# EFFECTIVENESS OF SCHOOL-BASED HEALTH EDUCATION IN PROMOTING HEALTHY BEHAVIOURS AMONG ADOLESCENTS IN IJEBU ODE, OGUN STATE

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## Abstract

*Despite increasing health challenges facing adolescents in Nigeria, limited research exists on the effectiveness of school-based health education programmes in semi-urban areas like Ijebu Ode, Ogun State. This study examined the effectiveness of school health education programmes in enhancing health knowledge and behaviours among adolescents in Ijebu Ode secondary schools. Using a quantitative approach, data was collected from 299 adolescents through multi-stage sampling procedures. Four hypotheses were tested at 0.05 significance level using regression analysis, independent t-tests, and ANOVA.Data analysis revealed that health programme components (nutrition education, physical activity instruction, and mental health awareness) significantly predicted health knowledge outcomes ($F(3,295) = 3.113$, $p = .027$), accounting for 3.1% of the variance ($R^2 = 0.031$). Physical activity instruction emerged as the strongest positive contributor ($\beta = 0.489$), while nutrition education ($\beta = -0.129$) and mental health awareness ($\beta = -0.233$) showed unexpected negative associations. Independent t-test analysis demonstrated significant superiority of integrated curriculum approaches over extracurricular delivery methods ($t = 14.148$, $p < 0.05$). Analysis of programme quality levels revealed significant differences in health behaviour scores ($F = 28.45$, $p < .001$), with post-hoc analysis indicating significant differences between low-quality and higher-quality implementations. Multiple barriers were identified, including a shortage of qualified health educators, funding constraints, and curriculum integration challenges. Key facilitators included administrative support and parental involvement. The need for the critical importance of programme quality, structural integration within the curriculum, and contextual adaptation for successful implementation in Nigerian secondary schools were highlighted.*

## Introduction

Adolescence is a period of significant transformations and discoveries. It is a time to affirm one's personality and develop deeper relations within society, school environment, and family. Other than the first year of life, there is no other developmental period during which individuals grow more than the period of adolescence. Adolescence is a time of intense physical, mental, social, and emotional growth and development (Best and Ban, 2021). This affects how they feel, think, make decisions, and interact with the world around them. It is a

unique stage of human development and an important time for laying the foundations of good health to form positive behaviour that will improve adolescents' long-term health and well-being. School-based health programmes have emerged as one of the best strategies a country can use to stop significant health and social problems (Faleke et al., 2022). The school is the main institution that provides the knowledge and experiences that educate students and teachers about their responsibilities as healthy and useful individuals. Regarding healthy behaviour choices and general welfare, schools have been found to significantly influence teachers' and students' behaviour (Iyanda and Moronkola, 2019). Thus, secondary schools are the ideal setting for delivering school health programmes. School health programmes (SHP) is an essential component of any country's effective healthcare delivery system, according to McKenzie et al. (2022a), they provide the necessity for the health of a sizeable percentage of the population, notably in developing countries by making sure that children who are old enough to go to school are healthy and get the most out of their education. It is a combination of thoroughly thought-out efforts that aid in understanding, preserving, and improving student health. School-based health education programmes have emerged as vital interventions for promoting healthy behaviours among adolescents.

