between the years 2014 and 2024 in different databases such as PubMed, a service of the National Library of Medicine, available at www.ncbi.nlm.nih.gov/pubmed, and Bireme (Virtual Health Library), a specialized service of the Pan-American Health Organization, available at www.bireme.br. We used the following descriptors in English: “human identification” AND “tattoo” AND “Brazil”; as well as in Portuguese: “identificação humana” AND “tatuagem” AND “Brasil”. However, no “case report” publications on body identification in Brazil were found. Thus, a new search strategy was adopted to investigate the use of tattoos as a thanatological tool for determining the identity of bodies in Brazil throughout this decade.

Due to the absence of a national open forensic database in Brazil, data collection employed verified governmental and journalistic sources consistent with digital criminology and open-source intelligence (OSINT) methodologies. Therefore, others complementary search strategies were applied:

- Google advanced search restricted to official Brazilian Civil Police and Forensic Police domains using the query: site: [official police domain] tatuagem Inclusion criteria: reports involving post-mortem identification or recognition of a corpse (Figure 1).
- Direct searches on the official websites of Civil Police and Forensic Police institutions from all Brazilian states, using the keyword “tatuagem”. Inclusion criteria identical to strategy 1 (Figure 2).

Figure 1 - Illustrates a Google search results page demonstrating the use of Google Advanced Search to restrict search queries to the official website of the Bahia Civil Police (Polícia Civil da Bahia). The search query displayed in the search bar is: "site: https://www.ba.gov.br/policiacivil/ tatuagem" (tattoo), which exemplifies the "site:" operator used to limit results exclusively to the specified government domain.

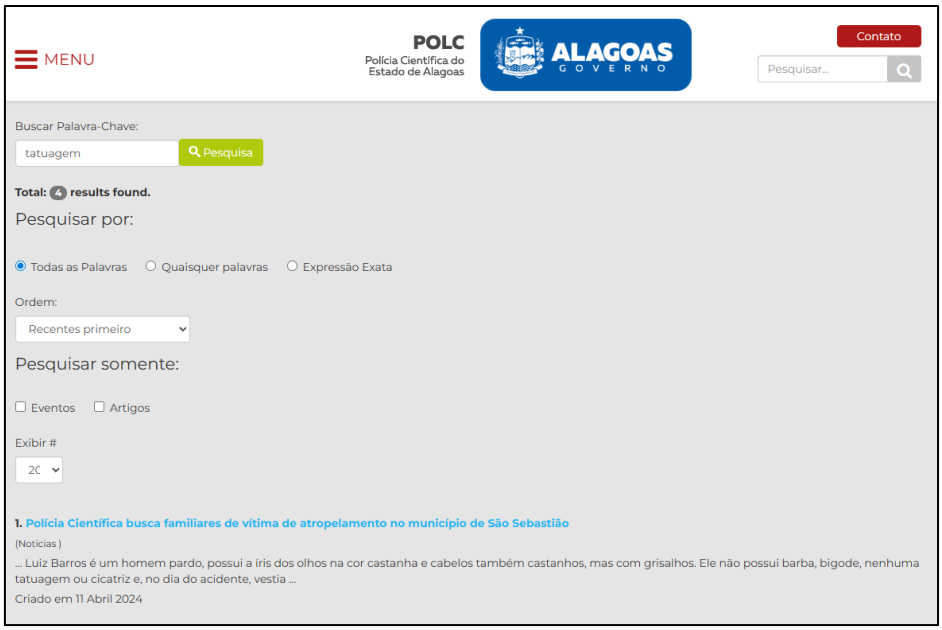

Figure 2 - Illustrates a direct search conducted on the official website of the Scientific Police of the State of Alagoas (Polícia Científica do Estado de Alagoas), demonstrating the methodology for retrieving forensic identification cases involving tattoos from official Brazilian law enforcement institutional websites. The search interface displays the keyword "tatuagem" (tattoo) entered in the search field, with 4 results found from the institution's database.

- Google News search using the terms "tatuagem" AND "identificação" AND "corpo" AND "Nome dos estados brasileiros", limited to the period 01/01/2014 to 08/31/2024, selecting only entries classified as news. Inclusion criteria: cases of human body identification or recognition where tattoos were reported as a determining or contributory factor (Figure 3).

