Eya et al. *Afr. J. Clin. Exper. Microbiol.* 2025; 26 (4): 432 - 440 https://www.afrjcem.org

African Journal of Clinical and Experimental Microbiology. ISSN 1595-689X Oct 2025; Vol.26 No.4
AJCEM/2439. https://www.ajol.info/index.php/ajcem

Knowledge and practices of hepatitis E virus disease prevention among pig handlers in selected local government areas of Enugu State, Nigeria

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Abstract:

Background: Hepatitis E virus (HEV) is a zoonotic pathogen with significant public health implications, particularly among pig handlers who are at increased risk due to occupational exposure. Despite the growing pig farming industry in Enugu State, Nigeria, awareness and preventive practices related to HEV remain poorly understood. This study assessed the knowledge and preventive measures of HEV among pig handlers in Enugu State, identifying key demographic factors influencing awareness and hygiene practices.
Methodology: A cross-sectional study was conducted among pig handlers in three Local Government Areas (Nsukka, Enugu South, and Aninri), representing the three senatorial zones of Enugu State, Nigeria. Random sampling was used to recruit participants, and data were collected with structured questionnaires administered by investigators between December 2023 and March 2024. Statistical analysis was done with SPSS version 27 and results included descriptive statistics and multivariable logistic regression to determine associations between sociodemographic factors and HEV knowledge and preventive practices.
Results: Of the total 228 enrolled pig handlers, only 29.8% had good knowledge of HEV while 70.2% had poor knowledge. Educational level was a strong predictor of HEV knowledge, with poor knowledge of HEV being significantly higher among participants with secondary-level education (aOR=4.1, 95% CI=1.79–9.59, p=0.005). Gender was equally associated with HEV knowledge, with good knowledge of HEV being significantly lower among females compared to males (aOR=0.39, 95% CI=0.217-0.710, p=0.001). Age also influenced knowledge, with poor knowledge of HEV being significantly higher in older participants (41–50 years) (aOR=3.20, p=0.004) compared to younger handlers (≤30 years). Conversely, good preventive practices were significantly higher among females compared to males (aOR=2.47, 95% CI=1.418-4.329, p=0.001), and among married individuals (aOR=0.39, p=0.010) and those aged 31–40 years (aOR=0.027, 95% CI=0.07-0.54, p=0.004), while poor preventive practices/measures were significantly higher among participants with no formal education (aOR= 28.75, 95% CI=5.285-156.385), p=0.001).
Conclusion: This study highlights a critical gap in HEV knowledge and preventive practices among pig handlers in Enugu State, Nigeria. While education, gender and age significantly influenced HEV knowledge levels, preventive practices were significantly higher among female gender, married individuals and those with high educational levels. These findings underscore the need for targeted health education programs, improved biosecurity measures, and enhanced surveillance to mitigate HEV transmission risks in pig farming individuals and communities. These insights contribute to global HEV research and support policy recommendations for zoonotic disease prevention in occupational settings.

Keywords: Hepatitis E virus, Pig handlers, Zoonosis, Knowledge, Practice, Enugu State, Nigeria

Received Jul 7, 2025; Revised Sep 8, 2025; Accepted Sep 9, 2025

Connaissances et pratiques en matière de prévention de l'hépatite E chez les porcins dans certaines zones administratives locales de l'État d'Enugu, au Nigéria

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Résumé:

Contexte: Le virus de l'hépatite E (VHE) est un agent pathogène zoonotique ayant des implications importantes pour la santé publique, en particulier chez les porcins qui présentent un risque accru en raison de leur exposition professionnelle. Malgré la croissance de l'élevage porcin dans l'État d'Enugu, au Nigéria, la sensibilisation et les pratiques préventives liées au VHE restent mal comprises. Cette étude a évalué les connaissances et les mesures préventives du VHE parmi les manutentionnaires de porcs de l'État d'Enugu, en identifiant les principaux facteurs démographiques influençant la sensibilisation et les pratiques d'hygiène.
Méthodologie: Une étude transversale a été menée auprès de manutentionnaires de porcs dans trois zones de gouvernement local (Nsukka, Enugu Sud et Aninri), représentant les trois zones sénatoriales de l'État d'Enugu, au Nigéria. Un échantillonnage d'aléatoire a été utilisé pour recruter les participants, et les données ont été collectées à l'aide de questionnaires structurés administrés par les enquêteurs entre décembre 2023 et mars 2024. L'analyse statistique a été réalisée avec SPSS version 27 et les résultats comprenaient des statistiques descriptives et une régression logistique multivariée pour déterminer les associations entre les facteurs sociodémographiques et les connaissances et les pratiques préventives du VHE.
Résultats: Sur un total de 228 manutentionnaires de porcs inscrits, seuls 29,8% avaient une bonne connaissance du VHE, tandis que 70,2% avaient une faible connaissance. Français Le niveau d'éducation était un bon prédicteur de la connaissance du VHE, la faible connaissance du VHE étant significativement plus élevée chez les participants ayant un niveau d'éducation secondaire (aOR=4,1, IC à 95%=1,79-9,59, *p*=0,005). Le sexe était également associé à la connaissance du VHE, la bonne connaissance du VHE étant significativement plus faible chez les femmes que chez les hommes (aOR=0,39, IC à 95%=0,217-0,710, *p*=0,001). L'âge a également influencé la connaissance, la faible connaissance du VHE étant significativement plus élevée chez les participants plus âgés (41-50 ans) (aOR=3,20, *p*=0,004) que chez les plus jeunes (≤ 30 ans). Français À l'inverse, les bonnes pratiques préventives étaient significativement plus élevées chez les femmes que chez les hommes (aOR=2,47, IC à 95%=1,418-4,329, *p*=0,001), et chez les personnes mariées (aOR=0,39, *p*=0,010) et celles âgées de 31 à 40 ans (aOR=0,027, IC à 95%=0,07-0,54, *p*=0,004), tandis que les mauvaises pratiques/mesures préventives étaient significativement plus élevées chez les participants sans éducation formelle (aOR=28,75, IC à 95%=5,285-156,385, *p*=0,001).
Conclusion: Cette étude met en évidence une lacune critique dans les connaissances et les pratiques préventives sur le VHE parmi les manutentionnaires de porcs dans l'État d'Enugu, au Nigéria. Alors que l'éducation, le sexe et l'âge ont significativement influencé les niveaux de connaissances sur le VHE, les pratiques préventives étaient significativement plus élevées chez les femmes, les personnes mariées et celles ayant un niveau d'éducation élevé. Ces résultats soulignent la nécessité de programmes d'éducation sanitaire ciblés, de mesures de biosécurité améliorées et d'une surveillance renforcée pour atténuer les risques de transmission du VHE chez les éleveurs porcins, tant au niveau individuel que communautaire. Ces informations contribuent à la recherche mondiale sur le VHE et étayent les recommandations politiques en matière de prévention des zoonoses en milieu professionnel.

Mots-clés: Virus de l'hépatite E, Porcins, Zoonose, Connaissances, Pratique, État d'Enugu, Nigéria

Introduction:

Hepatitis E virus (HEV) causes hepatitis E, which is an inflammation of the liver (1). Hepatitis E is estimated by the World Health Organization (WHO) to have contributed to about 44,000 fatalities in 2015, or 3.3% of all deaths from viral hepatitis (2). Severe viral hepatitis is the most common clinical sign of hepatitis E virus infection, and in certain people, it can result in severe liver failure (3). Additionally, the illness is commonly linked to mortality and extrahepatic symptoms (2,3). In Nigeria (4), HEV infection has been found to be a primary cause of acute sporadic hepatitis that is enterically transferred, particularly in the adult demographic. The primary cause of both acute and chronic liver infections and inflammation is viral hepatitis. Hepatitis A, B, C, D, E, F, and G viruses can cause acute liver illness.

The faecal-oral pathway is one way that this enteric hepatitis E virus might spread. Human HEV strains and those recovered from pigs, cows, chickens, rabbits, rats, and fish in developed nations have been found to share genetic similarities in developing nations (5). Animals are a major source of HEV infection and contribute to the increased prevalence of the disease (6). Farm- ers, animal butchers, veterinarians, and per- sons handling animal products or consuming raw or uncooked meat from deer, wild boar, and pigs infected with HEV are among the groups most at risk (4,6). Contact with pigs may increase the risk of contracting a zoonotic illness because they are the primary reservoir of zoonotic HEV and the most significant reservoir for HEV (5,6). The nucleotide sequ- ence of the first animal strain of HEV was iden- tified after it was isolated from pigs in the mid- western United States and ever since then (6), swine HEV has been found in every swine-pro- ducing nation on the planet. Swine HEV sequ- ences are classified as either genotype 3 or genotype 4.