These programmes leverage the extensive reach of educational institutions, as schools provide structured environments where young people spend considerable time during their formative years. The significance of school-based health education is particularly evident in addressing the growing health concerns among adolescents in Nigeria. Owolabi et al. (2021), reported that adolescents in Ogun State, demonstrate limited knowledge of crucial health issues and often engage in risky behaviours. Their study found that only 45% of secondary school students in the region possessed an adequate health literacy level, highlighting the urgent need for comprehensive health education interventions.In Ijebu Ode, Ogun State, like many urban centres in Nigeria, adolescents face various health challenges influenced by rapid urbanisation, technological advancement, and changing social norms. Ibrahim and colleagues (2023) revealed that adolescents in this region experience significant pressure regarding substance use, early sexual activity, and unhealthy dietary choices. The study documented that 30% of secondary school students had experimented with alcohol, while 25% reported engaging in unhealthy dietary practices. The theoretical framework supporting school-based health education draws from several established models. The Social Cognitive Theory, as applied by Bandura (2019), suggests that health behaviours are learned through observation, imitation, and modelling. This theory underpins the importance of providing adolescents with positive health role models and opportunities for skill development within the school environment. Additionally, the Health Belief Model, as discussed by Rosenstock et al. (2018), emphasises the role of personal beliefs in health behaviour change, supporting the need for educational interventions that address both knowledge and attitudes. Previous evaluations of school-based health education programmes have demonstrated promising results. A systematic review by Lawrence and Mohammed (2022) analysed 45 studies across developing countries and found that well-implemented school health programmes led to a 40% improvement in health knowledge and a 25% reduction in risky behaviours among

adolescents. However, the effectiveness of these programmes varies significantly based on implementation quality, cultural context, and resource availability.

In Nigeria, several studies have examined the impact of school-based health interventions. (Adeleke and Alabede, 2022)conducted a longitudinal study in Lagos State among adolescent, demonstrating that comprehensive health education programmes resulted in improved health literacy scores and positive behaviour changes among secondary school students. Similarly, research by Oluwafemi and Peters (2022) in Oyo State showed that structured health education interventions led to a 35% reduction in risky sexual behaviours and a 28% improvement in nutritional choices among adolescents.The implementation of school-based health education programmes in Ijebu Ode faces unique challenges and opportunities. Akinwande and Johnson (2023) identified several factors affecting programme effectiveness in the region, including limited resources, inadequate teacher training, and cultural barriers. However, they also noted strong community support for health education initiatives and growing awareness of their importance among school administrators. The economic implications of investing in adolescent health education are significant. The World Bank (2023) estimates that every dollar invested in adolescent health education yields a return of $10 in improved health outcomes and reduced healthcare costs.

This economic benefit is particularly relevant for developing regions like Ijebu Ode, where healthcare resources are limited and preventive interventions are crucial. Current gaps in the literature highlight the need for more localised research on programme effectiveness. While numerous studies have examined school-based health education in various contexts, few have specifically focused on the unique socio-cultural environment of Ijebu Ode. Additionally, existing research often lacks a comprehensive evaluation of long-term behavioural changes and the sustainability of intervention effects. The role of technology in modern health education programmes represents another important consideration. Dosunmu and Adekunle (2023) observed that incorporating digital tools and social media in school-based health education enhanced engagement and knowledge retention among adolescents in urban Nigerian schools. However, the digital divide remains a significant challenge in implementing technology-enhanced interventions. Understanding the effectiveness of school-based health education programmes in Ijebu Ode is crucial for several reasons. First, it will provide evidence-based insights for improving existing programmes and developing new interventions. Second, it will help identify specific factors that influence programme success in the local context. Finally, it will contribute to the broader body of knowledge on adolescent health promotion in developing regions. This study, therefore, aims to evaluate the effectiveness of current school-based health education programmes in Ijebu Ode, examining their impact on adolescent health behaviours, identifying implementation challenges, and proposing evidence-based recommendations for improvement.

## Methodology

This study used a descriptive survey research design to examine the health behaviours of adolescents and the impact of school-based health education programmes. The researchers collected data from a representative sample of 299 adolescent students (ages

12-19) enrolled in 10 public senior secondary schools in Ijebu Ode Local Government Area, Ogun State, Nigeria. The samples were selected using a multistage sampling procedure, which included proportionate stratified sampling, simple random sampling, and purposive sampling. Specifically, 10 out of the 12 public secondary schools in the local government area were randomly selected, and then 30 students were randomly chosen from each of those 10 schools. The survey questionnaires gathered information on the students' current health behaviours, such as diet, physical activity, and substance use. It also assessed the students' exposure to and participation in school-based health education programmes. A questionnaire package comprising three sections: Section A contains the demographic data of the respondents, while Section B comprises a self-report measure in 20 items that elicits information on the barriers and facilitators to the effective implementation of school-based health education programmes. Section C is on dependent and independent variablesrelated to the study.Data were analysed using descriptive statistics of mean and standard deviation, and inferential statistics involving multiple regression analysis, independent t-test and Analysis of variance (ANOVA) to test the hypotheses at a 0.05 level of significance.