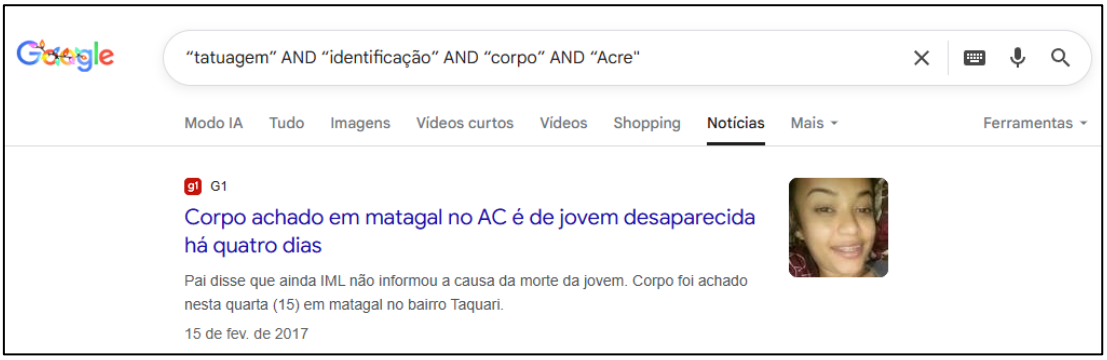

Figure 3 - illustrates a Google News search results page demonstrating the systematic methodology for retrieving forensic identification cases involving tattoos across Brazilian states. The search query displayed in the search bar is: "tatuagem" AND "identificação" AND "corpo" AND "Acre", exemplifying the Boolean search operators used to identify news reports where tattoos were documented as determining or contributory factors in human body identification cases. The search is restricted to the "Notícias" (News) category, as indicated by the highlighted tab below the search bar.

The results were excluded when the records included: opinion articles or editorial content; duplicated reports; international or fictional cases; reports mentioning tattoos without relevance to body identification.

After this, we extracted some variables from each record: year of publication, geographic region and federative unit, sex (gender), age of the person with no identification, tattoo type - based on the classification proposed by Birngruber *et al*. (2020); and Blanco & Valdez (2024), anatomical location of the tattoo, source type (official police publication or news media)[14,15].

Prior research has examined the use of open-source information to construct sampling frames, concluding that such data can, in certain contexts, be as effective as official records when working with police-related information. To enhance the comprehensiveness and reliability of our data[16–18] and to evaluate the reproducibility and regional consistency of the search process, a Jaccard similarity index was calculated comparing results from different Brazilian states using standardized Portuguese descriptors.

Descriptive statistics were used to characterize case distribution and tattoo characteristics over time. A Pearson correlation test was conducted to assess the association between year and proportion of tattoo-identified cases, following angular transformation of proportional data. Statistical analyses were performed using R software (version 4.5).

RESULTS

The similarity index (Jaccard) was 0.856 and ranged between 0.6 and 0.9, indicating a high degree of methodological stability and minimal dependence on geographic context when using descriptors in Portuguese. This suggests that the search and categorization strategy was consistent across regions, reducing the risk of geographic-driven sampling bias. The heatmap illustrates strong pairwise similarity among all countries, with darker tones reflecting higher Jaccard values. The clustering dendrogram demonstrates close grouping across sites, further supporting cross-regional reproducibility in data collection and descriptor matching (Figure 4).

The CO region had the lowest number, with only 28 news items (Figure 5). The Brazilian State that presented the highest number of News about identifying people's bodies with the help of tattoos was RO (30 news), followed by AL (25 news), PI (20 news),AM (15 news) and BA (14 news). On the other hand, the states with the least news found were AP and SE, which presented only 1 news report, followed by PE, which had 2 news reports, and RO and PA, which had 3 news reports (Figure 5).

Two hundred sixty-one news articles were obtained about determining the identity of people's bodies using tattoos in Brazil in the 2014 - 2024 decade (Table 1). There was a positive and significant trend ($r = 0.941$; g.l. = 9; $p < 0.001$) in the correlation between the number of news items and the year. The NE region presented the highest number with 89 news, followed by the N, SE, and S regions with 64, 49, and 31 news, respectively.

