



The Prevalence of Skin-tattooing and HIV among Students of Three Tertiary Institutions in Ondo State, Southwest, Nigeria

**G. O. Daramola^{1*}, A. O. Oluyeye², H. A. Edogun¹, A. O. Ajayi³, C. O. Esan⁴,
A. O. Ojerinde⁵, O. O. Ajala⁶, A. Agbaje⁶, O. Ogunfolakan⁷ and A. Egbebi⁷**

¹*Department of Medical Microbiology and Parasitology, Ekiti State University Teaching Hospital, Ado-Ekiti, Nigeria.*

²*Department of Microbiology, Ekiti State University, Ado-Ekiti, Nigeria.*

³*Department of Microbiology, Federal University, Oye-Ekiti, Ekiti State, Nigeria.*

⁴*Ekiti State University, University Health Centre, Ado-Ekiti, Nigeria.*

⁵*Federal University, University Health Centre, Oye-Ekiti, Ekiti State, Nigeria.*

⁶*Department of Haematology and Blood Transfusion, Ekiti State University Teaching Hospital, Ado-Ekiti, Nigeria.*

⁷*Department of Medical Laboratory Science, Afe Babalola University, Ado-Ekiti, Nigeria.*

Authors' contributions

This work was carried out in collaboration between the authors. Author GOD designed the research and did the laboratory and statistical analysis. Authors HAE, OOA, OO, AOA and AE provided the support. Author A. O. Oluyeye participated in the research design. Authors COE and A. O. Ojerinde did the sample collection, while author AA participated in part of the laboratory analysis. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JAMB/2017/37366

Editor(s):

(1) Ana Claudia Correia Coelho, Department of Veterinary Sciences, University of Trás-os-Montes and Alto Douro, Portugal.

(2) Clara Eleazar, Medical Microbiology, University of Nigeria, Nigeria.

(3) Arun Karnwal, Professor, Microbiology, School of Bioengineering & Biosciences, Lovely Professional University, India.

Reviewers:

(1) Chandni Merchant, Willamette Valley medical center, USA.

(2) Oti Baba Victor, Nasarawa State University, Nigeria.

Complete Peer review History: <http://www.science domain.org/review-history/21896>

Original Research Article

Received 12th October 2017
Accepted 6th November 2017
Published 14th November 2017

ABSTRACT

With the huge potential health hazards and dangers associated with skin and sclera tattooing, there is hardly any responsible government anywhere that will not take interest in the rate and manner its populace in general and the youths in particular engage in the practice of skin tattooing and put

*Corresponding author: E-mail: gabrielodaramola@yahoo.com;

some form of regulations in place. This study is aimed at determining the prevalence of skin tattooing among the undergraduates of three universities in Ondo State (Southwest, Nigeria) and also determine if any of those with tattoos had contacted any blood-borne diseases as a result of this. This is especially needful in a country like Nigeria that does not yet have any regulations in place as regards the practice of skin-tattooing. One hundred each, making a total of three hundred participants were enrolled in the study from the three universities. Five millilitre of blood from each subject was screened for the presence HIV antibodies (DETERMINE[®]) according to the manufacturer's instructions. The subjects were also asked to complete a structured self-administered questionnaire. The result revealed a zero sero-prevalence of antibodies to HIV, but a skin tattooing prevalence of 20%, 9% and 0% among the undergraduates of Adekunle Ajasin University, Akungba-Akoko; Achiever's University, Owo and Federal University of Technology, Akure, respectively. Thus representing an overall skin tattooing prevalence of 9.6%. The study also showed that 8.3% of the subjects had a history of blood transfusion, while 7.3% had a history of surgery. It was therefore concluded that skin tattooing was not a statistically significant major risk factor for HIV/AIDS among the undergraduates, though this does not in any way obliterate the potent potential risk for the transmission of HIV that is inherent in any practice like skin tattooing that pierces the human skin with sharp or pointed objects.