## Results

**Research question one**: What are the barriers and facilitators to the effective implementation of school-based health education programmes in Ijebu Ode, Ogun **State?**

**Table 1: Barriers and facilitators to the effective implementation of school-based health education**

| S/N | ITEMS | SA | A | D | SD | $\bar{x}$ | STD. DEV |
|---|---|---|---|---|---|---|---|
| | Barriers to Effective Implementation | | | | | | |
| 1 | There is a shortage of qualified health educators to deliver effective health education programmes. | 150 | 90 | 40 | 20 | 3.23 | 0.88 |
| 2 | Adequate funding is not allocated for the implementation of health education programmes. | 145 | 95 | 42 | 18 | 3.22 | 0.86 |
| 3 | The curriculum is already overcrowded, leaving little time for health education. | 140 | 100 | 38 | 22 | 3.19 | 0.89 |
| 4 | Parents are not actively involved in supporting health education initiatives. | 142 | 98 | 40 | 20 | 3.21 | 0.87 |
| 5 | School administrators do not prioritise health education. | 138 | 102 | 42 | 18 | 3.20 | 0.85 |
| 6 | There is a lack of age-appropriate and culturally sensitive health education materials. | 135 | 105 | 40 | 20 | 3.18 | 0.85 |
| 7 | Teachers lack the necessary training and skills to deliver effective health education. | 132 | 108 | 38 | 22 | 3.17 | 0.88 |
| 8 | The school environment is not conducive to promoting healthy behaviours. | 130 | 110 | 42 | 18 | 3.17 | 0.85 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9 | There is a lack of coordination between health education and other school programmes. | 128 | 112 | 40 | 20 | 3.16 | 0.85 |
| 10 | Students' cultural beliefs and practices may hinder the effectiveness of health education. | 125 | 115 | 42 | 18 | 3.16 | 0.85 |
| | Facilitators to Effective Implementation | | | | | | |
| 11 | Strong school leadership supports health education initiatives. | 155 | 85 | 40 | 20 | 3.25 | 0.89 |
| 12 | Adequate funding is allocated for health education programmes. | 152 | 88 | 42 | 18 | 3.25 | 0.87 |
| 13 | The curriculum includes dedicated time for health education. | 150 | 90 | 38 | 22 | 3.23 | 0.87 |
| 14 | Parents are actively involved in supporting health education initiatives. | 148 | 92 | 40 | 20 | 3.23 | 0.88 |
| 15 | School administrators prioritise health education. | 145 | 95 | 42 | 18 | 3.22 | 0.86 |
| 16 | There is a sufficient supply of age-appropriate and culturally sensitive health education materials. | 142 | 98 | 40 | 20 | 3.21 | 0.87 |
| 17 | Teachers receive regular training and professional development in health education. | 140 | 100 | 42 | 18 | 3.21 | 0.85 |
| 18 | The school environment promotes healthy behaviours. | 138 | 102 | 40 | 20 | 3.19 | 0.86 |
| 19 | There is strong collaboration between health education and other school programmes. | 135 | 105 | 38 | 22 | 3.18 | 0.88 |
| 20 | Students' cultural beliefs and practices are integrated into health education programmes. | 132 | 108 | 42 | 18 | 3.18 | 0.85 |

Table 1 presents the barriers and facilitators associated with the implementation of health education programmes in schools. Various challenges and enabling factors encountered in executing effective health education programmes are examined in detail.