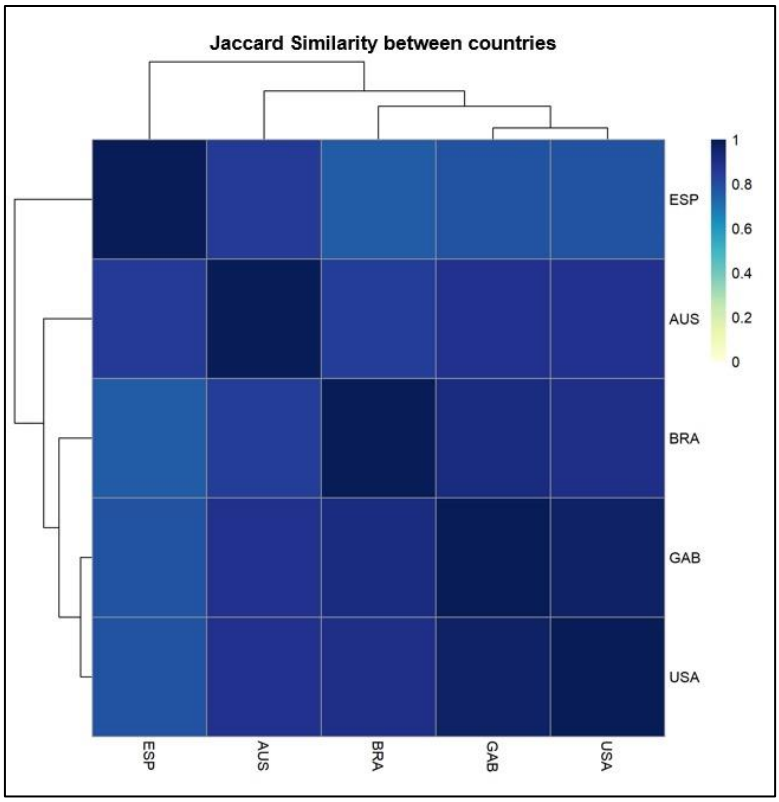

Figure 4 - Jaccard similarity heatmap and hierarchical clustering of countries. Darker colors represent higher similarity scores. The consistently high similarity values (mean = 0.856) indicate robust methodological reproducibility across regions and low geographical bias in term identification and retrieval.

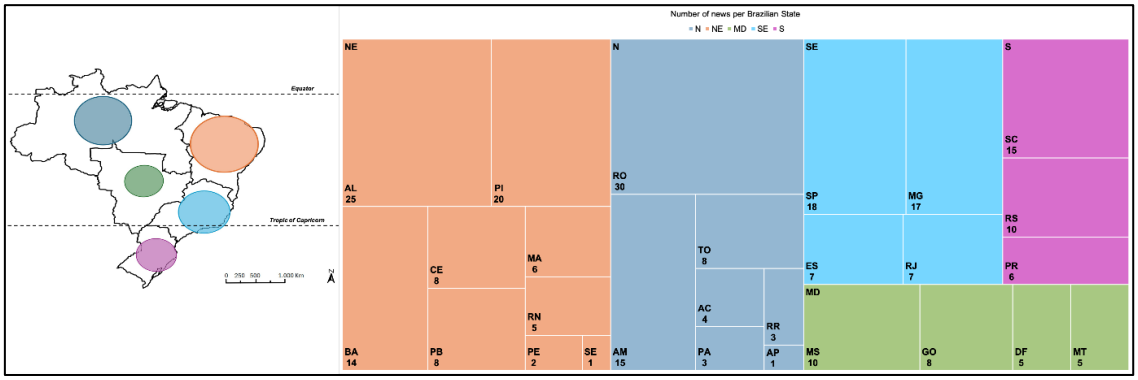

Figure 5 – Geographical variation of the proportion of News about identifying corpses using tattoos from different Brazilian states between 2014 – 2024. The number of News of each State from the North region (N) are highlighted in dark blue: AC - Acre, AP - Amapá, AM - Amazonas, PA - Pará, RO - Rondônia, RR - Roraima, TO - Tocantins; in orange, the number of News from states from the Northeast region (NE): AL - Alagoas, BA - Bahia, CE - Ceará, MA - Maranhão, PB - Paraíba, PE - Pernambuco, PI - Piauí, RN - Rio Grande do Norte, SE - Sergipe; in green from the Midwest region (MD): DF - Distrito Federal, GO - Goiás, MT - Mato Grosso, MS - Mato Grosso do Sul; in light blue from Southeast region (SE): ES - Espírito Santo, MG - Minas Gerais, RJ - Rio de Janeiro, SP - São Paulo; and in purple from South region (S): PR - Paraná, SC - Santa Catarina, RS - Rio Grande do Sul.

