

Effects of safety education on knowledge and attitude towards food safety among primary school food vendors in Oyo State: a quasi-experimental study

Adeola Bukola, Adebayo

Department of Health Education, University of Ibadan, Nigeria

Page | 1

Abstract

Background:

Food is the only substance universally consumed by humans and animals to sustain life and must therefore be properly handled and safeguarded, as contamination at any point along the food chain can have far-reaching and sometimes fatal consequences. Previous studies have largely focused on the prevalence of unsafe practices and levels of food safety knowledge, with limited attention to educational interventions capable of improving food handlers' behaviour.

Objective:

This study examined the effects of safety education on knowledge of, and attitude towards, food safety among primary school food vendors in Ido Local Government Area, Oyo State, Nigeria, and assessed the moderating effects of educational level and years of experience.

Methods:

A pretest–posttest control group quasi-experimental design, structured as a 2×2 factorial matrix, was adopted. A multistage sampling procedure was used to select sixty food vendors from ten schools in the study area. Knowledge of food safety was assessed using a validated and reliable questionnaire ($r = 0.78$).

Results:

There were significant main effects of treatment on knowledge, $F(1, 52) = 122.09$, $p < .001$, partial $\eta^2 = .70$, and on attitude, $F(1, 52) = 751.25$, $p < .001$, partial $\eta^2 = .94$. Participants exposed to safety education recorded the highest post-test mean scores in both knowledge (39.44) and attitude (33.58) compared with the control group. Findings on the moderating effects of educational level and years of experience on knowledge and attitude scores (H03, H04).]

Conclusion:

Safety education significantly improved food vendors' knowledge of, and attitude towards, food safety.

Recommendation:

Health teachers, governmental and non-governmental organisations, researchers, and stakeholders in school feeding services should adopt safety education programmes to improve food preparation practices, hygienic conditions, and consumption among primary school food vendors.

Keywords: safety education, knowledge, attitude, food safety, food vendors

Submitted: August 28, 2026 **Accepted:** September 08, 2026 **Published:** September 16, 2026

Corresponding Author: Adeola Bukola

Email: adebayoadeolabukola@gmail.com

Department of Health Education, University of Ibadan, Nigeria

Introduction

The educational system is expanding rapidly, and this growth has been accompanied by an increase in the number of food service providers whose operations remain poorly regulated despite the often-unhygienic environments in which they work. Food sold within these environments is therefore vulnerable to unhygienic conditions and to the poor personal hygiene of vendors across production, handling, and packaging, thereby increasing the likelihood of foodborne illness among consumers. It is also worth noting that many food vendors lack adequate knowledge of the kinds of meals appropriate for sale within school environments, which neither improves students' nutritional intake nor supports their academic performance. This situation is compounded by low levels of formal education among many food vendors and by enforcement officers' limited knowledge of balanced diets. Furthermore, many school food service operators tend to recruit and retain vendors who are untrained or have little formal education.

The World Health Organization (WHO, 2015) estimated that two million people die annually from unsafe food, with approximately 70% of diarrhoea cases linked to the consumption of contaminated food. Existing studies in Nigeria have largely focused on describing hygiene practices rather than evaluating interventions: for example, Nurudeen et al. (2014) surveyed the hygiene and sanitary practices of street food vendors in Ogun State, while Fatiregun et al. (2010) examined knowledge, attitude, and practice regarding food poisoning among residents of Okene metropolis. Comparatively few studies, however, have evaluated the effect of educational interventions on food vendors' behaviour.

Food safety knowledge is largely acquired through training, including certified courses that expose participants to time-temperature control, personal hygiene, safe food handling, and the causes of foodborne illness. Other sources include printed educational materials and increasingly accessible information through new media. Good food handling practice depends on food handlers being adequately trained and knowledgeable. While some studies report that increased food safety knowledge translates into positive food handling behaviour (Abdul-Mutalib et al., 2012; Saad et al., 2013), others find that good knowledge does not always result in positive hygienic behaviour (Clayton et al., 2002; Akabanda et al., 2017).

Improper food handling and inadequate food safety knowledge contribute to the deterioration of food quality and to the incidence of foodborne disease (Gibson et al., 2002). Approximately 10–20% of foodborne disease outbreaks have been attributed to contamination by food handlers, with poor food safety knowledge and inadequate personal and hand hygiene identified as

leading causes of such contamination (Oladoyinbo et al., 2015).

