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Factors Influencing the Excess Consumption of Ultra-Processed Food among Secondary School Learners: A Case of Selected Secondary Schools in Solwezi District, Zambia

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Abstract: **The purpose of this study was to investigate the factors contributing to the excessive consumption of Ultra-processed food among secondary school learners in Solwezi District, Zambia. The study employed a descriptive survey design with a mixed methods approach to investigate ultra-processed food consumption among school-going pupils in four secondary schools in Solwezi District. A sample of 130 participants was selected through purposive and simple random sampling techniques. Data analysis revealed a high prevalence of ultra-processed food consumption, with significant associations between socio-economic factors and dietary habits, including financial constraints and parental income influencing food choices. Strategies such as nutrition education and awareness campaigns were found effective in promoting healthier eating habits. Based on the findings, recommendations are made for policy makers, school administrators, and health practitioners to collaborate on implementing effective interventions aimed at reducing the consumption of ultra-processed foods and promoting healthier dietary choices among school children in Solwezi District.**

Keywords: **Dietary Habits, Food Accessibility, Nutrition Education, Parental Guidance and Socio-Economic Determinants.**

1. INTRODUCTION

1.1 Introduction

The consumption of ultra-processed foods (UPFs) among school-going pupils is a growing concern globally and particularly in Solwezi District, Zambia. These foods, defined by Monteiro et al. (2016) as products undergoing extensive processing with numerous additives, have become pervasive due to their convenience and affordability. However, they are often criticized for their poor nutritional quality, containing high levels of unhealthy fats, sugars, and sodium while lacking essential nutrients. Their increasing prevalence among school children in Solwezi reflects global dietary trends influenced by urbanization and aggressive marketing. Studies highlight the health risks associated with UPFs, including obesity, diabetes, and cardiovascular diseases (Louzada et al., 2015; Smith et al., 2019). Additionally, UPFs can adversely impact academic performance, with research showing negative correlations between UPF consumption and cognitive function, attention span, and energy levels (Jones & Brown, 2018). These dietary habits, shaped by convenience and socio-economic factors, present long-term health risks that extend into adulthood.

In Solwezi District, socio-economic disparities play a significant role in shaping dietary behaviors. Families with limited financial resources often resort to affordable UPFs, exacerbating health issues among children (Patel & Sharma, 2020).

Cultural and social influences, including peer pressure and media exposure, further normalize the consumption of UPFs among school children (Johnson et al., 2017). These patterns underscore the need for targeted interventions to address dietary habits and promote healthier alternatives. UPF consumption also impacts physical activity and overall well-being. Nutrient-deficient diets can lead to poor physical performance and increased fatigue during extracurricular activities (Fleck, 2014). Furthermore, these foods are linked to long-term health complications, including diabetes and heart disease, which can hinder physical and cognitive development (Brown, 2014). Addressing these issues requires integrated approaches combining nutrition education, improved access to healthy foods, and community-level interventions. The prevalence of UPFs in Solwezi mirrors broader trends in Zambia, with rapid urbanization and socio-economic changes driving dietary shifts. Studies by Bwalya and Sichilima (2019) and Kasonde et al. (2021) emphasize the health and educational challenges posed by UPFs. To mitigate these effects, policymakers and educators must work collaboratively to promote awareness, improve food accessibility, and support initiatives that encourage healthier eating among school-going pupils in the district.

1.2 Statement of the problem

Excessive consumption of ultra-processed foods among secondary school learners in Solwezi District is a public health concern linked to poor health and academic underperformance. High intake of sugary and fatty snacks contributes to obesity, malnutrition, and non-communicable diseases such as diabetes and heart disease (WFP, 2013; WHO, 2020). In Zambia, 23.4% of adolescents are overweight or obese due to poor dietary habits. In Solwezi, 78% of pupils consume ultra-processed foods at school, while 64% bring such snacks from home, despite the nutritional standards set by the Zambian Food and Nutrition Act (2020). Addressing the factors behind these unhealthy choices is essential for promoting healthier eating habits, improving learners' health, and boosting academic performance (Namunyola & Chanda, 2023).

1.3 Purpose of the Study

The purpose of the study was to investigate the factors contributing to the excessive consumption of Ultra-processed food among secondary school learners in Solwezi District, Zambia.

1.4 Objectives of the Study

The following were the objectives of the study:

1. To determine the prevalence of Ultra-processed food consumption among school-going pupils in four selected secondary schools in Solwezi District.
2. To ascertain the socio-economic determinants influencing dietary habits among school children in four selected secondary schools in Solwezi District.
3. To suggest strategies for promoting healthier dietary habits and mitigating the adverse effects of Ultra-processed food consumption among school-going pupils in four selected secondary schools in Solwezi District.