Table 1 – Number of News about the sex of unidentified tattooed corpses in Brazilian states between 2014- 2024. Region - a division of regions according to IBGE; States - acronyms of Brazilian States; F – number of reports of female corpses; M – number of male corpses; Total – the sum of the number of news articles for both sexes in each State.

Region	States	F	M	Total
N	AC	2	2	4
	AP	1	0	1
	AM	0	15	15
	PA	0	3	3
	RO	3	27	30
	RR	0	3	3
	TO	1	7	8
CO	DF	2	3	5
	GO	3	5	8
	MT	1	4	5
	MS	2	8	10
NE	AL	10	15	25
	BA	4	10	14
	CE	2	6	8
	MA	1	5	6
	PB	2	6	8
	PE	1	1	2
	PI	8	12	20
	RN	0	5	5
	SE	0	1	1
SE	ES	3	4	7
	MG	2	15	17
	RJ	1	6	7
	SP	4	14	18
SU	PR	0	6	6
	SC	1	14	15
	RS	3	7	10
Total		**57**	**204**	**261**

Footnote: AC - Acre, AP - Amapá, AM - Amazonas, PA - Pará, RO - Rondônia, RR - Roraima, TO - Tocantins; AL - Alagoas, BA - Bahia, CE - Ceará, MA - Maranhão, PB - Paraíba, PE - Pernambuco, PI - Piauí, RN - Rio Grande do Norte, SE - Sergipe; DF - Distrito Federal, GO - Goiás, MT - Mato Grosso, MS - Mato Grosso do Sul; ES - Espírito Santo, MG - Minas Gerais, RJ - Rio de Janeiro, SP - São Paulo; PR - Paraná, SC - Santa Catarina, RS - Rio Grande do Sul.

Tattoos were used to determine the identity of bodies in 61.4% of the News. News relating to GO, ES, MT, PE, and SE states indicated that all bodies with tattoos had their identity determined (Figure 6). State AP presented a single news item in which the tattooed body did not have its identification determined (Figure 6). Among the States that presented the highest number of News (RO, PI, AL), PI presented the highest proportion of News on the identification of bodies with certain tattoos (75% of the 15 news), followed by Alagoas with 60% of the 25 news and Rondônia with 30% of the 30 news (Figure 6).

Among the news articles, 57 were related to identifying female corpses, and 204 were male (Table 1). It is worth noting that only a single piece of News from the State of CE disclosed the identification of

the body of a transgender woman. Two states (AL and PI) presented the highest numbers of News about identifying female corpses (10 and 8, respectively). On the other hand, five States (AM, RR, RN, SE, and PR) did not show any news (0 news) about the identification of female corpses. Six States (RO, AL, AM, MG, SP, and SC) presented 14 or more news items about determining the identity of male bodies (27, 15, 15, 15, 14, 14, respectively). Only the State of AP did not present any news about determining the identity of male bodies.

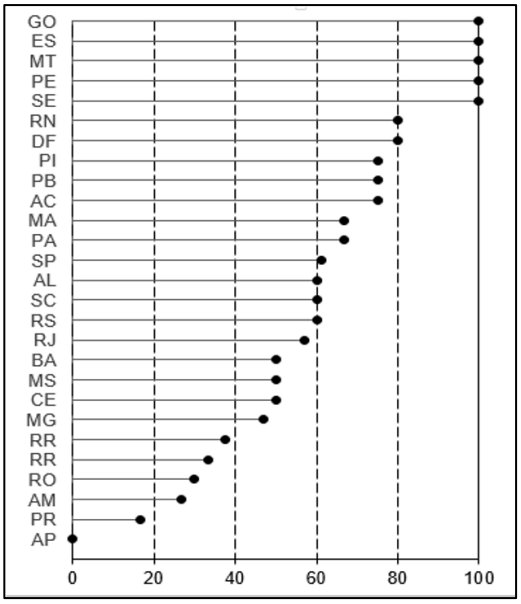

Figure 6 – The proportion of News positively determined the corpse identification using tattoos of the 26 Brazilian states and the Federal District between 2014 – 2024.