HEV outbreaks typically occur in countries and settings with low resources such as those with poor access to water, inadequate health care, and poor sanitation and hygiene. Water that is fit for drinking is typically contaminated by flooding or the disposal of faeces during the rainy season. The most prevalent way that outbreaks occur in rural, underdeveloped areas is through a water channel that traverses contaminated soil (4,6,7).

Research has demonstrated that HEV can result in chronic illness due to the virus's clinical persistence in immunocompromised

individuals and those receiving immunosuppressive therapy (6,7). Similarly, newer finding (8) has shown that HEV can primarily infect pregnant women and cause serious and deadly infections. This study was therefore aimed to determine the knowledge and disease prevention practices of hepatitis E virus among pig handlers in Enugu State, Nigeria.

Materials and method:

Study area:

This study was conducted in three Local Government Areas (LGAs) (Nsukka, Enugu South and Aninri) from the 3 senatorial zones (Enugu North, Enugu East and Enugu West respectively) of Enugu State, Nigeria. These LGAs were chosen based on the availability of large cluster of pig farms and the willingness of the leadership (gatekeepers) of these farm clusters consenting to participate in this study.

Enugu State is comprised of 261 political wards and shares borders with several neighboring States; Benue and Kogi to the north, Ebonyi to the east and southeast, Abia to the south, and Anambra to the west. The State was named after its capital and largest city, Enugu, and spans approximately 8,161 km² in area. According to 2023 estimates, the State is home to over 5.4 million residents, with a population density of about 1,300 people per square kilometer (9). The State was known for civil service, trading and all forms of agriculture, and recently witnessed surge in number of pig farms due to quest for animal protein, therefore making it a good setting to conduct this research.

Study design and participants:

The study used a descriptive cross-sectional questionnaire design to investigate pig handlers in Enugu State, Nigeria. To reduce non-response bias and avoid disrupting the respondents' work, investigators administered the questionnaire in person to those who gave informed consent after explaining the purpose of the study.

Participants were selected by simple random sampling and data collected between the period December 2023 and March 2024, with participation limited to pig and pig waste handlers and butchers aged 18 years and above. Participants who declined consent were excluded.

Ethical consideration:

Ethical approval with reference number MH/MSD/REC21/492 was obtained from the Health Research and Ethics Committee of Enugu State Ministry of Health Enugu State. In addition, another ethical approval with reference MOA/VED/EA/VOL1/1/25 was obtained from Enugu State Ministry of Agriculture and Agro-Industralization. Informed consent was obtained from each participant prior to interview-administration of questionnaires.

Sample size calculation:

The sample size was calculated using the formula of Lwanga and Lemeshow (11) suitable for descriptive cross-sectional study; $n=Z^2(1-P)/d^2$, where n=expected sample size, Z=standard normal deviation at 95% confidence interval (1.96), P=anticipated prevalence of 20% for 'good knowledge' of HEV from a previous study by Fasakin et al., (10), and d=margin of error at 6% (0.06). Considering a possible 10% attrition from poorly filled questionnaire (missing data), the minimum sample size was 190 participants, but we increased the number of participants recruited to 228.

Study data collection tool:

Information was collected from the study participants using a pre-tested questionnaire that was administered by the research interviewers. The survey tool was divided into five sections for information collection; socio-demographic, knowledge of HEV, HEV disease prevention practices, and vaccination strategies. Three professionals in the field of public health education evaluated the questionnaire and were validated after conducting a pilot with 30 pig handlers, with a Cronbach alpha coefficient score of 0.80.