1.5 Theoretical Framework

This study was guided by Albert Bandura's Social Cognitive Theory (SCT), which explains behavior as a result of interactions between personal, environmental, and behavioral factors. Observational learning, where individuals adopt behaviors based on what they see in their social environment, is central to SCT (Bandura, 1986). In the context of Solwezi's secondary school learners, SCT highlights how exposure to peers and family members consuming ultra-processed foods could influence similar habits, addressing the study's objectives on prevalence and socio-economic determinants. Additionally, SCT emphasizes self-efficacy—the belief in one’s ability to act—as critical in fostering healthier eating habits (Pajares, 2002).

1.6 Significance of the Study

The study was significant because as it addressed the issue of excessive ultra-processed food consumption among secondary school learners in Solwezi District, Zambia, which impacted students' health and academic performance. By investigating the factors driving these dietary habits, the study aimed to inform interventions and policies to promote healthier eating. The findings could guide the Government of Zambia, the Ministry of Education, and stakeholders in regulating ultra-processed food consumption in schools, improving nutrition standards, and reducing diet-related diseases. Additionally, the

study's outcomes could enhance school attendance, academic performance, and community involvement in promoting healthier lifestyles. Furthermore, the study contributed to the body of knowledge by providing insights into the relationship between diet and student well-being, which could inform future research and interventions in similar contexts.

2. LITERATURE REVIEW

2.1 Prevalence of Ultra-Processed Food Consumption among School-Going Pupils

The consumption of ultra-processed foods (UPFs) has been on the rise, particularly among children in the entire world. According to Monteiro et al. (2018), UPFs now make up a significant portion of children's diets in both developed and developing countries. This shift is largely driven by urbanization, increased availability, and aggressive marketing by food companies. Studies across different parts of Africa, such as the one by Njoroge et al. (2017) in Kenya, have revealed a rising trend in the consumption of processed snacks, sugary beverages, and fast food among schoolchildren. This is not limited to urban areas, as accessibility to such foods is expanding into rural regions. Zambia has seen similar trends, where children in both urban and rural areas are consuming more processed foods. A study by Chanda & Mwale (2019) in Lusaka found that schoolchildren are particularly vulnerable to the influence of convenience foods, given the limited availability of healthier alternatives. In Solwezi, a district that is undergoing urbanization, the proliferation of small shops and food outlets has contributed to the growing prevalence of UPFs. This study will assess the specific consumption patterns of UPFs among schoolchildren in Solwezi, aiming to gather data on the extent of their dietary shift toward ultra-processed foods.

2.2 Socio-Economic Determinants Influencing Dietary Habits among School Children

Socio-economic status (SES) is a critical factor in determining dietary habits. A study by Darmon & Drewnowski (2015) indicated that low-income families often rely on cheaper, calorie-dense processed foods due to their affordability and availability, despite their poor nutritional value. In Sub-Saharan Africa, including Zambia, socio-economic disparities in access to nutritious foods are widespread. Children from lower-income households are more likely to consume low-cost, highly processed foods, which lack essential nutrients (Mwenya et al., 2017). This reflects broader patterns seen in many African countries where economic constraints heavily influence food choices. In Zambia, the socio-economic divide is significant. Families in rural areas such as Solwezi often face challenges in accessing fresh, nutrient-dense foods due to factors such as limited transportation infrastructure and income constraints (Mulenga et al., 2020). Research by Sichone et al. (2017) showed that in rural parts of Zambia, children are more likely to rely on processed foods because they are easier to store and purchase in bulk, compared to fresh, perishable produce. This study will explore how these socio-economic factors specifically impact dietary choices among students in Solwezi, focusing on parental education levels, household income, and food access.

2.3 Impact of Ultra-Processed Food Consumption on Health and Academic Performance

The health consequences of excessive ultra-processed food consumption have been well-documented globally. Research by Monteiro et al. (2018) demonstrated that children consuming high amounts of UPFs are at increased risk of obesity, type 2 diabetes, and other metabolic disorders. These health issues, in turn, can affect academic performance, as children with poor health are more likely to experience difficulties concentrating, lower energy levels, and absenteeism from school (López-Olmedo et al., 2017). Globally, this is a growing concern as childhood obesity and related diseases are linked to declining educational outcomes. Regionally, studies in countries like South Africa have similarly shown that the consumption of UPFs is linked to poor health outcomes among children, particularly in low-income areas. A study by Tshivhase et al. (2020) found that children in rural South Africa who consumed high levels of processed foods had poorer cognitive performance and higher rates of absenteeism. In Zambia, children in urban and peri-urban areas, including Solwezi, are similarly at risk. Research by Chanda and Mwale (2019) suggests that students who frequently consume processed foods are more likely to experience health problems like obesity and fatigue, which can negatively impact their academic performance. This study will explore the relationship between UPF consumption, health outcomes, and academic performance among schoolchildren in Solwezi.

