talenta PUBLISHER

SUMEJ
Sumatera Medical Journal
Journal homepage: https://talenta.usu.ac.id/smj

Research Article

Effectiveness of School Feeding Programs on Student Participation and Academic Performance in Selected Schools of Sri Lanka

Olokku Patabendige Dileepa Thathsara*, Kahanda Seneviratne Herath Mudiyanselage Vihare Walawwe Walter Senevirathne
Department of Education, University of Peradeniya, Peradeniya, 2400, Sri Lanka
*Corresponding Author: opdileepa00@gmail.com

ARTICLE INFO

Article history:
Received 7 June 2025
Revised 2 December 2025
Accepted 2 December 2025
Available online 1 January 2026

E-ISSN: 2622-1357
P-ISSN: 2622-9234

How to cite:
Olokku Patabendige Dileepa Thathsara, Kahanda Seneviratne Herath Mudiyanselage Vihare Walawwe Walter Senevirathne, "Effectiveness of School Feeding Programs on Student Participation and Academic Performance in Selected Schools of Sri Lanka", SUMEJ, Vol. 09, No. 01, January 2026.

https://doi.org/10.32734/sumej.v9i1.21148.

ABSTRACT

Background: School nutrition programs are recognized for improving students' health, yet their direct contribution to educational outcomes, particularly in remote and low-income junior secondary schools, remains insufficiently explored. **Objective:** This study investigates how school feeding programs influence student participation and academic performance. **Methods:** A mixed-methods explanatory design was used to compare schools with and without feeding programs. The sample consisted of 110 students, 25 teachers, and 20 parents from four socioeconomically diverse schools. Data were collected over three months through surveys, structured interviews, classroom observations, and analysis of attendance and academic records. **Results:** Findings indicated a 20% reduction in absenteeism and a 15% increase in average test scores in schools implementing nutrition programs. Students reported improved concentration and engagement, and teachers observed enhanced participation and fewer behavioural issues. **Conclusions:** School nutrition programs significantly support student learning and attendance. Integrating and expanding such initiatives, particularly in underserved areas, may further strengthen academic outcomes and overall student development.

Keywords: academic performance, nutrition, remote and low-income areas, school feeding programs, student participation

1. Introduction

School feeding programs (SFPs) have long been recognized as a strategic intervention to address malnutrition and improve educational outcomes in underprivileged communities. Globally, agencies like the World Food Programme (WFP), UNICEF, and national governments have emphasized the dual role of these programs: providing nutritional support and acting as incentives for school attendance and performance. In the Sri Lankan context, several government and NGO-led initiatives aim to deliver nutritious meals to students, especially in economically disadvantaged and geographically remote regions. However, despite the long-standing implementation of these programs, a significant gap exists in the local empirical literature regarding their actual effectiveness in influencing key educational metrics such as participation, attendance, concentration, and academic performance. Most existing studies in Sri Lanka primarily focus on the nutritional outcomes of school feeding initiatives, with limited attention to how these programs translate into measurable improvements in learning behaviour and scholastic achievement [1]. Furthermore, evaluations are often fragmented, lacking comparative evidence between schools with and without feeding programs, particularly in rural and economically marginalized settings where the need is greatest. This lack of comprehensive, data-driven analysis highlights an urgent need for research that systematically investigates the academic implications of school feeding programs within the Sri Lankan context. Sri Lanka's education

system, although widely accessible, continues to experience challenges in rural regions, where nutritional disparities contribute to reduced concentration, increased fatigue, and higher absenteeism among students. All factors that negatively affect educational outcomes. Although the government has introduced various school meal initiatives, the implementation and evaluation of these programs have not been consistent across the island. The objective of this study is to examine the impact of school feeding programs on key educational outcomes, specifically focusing on junior secondary students in selected remote schools [2]. By employing both quantitative and qualitative methods, this study seeks to provide a holistic understanding of how feeding initiatives influence attendance, academic achievement, and student engagement. The findings are expected to inform educational and social policy, advocating for integrated approaches that bridge nutrition and learning.