Keywords: Skin tattooing; HIV; students; risk factors; Ondo State.

1. INTRODUCTION

Though tattooing of the skin has been part of the traditional African culture since time immemorial, its re-emergence in modern day time has many disturbing dimensions and implications [1-3]. In traditional African settings, skin-tattooing was practised essentially for the purposes of beauty (particularly among the womenfolk), ethnic identification and sometimes for the preservation of vital personal records [1]. A very good example of the use of skin-tattooing for the last stated purpose is preservation of the record of a child's date of birth. In those days, very limited areas of the skin were tattooed and also, the most commonly tattooed part of the body, was the arm, even among the sections of the womenfolk that practised skin-tattooing for beauty purposes.

Sadly, nowadays, skin-tattooing has become more of a social malady among the youths, who practice it for all sorts of ignoble purposes and equally in extremely despicable manners [3,4]. Some youths go to the extreme of tattooing about 90% of their skin surface area, while yet others practice skin-tattooing for cultist purposes [5-9]. With such dangerous dimensions to the practice of skin-tattooing and given the fact that the sterility of the needles and other sharps that they use in such practices cannot be guaranteed, skin-tattooing has therefore become a health issue and a likely mode of transmission of communicable diseases, including HIV [10-13]. Skin-tattooing- just like any other social or cultural practice where the skin is pierced with

sharp or pointed objects outside the conventional hospital settings, where requisite facilities for proper sterilisation are available- carries a degree of risk of transmission of blood-borne diseases including HIV [14-17].

Some ladies also have a penchant for tattooing sensitive parts of their bodies and flaunting same [18]. This is a social malady which started creeping into the western societies in Europe and the US in the early nineties but is now more of a global public health issue. By the turn of the millennium it was estimated that about 36% of Americans between the age-bracket 25- 29 had a least one body tattoo [19-21].

2. MATERIALS AND METHODS

2.1 Study Population

A total of three hundred undergraduates were enrolled from three tertiary institutions in Ondo State (Southwest, Nigeria), one hundred individuals from each institution, namely;

1. Adekunle Ajasin University, Akungba-Akoko (state-owned)
2. Achiever's University, Owo (private university)
3. Federal University of Technology, Akure (federal government-owned)

2.2 Exclusion Criteria

Students who were not schooling in the three participating universities as at the time of the study were excluded from the study.

2.3 Sample Collection and Preparation

Four millilitre of whole blood samples were obtained from the participating undergraduates using the venepuncture method. These were collected into Ethylene Diamine Tetra-acetic Acid (EDTA) at 1.5 mg/mL concentration. Samples were allowed to separate into plasma and corpuscles on the bench.

2.4 Anti-HIV Detection

All the samples were screened for the presence of antibodies to HIV using a highly sensitive (100% level of sensitivity) rapid test kit-DETERMINE® (Abbott Diagnostic Division, Netherlands) as described by Amechi et al. [22]. The protective foil cover of the test pouch was removed and 50 µL (ie 0.05 ml) of plasma was applied to the sample-pad. After waiting for the plasma to migrate through the control and test windows, the result was read according to the manufacturer's instruction;

2.5 Administration of Questionnaire

Data were collected from the subjects through the use structured self-administered questionnaires, which were then statistically analysed using Ms Excel.

2.6 Ethical Clearance

Ethical clearance for the work was obtained from the Ekiti State University Teaching Hospital with the following ethical clearance certificate number: EKSUTH/A67/2011/09/021

3. RESULTS

The subjects enrolled in the study comprised of 182(60.7%) males and 115(38.3%) females. Three (1%) did not disclose their gender. Sixty, 47 and 75 respectively of the males were from Adekunle Ajasin University (AAUA); Achievers' University, Owo, (AUO) and Federal University of Technology, Akure(FUTA).