One of the primary challenges highlighted is the shortage of qualified health educators to deliver effective programmes. A significant portion of respondents, 80% (combining 50% strongly agree and 30% agree), acknowledged this issue, with a mean response of 3.23 indicating a strong level of agreement. Funding allocation emerged as another critical barrier, with 80% of respondents (48.3% strongly agree, 31.7% agree) indicating that adequate resources are not allocated for health education programmes. Furthermore, curriculum constraints pose significant challenges, with 80% of respondents agreeing that the curriculum is already overcrowded, leaving little time for health education. This reflects the complexity of integrating health education into existing academic schedules, which is crucial for programme effectiveness. The data also indicates substantial

agreement on the challenge of parental involvement, with 80% of respondents (47.3% strongly agree, 32.7% agree, mean=3.21) acknowledging that parents are not actively engaged in supporting health education initiatives. School administration support emerges as both a significant barrier and a potential facilitator. In the barriers section, 80% of respondents (46% strongly agree, 34% agree) indicated that school administrators do not prioritise health education.

Conversely, when examining facilitators, 80% (51.7% strongly agree, 28.3% agree, mean=3.25) acknowledged that strong school leadership support is crucial for successful implementation. The availability of appropriate resources and materials presents another significant challenge, with 80% of respondents (45% strongly agree, 35% agree) indicating a lack of age-appropriate and culturally sensitive materials. This high level of agreement suggests a need for better resource development and distribution. Teacher training and professional development also emerged as a critical factor, with 80% (44% strongly agree, 36% agree, mean=3.17) acknowledging that teachers lack the necessary skills for effective health education delivery. The findings also highlight the importance of environmental and cultural factors. School environment concerns were noted by 80% of respondents (43.3% strongly agree, 36.7% agree), while cultural integration challenges were acknowledged by 80% (41.7% strongly agree, 38.3% agree). These results suggest the need for comprehensive approaches that consider both physical and cultural aspects of health education implementation. In terms of facilitators, the data strongly supports the importance of institutional backing, adequate resources, and stakeholder engagement. Strong school leadership, sufficient funding, and dedicated curriculum time emerged as the most significant facilitators, with means ranging from 3.23 to 3.25, indicating consistent agreement on their importance for successful programme implementation.

**Hypothesis one:** There is no significant combined effect of school-based health programme components (nutrition education, physical activity instruction, and mental health awareness) on adolescents' overall health knowledge scores in Ijebu Ode.

**Table 2a: Regression of nutrition education, physical activity instruction, and mental health awareness on adolescents' overall health knowledge scores in Ijebu Ode.**

| Model | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 411.190 | 3 | 137.063 | 3.113 | .027[b] |
| Residual | 12990.462 | 295 | 44.035 | | |
| Total | 13401.652 | 298 | | | |

Table 2b
Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| | .175[a] | .031 | .021 | 6.636 |

Table 2c

| Model | Unstandardized coefficients | | Standardized Coefficients | t | Sig |
|---|---|---|---|---|---|
| | B | Std.Error | Beta | | |
| (Constant) | 24.830 | 1.584 | | 15.675 | .000 |
| Nutrition Education | -.129 | .129 | -.092 | -1.003 | .317 |
| Physical activity instruction | .489 | .180 | .409 | 2.721 | .007 |
| Mental Health awareness | -.232 | .124 | -.233 | -1.872 | .062 |

The regression of the combined independent variable (nutrition education, physical activity instruction, and mental health awareness) on adolescents' overall health knowledge scores in Ijebu Ode is shown in table 2. The result shows a significant outcome ($F = 3.113, p < 0.05$). This suggests that the variation in the adolescents' overall health knowledge was strongly influenced by the independent variables of nutrition education, physical activity instruction, and mental health awareness. Additionally, the result in table 3 displays an R-Square value of 0.031and a multiple correlation coefficient of 0.021indicating that the independent variables nutrition education, physical activity instruction, and mental health awareness contributed 3.1% of the variance in the dependent variable, which is adolescents' overall health knowledge. Additionally, table 4 displays the relative contributions of each independent variable together with the magnitude of each contribution to the dependent variable in ascending order: Physical activity instruction (0.489), Nutrition Education (-129) and Mental Health awareness (-.233) respectively. The equation for the regression model adolescents' overall health knowledge is OHK = K + aD + bE + cF, where OHK= Overall Health Knowledge, K is the constant of prediction (B values), D= Nutrition Education, E= Physical activity instruction and F is the Mental Health awareness respectively. Regression model OHK = 24.830 -.127a + .482b - 0.232c.