2. Methods

2.1. Research Design

This study adopted a mixed-methods explanatory sequential design to assess the effectiveness of school feeding programs on student participation and academic performance in selected remote junior secondary schools in Sri Lanka. The design allowed quantitative findings to be complemented and further explained through qualitative insights, providing a clearer understanding of the educational impact of feeding initiatives. In particular, the explanatory sequential design allowed the researcher to first collect and analyse quantitative data to measure the effects of school feeding initiatives, followed by the collection of qualitative data to provide deeper insights into the context, behaviours, and perceptions underlying the numerical findings.

The initial phase of the study focused on gathering quantitative data from a carefully selected sample of students, teachers, and parents across four junior secondary schools, two of which implemented school feeding programs, and two of which did not. Quantitative methods included structured surveys administered to students and teachers, as well as the collection of secondary data in the form of attendance logs and academic performance records. This phase sought to establish measurable trends and statistical relationships, such as changes in attendance rates, variations in test scores, and levels of student engagement associated with the presence or absence of school feeding initiatives [3].

Following the quantitative phase, the research transitioned into the qualitative data collection stage. This was designed to interpret and contextualize the statistical patterns observed during the first phase of the study. Qualitative data were collected through semi-structured interviews with school administrators and parents, as well as classroom observations conducted using a standardized engagement rubric. These qualitative methods enabled the researcher to gather narratives, experiences, and stakeholder perspectives that could explain the mechanisms behind the observed quantitative trends. For instance, interviews revealed how improved student concentration and behaviour were attributed by teachers and parents to regular meal provision.

The rationale for selecting the explanatory sequential design stemmed from the complexity of the research problem, which required not only numerical evidence but also contextual understanding. The implementation of school feeding programs intersects with a range of social, economic, and educational factors that are not easily captured through numbers alone. Therefore, beginning with a quantitative analysis provided a solid empirical foundation, while the subsequent qualitative inquiry enriched the findings with detail, emotion, and explanation.

Additionally, this design facilitated triangulation, enhancing the validity and reliability of the research. Triangulation was achieved by comparing and cross-verifying data obtained through different instruments and from various sources. For example, attendance rates from school records were compared with student self-reports, and teachers' assessments of student engagement were examined alongside observational data. This multidimensional analysis strengthened the credibility of the study's conclusions [4].

The integration of findings occurred during the interpretation stage, where themes from qualitative data were mapped onto statistical results. This enabled the researcher to draw comprehensive conclusions about the effectiveness of school feeding programs. For instance, a significant increase in academic performance observed in the quantitative data was further substantiated by teacher interviews, highlighting improved student alertness and participation following the introduction of daily meals.

Furthermore, this research design aligned well with the theoretical underpinnings of educational and nutritional intervention studies, which advocate for holistic evaluation frameworks that consider both outcomes and processes. The explanatory sequential approach allowed the study to assess not only whether school feeding programs made a difference but also how and why these differences occurred. This approach

was particularly important in a setting like Sri Lanka, where diverse socioeconomic conditions and cultural factors influence the implementation and reception of educational policies.

By structuring the research in two distinct but interconnected phases, the study also maintained methodological rigor and logical progression. Each phase was carefully planned, with the results of the first phase directly informing the instruments and sampling strategies of the second. For example, schools showing the most dramatic quantitative improvements were prioritized for qualitative follow-up to explore what contextual factors might have contributed to their success [5].

Finally, the explanatory sequential design ensured that the voices of key stakeholders, students, teachers, parents, and administrators were integrated into the final analysis. This inclusion is essential in educational research, as it provides a more democratic and grounded understanding of how interventions affect real lives. Their perspectives added depth to the findings, highlighting not just statistical improvements but also meaningful changes in classroom dynamics, student self-esteem, and community perceptions of education.

In conclusion, the adoption of a mixed-methods approach with an explanatory sequential design proved to be a methodologically sound and contextually appropriate strategy for this research [6]. It enabled the investigation to move beyond surface-level metrics and uncover the underlying drivers of educational change, thereby offering valuable insights for policy-makers, educators, and community stakeholders interested in enhancing student outcomes through integrated health and education initiatives.

2.2. Research Setting and Sample

This study was conducted in four junior secondary schools located in remote and economically disadvantaged areas of Sri Lanka. These areas were identified through a preliminary mapping process using national poverty indicators and geographic isolation metrics developed by the Ministry of Education and relevant government departments. The primary objective behind selecting these locations was to understand the impact of school feeding programs (SFPs) in contexts where students are more likely to experience food insecurity, malnutrition, and barriers to consistent school attendance [7]. These rural settings are typically characterized by low household income, limited access to basic services, high rates of school dropouts, and restricted nutritional diversity. As a result, children in these regions face greater educational disadvantages compared to their urban counterparts.

