

Isaac Newton Nsoha<sup>1</sup>; Bashir Malgwi<sup>2</sup> and Francis Enehche Ejuh<sup>1,3\*</sup>

National Open University of Nigeria, Maiduguri Study Centre, Maiduguri, Borno State<sup>1</sup>; Department of Veterinary Public Health and Preventive Medicine, University of Maiduguri, Maiduguri, Nigeria<sup>2</sup>; Department of Veterinary Microbiology, University of Maiduguri, Maiduguri, Nigeria<sup>1,3\*</sup>

\*Correspondence: [efrenchefrancis@ummaid.edu.ng](mailto:efrenchefrancis@ummaid.edu.ng), +2348057243878

**Background**

Zoonotic TB is a form of tuberculosis in people caused by *Mycobacterium bovis* (El-Sayed et al., 2016). Cattle are the most critical animal reservoir for *M. bovis*. Zoonotic tuberculosis has resulted in substantial economic losses and trade barriers, with a significant impact on the livelihoods of poor and marginalised communities (Ejuh et al., 2014). The BCG vaccine has been used to prevent active tuberculosis for over 100 years yet zoonotic tuberculosis (ZTB) remains a substantial occupational threat to animal handlers, abattoir workers and veterinarians (Mangtani et al., 2014).

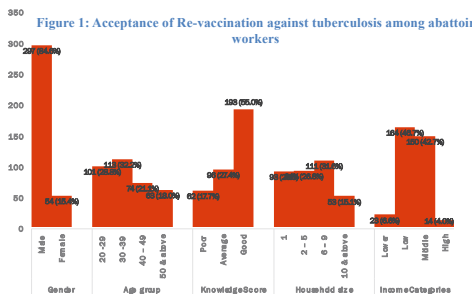


Table 1: Demographic variables as predictors of tuberculosis re-vaccine acceptance among abattoir workers in Nigeria

Variable	AOR	95% C. I	p-value	
Age group	20 - 29	0.360	0.092-1.409	0.142
	30 - 39	0.211	0.058-0.773	0.019
	40 - 49	0.119	0.035-0.406	0.001
Knowledge Score	50 & above	Ref.	Ref.	Ref.
	Poor	Ref.	Ref.	Ref.
	Average	3.834	1.594-9.222	0.003
Household size	Good	1.805	0.899-3.625	0.097
	1	5.164	1.766-15.100	0.003
	2 - 5	4.580	1.611-13.022	0.004
	6 - 9	2.149	0.910-5.079	0.081
	10 & above	Ref.	Ref.	Ref.
Income Categories	Lower	1.414	0.306-6.538	0.658
	Low	1.294	0.086-4.344	0.676
	Middle	6.461	1.720-24.268	0.006
High	Ref.	Ref.	Ref.	

Table 2: logistic regression model of tuberculosis Revaccination Acceptance and Perception of Self-Efficacy

Questions	Response	N (%)	AOR	95% C.I	P value
Regular washing of hands helps to prevent ZTB	Certainly not	164 (38.1%)			
	Most Certainly	267 (61.9%)	2.733	1.733-4.698	0.000
Proper cooking of meat helps to prevent ZTB	Certainly not	134 (31.1%)			
	Most Certainly	297 (68.9%)	2.329	1.367-3.968	0.002
Living with animals is a risk factor for contacting ZTB	Certainly not	178 (41.3%)			
	Most Certainly	253 (58.7%)	1.385	0.778-2.466	0.268

**Specific Aims & Objectives**

The study aimed to evaluate zoonotic tuberculosis knowledge and factors associated with accepting tuberculosis re-vaccination among abattoir workers in Nigeria