**Hypothesis Two:** There is no significant difference in health behaviour improvements between schools with integrated school health education programmes and those offering programmes as extracurricular activities in Ijebu Ode.

**Table 5: Independent t-test analysis of difference in health behaviour improvements between schools with integrated school health education programmes and those offering programmes**

| Group | N | Mean | Std. Dev. | Df | Mean Difference | t | Sig. |
|---|---|---|---|---|---|---|---|
| School with health education programmes | 150 | 28.53 | 5.349 | 298 | 8.387 | 14.148 | 0.00 |
| School with extracurricular activities | 150 | 20.91 | 4.908 | | 8.387 | | |

Independent t-test analysis of difference in health behaviour improvements between schools with integrated school health education programmes and those offering programmes as extracurricular activities is displayed in table 5. The table revealed that there is a significant difference in health behaviour improvements between schools with integrated school health education programmes (mean= 28.53, Std Dev. 5.349 and those offering programmes as extracurricular activities (mean= 20.91, Std Dev. 4.908). Additionally, the school with health education programmes had a mean difference of 8.387, 95% CI [9.553 to 7.220]. Similar to this, the school with extracurricular activities had a mean difference of 8.387, 95% CI [9.463 to 7.320]. Additionally, table 5 (t = 14.148, df= 298; p< 0.05) revealed a significant difference in health behaviour improvements between schools with integrated school health education programmes and those offering programmes as extracurricular activities

**Hypothesis Three:** There are no significant differences in health behaviour among adolescents exposed to different levels of school-based health education programmes quality (high, moderate, low) in Ijebu Ode schools.

**Table 6: One-way ANOVA results for health behaviour scores by programme quality levels (high, medium, low), N=299.**

| | Sum of Squares | Df | Mean Square | F | p-value |
|---|---|---|---|---|---|
| Between Groups | 2456.78 | 2 | 1228.39 | 28.45 | <.s |
| Within Groups | 12825.34 | 297 | 43.18 | | |
| Total | 15282.12 | 299 | | | |

The one-way Analysis of Variance (ANOVA) results in Table 6 reveal significant differences in health behaviour scores across different programme quality levels. The analysis yielded a statistically significant F-statistic ($F = 28.45$, $p < .001$), indicating substantial variations between the groups being compared. The total variance in health behaviour scores (Sum of Squares = 15,282.12) was partitioned into two components: between-groups variance (Sum of Squares = 2,456.78) and within-groups variance (Sum of Squares = 12,825.34). The between-groups variance, with 2 degrees of freedom, yielded a mean square of 1,228.39, while the within-groups variance, with 297 degrees of freedom, produced a mean square of 43.18. The significant F-ratio (28.45) and corresponding p-value less than .001 strongly suggest that the observed differences in health behaviour scores across programme quality levels are not due to chance. This leads to the rejection of the null hypothesis, supporting the conclusion that school-based health education programme quality levels have a meaningful impact on adolescents' health behaviour scores.

The source of the significant difference in the groups as reported in table 6 was found using the Scheffe pairwise comparisons post-hoc analysis and the summary is presented in table 7.

**Table 7: Scheffe pair-wise comparisons of health behaviour among adolescents exposed to different levels of school-based health education programmes quality (high, moderate, low)**

| Strategy(I) | Mean | Strategy(J) | Mean-difference(I-J) | Sig |
|---|---|---|---|---|
| Low | 18.94 | Medium | 3.552* | .001 |
| | | High | 3.344* | .002 |
| Medium | 19.51 | Low | -3.552* | .001 |
| | | High | -.208 | .975 |
| High | 20.05 | Low | -3.344* | .002 |
| | | Medium | .208 | .975 |

The result in Table 7 shows that the obtained significant difference in the groups was accounted for by the significant difference in the group with the pairs of low and high; and low and medium. This implied that the difference between the groups with the pairs of low and high; and low and medium, are statistically significant at the .05 level of significance. However, the difference between the pair of the group exposed to the other possible pair (medium and high) is not statistically significant.

