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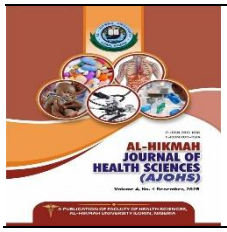

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Original Article

Regulatory Gaps and Occupational Health Risks in Nigeria's Body Art Industry

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ABSTRACT

Introduction: The rapid expansion of tattooing and body piercing in Nigeria has occurred largely outside formal occupational health governance frameworks, raising significant concerns regarding practitioner and client safety. Although these practices involve intentional skin penetration and exposure to blood and chemical substances, they remain predominantly unregulated. This study examined the extent to which regulatory gaps contribute to occupational health risks within Nigeria's body art industry, moving beyond individual-level explanations to interrogate structural determinants of unsafe practice.

Methods: A quasi-experimental design was employed, involving baseline and post-intervention assessments of 59 tattoo and body piercing artists operating in selected urban settings. Data were collected using a structured questionnaire assessing knowledge, attitudes, self-reported practices, and exposure to regulatory oversight, and were analysed using descriptive and inferential statistical techniques.

Results: The findings revealed persistently low (< 15%) compliance with health safety practices, despite moderate levels of awareness (28.8%), highlighting a pronounced knowledge–practice gap. Notably, most practitioners reported no experience of routine inspection, licensing requirements, or formal enforcement mechanisms, underscoring the absence of a coherent national regulatory framework. Educational interventions produced improvements in knowledge but had a limited impact on sustained behavioural change in the absence of external regulation.

Conclusion: The study concludes that occupational health risks in Nigeria's body art industry are not merely a function of inadequate training but are structurally embedded within a regulatory vacuum. Strengthening national standards, inspection regimes, and institutional accountability is therefore essential to safeguarding public health and advancing occupational safety within this rapidly growing informal sector.

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Introduction

Body art practices, particularly tattooing and body piercing, have experienced substantial global expansion over the past two decades, shifting from marginal cultural expressions to widely accepted forms of aesthetic modification and identity construction. This transformation has been driven by changing social norms, increased visibility in popular culture, and the influence of global media, which have collectively normalised body modification across diverse demographic groups (Sindoni *et al*., 2021). In Nigeria, this trend has been especially evident among young adults in urban centres, where tattoo studios and informal piercing outlets have proliferated in response to growing consumer demand. The increasing visibility and social acceptability of body art within Nigerian cities reflect broader processes of cultural globalisation and generational change.

Despite this rapid expansion, the institutional and regulatory response to body art practices in Nigeria has remained limited. Tattooing and body piercing involve deliberate penetration of the skin, repeated contact with blood and bodily fluids, and exposure to chemical substances contained in inks and pigments. These characteristics align body art practices with other high-risk occupational activities that require strict infection prevention and control measures. Studies have demonstrated that such procedures carry risks of blood-borne infections, including hepatitis B and hepatitis C, as well as bacterial skin infections and allergic reactions linked to ink components (Serup *et al*., 2015). Additional research has highlighted the occurrence of adverse effects associated with tattooing in community settings, reinforcing the need for systematic safety controls to protect both practitioners and clients (Sindoni *et al*., 2021).

The core problem addressed in this study arises from the disconnect between the recognised health risks associated with body art practices and the weak regulatory oversight governing the sector in Nigeria. Unlike healthcare and other regulated personal service industries, the body art industry largely operates within the informal economy, with limited institutional monitoring or enforcement of safety standards. Empirical evidence from Nigerian contexts indicates that unsafe practices, including inconsistent sterilisation of equipment, improper disposal of sharps, and limited use of personal protective equipment, remain prevalent among tattoo artists and body piercers (Ehwarieme & Amieghemie, 2018). These practices persist despite moderate levels of awareness regarding health risks, suggesting that knowledge alone is insufficient to ensure safe conduct in the absence of external regulatory controls.