**Methods**

The study assessed zoonotic tuberculosis knowledge and used the health belief model (HBM) to determine the factors associated with the acceptance of tuberculosis revaccination among abattoir workers in Nigeria by using an online (Google form) self-administer, non-repeated questionnaire from March 2021 to September 2022. We recruited four thousand target participants via social media. Data obtained were retrieved in excel and imported into SPSS version 20.0. The data were presented using descriptive statistics. Chi-square, ANOVA and logistic regression were used for inferential statistics. A p-value

**Conclusions**

Tuberculosis re-vaccination intention among abattoir workers in Nigeria was high. It depends on the knowledge of zoonotic tuberculosis (ZTB), socio-demographic characteristics, perception of seriousness of tuberculosis and other health belief model constructs. We recommend that agencies involved in public health orientation communicate the risk associated with tuberculosis to abattoir workers. This is not to frighten the public but to build confidence in informed health decision making regarding vaccine-preventable zoonoses at the animal-human interface.

**Results**

Four hundred and thirty-one (431) abattoir workers consented and completed the online questionnaire. The majority 140 (32.5%) of the respondents were 30-39 years old, and 219 (50.8%) belong to low-income category. The overall zoonotic tuberculosis mean knowledge score was 4.520±1.520 (range: 0-7). Most (351, 81.4%) of the respondents were willing to accept the TB vaccine. We observed significant difference in the TB vaccine acceptance among age groups ( $\chi^2 = 14.994$ ;  $p = 0.002$ ), knowledge category ( $\chi^2 = 6.555$ ;  $p = 0.038$ ) and income groups ( $\chi^2 = 23.681$ ;  $p = 0.000$ ). Middle-income earners, 150 (93.2%) were more willing to accept the TB vaccine compared to others in the group. The age groups 30-39 (AOR: 0.211; 95% CI: 0.058- 0.773; P = 0.019) and 40-49 (AOR: 0.119; 95% CI: 0.035- 0.406; P = 0.001) were associated with 73.4% and 84.3% decrease in tuberculosis vaccine acceptance compared to the age group 50 years and above. Having average knowledge about zoonotic tuberculosis (AOR: 3.834; 95% CI: 1.594- 9.222;  $p = 0.003$ ), and middle income earner (AOR: 6.461; 95% CI: 1.720-24.268;  $p = 0.006$ ) were related to about 4.6, and 6.5 times increase in tuberculosis vaccine acceptance. The belief that one could contact ZTB if they did not take preventive measures (COR: 2.200; 95% CI: 1.208- 3.757;  $p = 0.004$ ), believing that living with an animal is a risk factor for contacting ZTB (COR: 2.245; 95% CI 1.371-3.675;  $p = 0.001$ ) were associated with the acceptance of tuberculosis revaccination.

**References**

Ejuh, E.F., Raji, M.A., Bello, M., Lawan, F.A., Francis, M.I., Kudi, A.C., Cadmus, S.I.B., 2014. Prevalence and direct economic losses from bovine tuberculosis in Makurdi, Nigeria. *Vet. Med. Int.* 2014, 8 pages. <https://doi.org/10.1155/2014/904861>.  
 El-Sayed, A., El-Shannat, S., Kamel, M., Castañeda-Vazquez, M.A., Castañeda-Vazquez, H., 2016. Molecular Epidemiology of *Mycobacterium bovis* in Humans and Cattle. *Zoonoses Public Health.* <https://doi.org/10.1111/zph.12242>  
 Mangtani, P., Abubakar, I., Ariti, C., Beynon, R., Pimpin, L., Fine, P.E.M., Rodrigues, L.C., Smith, P.G., Lipman, M., Whiting, P.F., Sterne, J.A., 2014. Protection by BCG vaccine against tuberculosis: A systematic review of randomized controlled trials. *Clin. Infect. Dis.* 58, 470-480. <https://doi.org/10.1093/CID/CIT790>

**Acknowledgements**

The authors are grateful to the Sabin Vaccine Institute and the UNICEF for providing the platform for us to present this research to the global community. We also acknowledge the managements of the University of Maiduguri, Nigeria for the administrative support.