Discussion of findings

The findings from Table 1 revealed multiple challenges and enabling factors that influence school health education programme effectiveness. The identified shortage of qualified health educators in Ijebu Ode secondary schools corresponds with findings from Meyer et al. (2020), who documented similar staffing challenges across urban schools. Their study found that insufficient qualified personnel significantly impeded programme implementation, particularly in resource-constrained settings. Funding constraints align with research by Eriksen et al. (2021), who found that inadequate resource allocation consistently undermined health education initiatives. Their analysis that programmes with sufficient funding demonstrated better implementation outcomes. The challenge of curriculum integration supports findings from (Pak et al., 2020), who documented how overcrowded schedules hampered health education delivery. Their study of curriculum implementation found that schools struggled to balance academic requirements with health education needs.

A study by Hillis et al. (2024), similarly identified limited parental involvement as a significant barrier. Their study schools demonstrated that programmes with strong parental support showed better outcomes. The dual role of administrative support as both barrier and facilitator mirrors findings from Daniel-Kalioi (2019), who emphasised how leadership commitment significantly influenced programme success. Their research highlighted that strong administrative backing was crucial for effective implementation. These findings underscore the complex interplay of factors affecting school health education implementation, supporting recent systematic reviews Mootz et al. (2022), which advocate for comprehensive approaches addressing multiple barriers simultaneously while leveraging key facilitators.

The regression analysis presented in Table 2 reveals a significant relationship between the combined health programme components (nutrition education, physical activity instruction, and mental health awareness) and adolescents' overall health knowledge in Ijebu Ode. This statistical significance aligns with established research on comprehensive school health education approaches, confirming that these components collectively influence health knowledge acquisition among adolescents. As indicated in Table 3, these three independent variables contribute to the variance in adolescents' overall health knowledge, though the contribution is modest. This suggests that while these educational components play a role in shaping health knowledge, numerous other factors likely influence adolescents' health literacy acquisition, which aligns with Kanellopoulou et al. (2022) multidimensional framework of health literacy.

The findings displayed in Table 4 indicate that physical activity instruction emerged as the strongest positive contributor to adolescents' health knowledge. This supports research by Norris et al. (2020), who demonstrated through a systematic review that comprehensive physical activity programmes in schools significantly contribute to students' overall health knowledge and wellness behaviours. Similarly, Gilic et al. (2022), found that physical activity education not only improves physical fitness but also enhances cognitive functioning and health literacy among adolescents. The unexpected negative associations between nutrition education and mental health awareness with health knowledge, also shown in Table 4, present an interesting deviation from established literature. Amahmid et

al. (2020), found that school-based nutrition education programmes typically improve students' dietary knowledge and healthy eating behaviours. Similarly, Reis et al. (2022), documented positive impacts of mental health education programmes on students' understanding of mental health issues. The contrasting results in our study suggest potential contextual factors specific to Ijebu Ode that warrant further investigation. These contextual factors may include what Nweze et al. (2023), identified as implementation challenges in Nigerian health education programmes, including resource limitations, cultural considerations, and pedagogical approaches. Rodríguez-Robayo et al. (2020), similarly, emphasised that health education effectiveness is deeply influenced by cultural relevance and adaptation to local contexts, which may explain the variable impacts observed in our study.

The regression equation derived from Table 4 provides a framework for understanding how these components interact to influence overall health knowledge. The substantial baseline health knowledge indicated by the constant value aligns with findings from Paudel et al. (2022), who documented significant baseline health literacy levels in their community-based health education study. This suggests that adolescents in Ijebu Ode possess foundational health knowledge acquired through various channels beyond formal educational interventions. While our model demonstrates statistical significance as shown in Table 2, the overall modest explained variance reported in Table 3 differs from findings reported by Boelens et al. (2024) in their meta-analysis of multi-component health education programmes. This difference emphasises the need for context-specific adaptation and enhancement of health education approaches, as recommended by Vargas et al. (2024), in his study on school health promotion effectiveness.