Focusing solely on individual knowledge and attitudes risks obscuring the structural conditions that shape occupational behaviour within the body art industry. Where enforceable standards, routine inspections, and formal accountability mechanisms are absent, unsafe practices may become normalised as part of everyday professional routines. This study, therefore, frames regulatory gaps, rather than practitioner negligence alone, as a central determinant of occupational health risk within Nigeria's body art industry, positioning regulation as a critical component of effective risk mitigation.

Methods

Study Design

This study employed a quasi-experimental design with baseline and end-line assessments to examine occupational health knowledge, attitudes, practices, and regulatory exposure among tattoo artists and body piercers. This approach was appropriate given the practical and ethical constraints of randomisation in informal occupational settings, where practitioners operate independently. Quasi-experimental designs are widely used to evaluate interventions and structural influences in real-world contexts where controlled experimentation is impractical (Rogers & Revesz, 2019). The design enabled assessment of change over time while examining how regulatory conditions shape occupational behavior beyond individual training effects.

Study Setting and Population

The study was conducted in Ijebu-Jesa and Ede local governments within Osun State, south-western Nigeria, where tattooing and body piercing services are increasingly visible. These locations were selected due to the documented presence of both established tattoo studios and informal piercing outlets, providing a representative cross-section of practice contexts within the state. Urban settings were prioritized given their higher concentration of young adults and greater demand for body art services, which amplify both occupational exposure and potential public health impact.

The study population comprised practising tattoo artists and body piercers operating within the selected communities at the time of data collection. Eligibility criteria included active engagement in tattooing or body piercing services and willingness to participate in both baseline and end-line assessments. Practitioners varied in age, educational background, years of professional experience, and training mode, reflecting the heterogeneity characteristic of Nigeria's body art industry. This diversity was critical to

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capturing variations in health safety practices and regulatory exposure across different practitioner profiles.

Data Collection Instruments
Data were collected using a structured, researcher-designed questionnaire developed to assess four key domains: knowledge of health safety practices, attitudes toward health safety, self-reported occupational practices, and exposure to regulatory oversight. The knowledge section evaluated understanding of infection prevention, sterilisation procedures, waste disposal, and universal precautions. Attitudinal items explored perceptions of occupational risk, responsibility for safety, and views on regulation and inspection. The practice section assessed routine behaviours, including equipment sterilisation, use of personal protective equipment, and sharps disposal methods. Regulatory exposure items captured participants' awareness of formal standards, experience of inspections, and licensing status.

The questionnaire was refined following a pilot phase and demonstrated acceptable internal consistency, with Cronbach's alpha coefficients ranging between 0.70 and 0.80 across the major scales. These reliability values are consistent with established benchmarks for social and health science research instruments, supporting the tool's suitability for assessing occupational health constructs (Nunnally & Bernstein, 1994). The instrument was administered at baseline prior to the intervention and repeated at end-line to assess changes over time.

Sample Recruitment Strategy and Recruitment
Participants were recruited through field visits to tattoo studios and body piercing outlets in Ijebu-Jesa and Ede Local Government Areas of Osun State, Nigeria. Eligible practitioners actively engaged in tattooing or body piercing were approached directly, informed about the study objectives, and invited to participate. Only individuals willing to complete both baseline and end-line assessments were enrolled following informed consent.

Sampling Technique
A purposive sampling approach, combined with snowball recruitment, was employed to identify eligible participants actively engaged in tattooing and body piercing within the study locations. Initial participants were identified through local networks and studio visits, after which additional practitioners were recruited via peer referral. This approach was appropriate given the informal and unregistered nature of the industry.

Educational Intervention
The educational intervention comprised a structured occupational health and safety sensitisation programme delivered after the baseline assessment. Training covered infection prevention, sterilisation procedures, use of personal protective equipment, sharps disposal, waste management, and awareness of blood-borne infection risks. Interactive teaching methods, including presentations, demonstrations, and discussions, were used to promote the practical application of safe occupational practices.