The 20- to 29-year-old group showed the highest number of news items about determining the identity of bodies, with 67 news items, followed by the 30- to 39-year-old group (39 news items), and the 20-year-old or less and 40-year-old or more groups presented 26 news items each (Table 2). Thus, approximately 61% of the sample disclosed relevant information about the determination of the identity of bodies with the help of tattoos in different Brazilian states.

Among the 261 news outlets, 108 did not inform us of the type of tattoos on the bodies, and 153 reported the types of tattoos. Of these, 32.9% were classified as written (names, tributes to family members, letters, numbers, among other expressions); 17.6% ornaments (tribal, skulls); 16.1% plants or animals; 13.0% fantasies (references to cartoons, films, cartoons); 10.2% symbols in general (stars, knives, dollar signs); 5.1% religious (crosses and other religious references); 5.1% human figures (faces, profiles). It is worth noting that no news mentioned the total number of tattoos on the bodies.

About body parts, tattoos on the upper limbs (shoulders, arms, forearms, hands) were the most common, with 48.5% of the body parts disclosed in the 239 mentions in the News, followed by tattoos on the chest (anterior, lateral, dorsal) and lower limbs (hips, thighs, calves, feet) with 21.8% of the 239 mentions in the News. Parts such as the abdomen–pelvis, and head–and neck presented 10% and 9% of the 239 mentions in the News (Figure 7). Furthermore, 62 news articles did not mention tattooed body parts.

Table 2 – Number of News that informed the age range of unidentified tattooed corpses in Brazilian states in the decade 2014-2024. Region - division of regions according to IBGE; States - acronyms of Brazilian States; N-inf - number of news stories that did not provide age group information; under20 – number of News of corpses with less than 20 years old; 20-29 – age group of corpses between 20 and 29 years old; 30-39 – age group of corpses between 30 and 39 years old; over40 – corpses with more than 40 years old; Total – sum of the number of news stories in each age group in each State.

Region	States	N-inf	under 20	20-29	30-39	over40	Total
N	AC	2	1	1	0	0	4
	AP	1	0	0	0	0	1
	AM	9	0	5	0	1	15
	PA	2	0	1	0	0	3
	RO	17	0	5	4	4	30
	RR	2	0	1	0	0	3
	TO	5	0	1	1	1	8
NE	AL	9	4	9	2	1	25
	BA	5	2	2	4	1	14
	CE	6	0	1	2	0	9
	MA	4	1	0	0	1	6
	PB	4	1	2	1	0	8
	PE	2	0	0	0	0	2
	PI	9	1	6	1	3	20
	RN	1	0	2	0	1	4
	SE	0	0	1	0	0	1
CO	DF	3	1	1	0	0	5
	GO	2	2	2	2	0	8
	MT	2	0	2	0	1	5
	MS	5	2	2	0	1	10
SE	ES	1	2	3	1	0	7
	MG	2	3	4	3	5	17
	RJ	1	1	2	1	2	7
	SP	3	2	5	6	2	19
SU	PR	1	0	2	2	1	6
	SC	2	2	4	5	2	15
	RS	3	1	3	3	0	10
Total		**103**	**26**	**67**	**39**	**26**	**261**

Footnote: AC - Acre, AP - Amapá, AM - Amazonas, PA - Pará, RO - Rondônia, RR - Roraima, TO - Tocantins; AL - Alagoas, BA - Bahia, CE - Ceará, MA - Maranhão, PB - Paraíba, PE - Pernambuco, PI - Piauí, RN - Rio Grande do Norte, SE - Sergipe; DF - Distrito Federal, GO - Goiás, MT - Mato Grosso, MS - Mato Grosso do Sul; ES - Espírito Santo, MG - Minas Gerais, RJ - Rio de Janeiro, SP - São Paulo; PR - Paraná, SC - Santa Catarina, RS - Rio Grande do Sul.