2.4 Strategies for Promoting Healthier Dietary Habits in Schools

Globally, many schools are adopting programs to improve students' diets by offering healthier meals and integrating nutrition education into curricula. Programs like the "School Fruit and Vegetable Scheme" in Europe have been shown to

increase the consumption of fruits and vegetables among children (Crawford et al., 2018). These initiatives focus on making healthier foods more accessible and teaching children about the importance of a balanced diet. Moreover, global efforts to limit the marketing of unhealthy foods to children, such as those seen in countries like Mexico and Chile, have demonstrated positive results in reducing the consumption of UPFs (Sarma et al., 2020). In Zambia, some schools have already begun integrating nutrition education into the curriculum, though the implementation is inconsistent. A study by Mulenga et al. (2020) found that in urban schools, nutrition education has started to take root, but rural schools like those in Solwezi often lack the resources to sustain such programs. There is also a need for healthier options in school canteens, as many schools still offer highly processed snacks. Strategies such as the introduction of school gardens, where students can learn about growing their own food, could be beneficial (Ngoma & Mweemba, 2018). This study will suggest tailored strategies for Solwezi's secondary schools, focusing on local, practical solutions to promote healthier dietary habits.

2.5 Role of Government and Policy in Regulating Ultra-Processed Food Consumption

Government policies have played a critical role in regulating UPF consumption, particularly in school environments. Policies such as those in Brazil, where the government has enforced the restriction of UPFs in schools and promotes the consumption of locally grown, nutritious foods, have been highly successful (Monteiro et al., 2018). Similarly, the World Health Organization (WHO) has called for stronger regulations around the marketing of unhealthy foods to children, with several countries adopting restrictions on such advertisements (Sarma et al., 2020). These global initiatives underscore the importance of policy in shaping children's food environments. In Zambia, there is potential for stronger policy enforcement to mitigate the prevalence of UPF consumption. The Zambian government could introduce regulations limiting the sale of unhealthy foods in schools, particularly in canteens, while promoting healthier meal options through subsidies or partnerships with local farmers. Sambo (2014) highlighted the importance of regulating street food vendors who contribute to UPF consumption near schools. By developing policies that target both the supply side (availability of healthy foods) and the demand side (students' knowledge and habits), the Zambian government could play a pivotal role in improving children's dietary habits. This study will explore how government policies could be strengthened in Solwezi to regulate UPF consumption in schools.

3. RESEARCH METHODOLOGY

3.1 Research design

This study utilized a descriptive survey design alongside a mixed methods approach, enabling the collection and analysis of both quantitative and qualitative data. The design was chosen to explore the prevalence, patterns, and characteristics of Ultra-processed food consumption among school pupils in Solwezi District. By combining different data sources and methods, the study aimed to ensure the validity and reliability of its findings, offering a comprehensive understanding of the research topic.

3.2 Research site

The study was conducted in four selected secondary schools in Solwezi District, located in Northwestern Province, Zambia. Solwezi is situated on the Chingola–Solwezi–Mwinilunga Road, approximately 177 kilometers north-west of Chingola and 275 kilometers south-east of Mwinilunga. The district has a population of 121,425 people (2022 Census Report) and an annual growth rate of 3.8%. The study site was chosen for its relevance to the research objectives, considering the social and geographical characteristics of the area (Yin, 2018).

3.3 Population, Sample and Sampling procedure

The target population for this study in Solwezi District, Zambia, included school administrators, Food and Nutrition teachers, other subject teachers, pupils, and parents from selected schools, with an estimated total of 1300 individuals. The study aimed to gather insights on Ultra-processed food consumption, focusing on diverse perspectives from all stakeholder groups. A sample of 130 participants was drawn, representing 10% of the target population. The sample included 8 school administrators, 80 learners, 32 teachers, and 10 parents. The sampling procedure combined purposive sampling to select schools and administrators, stratified sampling for balanced representation of teacher and student groups, systematic random sampling for selecting students, and convenience sampling for recruiting parents. This approach ensured a comprehensive and representative sample, providing diverse insights into the study's focus on dietary behaviors (Creswell, 2014).

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3.4 Data Analysis

Data analysis in this study involved a combination of quantitative and qualitative techniques. Quantitative data from questionnaires were analyzed using SPSS and Excel, where descriptive statistics such as frequencies, percentages, and means were calculated, and visualizations like charts and graphs were created. Qualitative data from interviews were analyzed using thematic analysis to identify recurring themes and patterns. This dual approach allowed for a comprehensive understanding of Ultra-processed food consumption, integrating both statistical trends and contextual insights to address the research objectives.