Data Analysis
Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) version 23. Descriptive statistics were used to summarize socio-demographic characteristics and baseline levels of knowledge, attitudes, practices, and regulatory exposure. Inferential statistical techniques were employed to examine relationships among variables and to assess changes from baseline to endline. Tests included independent-samples t-tests, analysis of variance (ANOVA), correlation analysis, and effect size estimation using Cohen's d, consistent with best practices in intervention evaluation research.
Statistical significance was set at a 5% level. Emphasis was placed on the interpretation of patterns and relationships rather than on isolated numerical values, in line with the study's analytical focus on structural determinants of occupational health behaviour. This approach facilitated integration of quantitative findings with theoretical and policy-oriented analysis.

Ethical Considerations
Ethical approval for this study was obtained from the Osun State Health Research Ethical Committee, with approval number OSHREC/PRS/569T/579 prior to data collection. Participation was voluntary, and informed consent was obtained from all respondents after providing clear information regarding the study's purpose, procedures, and potential risks. Anonymity and confidentiality were maintained throughout the research process, and data were used solely for academic purposes in accordance with ethical research standards (World Medical Association, 2013).

Results
Socio-Demographic Characteristics of Respondents
Data were analysed for 59 participants comprising practising tattoo artists and body piercers operating within the selected urban communities. The socio-demographic profile reflects a predominantly young and economically active workforce, consistent with the demographic groups most engaged in Nigeria's

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expanding body art sector. Participants exhibited wide variation in age, educational attainment, years of professional experience, and pathways into practice, underscoring the heterogeneous and informal character of the industry.

Educational attainment ranged from basic formal education to post-secondary qualifications, although a substantial proportion of respondents reported no specialised vocational or health-related training. This finding is particularly salient given the technical and hygienic demands of body art practice. Years of professional experience also varied considerably, indicating that occupational longevity does not necessarily correspond with formal skill development or regulatory exposure. These characteristics provide critical contextual grounding for interpreting patterns observed in knowledge, attitudes, practices, and regulatory oversight.

Table 1. Socio-Demographic Characteristics of Tattoo and Body Piercing Artists (N = 59)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	18–24	15	25.4
	25–34	28	47.5
	35–44	12	20.3
	45 and above	4	6.8
Sex	Male	41	69.5
	Female	18	30.5
Highest educational level	Primary education	9	15.3
	Secondary education	26	44.1
	Post-secondary education	24	40.6
Years of professional experience	Less than 2 years	14	23.7
	2–5 years	21	35.6
	More than 5 years	24	40.7
Mode of training	Informal apprenticeship	37	62.7
	Self-taught	12	20.3
	Formal training/course	10	16.9

Table 1 presents a detailed overview of respondents' age distribution, educational levels, professional experience, and training background. The table illustrates the absence of standardised entry requirements into the profession, reinforcing the informal nature of body art practice in the study setting and its implications for occupational health governance.

Knowledge of Health Safety Practices

Analysis of respondents' knowledge revealed uneven understanding of health safety practices across key domains. While many participants demonstrated awareness of basic hygiene principles, gaps were evident in more technical aspects of infection prevention, including universal precautions, appropriate sterilisation procedures, and biomedical waste management. This pattern suggests that knowledge acquisition within the industry is often partial and fragmented rather than comprehensive.

Notably, higher knowledge levels were not consistently associated with greater years of professional experience, indicating that experiential learning alone does not guarantee improved understanding of occupational health risks. This finding challenges the assumption that time spent in practice naturally leads to safer conduct and instead highlights the absence of structured mechanisms for reinforcing and updating safety knowledge.