Several studies report that most food handlers hold positive attitudes towards practices such as maintaining a clean working area, hand hygiene, and food preparation, even though some struggle to apply this knowledge consistently; for instance, forgetting or disregarding the need to use separate kitchen utensils, particularly where premises are supplied with a limited number of utensils such as cutting boards (Ansari-Lari et al., 2010; Annor & Baiden, 2011; Akabanda et al., 2017). Glove use, though important, remains uncommon among many food handlers, partly because of the discomfort associated with prolonged use in hot climates; gloves may also become a source of contamination if not changed between contact with raw materials and other kitchen surfaces (Lin & Sneed, 2005). In a related study, most participants (86.5%) considered food hygiene important, although only about half (52%) were satisfied with their working environmental conditions. When purchasing food, most respondents (60.5%) considered freshness their most important criterion. Although the majority (93%) recognised the importance of hand washing, nearly half (46.5%) believed that water used for washing utensils should only be discarded once it changed colour. Overall, 71% of respondents demonstrated a good level of positive attitude towards food hygiene (Abdul-Mutalib et al., 2012).

Despite this body of evidence, few studies have specifically evaluated the effect of a structured safety education intervention on food vendors' knowledge and attitude or examined whether such an effect is moderated by educational level and years of experience. This study therefore investigated the effects of safety education on knowledge of, and attitude towards, food safety among primary school food vendors in Ido Local Government Area and examined the moderating effects of educational level and years of experience.

The following null hypotheses were tested at the 0.05 level of significance:

H01: There is no significant main effect of treatment on knowledge of food safety among primary school food vendors.

H02: There is no significant main effect of treatment on attitude towards food safety among primary school food vendors.

H03: There is no significant interaction effect of treatment and educational level on knowledge of, and attitude towards, food safety.

H04: There is no significant interaction effect of treatment and years of experience on knowledge of, and attitude towards, food safety.

Materials and Methods

Study Design

This study adopted a pretest–posttest control group quasi-experimental design, structured as a $2 \times 2 \times 2$ factorial matrix, to examine the effects of safety education (treatment) on knowledge of, and attitude towards, food safety, with educational level and years of experience as moderating variables.

Study Setting and Duration

This study was conducted in public primary schools in Ido Local Government Area of Oyo State, Nigeria. The intervention was implemented over eight weeks, from 11 March to 3 May 2019. Pre-test data were collected on 11 March 2019, prior to the commencement of the intervention, while post-test data were collected on 3 May 2019, immediately following completion of the intervention.

Study Population

The study population comprised all food vendors operating within public primary schools in Ido Local Government Area of Oyo State, Nigeria, who were engaged in the preparation and/or sale of food to pupils at the time of the study. I focused on food vendors because they are directly involved in the preparation and sale of food consumed by schoolchildren. Any gap in their knowledge or attitude towards food safety can potentially increase the risk of food contamination and foodborne illness. Therefore, improving their knowledge through health education was considered an important preventive approach.

The inclusion criteria are participants who were actively engaged in food vending within the selected primary schools, had been involved in food vending in the school for at least three months, were directly involved in food preparation, handling, or sale, and were willing to participate in the study and provide informed consent. The exclusion criteria are vendors who had received formal food safety training before the study, were not directly involved in food preparation or handling, were unavailable for the intervention sessions, or were unwilling to provide informed consent were excluded from the study.

Sample Size Determination

A total of sixty (60) food vendors were selected for this study using a multistage sampling procedure, drawn from ten (10) public primary schools in the study area. The sample size of 60 food vendors was determined by the accessible population of eligible food vendors in the

selected public primary schools. All eligible, available, and consenting food vendors were recruited for the study. A formal a priori power calculation was not conducted; instead, sample size was fixed by the total number of accessible, eligible food vendors across the ten selected schools (i.e., a census of the accessible population rather than a probability-based power estimate). This is acknowledged as a methodological limitation.