3.5 Ethical Issues

Ethical considerations were central to this study, focusing on protecting participants' rights, privacy, and confidentiality. Ethical clearance was obtained from the Rockview University Research Ethics Committee to ensure compliance with established ethical standards. Additionally, permission was sought from the Solwezi District Education Board Secretary to conduct the research in local schools, fostering collaboration with educational authorities and ensuring transparency throughout the process.

Informed consent was a key ethical principle, with participants fully briefed on the study's objectives, procedures, and potential risks. Consent forms were provided, and for minors, parental consent and assent were obtained. Confidentiality was strictly maintained, with data anonymized and securely stored. The research adhered to ethical guidelines to minimize risks, ensuring that participants were treated with respect and sensitivity, and had the option to withdraw from the study at any time without consequence.

4. FINDINGS AND DISCUSSIONS

4.1 The prevalence of Ultra-processed Food Consumption among School-going Pupils in Selected Secondary Schools in Solwezi District

The findings in figure 1 indicate that the majority of teachers, 12 (37.50%), strongly agreed that ultra-processed food consumption among students is prevalent, while 10 (31.25%) agreed. A smaller proportion were neutral, 5 (15.63%), disagreed, 3 (9.38%), or strongly disagreed, 2 (6.25%). These findings are presented in the figure below.

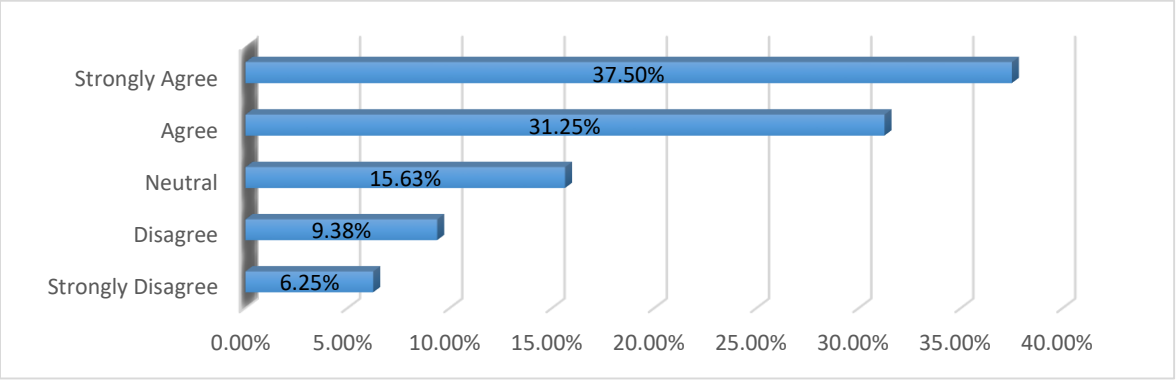

Figure1: Ultra-processed Food Consumption among Students is Prevalent

Many teachers observed a high prevalence of ultra-processed food consumption among students, raising concerns about their health and nutrition. These foods, often high in sugar, fat, and salt, are linked to global trends of poor dietary habits, as noted in studies like Albuquerque et al. (2020). This shift, driven by urbanization and the availability of cheap processed foods, posed significant health risks, including obesity and chronic diseases, which also affected academic performance.

4.2 Frequency of Observing Students Consuming Ultra-Processed Food on School Premises

With regard to frequency of observing students consuming ultra-processed food on school premises, the results of this study showed that an equal number of teachers, 10 (31.25%), observed students consuming ultra-processed food on school premises frequently and always. Eight teachers (25.00%) observed this occasionally, while 4 (12.50%) observed it rarely. These findings are illustrated in figure 2 below.

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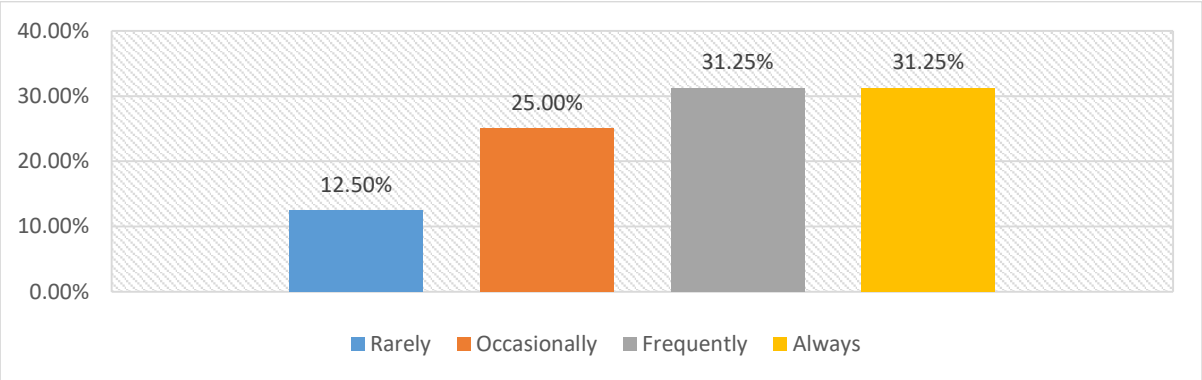