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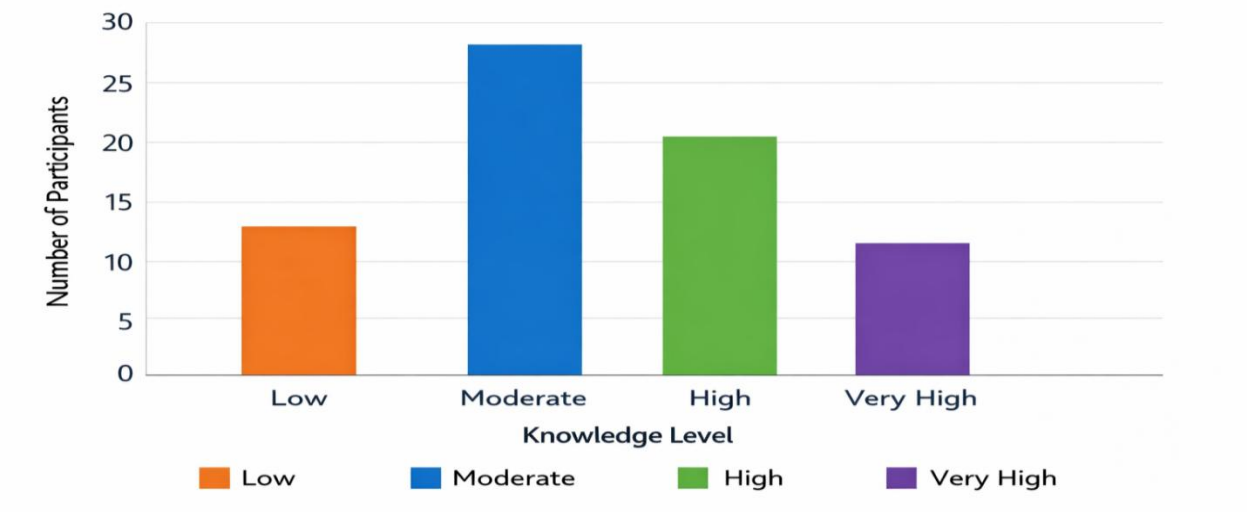

Figure 1: Distribution of Health Safety Knowledge among Tattoo and Body Piercing Artists

Figure 1 illustrates the spread of knowledge levels across respondents. The figure shows a concentration of participants within average knowledge categories, with fewer demonstrating high levels of comprehensive understanding. This distribution provides empirical support for the presence of awareness without depth, a condition that may be insufficient to sustain safe practice in the absence of regulatory reinforcement.

Attitudes toward Health Safety Practices

Respondents' attitudes toward health safety practices revealed a nuanced relationship between perceived importance and professional commitment. Although many participants expressed general agreement with the need for hygienic procedures, this recognition did not consistently translate into a strong sense of obligation or accountability. Safety was often framed as a personal or discretionary matter rather than a professional requirement.

Attitudes toward regulation and inspection were similarly ambivalent. Some respondents viewed external oversight as unnecessary or potentially disruptive to their work, while others acknowledged that inspection could contribute to improved standards and professional legitimacy. These divergent attitudes reflect the broader regulatory environment, in which safety norms are shaped primarily by peer practices rather than institutional expectations.