Scoring system of participants' knowledge and practice:

Knowledge of HEV was assessed using 8 stem questions and some having multiple responses which results to 10 questions. Each correct answer was allotted score "one" (1) and every wrong answer was allotted "zero" (0). The results of the total score were 10 and "good knowledge" of HEV was graded using half of the maximum point (> 5) while "poor knowledge" was put at a cut-off value of < =5. HEV preventive practices/measures were also scored similarly, by assessing 10 stem questions which resulted in a maximum score of 10 points. Each correct answer was scored (1) point while wrong answer was scored (0). Participants whose scores were between 0 to 5 were scored as having "poor preventive measures" while those whose scores were between 6 to 10 were scored as having "good preventive measures".

Statistical analysis:

The Statistical Package for Social Sciences (SPSS) version 27 (IBM, United States) was used for data entry and analysis. The demographic information of the respondents and the analyses of their HEV knowledge and preventive behaviors were conducted using descriptive statistics. Frequencies and percentages were also used to express categorical variables.

Significant differences between the variable groups were determined using the Chi-square and Fisher Exact tests as appropriate. Binary logistic regression was used to establish associations between independent variables and levels of HEV knowledge and preventive practices. Associations with *p*-value less than 0.05 were considered statistically significant.

Results:

Demographic characteristics of study participants:

A total of 385 pig handlers who worked in piggeries were approached to participate in the study, but only 228 consented and completed the study questionnaire, which gave 59% response rate. Table 1 shows the summary of the socio-demographics and job characteristics of the participants. The mean age of the participants was 43.42±16.1 years, and 84 (36.8%) were aged 51 years and above while 109 (47.4%) participants were males and 120 (52.6%) were females.

Ninety-four (41.3%) of the participants had at least primary level education, while majority (n=174; 76.3%) were married and 108 (47.4%) have worked longer than 6 years in pig farm as animal handlers. Only 54 (23.7%) participants reported to have received certain levels of formal training on pig handling or farm cleaning and 210 (92.1%) of the participants consume pork as main source of animal protein (Table 1).

Table 1: Frequency distribution of Participants' Social Demographic characteristics

Variables	Frequency	Percent
Age group (years)		
≤ 30	60	26.3
31 – 40	30	13.2
41 – 50	54	23.7
≥51	84	36.8
Mean age (±SD) (years)	43.42±16.123	
Gender		
Male	108	47.4
Female	120	52.6
Highest education attained		
No formal education (NFE)	12	5.3
Primary	94	41.2
Secondary	68	29.8
Tertiary	54	23.7
Marital status		
Single	54	23.7
Married	174	76.3
Received any form of training for this job		
Yes	54	23.7
No	174	76.3
Use of stream as source of water supply at home		
Yes	126	55.3
No	102	44.7
Consume pork		
Yes	210	92.1
No	18	7.9
Years in pig farm		
<1	24	10.5
1 – 5	66	28.9
6 – 10	108	47.4
>10	30	13.2

Participants' knowledge of HEV:

Table 2 shows that only 28.9% (n=66) of the participants had "good knowledge" of HEV while majority (70.2%, n=162) had "poor knowledge" of the virus. However, on bivariate analysis, factors significantly associated with knowledge of HEV among the participants were age, marital status, educational level and gender (p<0.05). Further analysis of the table using binary logistic regression shows that among the age groups, those aged 41-50 years were three times more likely (aOR=3.2; 95% CI=1.211–8.456; p=0.010) to have poor knowledge of HEV than age group over 51 years. Those aged ≤30 years and those aged 31-40 years showed no statistical association with levels of knowledge.

Educational level had a significant association with knowledge levels. Participants with secondary education had four times odd of poor knowledge compared to those with tertiary education (aOR=4.1, 95% CI=1.791–9.597, p=0.005). This result suggests that those with lower education were more likely to have poor knowledge of HEV while those with tertiary education had good knowledge levels.

Participants' preventive practices/measures against HEV:

Table 3 presents the preventive practices/measures by the study participants against HEV infection. Among the 147 participants (64.5%) with good preventive practices, males comprised 53.7%, while females accounted for 74.2%. However, poor preventive practices/measures against HEV was twice as high in males compared to females (aOR=2.47, 95% CI=1.418–4.329, p=0.001). Analysis of age groups revealed that poor preventive practices /measures against HEV was significantly lower among participants aged 31–40 years (aOR= 0.027, 95%CI=0.027–0.548, p=0.004), compared to other age groups who did not show statistically significant associations with preventive practices (p>0.05). Marital status also played a role in HEV preventive measures. Single individuals were twice as likely to engage in poor practices compared to those who were married (aOR=2.009, 95% CI=1.078–3.743, p=0.037), indicating that married participants adhered more strictly to preventive measures.