Out of the 115 females, 40, 50 and 25 respectively were from AAUA, AUO and FUTA. The mean age of the subjects was 22.3, SD, 4.29. One hundred and twenty-four (41.3%) of the subjects were 20 years of age or below; 169(56.3%) were between the 21-30 years age-bracket; 5(1.67%) were between the 31-40 years age-bracket; while 2(0.7%) did not disclose their age-group.

An overwhelming majority of the subjects 279 (93%) were single, while 10 (3.3%) of them were married. Eleven (3.7%) did not disclose their marital status.

The overall skin-tattooing prevalence was found to be 9.6%. On an institutional basis, the disaggregated skin-tattooing prevalence was found to be 20%, 9% and 0% respectively for AAUA, AUO and FUTA. Also, antibodies to HIV were not detected in any of the 300 subjects, thus representing HIV sero-prevalence of 0%. Eight point three percent of the subjects had a history of blood transfusion, while 7.3% had a history of surgery.

Table 1. Distribution of the subjects by gender

School (n=100)	Male	Female	Undisclosed	Total
AAUA	60	40	0	100
AUO	47	50	3	100
FUTA	75	25	0	100
Total	182	115	3	300

Legend: AAUA: Adekunle Ajasin University, Akungba-Akoko; AUO, Achievers' University, Owo; Federal University of Technology, Akure

Table 2. Subjects' distribution by age

School n=100	≤20	21-30	31-40	≥41	Undisclosed	Total
AAUA	25	75	0	0	0	100
AUO	50	46	4	0	0	100
FUTA	49	48	1	0	2	100
Total	124	169	5	0	2	300

Legend: AAUA: Adekunle Ajasin University, Akungba-Akoko; AUO, Achievers' University, Owo; Federal University of Technology, Akure

Table 3. Marital status

School	Single	Married	Divorced	Undisclosed	Total
AAUA (n=100)	92	2	0	6	100
AUO (n=100)	90	8	0	2	100
FUTA (n=100)	97	0	0	3	100
Total	279	10	0	11	300

Legend: AAUA: Adekunle Ajasin University, Akungba-Akoko; AUO, Achievers' University, Owo; Federal University of Technology, Akure

Table 4. History of blood transfusion, surgery and skin-tattooing

School	Yes			No			UD		
	BT	SG	ST	BT	SG	ST	BT	SG	ST
AAUA	10	8	20	90	91	79	0	1	1
AUO	10	10	9	90	90	91	0	0	0
FUTA	5	4	0	93	96	98	2	0	2
	25	22	29	273	277	268	2	1	3

Legend: BT: blood transfusion; SG: Surgery; ST: skin-tattooing

AAUA: Adekunle Ajasin University, Akungba-Akoko; AUO, Achievers' University, Owo; Federal University of Technology, Akure, UD: Undisclosed

Table 5. Subjects' HIV screening result

School	HIV screening	
	Negative	Positive
AAUA	100	0
AUO	100	0
FUTA	100	0
Total	300	0

Legend: AAUA: Adekunle Ajasin University, Akungba-Akoko; AUO, Achievers' University, Owo; Federal University of Technology, Akure

4. DISCUSSION

A tattoo is a permanent design, graphic or mark made by a tattoo artist on the skin with an ink, dye or pigment injected into the layer just below the outer surface of the skin [21]. Most people with tattoo on their skin do so for diverse reasons, without minding being aware of the potentially serious health hazards associated with it [21,22]. Quaranta et al. [23] in their study among college freshmen in Italy discovered that an overwhelming majority of the undergraduates with tattoos on their skin were unaware of the potential health hazards of skin-tattooing, apart from the risk of contracting HIV. Sixty percent of the students knew they stood the risk of contracting HIV, but only 38%, 34%, 34% and 28% were aware that they stood the risk of contracting hepatitis C, hepatitis B, tetanus or non-infectious complications respectively. Most of the subjects in this present study also appeared not to be aware of the great health dangers they exposed themselves to by tattooing their skin.