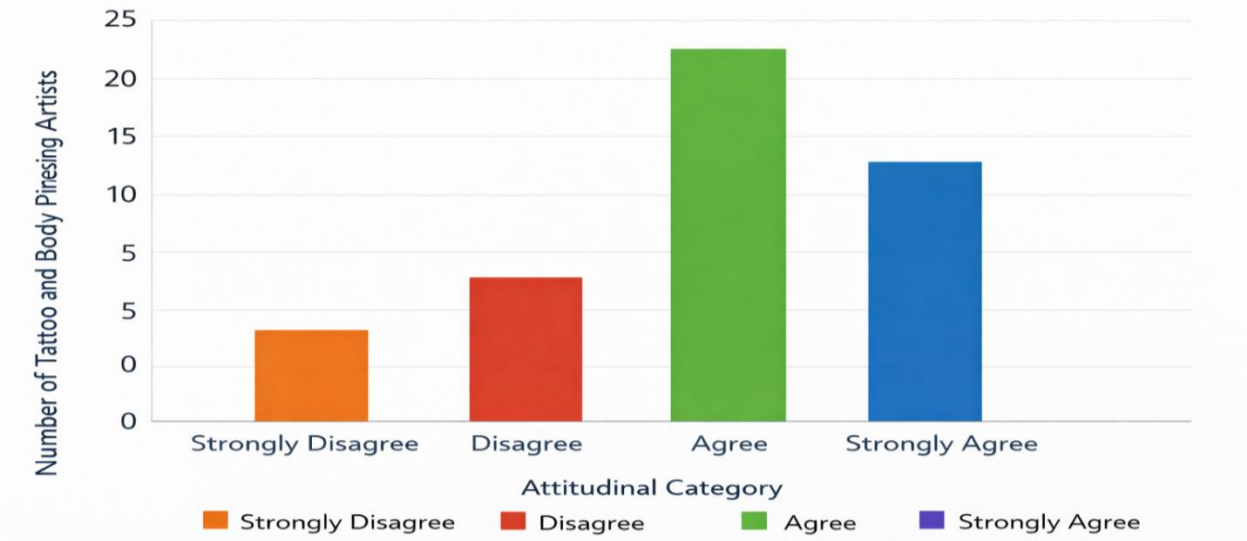

Figure 2: Attitudinal Disposition toward Health Safety Practices

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Figure 2 presents the distribution of respondents' attitudes across key safety dimensions. The figure demonstrates that positive attitudes toward health safety are present but uneven, reinforcing the distinction between attitudinal endorsement and consistent behavioural compliance.

Health Safety Practices and Compliance

Self-reported health safety practices revealed significant inconsistencies between knowledge, attitudes, and behaviour. Although some respondents reported regular adherence to practices such as equipment sterilisation and basic hand hygiene, unsafe practices remained widespread. These included irregular use of personal protective equipment, reliance on improvised sharps disposal methods, and inconsistent disinfection of work surfaces between clients.

The persistence of unsafe practices despite moderate knowledge and generally favourable attitudes underscores a pronounced knowledge–practice gap. In the absence of routine inspection or enforceable standards, compliance appears to be influenced more by convenience, cost considerations, and entrenched peer norms than by formal occupational health principles. This finding aligns with broader occupational health literature emphasising that voluntary adherence is unlikely to be sustained without external accountability mechanisms.

Table 2. Health safety practices among tattoo and body piercing artists (N = 59)

Health safety practice	Practice category	Frequency (n)	Percentage (%)
Sterilisation of instruments between clients	Always	26	44.1
	Sometimes	21	35.6
	Rarely/Never	12	20.3
Use of disposable needles	Always	31	52.5
	Sometimes	18	30.5
	Rarely/Never	10	16.9
Use of personal protective equipment (e.g., gloves)	Always	24	40.7
	Sometimes	20	33.9
	Rarely/Never	15	25.4
Hand hygiene before and after procedures	Always	29	49.2
	Sometimes	19	32.2
	Rarely/Never	11	18.6
Sharps disposal using approved containers	Always	17	28.8
	Sometimes	22	37.3
	Rarely/Never	20	33.9
Disinfection of work surfaces between clients	Always	23	39.0
	Sometimes	24	40.7
	Rarely/Never	12	20.3

The table summarises respondents' self-reported practices. The table highlights selective application of safety measures rather than systematic compliance, reinforcing the argument that regulatory absence contributes directly to inconsistent occupational behaviour.

Regulatory Exposure and Oversight

Regulatory exposure among respondents was markedly limited. The majority of participants reported no prior experience of formal inspection, licensing, or engagement with health authorities in relation to their professional activities. Awareness of existing guidelines, where present, was informal and not linked to enforceable obligations or monitoring mechanisms.

This lack of regulatory contact has profound implications for occupational health governance. Without inspection, licensing, or sanctions, practitioners operate within an environment where unsafe practices carry minimal external consequences. Such conditions weaken incentives for sustained compliance and undermine efforts to standardise safety procedures across the industry.

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Table 3. Indicators of regulatory oversight and inspection among tattoo and body piercing artists (N = 59)

Regulatory indicator	Response category	Frequency (n)	Percentage (%)
Ever inspected by a health or regulatory authority	Yes	9	15.3
	No	50	84.7
Awareness of any formal health safety guidelines for body art	Aware	17	28.8
	Not aware	42	71.2
Possession of any form of operating licence or permit	Licensed	7	11.9
	Not licensed	52	88.1
Receipt of official guidance on infection control	Yes	12	20.3
	No	47	79.7
Perceived necessity of routine inspection	Necessary	34	57.6
	Not necessary	25	42.4

Table 3 details respondents' exposure to regulatory mechanisms, including inspection history and awareness of formal standards. The table underscores the near-complete absence of institutional oversight, providing a structural explanation for the occupational health risks identified across earlier result sections.