Educational attainment showed significant association with HEV preventive practices. Participants with no formal education demonstrated the highest likelihood of poor preventive measures (aOR=28.75, 95% CI= 5.285–156.385, p=0.001), followed by those with primary education (aOR=10.624, 95% CI=4.489–25.168, p<0.05). Conversely, those with secondary education were significantly less likely to have poor preventive practices (aOR=0.174, 95%CI=0.035–0.858, p<0.05). This underscores the importance of higher education in improving health literacy, hygiene awareness, and access to preventive resources.

However, pork consumption (p=1.00), formal training in pig farming (p=0.214), and years spent in pig farming (p=0.106) were factors not significantly associated with HEV preventive practices among the participants.

Table 2: Multivariable logistic analysis of factors with associated with overall HEV knowledge of the participants

Variable	Total (n=228)	Poor knowledge (n=160, 70.2%)	Good knowledge (n=66, 29.8%)	*p* value	aOR (95% CI)
Age group (years)					
≤ 30	60	36 (60.0)	24 (40.0)		0.60 (0.298 – 1.209)^{ns}
31 – 40	30	18 (60.0)	12 (40.0)	0.004	0.60 (0.251 – 1.433)^{ns}
41 – 50	54	48 (88.9)	6 (11.1)		3.20 (1.211 – 8.456)*
≥ 51	84	58 (69.0)	26 (31.0)		R
Gender					
Male	108	64 (59.3)	44 (40.7)	0.001	0.39 (0.217 – 0.710)*
Female	120	96 (80.0)	24 (20.0)		R
Marital status					
Single	54	30 (55.6)	24 (44.4)	0.010	0.39 (0.210 – 0.754)*
Married	174	130 (74.7)	44 (25.3)		R
Highest education attained					
NFE	12	10 (83.3)	2 (16.7)	0.005	4.0 (0.799 – 20.017)^{ns}
Primary	94	63 (67.0)	31 (33.0)		1.6 (0.817 – 3.234)^{ns}
Secondary	68	57 (83.8)	11 (16.2)		4.1 (1.791 – 9.597)*
Tertiary	54	30 (55.6)	24 (44.4)		R

NFE=No formal education; * =significant at p-value <0.05; ns = not significant; R= Reference group; aOR = adjusted Odd ratio; CI = Confidence Interval

Table 3: Multivariable logistic analysis of factors associated with overall HEV preventive practices among the participants

Variable	Poor practice (n=81, 35.5%)	Good practice (n=147, 64.5%)	*p*-value	aOR (95% CI)
Gender				
Male (n=108)	50 (42.3)	58 (53.7)	0.001	2.47 (1.418 - 4.329)*
Female (n=120)	31 (25.8)	89 (74.2)		R
Age group (years)				
≤ 30 (n=60)	26 (43.3)	34 (56.7)	0.004	1.307 (0.668 - 2.571)^{ns}
31 – 40 (n=30)	12 (30.0)	28 (70.0)		0.027 (0.027 - 0.548)*
41 – 50 (n=54)	22 (40.7)	32 (59.3)		1.175 (0.583 - 2.369)^{ns}
>50 (n=84)	31 (36.9)	53 (63.1)		R
Marital status				
Single (n=54)	26 (48.1)	28 (51.9)	0.037	2.009 (1.078 - 3.743)*
Married (n=174)	55 (31.6)	119 (68.4)		R
Highest education attained				
NFE (n=12)	10 (83.3)	2 (16.7)	0.001	28.75 (5.285 - 156.385)*
Primary (n=94)	61 (64.9)	33 (35.1)		10.624 (4.489 - 25.168)*
Secondary (n=68)	2 (2.9)	66 (97.1)		0.174 (0.035 - 0.858)*
Tertiary (n=54)	8 (14.8)	46 (85.2)		R
Consume pork				
No (n=18)	6 (33.3)	12 (66.7)	1.000	
Yes (n=210)	75 (35.7)	135 (64.3)		
Received formal farm operational training				
No (n=174)	58 (33.3)	116 (66.7)	0.214	
Yes (n=54)	23 (42.6)	31 (57.4)		
Years in Pig farm				
< 1 (n=24)	6 (25.0)	18 (75.0)		
1 – 5 (n=66)	24 (36.4)	42 (63.6)	0.106	
6 – 10 (n=108)	45 (41.7)	63 (58.3)		
>10 (n=30)	6 (20.0)	24 (80.0)		