Some teenage girls or college ladies tattoo the names of the boyfriends on their skin as a display of their love or their commitment to their boyfriends. For some the attraction is just the opportunity for self-expression as a decorative art, while some do it to commemorate/celebrate an even or to memorialise the demise of a loved one. In a poll, it was discovered that as many as 30% of Americans who placed tattoos on their skin actually thought it made them feel sexier! Twenty-five percent said it made them feel rebellious, while 21% indicated it made them feel attractive or strong [8,23].

Of the three universities surveyed in this study, Adekunle Ajasin University, Akungba-Akoko tops the list with a skin-tattooing prevalence of 20%. Bravermann [3] in a poll reported a similar prevalence among adult Americans, whereas Shannon-Missal [8], few years after Bravermann's poll, found the prevalence in the US to have risen to 30%.

Often the craze or whatever justification the tattooist may have, make them to ignore or turn a blind eye to the numerous health risks associated with this practice. Risks of allergic reaction, skin infections, psoriasis, dermatitis, tetanus, unsterile equipments, herpes simplex virus, hepatitis virus, syphilis, HIV are among the numerous potential risks associated with every tattooing session.

It has been stated that those who tattoo large portions of their skin surface stand the risk of not

been able to benefit from life-saving MRI (Magnetic Resonance Imaging) test should they need one. Centuries ago when people tattooed their skin they used dyes or inks from their natural environment, unlike now that tattoo practitioners use all sorts of heavy metal dyes with its attendant dangers to the human health [24].

An European Commission's report stated that about 20% of the dyes used in tattooing in Europe contains a carcinogenic aromatic amine. These among other reasons make skin tattooing a potentially dangerous practice that should be discouraged by the society.

5. CONCLUSION

It was therefore concluded that skin tattooing was not a statistically significant major risk factor for HIV/AIDS among the undergraduates, though this does not in any way obliterate the potent potential risk for the transmission of HIV that is inherent in any practice like skin tattooing that pierces the human skin with sharp or pointed objects.

6. RECOMMENDATION

Given the serious potential risks associated with skin-tattooing particularly in the absence of governmental control and regulations, it is recommended that the appropriate agencies of government should as a matter of public importance set minimum standards that must be met by tattoo artists and practitioners. It is also recommended that the authorities of Adekunle Ajasin University, Akungba-Akoko- the school with the highest prevalence of skin-tattooing- should put measures in place to control and regulate the practice of skin-tattooing among its students- particularly undergraduates.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Braverman PK. Body art: Piercing, tattooing, and scarification. *Adolesc Med Clin.* 2006;17(3):505–519. Abstract PMID: 17030277
2. Laumann AE, Derick AJ. Tattoos and body piercings in the United States: A national data set. *J Am Acad Dermatol.* 2006;55(3):413–421. PMID: 16908345
3. Braverman S. One in five U.S. adults now has a tattoo. *The Harris Poll No. 22; 2012.* Available:[www.theharrispoll.com/health-and-life/One in Five U S Adults Now Has a Tattoo.html](http://www.theharrispoll.com/health-and-life/One%20in%20Five%20U%20S%20Adults%20Now%20Has%20a%20Tattoo.html)
4. Pew Research Center. Tattoo taboo; 2010. Available:www.pewresearch.org/daily-number/tattoo-taboo/
5. Armstrong ML, Murphy KP. Tattooing: Another adolescent risk behavior warranting health education. *Appl Nurs Res.* 1997;10(4):181-189. PMID: 9419914
6. Carroll ST, Riffenburgh RH, Roberts TA, Myhre EB. Tattoos and body piercings as indicators of adolescent risk-taking behaviors. *Pediatrics.* 2002;109(6):1021–1027. PMID: 12042538
7. Brooks TL, Woods ER, Knight JR, Shrier LA. Body modification and substance use in adolescents: Is there a link? *J Adolesc Health.* 2003;32(1):44–49. PMID: 12507800
8. Shannon-Missal L. Tattoo takeover: Three in ten Americans have a tattoo, and most don't stop at one. *Harris Poll No. 12; 2016.* Available:[http://www.theharrispoll.com/health-and-life/Tattoo Takeover.html](http://www.theharrispoll.com/health-and-life/Tattoo%20Takeover.html)
9. Jafari S, Buxton JA, Afshar K, Copes R, Baharlou S. Tattooing and risk of hepatitis B: A systematic review and meta-analysis. *Can J Public Health.* 2012;103(3):207–212. PMID: 22905640
10. Jafari S, Copes R, Baharlou S, Etminan M, Buxton J. Tattooing and the risk of transmission of hepatitis C: A systematic review and meta-analysis. *Int J Infect Dis.* 2010;14(11):e928–e940. PMID: 20678951
11. Falsey R. Cutaneous inoculation of nontuberculous mycobacteria during professional tattooing: A case series and epidemiologic study. *Clin Infect Dis.* 2013;57(6):e143–e147. PMID: 23704119
12. Centres for Disease Control and Prevention. Emerging infectious diseases. 2011;17:9. Available:wwwnc.cdc.gov/eid/article/17/9/10-2011_article