Table 4. Cross-table synthesis linking socio-demographic characteristics, health safety practices, and regulatory oversight (N = 59)

Dimension	**Patterns from Table 1 (Socio-demographics)**	**Patterns from Table 2 (Practices)**	**Patterns from Table 3 (Regulation)**	**Implication**
Age and experience	Majority aged 25–34 with over 2 years' experience	Selective compliance rather than consistent adherence	Minimal inspection regardless of experience	Experience alone does not ensure safer practice without oversight
Education level	Many with secondary or post-secondary education	Moderate use of PPE and sterilisation	Low awareness of formal guidelines	Formal education is insufficient without sector-specific regulation
Mode of training	Predominantly informal apprenticeship	Inconsistent sharps disposal and surface disinfection	No standardised training requirements	Informal training reproduces unsafe norms
Professional status	Largely unlicensed practitioners	Partial compliance across most safety indicators	Absence of licensing and inspection	Regulatory absence normalises risk-taking behaviour

Table 4 demonstrates that occupational health risks in Nigeria's body art industry are shaped by the interaction of informal workforce characteristics and weak regulatory governance. Despite moderate education levels and professional experience, practitioners exhibited inconsistent safety practices, indicating that individual attributes alone do not determine compliance. Informal training pathways and a lack of licensing requirements reinforce unsafe norms, while minimal inspection removes external accountability. Crucially, regulatory absence cuts across all demographic groups, neutralising the potential protective effects of experience or education. These findings reinforce the argument that occupational risk is structurally produced and that regulatory reform is essential for translating knowledge and attitudes into sustained safe practice.

Discussion

This study set out to examine the relationship between regulatory gaps and occupational health risks within Nigeria's body art industry, and the findings collectively demonstrate that unsafe practices persist not primarily because of complete ignorance, but because of weak institutional governance. Analysis of data from 59 participants revealed moderate levels of awareness regarding health safety principles, yet this awareness did not consistently translate into safe occupational behaviour. Knowledge, attitudes, and practices were misaligned, with practitioners often expressing support for hygiene and safety while simultaneously engaging in behaviours that exposed both themselves and clients to preventable risks.

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A central empirical insight is the near absence of regulatory exposure across the study population. Most respondents reported no experience of inspection, licensing, or formal engagement with health authorities. This finding provides a critical contextual explanation for the observed knowledge–practice gap and aligns with evidence from comparable low-regulation settings, where occupational behaviour is shaped more by informal norms than by enforceable standards (Tamene & Yemane, 2022). Taken together, the results indicate that occupational health risks in Nigeria's body art industry are structurally embedded within a regulatory vacuum rather than being solely attributable to individual negligence.

Regulation as a Structural Determinant of Occupational Health Risk

The findings strongly support the conceptualisation of regulation as a structural determinant of occupational health risk within the body art industry. In regulated occupational settings, safety practices are reinforced through licensing, routine inspections, and sanctions, which establish clear expectations and accountability mechanisms (Schmidt, 2015). By contrast, Nigeria's body art industry operates largely outside such frameworks, allowing unsafe practices to become normalised. The absence of enforceable standards removes external incentives for compliance, leading practitioners to rely on personal judgment or peer-derived norms when making decisions about sterilisation, waste disposal, and protective equipment use. This reliance reflects a permissive risk environment in which safety is discretionary rather than obligatory (Kluger, 2019).

Comparative evidence from regulated contexts underscores the importance of enforcement. Studies from Europe and North America show that compulsory certification and inspection are associated with higher compliance and more consistent application of infection control measures (Serup & Bäumler, 2017). The contrast with the Nigerian context highlights regulation not merely as an administrative requirement but as a foundational mechanism shaping occupational culture. In its absence, responsibility for risk management is individualised, obscuring the role of governance in preventing harm.