NFE=No formal education; * =significant at *p*-value <0.05; ns = not significant; R= Reference group; aOR = adjusted Odd ratio; CI = Confidence Interval

Discussion:

This study was aimed at assessing the knowledge and practices related to the prevention of HEV among pig handlers in Enugu State, Nigeria. Our findings indicate that only 29.8% of the enrolled pig handlers in Enugu State had good knowledge of HEV while 70.2% had poor knowledge of HEV. This finding is consistent with very low awareness of HEV reported by Mbachu et al., (12), where 98.6% of their subjects had poor knowledge of HEV. Similar finding was reported in Ogbomoso Oyo state Nigeria (13) where only 1% of the pregnant women enrolled had knowledge of HEV. Another study in Malaysia (14) reported that only 4.5% of their study participants who were food handlers had knowledge of HEV.

The reason why relatively high percentage of our study participants had good knowledge of HEV compared to these other studies could be attributed to an oral report that some of the pig handlers had during interventional education by the State Ministry of Agriculture following an outbreak of African swine fever mentioned HEV. This trend is suggestive of uniform poor knowledge of the virus in Africa and Asia. Limited awareness of HEV among pig handlers and the general public can heighten the risk of zoonotic transmission, particularly through direct contact with pigs or consumption of undercooked pork. Poor hygiene practices and inadequate disposal of pig waste may lead to environmental contamination, increasing the likelihood of community outbreaks. Additionally, insufficient knowledge contributes to underreporting and delayed diagnosis, ultimately weakening public health efforts.

Our study found that participants aged 41–50 years have significantly higher odds (aOR=3.20, *p*=0.004) of poor knowledge compared to those aged ≤30 years. Similar review studies in Nigeria, Ethiopia, and Sudan (15) have found that higher proportion of younger individuals (≤30 years of age) tend to have good knowledge of HEV than their older counterparts. The reason for this could be due to higher educational exposures, cultural belief and social media influence. Our finding however contrast studies in Europe and the USA (15,16), which reported that higher proportion of older adults (≥50 years of age) often have good knowledge due to accumulated health awareness programs.

This study shows that good knowledge of HEV was significantly higher among males than females (aOR=0.39, *p*=0.001), which is consistent with study in Ghana, West Africa where men have higher health literacy due to greater access to formal education (17). However, studies in high-income countries (UK, Canada) show no significant gender difference, which could likely be due to equal access to health education (18). Our study indicates

that larger proportion of single (unmarried) individuals have good knowledge of HEV than married individuals, and vice versa (aOR= 0.39, p=0.010), in keeping with studies from Ethiopia and Uganda (19,20) which reported that married individuals often have lower health literacy, possibly due to family responsibilities, limiting access to health information.

In our study, we found that educational level was significantly associated with HEV knowledge as reported in many other studies such as the Malaysian study (14), which reported that those with tertiary education had higher knowledge than those with lower level education. Oladipo and colleagues (13) also reported that those with higher education had better knowledge of HEV than those with lower education level. The reason for this could be due to the fact that individuals with higher education are more likely to have information on HEV due to improved health literacy, greater access to reliable information, and increased exposure to public health messages. A study in Ekiti State, Nigeria (4) reported consistently low awareness of HEV among antenatal attendees with lower educational background, despite 96% having at least a secondary-level education. This suggests that educational attainment did not play a significant role in differentiating knowledge levels. The reason for this could be traced to the fact that the Ekiti study participants did not have those whose educational status was higher than secondary school. Our study found that having a secondary level education is significantly associated with good knowledge (aOR=4.1, p=0.005). Similar studies in Kenya and South Africa (21) confirm that acquisition of higher education improves HEV awareness. In developed countries, tertiary education is the strongest predictor of health knowledge (18).