Figure 2: Frequency of Observing Students Consuming Ultra-processed Food on School Premises

The findings showed that nearly one-third of teachers observed students consuming ultra-processed foods frequently or always, indicating that such foods were a regular part of their diet at school. This aligned with global trends noted by Adair and Popkin (2015), where children were shifting to more processed, convenient foods. The availability of ultra-processed foods in schools, supported by marketing strategies, played a key role in shaping students' eating habits, as highlighted by Albuquerque et al. (2020) and Banda et al. (2018). These factors raised concerns about the health implications of such diets.

4.3 Types of Ultra-Processed Food Usually Consumed During School Hours

The findings presented in table 1 showed that chips/crisps were the most commonly consumed ultra-processed food during school hours, reported by 25 learners (31.25%). Candy/sweets were consumed by 20 learners (25.00%), soda/soft drinks and processed snacks (cookies, cakes, etc.) by 15 learners each (18.75%), and other items, specifically energy drinks, by 5 learners (6.25%).

Table 1: Types of Ultra-processed Food Usually Consumed During School Hours

Response	Frequency	Percentage
Chips/crisps	25	31.25%
Candy/sweets	20	25.00%
Soda/soft drinks	15	18.75%
Processed snacks (cookies, cakes, etc.)	15	18.75%
Other (Energy drinks)	5	6.25%
Total	**80**	**100%**

The prevalence of ultra-processed food consumption among students in Solwezi District, such as chips, crisps, and sugary snacks, aligns with global trends observed in similar studies (Albuquerque et al., 2020). These foods are often chosen for their convenience, affordability, and appeal, making them a dominant part of students' diets. However, the regular consumption of such items contributes to various health issues, including weight gain, obesity, cardiovascular diseases, and poor cognitive function (Adair & Popkin, 2015). The frequent intake of calorie-dense snacks with minimal nutritional value can displace healthier foods, which are essential for students' growth and academic performance. The students' awareness of the negative effects of consuming ultra-processed foods reflects a growing concern about their impact on health and academic performance (Koffi, 2021). While many students acknowledge the adverse effects of these foods on their energy levels and concentration in class, there is a clear indication that such snacks are still preferred, often due to their easy availability in school surroundings. This highlights the need for interventions promoting healthier food choices within schools to reduce the consumption of ultra-processed foods and improve students' overall well-being and academic outcomes (Lee et al., 2016).

During interviews with school administrators, it was noted that ultra-processed food consumption is a significant issue. School administrator 1 highlighted, "It's quite common to see students bringing chips, sweets, and sodas to school. These items are readily available in the nearby shops." This observation underscores the accessibility and availability of unhealthy snacks near schools, making them easily accessible to students. School administrator 2 further stated, "We have observed

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that students prefer these snacks over healthier options, and it's affecting their overall health and academic performance." This statement aligns with research by Adair and Popkin (2015), which suggests that the availability of ultra-processed foods in and around school environments contributes to poor dietary choices, with long-term implications for students' health and academic performance.

4.4 Inferential Statistics of Ultra-Processed Food Consumption among School-going Pupils in Solwezi District

The inferential statistics illustrated in table 2 revealed significant associations across all variables regarding ultra-processed food consumption among school-going pupils in Solwezi District. The prevalence of ultra-processed food consumption was statistically significant ($p = 0.014$), indicating that such consumption was common and a concern in these schools. Observations of students frequently consuming these foods also showed a significant association ($p = 0.039$), confirming that ultra-processed foods were a regular part of pupils' diets. The types of ultra-processed foods, particularly chips, sweets, and soda, were significantly prevalent ($p = 0.028$), suggesting that these unhealthy food choices dominated.

Table 2: Ultra-processed Food Consumption Among School-going Pupils in Solwezi District (Chi-square test)

Variable	Chi-square (χ^2)	p-value	Significance
Prevalence of Ultra-processed Food Consumption	12.5	0.014*	Significant
Frequency of Observing Ultra-processed Food Consumption	6.5	0.039*	Significant
Types of Ultra-processed Food Commonly Brought to School	9.1	0.028*	Significant

4.5 Influence of Socio-economic Background on Students' Dietary Habits

With regard to the influence of socio-economic background on students' dietary habits, the findings of this study as presented in figure 3 below revealed that majority of teachers, 16 (50.00%), believed that socio-economic background significantly influences students' dietary habits. Ten teachers (31.25%) thought it had a moderate influence, while smaller numbers believed it had a slight influence, 4 (12.50%), or no influence at all, 2 (6.25%).