DISCUSSION

Tattoos are classified as secondary identification method according to Interpol; however, in specific contexts, they can be utilized as primary or exclusive methods in human identification[19–22]. In Brazil 53,894,158 deaths were registered, of which 665,181 correspond to people whose identity remained undetermined since 05/15/2015, representing approximately 1.23% of the total [23]. The scale of these highlights the importance of adopting different strategies for human identification.[20,24] Although a challenging complex approach, the use of tattoos has the potential to accelerate the identification process, offering a rapid and cost-effective solution in contexts where conventional primary methods may be compromised or unavaiable[14,15,22].

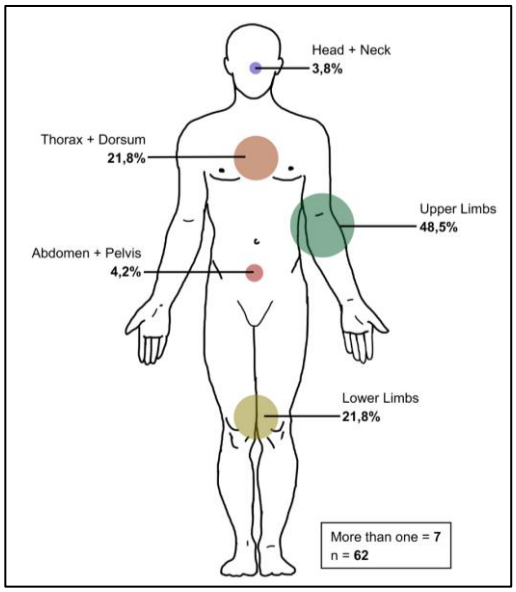

Figure 7 – Visual representation of the proportions of News that highlighted the tattooed body part, illustrating how frequently each area was mentioned in each report.

Our results indicate that 17 states recorded more than half of the News reports on the successful identification of bodies through tattoos. In five states (GO, ES, MT, PE, and SE), all tattooed bodies analyzed had their identities confirmed. Several reports indicated that identification was only possible after information was released by the media. This increased number of reports about the use of tattoos to help identify bodies in Brazil may reflect a deliberate publicization/communication strategy aimed at raising public awareness and reducing the proportion of deaths without confirmed identity.

Less than 30% of the news reports involved the identification of tattooed women. This percentage aligns with patterns observed in European countries and Mexico[14,25,26], but contrasts with data from India, where tattooing is more prevalent among women[27,28]. Most of the cases reported in Brazil individuals aged 20-39 years, consistent with findings from Mexico and Australia[14,25,29]. In both countries, as in Brazil, tattoos on the upper limbs were the most common and most frequently used for identification. Tattoos containing written text predominated[13,14,25].

Although recent studies suggest that tattoo prevalence is higher among women[2,3,30,31], violent deaths in Brazil disproportionately affect males, accounting for approximately 90.2% of cases[32]. This pattern helps explain why less than one-third of the reports in our study referred to tattooed women.

When analyzing the age groups most frequently mentioned in the News reports, we observed correspondence with data on violent deaths in Brazil, which predominantly affect individuals under 29 years of age. According to the 2024 Public Security Yearbook, this group accounted for 47.4% of intentional homicide victims.[32] Since most of the news was obtained from official Civil and Scientific Police websites, it is reasonable to infer that most cases examined in this study are associated with violent deaths. However, no Brazilian study to date has systematically evaluated the relationship between violent death victims and the presence or absence of tattoos[32].

International findings provide some perspective. In the United States, a study conducted at a Department of Pathology in Iowa reported an average age of 39 years among tattooed cadavers and suggested that individuals with tattoos tend to die younger than those without tattoos. In Australia, a study of 150 tattooed corpses revealed an average age of 48 years, with

48% of deaths attributed to unnatural causes[33]. Another Australian study involving 100 tattooed corpses (average age: 49 years) found no significant association between tattoos and premature death[34].

Motivations for getting a tattoo are diverse, including aesthetic, religious, and commemorative reasons; nonetheless, vanity often plays a central role[3,31,35,36]. In our study, written tattoos (names, dedications to relatives, words, numbers and expressions) were the most common, corroborating findings from other investigations[13,14,25]. Recognizing tattoo patterns can accelerate corpse identification[37]. By adopting a standardized classification, such as writings, ornaments, plants, animals, costumes, religious, general symbols and human figures, it becomes possible to assess whether a tattoo is common or rare and to narrow down potential matches[13,14,25,37].