A further key finding is the persistence of a knowledge–practice gap despite moderate awareness among practitioners. This mirrors earlier Nigerian studies reporting that training improves knowledge without ensuring sustained behavioural change (Ehwarieme & Amieghemie, 2018). The Theory of Planned Behaviour helps explain this pattern, as behaviour is shaped not only by knowledge and attitudes but also by subjective norms and perceived behavioural control, both of which are influenced by regulatory environments (Ajzen & Madden, 1986). Without inspections or sanctions, training produces short-term gains that are unlikely to be sustained. These findings align with international evidence linking unregulated body art practices to infection and dermatological risks (Jafari *et al*., 2012; Serup *et al*., 2015; Sindoni *et al*., 2021; Tamene & Yemane, 2022) and reinforce the argument that regulatory absence is a generalisable occupational risk factor in informal settings.

Public Health and Occupational Health Implications

The implications of these findings extend beyond individual practitioners to encompass broader public health concerns. Unsafe tattooing and body piercing practices increase the risk of transmitting infectious diseases within communities, placing additional strain on already overburdened health systems. Where surveillance systems fail to capture tattoo-related complications, the true scale of these risks remains obscured, limiting effective policy response (Kluger, 2019).

From an occupational health perspective, the findings highlight the vulnerability of workers operating within informal sectors that fall outside conventional regulatory frameworks. Tattoo artists and body piercers are exposed to hazards comparable to those faced by healthcare workers, yet they lack equivalent institutional protections. Addressing this disparity requires reconceptualising body art not merely as a cultural or aesthetic activity, but as an occupation warranting formal health and safety governance.

Ultimately, the discussion underscores that occupational health risks in Nigeria's body art industry are not inevitable consequences of cultural practice, but preventable outcomes shaped by regulatory choices. Strengthening governance structures represents a critical step toward protecting practitioners, clients, and the wider public.

Policy and Practice Implications

The findings demonstrate a clear need for regulatory reform to address occupational health risks within Nigeria's body art industry. The absence of enforceable national standards has enabled unsafe practices to persist despite moderate practitioner awareness, indicating that education alone is insufficient without institutional support. Developing nationally recognised infection prevention and control

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standards specific to tattooing and body piercing is therefore essential. Such standards should address sterilisation, waste disposal, facility hygiene, and safe handling of inks and sharps, aligning body art practice with public health principles.

Clear institutional responsibility is also required. Federal and state health authorities, working with local government environmental health officers, should be mandated to license and inspect body art establishments. Routine inspections would promote compliance and normalise safety as a professional obligation rather than a discretionary choice, while proportionate regulation would minimise the risk of further informality.

Integrating the body art industry into existing occupational health and safety frameworks would enhance practitioner protection and public health surveillance. Mandatory training linked to certification and periodic renewal would reinforce safe practices and professional legitimacy, shifting risk management from individual discretion to shared institutional responsibility.

Intervention Impact Analysis

Comparison between baseline and post-intervention findings revealed that while knowledge improved significantly, behavioural change remained limited. This reinforces the persistence of the knowledge–practice gap in the absence of regulatory enforcement.

Conclusion

This study demonstrates that occupational health risks within Nigeria's body art industry are not primarily the result of individual ignorance but are sustained by a regulatory vacuum that weakens accountability and normalises unsafe practice. Evidence from 59 practitioners shows that moderate knowledge and generally positive attitudes fail to translate into consistent safe behaviour in the absence of enforceable standards, routine inspection, and institutional oversight. Addressing these risks, therefore, requires a shift from individualised interventions toward comprehensive regulatory reform that integrates tattooing and body piercing into national occupational health and public health governance frameworks.

Limitations

This study has several limitations that should be considered when interpreting the findings. The sample size of 59 participants, while suitable for exploratory analysis in an informal occupational setting, limits generalisability beyond the selected urban communities, as body art practices may vary across regions of Nigeria. Reliance on self-reported data introduces the potential for social desirability and recall bias, with practitioners possibly overstating compliance. The absence of an external regulatory benchmark constrained direct comparison with formally enforced standards. Additionally, the quasi-experimental design could not fully isolate broader contextual influences on behaviour. Nonetheless, the study offers valuable insight into the structural role of regulation in shaping occupational health risk.

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