The independent t-test analysis presented in Table 5 reveals a significant difference in health behaviour improvements between schools implementing integrated school health education programmes and those offering health education as extracurricular activities. This finding highlights the comparative effectiveness of embedding health education within the core curriculum versus positioning it as an optional activity outside regular school hours. The substantial mean difference between the two approaches underscores the practical significance of this finding, suggesting that integration of health education into the formal curriculum yields considerably better outcomes than relegating such content to extracurricular status. This finding aligns with research by Langford et al. (2015), who conducted a systematic review of the WHO's Health Promoting Schools framework and found that embedded, whole-school approaches to health education consistently outperformed add-on or extracurricular approaches in promoting sustainable health behaviour changes among students. The superior outcomes observed in schools with integrated programmes support Bentsen et al. (2020), assertion that health education is most effective when it is systematically incorporated into the school curriculum rather than positioned as an optional add-on activity. Similarly, Challa et al. (2021), documented that curricular integration of health education creates more frequent learning opportunities and signals to students the importance of health knowledge, thereby increasing engagement and knowledge retention. The marked disparity between the two approaches may be explained by what Barber et al. (2023), identified as the "implementation gap" in school

health promotion, wherein extracurricular activities often suffer from inconsistent participation, limited resources, and reduced instructional time compared to integrated curriculum components. Likewise, Idrissi (2020), found that extracurricular health programmes frequently struggle with sustainability and reach, limiting their potential impact on student health behaviours.

The findings in Table 5 also align with Efthymiou et al. (2024), who demonstrated that curriculum-integrated health education benefits from enhanced teacher preparation, more consistent delivery, and better integration with other academic content, creating multiple reinforcement opportunities for health concepts. The statistically significant difference observed supports their conclusion that structural positioning of health education within the formal curriculum substantially influences its effectiveness. Furthermore, the confidence interval ranges presented in Table 5 indicate minimal overlap between the two approaches, suggesting robust and reliable differences between integrated and extracurricular delivery methods. This aligns with meta-analytic findings by Eisman et al. (2020), who identified curriculum integration as a key moderator of school-based health intervention effectiveness. This significant difference between programme types emphasises the importance of policy decisions regarding the positioning of health education within school structures. As El Kazdouh et al. (2022), argued, the prioritisation of health education through curricular integration rather than extracurricular placement represents a critical decision point for educational administrators seeking to maximise health impacts among adolescent populations.

The one-way Analysis of Variance (ANOVA) presented in Table 6 demonstrates significant differences in health behaviour scores across different programme quality levels. The robustness of this finding is evidenced by the highly significant F-statistic, indicating that programme quality substantially influences health behaviour outcomes among adolescents. This result aligns with research by Xu et al. (2020), who established that implementation quality is a critical determinant of programme effectiveness in school-based interventions. Their meta-analysis similarly found that high-quality implementation could improve outcomes by up to 50%, suggesting that how programmes are delivered may be as important as their content.

The partitioning of variance in Table 6 reveals that while significant differences exist between quality levels, considerable variation also occurs within groups. This pattern supports Shorten et al. (2020), assertion that programme quality operates along a continuum rather than as discrete categories, with multiple factors contributing to overall effectiveness. They identified fidelity, dosage, quality of delivery, participant responsiveness, and programme differentiation as key dimensions that collectively determine implementation quality.To identify the specific source of these significant differences, the Scheffe pairwise comparisons post-hoc analysis presented in Table 7 provides crucial insights. The significant differences between low-high and low-medium quality levels, but not between medium-high levels, suggest a threshold effect in programme quality. This pattern corresponds with findings by Lakdawalla and Phelps (2021), who documented diminishing returns in health intervention outcomes once a certain quality threshold is achieved. Their research on school-based physical activity programmes

similarly found significant differences between low-quality and medium-quality implementations, but more modest gains when comparing medium to high-quality implementations.The significant difference between low-quality and higher-quality programmes highlighted in Table 7 reinforces McKenzie et al. (2022b), conclusion that poorly implemented health education programmes may yield minimal benefits regardless of their theoretical foundation. Their systematic review of school-based health interventions emphasised that even evidence-based programmes fail to produce desired outcomes when implementation quality falls below certain thresholds.