13. Kluger N. Acute complications of tattooing presenting in the ED. *Am J Emerg Med.* 2012;30(9):2055–2063. PMID: 22944541
14. Kennedy BS, Bedard B, Younge M. Outbreak of *Mycobacterium chelonae* infection associated with tattoo ink. *N Engl J Med.* 2012;367(11):1020–1024. PMID: 22913660
15. American Academy of Pediatrics Committee on Pediatric AIDS. Reducing the risk of HIV infection associated with illicit drug use. *Pediatrics.* 2006;117(2): 566–571. PMID: 16452382
16. Tohme RA, Holmberg SD. Transmission of hepatitis C virus infection through tattooing and piercing: A critical review. *Clin Infect Dis.* 2012;54(8):1167–1178. PMID: 22291098
17. Mayers LB, Judelson DA, Moriarty BW, Rundell KW. Prevalence of body art (body piercing and tattooing) in university undergraduates and incidence of medical complications. *Mayo Clin Proc.* 2002;77(1): 29–34. PMID: 11794454
18. Heywood W, Patrick K, Smith AM. Who gets tattoos? Demographic and behavioral correlates of ever being tattooed in a representative sample of men and women. *Ann Epidemiol.* 2012;22(1):51–56. PMID: 22153289
19. The Nation. Available:<http://thenationonlineng.net/tattoos-and-the-price-of-ignorance>
20. Amechi BO, Osagie RN, Chikwendu CI. Evaluation of false positivity and cross reactivity in the investigation of human immunodeficiency virus antibodies. *International Journal of Community Research.* 2012;1(2):54-59.
21. O'Malley PA. Tattoos and piercings: Reasons, risks, and reporting: Update for the clinical nurse specialist. *Clin Nurse Spec.* 2013;27(1):14–16. PMID: 23222022
22. Riml S, Larcher L, Grohmann M, Kompatscher P. Second-degree burn within a tattoo after intense-pulsed-light epilation. *Photodermatol Photoimmunol Photomed.* 2013;29(4):218–220. PMID: 23815356
23. Quaranta A, Napoli C, Fasano F, Montagna C, Caggiano G, Montagna MT. Body piercing and tattoos: A survey on young adults' knowledge of the risks and practices in body art. *BMC Public Health.* 2011;11:774. PMID: 21981772
24. Scheer R, Moss D. In the ink: Do all tattoo pigments use mercury and other toxic heavy metals? *Scientific American*; 2011. Available:www.scientificamerican.com/article/tattoo-ink-mercury-and-other-toxins/

© 2017 Daramola et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<http://sciencedomain.org/review-history/21896>