With respect to HEV preventive practices, higher proportion of male participants had significantly poor preventive practices of HEV compared to females (aOR=2.47, p= 0.001). Therefore, females were more likely to engage in HEV hygiene and preventive measures in their respective farms. This finding is consistent with other studies in Nigeria, Ethiopia, and Uganda which reported that women generally adopt HEV preventive hygiene practices, particularly waste handling and general farm sanitation (10,19,20). Higher proportion of our participants aged 31–40 years had signifi- cantly good preventive practices while higher proportion of our older participants aged > 50 years had poor preventive practices (aOR=0.027, p=0.004). This is in keeping with a study in Europe (15,16) where it appears that younger pig farm workers (those <35 years) tend to adopt HEV preventive measures than their older counterparts. The reasons for this could be due to procedural awareness, risk perception and educational but similar findings were reported in Niger Republic (22), Saudi Arabia (23) and India (24).

In our study, higher number of participants who were single (unmarried) had significantly poor preventive practices (aOR=2.009, p=0.037) than married participants who were more likely to engage in good hygiene and preventive measures against HEV in the pig farms. The reason for this disparity is not particularly apparent but may be due to social, economic, and psychological benefits of marriage which translates into more consistent health-protective behaviors in the HEV prevention on pig farms. Higher proportion of participants with no formal education (NFE) had significantly poor preventive practices (aOR=28.75, p=0.001), followed by those with primary education (aOR=10.624, p= 0.001), while lower proportion of those with secondary education had significantly poor preventive practices (aOR=0.174, p=0.001). This could be related to the fact that workers with low level education have limited health literacy, poorer access to information, and fewer resources, leading to poor preventive practices among them. In contrast, those with secondary education are better informed and empowered to adopt effective HEV prevention measures.

To the best of our knowledge, this study is the first in southeast Nigeria to specifically target pig handlers, an occupational group at heightened risk for HEV zoonotic transmission due to close contact with infected animals, exposure to fecal matter, and contaminated water. Consequently, our study offers valuable insights into a vulnerable and often overlooked population. However, several limitations must be considered. Relying on self-reported data introduces the possibility of recall bias or social desirability bias. Furthermore, selection bias may have occurred, as only those pig handlers who were at the respective farms and consented were enrolled. However, some eligible individuals chose not to participate and were excluded. Nonetheless, we believe these limitations were minimized by the inclusion of pig handlers from all three senatorial zones of Enugu State, providing a fairly representative sample of the State.

Conclusion:

This study highlights a critical gap in both knowledge and preventive practices regarding HEV infection among pig handlers in Enugu State, Nigeria. Only 29.8% of the participants had good knowledge of HEV, leaving a majority with poor knowledge of the virus. This deficient understanding, consistent with findings from other regions in Nigeria and parts of Asia, poses a heightened risk for zoonotic transmission, particularly given the suboptimal hygiene and biosecurity practices ob-

served on pig farms. Demographic factors play a significant role in shaping HEV knowledge and practices. Younger handlers, those with higher education, and married individuals generally exhibited better knowledge and consistently adopted more effective preventive strategies.

These findings underscore the design and implantation of tailored educational programs and targeted public health interventions to improve HEV awareness and biosecurity on pig farms in Enugu State Nigeria. Enhancing health literacy especially among less educated and older farm workers together with reinforcing proper hygiene practices can reduce HEV transmission risks. In addition, integrating these preventive measures within existing agricultural and public health frameworks is crucial to safeguarding the health of both pig handlers and the broader community.

Acknowledgements:

The authors acknowledge the assistance of the Pig Famers Association (Nsukka, Enugu and Aninri), pig handlers and research assistants.

Contributions of authors:

ENJ, OFN were responsible for study design, ENJ, CMC and CNV actively collected data, CMC did data analysis. ENJ, OFN, CMC and CNV performed data interpretation, drafted the manuscript and all the reviews. All authors read and approved the final version of the manuscript.

Source of funding:

Authors received no external funding.

Conflicts of interest:

Authors declare no conflict of interest.

Declaration of authors:

Authors hereby declare that the work presented in this article is original and that any liability for claims relating to the content of this article will be borne by them.

Data availability statement:

Data for the study are available upon a reasonable request from the corresponding author.

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