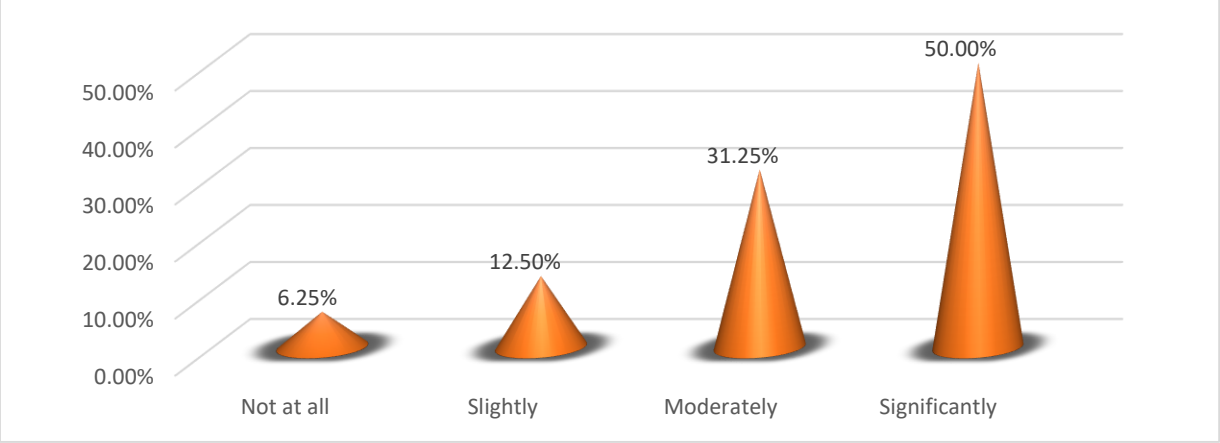

Figure 3: Influence of Socio-economic Background on Students' Dietary Habits

Teachers in the selected secondary schools in Solwezi District highlighted the significant influence of socio-economic background on students' dietary habits. One of the respondents expressed that:

"Students from lower socio-economic backgrounds often struggle to access healthier food options due to financial constraints, leading them to rely more on cheaper, ultra-processed foods".

This observation reflects broader trends identified in research by Louzada et al. (2015), which suggests that limited financial resources often result in the prioritization of cost-effective, energy-dense foods over more nutritious choices. Furthermore, barriers such as limited availability of fresh produce and the presence of food deserts in economically disadvantaged areas exacerbate these challenges, making it harder for students to maintain balanced and healthy diets. These factors underscore the complex relationship between socio-economic status and dietary behaviors, pointing to the need for targeted

interventions to improve access to nutritious food options in low-income communities. Additionally, the respondents noted that the socio-economic background of students plays a significant role in shaping their dietary habits, particularly in the context of ultra-processed food consumption among secondary school learners in Solwezi District, Zambia. Students from low-income households often have limited access to fresh and nutritious foods due to financial constraints, leading them to rely on cheaper, calorie-dense ultra-processed foods that are widely available and affordable. Conversely, students from higher socio-economic backgrounds may have greater access to healthier food options but can still be influenced by convenience, peer preferences, and marketing strategies that promote ultra-processed products (Chanda et al., 2023). Additionally, parental education levels and awareness about nutrition impact food choices, as well-informed parents are more likely to encourage balanced diets while those with limited knowledge may unintentionally promote unhealthy eating patterns. Furthermore, disparities in school meal programs, availability of food vendors, and exposure to advertising contribute to students' dietary decisions, reinforcing the prevalence of ultra-processed food consumption. Therefore, socio-economic factors not only determine accessibility and affordability but also shape students' perceptions and preferences regarding food choices, highlighting the need for targeted interventions to promote healthier eating habits among learners in the district.

4.6 Socio-Economic Determinants Affecting Dietary Habits among Learners

The findings illustrated in table 3 revealed that a majority of learners recognized the strong influence of socio-economic status on food choices and availability. Most learners agreed that their family's financial situation played a significant role in determining the types of food available at home, reflecting the broader impact of economic constraints on food access. Furthermore, the majority of students believed that individuals from lower-income families are more likely to consume ultra-processed foods due to limited access to healthier options. This reflects an awareness among learners of the disparities in food access linked to socio-economic backgrounds. Miyoba et al (2024) in their study observed that effective strategies for promoting healthier dietary habits among students in secondary schools require a multifaceted approach that combines education, school policies, and community involvement. Nutrition education should be integrated into the curriculum to increase students' awareness of the health risks associated with excessive consumption of ultra-processed foods and the benefits of a balanced diet. Schools can implement healthy meal programs that prioritize fresh, locally sourced foods while limiting the availability of sugary snacks and processed foods in school canteens. Encouraging parental involvement through workshops and awareness campaigns can reinforce healthy eating habits at home. Additionally, collaboration with local farmers and suppliers can ensure access to affordable, nutritious alternatives. Behavioral interventions, such as setting up school gardens and organizing cooking classes, can also enhance students' engagement with healthy eating. Moreover, regulatory policies, including restrictions on the marketing and sale of unhealthy foods within school premises, can help create an environment that supports better dietary choices. By combining education, accessibility, and policy changes, schools can play a pivotal role in fostering healthier dietary habits among students and reducing their dependence on ultra-processed foods.