Assignment Method

Food vendors were assigned to the experimental and control groups. The unit of allocation in this study was the school rather than the individual food vendor. Following the random selection of 10 public primary schools, five schools were purposively assigned to the experimental group and the remaining five schools to the control group based on geographical proximity. Food vendors within each selected school participated in the intervention corresponding to the group to which their school was assigned. Thus, individual food vendors were not randomly allocated to the study groups, making the study quasi-experimental rather than a fully randomised controlled trial. The experimental group received the food safety education intervention, while the control group received health education on drug education. To minimise bias arising from non-random allocation, baseline scores were incorporated as covariates in the MANCOVA analysis, statistically adjusting post-test comparisons for pre-existing differences between groups.

Exposure Quantity and Duration

The experimental group was intended to receive the Food Safety Education Training Package in eight weekly sessions (one session per week across the eight-week intervention period), with each session intended to last approximately 60–90 minutes. The control group received an equivalent schedule of eight weekly sessions on drug education.

Time Span

The intervention was intended to be delivered over the full eight-week study period (11 March to 3 May 2019) for both groups: the experimental group received the food safety education programme and the control group received the drug education programme across the same eight-week window, so that both groups were exposed to their respective programmes for an equivalent total duration.

Compliance and Adherence

Sessions were conducted on school premises during vendors' normal working hours to minimise disruption and encourage attendance; additional incentives like reminder systems (e.g., SMS/phone reminders) were

used to promote compliance beyond this scheduling accommodation. As reported under Participant Flow, all 60 participants completed the intervention and both assessments, with no withdrawals or losses to follow-up.

Blinding

Given the nature of the intervention, a face-to-face safety education training package, blinding of participants and intervention facilitators to group allocation was not feasible, as vendors were necessarily aware of whether they had received the training. However, the research assistants who administered and collected the pre-test and post-test questionnaires were blinded to participants' group allocation to minimise assessment bias and ensure objective assessment of participants' responses. The data analyst was blinded to group identity during the analysis so as to conduct the statistical analysis without being influenced by expectations about whether the intervention should be effective.

Instrumentation

Data were collected using a Food Safety Education Training Package, administered to the experimental group, and a structured questionnaire measuring participants' knowledge of, and attitude towards, food safety. The draft instrument was subjected to face and content validation by an expert in health education, and its reliability was established using the Cronbach alpha method, yielding a coefficient of 0.78 for the knowledge subscale.

Table 1: Demographic and baseline characteristics of participants by group

Characteristic	Experimental (n = 30)	Control (n = 30)	p-value
Age (mean $\pm$ SD, or age-group %)	22.3 $\pm$ 2.8	19.1 $\pm$ 1.3	< .001
Sex, n (%) female / male	Male: 18 (60.0%) Female: 12 (40.0%)	Female: 16 (53.3%) Male: 14 (46.7%)	.301
Educational level, n (%) per category	No formal education: 8 (26.7%) Primary: 12 (40.0%) Secondary: 6 (20.0%) Tertiary: 4 (13.3%)	No formal education: 8 (26.7%) Primary: 12 (40.0%) Secondary: 6 (20.0%) Tertiary: 4 (13.3%)	1.000
Years of vending experience (mean $\pm$ SD, or category %)	24.1 $\pm$ 2.9	10.1 $\pm$ 1.5	< .001
Baseline (pretest) knowledge score, mean $\pm$ SD	23.1 $\pm$ 2.4	15.1 $\pm$ 2.9	< .002
Baseline (pretest) attitude score, mean $\pm$ SD	19.1 $\pm$ 1.3	14.1 $\pm$ 2.3	< .004

Outcome Measures

The primary outcome measures were participants' knowledge of food safety and attitude towards food safety, each assessed using the structured questionnaire (pretest and post-test scores). Secondary outcome measures were the interaction effects of educational level and years of vending experience with treatment on knowledge and attitude scores, corresponding to hypotheses H03 and H04.

Data Analysis

Data were analysed using descriptive statistics (means and standard deviations) and Multivariate Analysis of Covariance (MANCOVA) to test the stated hypotheses at the 0.05 level of significance. At baseline, the experimental and control groups were compared on continuous variables (age, years of vending experience, baseline knowledge, and baseline attitude) using independent-samples t-tests, and on categorical variables (sex and educational level) using Pearson chi-square tests of independence; results of these baseline comparisons are reported in Table 1.