Tattoo placement and visibility are also crucial factors. Although studies remain scarce, tattoos located on exposed areas such as arms and legs, are more likely to be noticed, photographed, or shared on social networks, facilitating ante- and postmortem comparisons and increasing the likelihood of media reporting. On the other hand, tattoos in less visible areas, such as back, pelvis and abdomen, may complicate identification efforts. Large-scale studies on tattoo distribution by body region are limited, but 2014 "1st Tattoo Census in Brazil" conducted by *Superinteressante* magazine with over 80,000 participants, showed that the most tattooed areas were arms (Men: 27.5%; Women: 16%), back (Men: 11%; Women: 14.2%) and shoulders (Men: 14.5%; Women: 10%)[38]. These findings align with those of Lise et al[39], who identified the arm as the most common site among men and the back among women. The least tattooed areas included the neck (Men: 1.1%; Women: 1.8%), abdomen (Men: 1.2%; Women: 1.4%) and head (Men: 0.8%; Women: 0.4%), corroborating the results of our study.

Head tattoos represented a small proportion of our findings (3,8%; n = 9), predominantly consisting of written tattoos, ornaments, animals and human figures. This prevalence is consistent with findings reported in other studies[15,25]. The rarity of head tattoos in forensic identification cases underscores their potential significance as distinctive markers in human identification[40,41] and the importance of the forensic dentist to work in these cases.

More remarkably, our study revealed an absence of documented cases involving intraoral tattoos in the Brazilian news in the decade 2014-2024. However, it remains uncertain whether the absence of documented intraoral tattoo cases reflects an actual rarity of this practice in Brazil or merely insufficient documentation and reporting in the forensic cases analyzed. Intraoral tattoos may exist but were not explicitly mentioned or highlighted in the news reports examined, suggesting a potential gap in forensic awareness or standardization of reporting protocols. The rarity of intraoral documentation in contemporary forensic cases may reflect either a genuine decline in this practice or inadequate recording of such distinctive

oral features in accessible forensic databases. Given the oral cavity's unique microenvironment, intraoral tattoos present an underexplored yet potentially valuable resource for forensic dentists[40,41]. Integrating intraoral tattoo assessment into standardized forensic identification protocols could enhance the discriminatory power of oral-based identification methods, particularly in cases where conventional dental records are unavailable or compromised. This integration would be especially relevant in mass disaster scenarios and criminal investigations, where the combination of head and intraoral tattoo documentation could provide complementary evidence for victim identification[22,40,41].

The role of tattoos in human identification is particularly evident in mass disasters scenarios. Although less frequent than other methods, tattoos have been crucial in certain contexts, especially when body condition or logistical constraints limit the use of primary methods[7,8,12,24]. Tattoos offer practical advantages: they are stable and durable, easily detected during necropsy, identifiable even on isolated body parts, and provide a low-cost, rapid means of comparison. Despite the possibility of similar designs being tattooed on multiple individuals, unique features such as pigment intensity, skin type, and line definition make each tattoo distinctive[10,11,36,42].

Furtado *et al.* (2024)[10] reported two cases of successful identification through anthropological analysis of complex tattoos after the Brumadinho dam collapse in 2019, which caused 272 deaths. In one instance, even and advanced state of decomposition did not prevent identification. Relatives provided descriptions, which were cross-checked with a low-resolution photo from Facebook. Despite the poor image quality, sufficient points of convergence between ante and postmortem characteristics were identified, leading to a positive identification.

Other major events have reinforced the value of tattoos in forensic contexts. Following the 2004 tsunami in Thailand, tattoos proved easier to detect than scars under adverse conditions, and the collaboration of local staff was crucial for correct interpretation, emphasizing the need for cultural and contextual understanding[7,13]. Blau, *et al.* (2022)[8,24] also documented cases where tattoos were instrumental in the Shoreham Airshow crash in England (2015) and Pamir Airways flight 112 crash, where even a skin fragment unsuitable for DNA analysis allowed positive identification due to unique tattoo characteristics.