Table 3: Descriptive Statistics for Socio-economic Determinants Affecting Dietary Habits among Learners

Statement	Mean	Std. Dev
1. I believe healthy food options are affordable for families of all income levels.	2.45	1.22
2. My family's financial situation influences the types of food available at home.	4.10	0.95
3. I think students from lower-income families consume more Ultra-processed food than those from higher-income families.	4.00	1.05
4. Socio-economic status does not impact students' dietary habits.	2.35	1.18
5. Access to healthier food options is a privilege reserved for families with higher incomes.	3.85	1.12

The findings above align with research by Msambichaka et al. (2020) and López-Sobaler et al. (2017), which emphasize the role of socio-economic factors in shaping dietary habits. The perception that healthier food options are primarily available to higher-income families highlights the need for targeted interventions to improve food affordability and access, particularly for lower-income households. Such efforts are crucial for addressing the growing reliance on ultra-processed foods and ensuring equitable access to nutritious food options for all socio-economic groups.

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4.7 Chi-Square Test of Independence for Socio-Economic Background and Dietary Habits

The Chi-Square test of independence conducted as illustrated in table 4 showed that socio-economic background significantly influenced students' dietary habits ($\chi^2 = 11.6$, $p = 0.021$). This implies that students from different socio-economic backgrounds had distinct eating patterns, particularly in terms of their access to and choice of food. The test also revealed a significant difference in dietary choices between students from different socio-economic backgrounds ($\chi^2 = 9.3$, $p = 0.032$), confirming that socio-economic status plays a role in the types of foods consumed. Additionally, financial constraints were significantly associated with reduced access to healthy food options ($\chi^2 = 14.5$, $p = 0.008$), highlighting the importance of economic factors in dietary behaviors.

Table 4: Chi-Square Test of Independence for Socio-Economic Background and Dietary Habits

Variable	Chi-square (χ^2)	p-value	Interpretation
Influence of Socio-economic Background on Dietary Habits	11.6	0.021*	There was a significant relationship between socio-economic background and students' dietary habits ($\chi^2 = 11.6$, $p = 0.021$).
Differences in Dietary Choices Between Socio-economic Backgrounds	9.3	0.032*	A significant difference was found in dietary choices based on socio-economic background ($\chi^2 = 9.3$, $p = 0.032$).
Impact of Financial Constraints on Access to Healthy Food	14.5	0.008**	Financial constraints significantly impacted access to healthy food options ($\chi^2 = 14.5$, $p = 0.008$).

4.8 Effective Strategies for Promoting Healthier Dietary Habits among Students

The findings presented in figure 4 below revealed that the most commonly endorsed strategy for promoting healthier dietary habits among students was nutrition education programs, favored by 18 teachers (56.25%). Offering healthier food options in the school cafeteria was seen as effective by 6 teachers (18.75%), while involving parents in nutrition-related activities was considered beneficial by 5 teachers (15.63%). Fewer teachers, 3 (9.37%), suggested organizing awareness campaigns on the dangers of ultra-processed food.