Results

Participant Characteristics

Table 1 presents the demographic and baseline characteristics of participants in the experimental and control groups

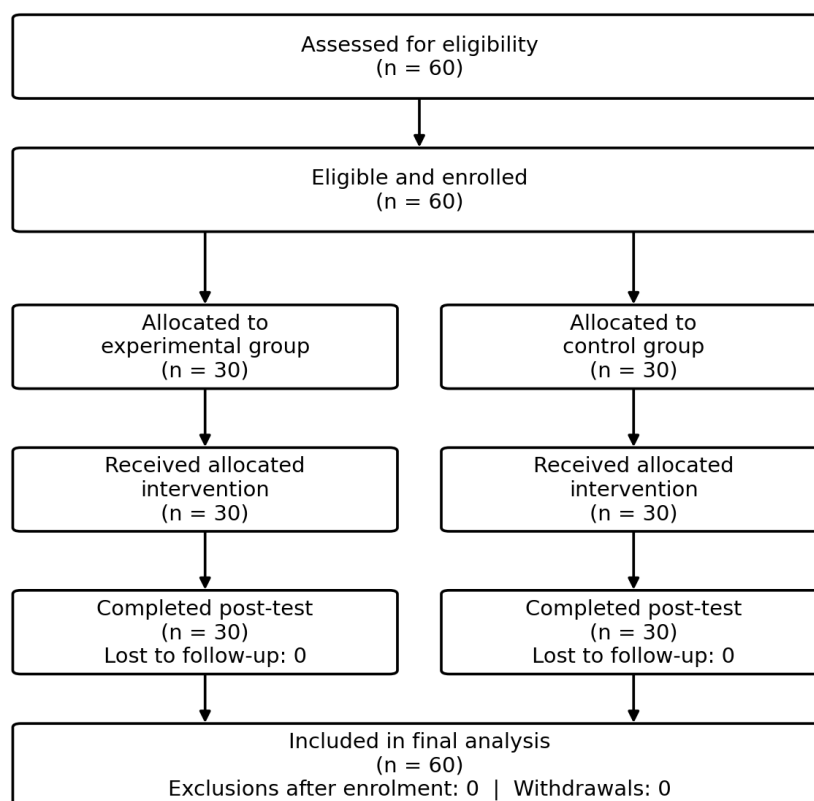


Figure 1. Participant flow through the study.

A total of 60 eligible food vendors were recruited from the selected public primary schools in Ido Local Government Area of Oyo State. Thirty (30) vendors from five selected schools were assigned to the experimental group, while 30 vendors from the remaining five schools were assigned to the control group. All 60 participants received the intervention assigned to their respective groups and completed both the pretest and post-test assessments. There were no withdrawals, exclusions after enrolment, or losses to follow-up during the study. Consequently, all 60 participants were included in the final data analysis.

Adverse Events

No adverse or unintended effects were observed or reported during the study. The food safety education intervention and data collection procedures did not result in any reported physical discomfort, psychological distress, resistance to participation, or significant disruption of the participants' vending activities. All participants completed the intervention and post-test assessment without reported adverse events.

Results and Discussion

Table 2: Summary of MANCOVA showing the effects of treatment on knowledge and attitude towards food safety among primary school food vendors

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial η^2
Corrected Model	Knowledge	3311.195 ^a	7	473.028	33.835	<.001	.820
	Attitude	1867.502 ^b	7	266.786	250.650	<.001	.971
Intercept	Knowledge	29018.995	1	29018.995	2075.671	<.001	.976
	Attitude	23082.420	1	23082.420	21686.309	<.001	.998
Treatment	Knowledge	706.895	1	706.895	122.091	<.001	.701
	Attitude	799.609	1	799.609	751.245	<.001	.935
Error	Knowledge	726.988	52	13.981			
	Attitude	55.348	52	1.064			
Total	Knowledge	63133.000	60				
	Attitude	50487.000	60				
Corrected Total	Knowledge	4038.183	59				
	Attitude	1922.850	59				

Note. MANCOVA = Multivariate Analysis of Covariance. Exact p-values below .001 are reported as "<.001" per convention. df = degrees of freedom.

a. R Squared = .820 (Adjusted R Squared = .796)

b. R Squared = .971 (Adjusted R Squared = .967)