Because they are engraved in deeper layers of the skin, tattoos often withstand burns and advanced decomposition, making them particularly valuable in mass casualty incidents where other methods are not viable[13,19,42]. In mass disasters with significant body fragmentation, such as isolated limbs, the exclusive use of primary methods may be insufficient. In such cases, the victim's identity is often ascertained by accessing antemortem data and analyzing limitations of the context. Therefore, secondary methods, such as the use of tattoos,

become essential for overcoming barriers in the identification process[24].

Overall, tattoos represent a robust tool for human identification, offering consistent patterns for individualization. In Brazil, their use in forensic practice has expanded significantly over the past decade, yielding promising results despite untapped potential. The growing prevalence of tattoos in contemporary society[43,44] has substantially increased the likelihood of tattoo-based identifications in forensic cases. Notably, social media platforms have emerged as powerful in amplifying tattoo visibility and documentation, as individuals increasingly share photographs of their tattoos online[43,45–47], creating extensive digital archives that can be leveraged for forensic identification purposes. Continued investment in methodologies and protocols for tattoo-based identification is crucial, as it provides an economically viable complement to other technologies[15].

A limitation of this study is its reliance on open-source information obtained via Google News® and the official police websites. However, previous research has demonstrated the reliability and validity of such data sources[16,18,48]. Future studies should incorporate records from Brazil´s official forensic medicine institutes to strengthen these findings.

Press coverage in digital media, especially through popular editorials, plays a crucial role in shaping public perceptions and can serve as an important ally in state strategies to reduce the number of unidentified deaths.

CONCLUSION

Tattoos proved decisive in 61.4% of identifications, demonstrating their substantial utility as a forensic identification tool. The demographic analysis revealed a higher prevalence among men (204 individuals) and those aged 20–29. Geographically, the Northeast region emerged with the highest number of cases (89), with Rondônia leading at the state level. Text-based tattoos were the most common tattoo type observed (32.9%), predominantly located on the upper limbs (48.5%).

The use of tattoos emerges as a rapid, cost-effective, and promising solution for victim identification, particularly relevant in cases of violent deaths and mass disasters. Popularizing this identification method can drastically reduce the number of unidentified individuals in Brazil.

ACKNOWLEDGMENTS

The authors would like to thank Pontifícia Universidade Católica de Minas Gerais for infrastructure support and the use of its facilities.

This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – Brasil (CAPES) – Finance Code 001.

RESUMO

As tatuagens servem como ferramentas forenses valiosas para a identificação de vítimas de desastres e crimes, devido à sua notável resistência à degradação. Dada a maior margem de erro associada a muitos métodos secundários de identificação post-mortem, as tatuagens oferecem um meio de identificação confiável e potencialmente primário, sendo cada vez mais reconhecidas por sua singularidade e popularidade crescente. Este estudo teve como objetivo investigar casos no Brasil na última década (2014–2024) em que as tatuagens foram utilizadas como métodos exclusivos ou auxiliares para a

identificação de corpos envolvidos em contextos criminais. A metodologia retrospectiva incluiu uma revisão abrangente da literatura (PubMed e Bireme), complementada por consultas de dados em sites oficiais das polícias brasileiras e reportagens do Google News (notícias jornalísticas). Estatísticas descritivas foram empregadas para caracterizar os padrões de uso de tatuagens na identificação. Foram analisadas 261 notícias, que revelaram um aumento significativo nas identificações auxiliadas por tatuagens ao longo dos anos ($r = 0,941$; $p < 0,001$). Geograficamente, a região Nordeste relatou o maior número de casos (89), com Rondônia liderando em nível estadual (30). As tatuagens mostraram-se decisivas em 61,4% das identificações, apresentando maior prevalência entre homens (204) e indivíduos na faixa etária de 20 a 29 anos. O tipo de tatuagem mais comum observado foi o baseado em texto (32,9%), predominantemente localizado nos membros superiores (48,5%). Em conclusão, o uso de tatuagens surge como uma solução rápida, econômica e promissora para a identificação de vítimas, sendo particularmente relevante em casos de mortes violentas e desastres em massa. A popularização deste método de identificação pode reduzir drasticamente o número de indivíduos não identificados no Brasil.

PALAVRAS-CHAVE
Antropologia forense; Tatuagem; Identificação de vítimas.

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