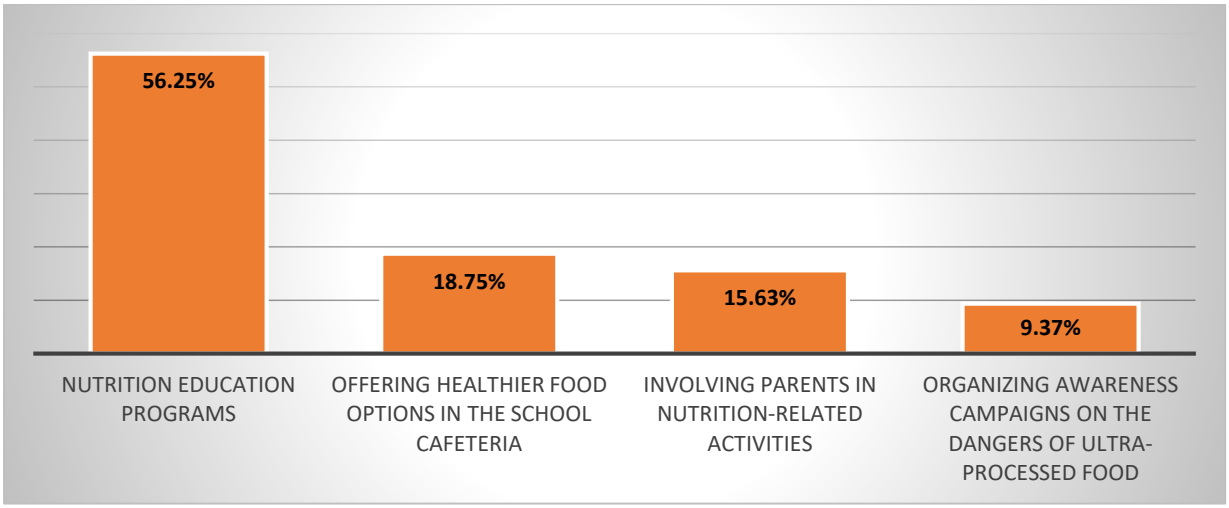

Figure 4: Strategies for Promoting Healthier Dietary Habits among Students

The strategies identified by teachers to promote healthier dietary habits in schools underscore the importance of a comprehensive, multi-level approach. Nutrition education programs were viewed as essential, aligning with studies that highlight the role of education in shaping students' dietary behaviors and increasing their awareness of healthy food choices

(Muthuri et al., 2017). By integrating nutrition education into the curriculum, schools can empower students to make informed decisions and reduce reliance on unhealthy, processed foods. Additionally, providing healthier food options within school cafeterias can directly impact students' eating habits, as it ensures they have access to nutritious meals during school hours. The involvement of parents in nutrition-related activities was also emphasized, as research shows that parental engagement plays a key role in reinforcing healthy eating behaviors at home, complementing school-based initiatives (Oyeyemi et al., 2019). These combined strategies help create an environment where healthier eating becomes the norm, both in and outside of the classroom (Kangwa & Chanda, 2025).

Additionally, the results revealed that promoting healthier dietary habits among secondary school learners requires a multi-faceted approach that addresses both individual behaviors and broader environmental influences. One key strategy is integrating nutrition education into the school curriculum to enhance students' awareness of the health risks associated with excessive consumption of ultra-processed foods while promoting healthier alternatives. One of the head teachers pointed out that:

"Schools can also implement policies that regulate the availability of ultra-processed foods within school premises, replacing them with nutritious options such as fruits, whole grains, and protein-rich snacks. Encouraging parental involvement through workshops and awareness campaigns can further reinforce healthy eating habits at home, ensuring consistency in dietary choices."

Additionally, collaboration with local food suppliers and vendors to offer affordable, healthy meal options within school cafeterias and nearby food outlets can make nutritious choices more accessible (Bwalya & Sichilima, 2019). Another effective approach involves incorporating hands-on activities such as school gardens, cooking classes, and nutrition clubs to engage students actively in learning about healthy eating. Finally, leveraging digital platforms and social media campaigns to share engaging content on nutrition and healthy lifestyles can further reinforce positive eating habits among learners. By implementing these strategies, schools and communities can work together to foster a supportive environment that encourages students to adopt and maintain healthier dietary habits.

5. CONCLUSION

In conclusion, the excessive consumption of ultra-processed foods among secondary school learners in selected schools in Solwezi District, Zambia, is influenced by a combination of socio-economic, environmental, and behavioral factors. Limited nutritional awareness, aggressive marketing by food companies, and the affordability and accessibility of ultra-processed foods contribute to their high consumption among students. Additionally, peer influence, busy school schedules, and the lack of strict school policies on healthy eating further exacerbate the issue. The preference for convenience and taste over nutritional value also plays a significant role in shaping students' dietary choices. Addressing this concern requires a multi-faceted approach, including nutritional education, policy interventions, and increased availability of healthier alternatives within school environments. By promoting awareness and encouraging healthier eating habits, stakeholders can help mitigate the negative health implications associated with the overconsumption of ultra-processed foods among secondary school learners.

6. RECOMMENDATIONS

- School administrators should implement comprehensive nutrition education programs to educate students about the benefits of healthy eating and empower them to make informed food choices.
- School Head Teachers should promote nutrition education in the school curriculum and ensure canteens offer healthier food options.
- The Ministry of Education through the District Education Board Secretary (DEBS) should implement district-wide policies to limit ultra-processed foods in schools and support nutritional assessments for targeted interventions.
- The Home Economics Department should enhance the curriculum with practical lessons on healthy eating and engage pupils in hands-on activities like school gardens.
- The Home Economics Head of Department (HOD) should lead initiatives to educate both students and parents on the dangers of ultra-processed foods, and organize workshops to reinforce healthy dietary habits at school and at home.

- Parent-Teacher Associations (PTAs) should engage in promoting nutrition-related activities and workshops to educate parents on preparing balanced meals at home and supporting healthy eating habits.
- Schools should collaborate with health organizations to conduct regular awareness campaigns on the health risks of ultra-processed foods, targeting both students and their families to encourage healthier dietary practices.

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