Table 3: Adjusted marginal means showing the direction of difference in knowledge and attitude towards food safety between the treatment and control groups

Dependent Variable	Treatment Group	Mean	Std. Error	95% CI Lower Bound	95% CI Upper Bound
Knowledge	Experimental	39.444	1.093	37.250	41.638
	Control	24.046	0.864	22.312	25.780
Attitude	Experimental	33.582	0.302	32.977	34.187
	Control	23.043	0.238	22.564	23.521

Note. CI = confidence interval. Means are estimated marginal means adjusted for baseline (pretest) knowledge and attitude scores, entered as covariates in the MANCOVA model.

Table 2 shows a significant main effect of treatment on knowledge of food safety among primary school food vendors in Ido Local Government Area of Oyo State, $F(1, 52) = 122.09, p < .001$, partial $\eta^2 = .70$; the corresponding hypothesis (H01) was therefore rejected. Using Cohen's (1988) benchmarks for partial eta-squared (.01 = small, .06 = medium, .14 = large), this effect exceeds conventional thresholds for a large

effect, indicating that the intervention accounted for approximately 70% of the variance in participants' knowledge scores. This finding lends empirical support to the premise that structured, facilitator-led instruction rather than incidental exposure to food safety information is required to produce measurable gains in food handlers' knowledge base.

Table 2 further shows a significant main effect of treatment

on attitude towards food safety, $F(1, 52) = 751.25, p < .001$, partial $\eta^2 = .94$; the corresponding null hypothesis (H02) was also rejected. This effect size indicates that the intervention accounted for approximately 94% of the variance in participants' attitude scores, an unusually large proportion for a single-factor behavioural intervention, and one that merits closer methodological scrutiny.

Magnitude and Interpretation of the Treatment Effects

The size of the attitude effect in particular warrants cautious interpretation. Effects of this magnitude are uncommon in applied educational and public health intervention research, where partial η^2 values above .40 are already considered exceptionally large (Cohen, 1988). Several features of the present design may plausibly have contributed to this outcome. First, the absence of participant blinding meant that experimental-group vendors knew they were receiving a dedicated training intervention, which may have heightened motivation to respond favourably on the post-test attitude measure, a form of social-desirability or demand-characteristic bias that self-report instruments cannot fully exclude. Second, because allocation occurred at the school rather than the individual level, and the groups differed significantly on several baseline characteristics (Table 1), residual between-group heterogeneity not fully captured by the covariates may have inflated the apparent treatment effect despite statistical adjustment. Third, the relatively small error variance associated with a sample of 60 participants drawn from only ten schools may have produced a less stable estimate than would be obtained from a larger, multi-site sample. These considerations do not undermine the substantive conclusion that safety education improved knowledge and attitude; rather, they suggest that the precise magnitude of the effect should be interpreted cautiously pending replication in a fully randomised, multi-site trial.

As shown in Table 3, participants in the experimental group recorded a higher adjusted mean knowledge score ($M = 39.44$) than those in the control group ($M = 24.05$), indicating that safety education had a greater effect on knowledge of food safety among participants who received the intervention. Similarly, the experimental group recorded a higher adjusted mean attitude score ($M = 33.58$) than the control group ($M = 23.04$), indicating a greater effect of the intervention on attitude towards food safety. Read together, these adjusted mean differences are consistent with the Knowledge-Attitude-Practice (KAP) framework commonly applied in food safety education research, which conceptualises structured knowledge acquisition as a necessary, though not on its own sufficient, precursor to attitude change and, ultimately, to sustained behavioural modification.

These findings are consistent with Margaret et al. (2013), who reported that 81% of college-level, 62% of secondary-level, and 58% of primary-level respondents knew why food handlers should maintain personal cleanliness, and that 78% of college-level respondents (compared with 50% at the primary level and 60% at the secondary level) could identify behaviours that do not lead to food contamination, findings that similarly point to the importance of structured education, and specifically educational attainment, in improving food safety knowledge. The present findings are also consistent with Mizanur et al. (2012), who found that only 36.8% of vendors had good knowledge of food hygiene prior to intervention, and reported food safety training as a strong predictor of positive attitude and hygiene practice. Mizanur et al. (2012) further reported that only 19.1% of food vendors had a good attitude towards food hygiene before training and recommended continuous monitoring and periodic training incorporating basic food safety principles and microbial surveillance to optimise hygiene in food vending settings, a recommendation that aligns closely with the present findings on the value of structured safety education.