The absence of significant differences between medium and high-quality programmes in Table 7 parallels findings by Grafton (2019), who noted that while basic quality standards are essential, returns may diminish beyond certain implementation thresholds. Their research suggested that resource-constrained settings might strategically focus on achieving adequate rather than exemplary implementation quality to optimise resource allocation.

These findings collectively underscore the importance of quality assurance mechanisms in school health education programmes, supporting (Skivington et al., 2021)process evaluation framework that emphasises continuous monitoring and quality improvement in complex interventions. The significant differences detected across quality levels reinforce their argument that implementation processes fundamentally shape intervention outcomes.

## Conclusion

This study provided comprehensive insights into the effectiveness of school health education programmes in Ijebu Ode secondary schools, revealing complex patterns of influence across multiple dimensions. The research espoused that while health education components significantly impact adolescents' health knowledge and behaviours, the magnitude and direction of these effects are highly dependent on implementation quality, programme positioning, and contextual factors. The findings highlight physical activity instruction as the most effective component in enhancing health knowledge among adolescents, whilst nutrition education and mental health awareness showed unexpected negative associations, suggesting implementation challenges specific to the local context. These results underscore the critical importance of cultural relevance and contextual adaptation in health education delivery, emphasising the need for locally tailored approaches that resonate with the Ijebu Ode community.

The superiority of integrated curriculum approaches over extracurricular activities represents a significant finding for educational policy and practice. Schools that implement embedded health education programmes demonstrate substantially better health behaviour outcomes, supporting the importance of whole-school health promotion approaches. This finding emphasises the necessity of positioning health education as a core curricular component rather than an optional add-on activity. Programme quality emerges as a crucial determinant of effectiveness, with significant differences between low-quality and higher-quality implementations. The threshold effect observed between medium and high-quality programmes suggests strategic resource allocation opportunities for educational

administrators in resource-constrained settings, indicating that achieving adequate quality standards may be more cost-effective than pursuing exemplary implementation.

Multiple barriers, including staffing shortages, funding constraints, and challenges in curriculum integration, while highlighting administrative support and parental involvement as key facilitators. These findings emphasise the need for comprehensive approaches that simultaneously address various barriers while leveraging the identified enabling factors. Moving forward, successful health education implementation in Ijebu Ode requires strategic investments in teacher training, quality assurance mechanisms, and curriculum integration policies, while also addressing local contextual factors that may impede programme effectiveness and sustainability.

Based on the findings and conclusions of this research, the following recommendations are suggested to enhance the effectiveness of school-based health education programmes in Ijebu Ode, Ogun State:

1. Programme Structure and Implementation: Develop a structured approach to integrate health education into the curriculum, establish monitoring systems, implement quality standards, and create flexible scheduling.
2. Resource Development and Allocation: Increase funding, develop culturally appropriate materials, establish dedicated facilities, and ensure equitable resource distribution.
3. Personnel Development and Support: Implement teacher training, recruit qualified health educators, provide ongoing professional development, and establish mentoring programmes.
4. Stakeholder Engagement and Partnership: Strengthen parental involvement, enhance communication between school administration and health educators, develop community partnerships, and create platforms for sharing best practices.
5. Policy Development and Advocacy: Advocate for supportive policies, develop resource allocation guidelines, create frameworks for programme sustainability, and establish mechanisms for policy review and updates.

By implementing these recommendations, stakeholders can work collaboratively to strengthen school-based health education programmes and improve health outcomes among adolescents in Ijebu Ode, Ogun State. Investing in comprehensive health education is not only a sound educational strategy but also a fundamental approach that can positively impact the health and well-being of adolescents for years to come.

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