It is nonetheless important to situate these gains within the broader, more equivocal literature on the knowledge-behaviour relationship. Whereas some studies report that increased food safety knowledge translates directly into improved handling practice (Abdul-Mutalib et al., 2012; Saad et al., 2013), others caution that knowledge gains do not reliably produce corresponding improvements in hygienic behaviour (Clayton et al., 2002; Akabanda et al., 2017). The present study measured knowledge and attitude but did not directly observe food handling practice; the substantial gains recorded here should therefore be read as evidence that safety education can shift what vendors know and believe, rather than as direct evidence that their observed practices changed to the same extent.

Theoretical and Practical Implications

Theoretically, these findings extend the food safety literature by demonstrating that a structured, facilitator-led intervention can produce large, statistically robust improvements in both the cognitive (knowledge) and affective (attitude) components of food safety behaviour among a population of primary school food vendors that has received comparatively little targeted research attention relative to street food vendors and formal catering staff. Practically, the results support the case for embedding structured food safety education, rather than passive information dissemination, within school health and feeding programmes. Given that the intervention was delivered over a relatively short eight-week period and produced measurable gains, safety education of this kind appears to be a feasible, low-cost complement to existing school feeding oversight structures. As recommended in the Conclusion,

however, future implementation should take vendors' educational level and years of experience into account, since these characteristics may moderate responsiveness to training content and delivery format.

Generalizability

The findings of this study are generalizable primarily to food vendors operating within public primary schools in Ido Local Government Area of Oyo State, and to similar settings with comparable sociodemographic, educational, and regulatory characteristics. The study was conducted within a single local government area using a quasi-experimental design with random selection of schools but non-random allocation of schools to the experimental and control groups. Ten public primary schools were selected through simple random sampling, while the selected schools were purposively assigned to the experimental and control groups based on proximity. Caution should be exercised in extending these findings to food vendors in other local government areas, states, or countries, or vendors operating in markedly different educational, cultural, or regulatory environments (e.g., private schools, tertiary institutions, or open-market food vending), without further replication in those settings.

Conclusion

Based on the findings of this study, it was concluded that safety education was effective in improving food vendors' knowledge of, and attitude towards, food safety. It is recommended that school and community health educators make conscious efforts to organise safety education programmes that take participants' educational level and years of experience into account, so that different vendor groups are adequately served by future intervention programmes.

Limitations

This study has some limitations that should be considered when interpreting its findings. First, outcomes were assessed using a self-reported knowledge and attitude questionnaire, which is susceptible to social desirability bias and does not directly capture vendors' actual food handling practices or behaviour; observed changes in reported knowledge and attitude may therefore not fully translate into changed practice. Second, because the experimental and control groups were drawn from schools within the same local government area, there is a possibility of contamination; that is, vendors or school staff in the control group may have been indirectly exposed to safety education content through informal interaction with participants in the experimental group, which could have attenuated the observed treatment effect. Third, the quasi-experimental design and the study's restriction to a single local

government area limit the generalizability of the findings to other populations and settings, as discussed above. Future studies should consider fully randomized designs with geographically separated clusters, direct observation of food handling practices as an outcome measure, and longer-term follow-up to assess the sustainability of any changes in knowledge, attitude, and practice.

Ethical Consideration

Ethical approval for this study was obtained from the University of Ibadan Ethical Review Committee, and permission was subsequently obtained from the relevant school authorities before data collection commenced. All data collected were treated as confidential, and respondents volunteered to participate in the training.

Acknowledgements

The author appreciates Dr. Adetoun Akinwusi for her support throughout this research, and Dr. Balogun O. J. for proofreading this work.

List of Abbreviations

WHO: World Health Organization; MANCOVA: Multivariate Analysis of Covariance; SD: standard deviation; CI: confidence interval; KAP: Knowledge-Attitude-Practice.

Source of Funding

The author declares that the study received no funding from any source throughout the course of the research.

Conflict of Interest

The author declares that there is no conflict of interest

Data Availability

The author declares that data will be made available upon reasonable request.

Author Biography

Adebayo Adeola is a doctoral student in the Department of Health Education, University of Ibadan. Her research focuses primarily on food safety education, community-based epidural analgesia, maternal and reproductive health, disease prevention and health interventions, and digital health communication.

Adebayo holds both a Bachelor's degree and a Master's degree in Health Education from Ekiti State University and the University of Ibadan, respectively.

Currently, her doctoral work examines epidural analgesia. Her recent work aims to bridge the gap between behavioral theory and public health practice to improve health outcomes among women in Oyo State.

References

1. Abdul-Mutalib, N. A., Abdul-Rashid, M. F., Mustafa, S., Amin-Nordin, S., Hamat, R. A., & Osman, M. (2012). Knowledge, attitude and practices regarding food hygiene and sanitation of food handlers in Kuala Pilah, Malaysia. *Food Control*, 27(2), 289-293. <https://doi.org/10.1016/j.foodcont.2012.04.001>
2. Akabanda, F., Hlorts, E. H., & Owusu-Kwarteng, J. (2017). Food safety knowledge, attitudes, and practices of institutional food handlers in Ghana. *BMC Public Health*, 17(1), 40. <https://doi.org/10.1186/s12889-016-3986-9>
3. Annor, G. A., & Baiden, E. A. (2011). Evaluation of food hygiene knowledge, attitudes, and practices of food handlers in food businesses in Accra, Ghana. *Food and Nutrition Sciences*, 2(8), 830-836. <https://doi.org/10.4236/fns.2011.28114>
4. Ansari-Lari, M., Soodbakhsh, S., & Lakzadeh, L. (2010). Knowledge, attitudes, and practices of workers on food hygienic practices in meat processing plants in Fars, Iran. *Food Control*, 21(3), 260-263. <https://doi.org/10.1016/j.foodcont.2009.06.003>
5. Clayton, D. A., Griffith, C. J., Price, P., & Peters, A. C. (2002). Food handlers' beliefs and self-reported practices. *International Journal of Environmental Health Research*, 12(1), 25-39. <https://doi.org/10.1080/09603120120110031>
6. Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.
7. Fatiregun, A. A., Oriaye, O., & Isere, E. E. (2010). Knowledge and practice of food safety and hygiene among food handlers in Okene metropolis, Kogi State, Nigeria.
8. Gibson, H., Rose, J., Haas, C., Gerba, C., & Rusin, P. (2002). Quantitative assessment of risk reduction from hand washing with antibacterial soaps. *Journal of Applied Microbiology*, 92(S1), 136S-143S. <https://doi.org/10.1046/j.1365-2672.92.5s1.17.x>
9. Lin, C. T. J., & Sneed, J. (2005). University foodservice employees' food safety knowledge, attitudes, practices, and training. *Foodservice Research International*, 16(1-2), 35-48.
10. Nurudeen, A. A., Lawal, A. O., & Ajayi, S. A. (2014). A survey of hygiene and sanitary practices of street food vendors in the Central State of Northern Nigeria. *Journal of Public Health and Epidemiology*, 6(5), 174-181. <https://doi.org/10.5897/JPHE2013.0607>
11. Oladoyinbo, C. A., Akinbule, O. A., & Awosika, I. A. (2015). Knowledge of food-borne infection and food safety practices among local food handlers in Ijebu-Ode Local Government Area of Ogun State, Nigeria. <https://doi.org/10.5897/JPHE2015.0758>
12. Saad, M., See, T. P., & Adil, M. A. M. (2013). Hygiene practices of food handlers at Malaysian government institutions training centers. *Procedia - Social and Behavioral Sciences*, 85, 118-127. <https://doi.org/10.1016/j.sbspro.2013.08.344>
13. World Health Organization. (2015). WHO estimates of the global burden of foodborne diseases. World Health Organization.

PUBLISHER DETAILS:

Student's Journal of Health Research (SJHR)
(ISSN 2709-9997) Online
(ISSN 3006-1059) Print
Category: Non-Governmental & Non-profit Organization
Email: studentsjournal2020@gmail.com
WhatsApp: +256 775 434 261
Location: Scholar's Summit Nakigalala, P. O. Box 701432, Entebbe Uganda, East Africa