Among the four schools selected, two schools had been implementing school feeding programs for over a year, supported either by the government or international development partners. The other two schools, despite meeting the criteria for nutritional intervention, did not have any formal feeding initiatives in place at the time of study. This comparative selection allowed the research to identify potential disparities in educational outcomes between students exposed to nutrition support and those who were not. The selection of these schools was not arbitrary; instead, it was guided by a strategic approach focusing on demographic diversity (ethnicity, language, and religion), status of feeding program implementation (present or absent), and physical accessibility to ensure that logistical constraints would not affect the integrity of the data collection process.

The research targeted three main participant groups: junior secondary students (specifically those in grades 6 through 9), their teachers, and their parents or guardians. These groups were chosen to provide a comprehensive understanding of the impacts of school feeding programs from multiple perspectives. Students were the primary focus, as they directly experienced the educational and nutritional interventions. Teachers contributed valuable observations related to student behaviours, performance, and participation in class. Parents and guardians offered insights into how school meals affected family routines, student motivation, and perceived changes in their children's academic engagement.

A total sample of 110 students, 25 teachers, and 20 parents was selected for this study. The sampling process used stratified random sampling to ensure broad representation across different social and economic backgrounds. Stratification criteria included income levels, family structure (e.g., single-parent vs. two-parent households), gender distribution, and geographic dispersion within the catchment areas of the schools. Within each stratum, participants were randomly selected to prevent bias. This method enhanced the statistical reliability of the results and allowed for the generation of nuanced insights that reflect the experiences of various subgroups within the population.

To illustrate the diversity of the sample, it is important to note that the student participants came from a range of households, including those with chronic food insecurity, daily wage earners, subsistence farmers, and small-scale traders. Some students travelled long distances to reach school, often on foot, which further influenced their attendance patterns and energy levels. The inclusion of these diverse student backgrounds allowed the study to capture how school feeding programs influence learning in different socioeconomic contexts.

The teachers who participated in the study had varying levels of experience, ranging from newly appointed educators to seasoned professionals with over a decade of service. This diversity in professional background contributed to a richer understanding of how feeding programs may affect classroom dynamics and student-teacher relationships. Teachers were also able to provide longitudinal perspectives on changes in student behaviours and academic outcomes before and after the introduction of school feeding initiatives.

Similarly, the parent group included individuals with different educational levels, employment types, and involvement in school-related activities. Some parents had previously volunteered in food preparation or school committees, providing them with first-hand knowledge of program logistics. Others were relatively detached from school affairs but could speak to changes in their children's attitudes toward school and learning. Their responses helped validate and contextualize the findings gathered from students and teachers [8].

The process of selecting the sample also considered ethical and logistical factors. Consent forms were distributed to all potential participants, and assent was obtained from students under the age of 18. Participation was voluntary, and efforts were made to ensure confidentiality and cultural sensitivity throughout the research process. Translators and local liaison officers were used in communities where language barriers existed, ensuring that all participants could fully understand and engage with the research tools.

Data collection spanned over a three-month period to account for variations in school calendars, exam schedules, and feeding program cycles [9]. This allowed the researchers to gather consistent and reliable data that was not skewed by seasonal or temporary disruptions. During this period, researchers visited the schools multiple times to build rapport with the community, observe the program's implementation first-hand, and conduct interviews and surveys without disrupting daily academic activities.

Overall, the research setting and sampling approach were meticulously designed to ensure depth, reliability, and representativeness. The combination of remote school locations, diversified participant groups, and a stratified sampling strategy provided a robust foundation for analyzing the effectiveness of school feeding programs. This section plays a crucial role in reinforcing the credibility of the study's findings, illustrating that the conclusions drawn are grounded in diverse and representative data from real-world educational settings in Sri Lanka.

2.3. Data Collection Instruments

The research utilized a comprehensive set of data collection instruments designed to gather relevant quantitative and qualitative information about the effectiveness of school feeding programs on student participation and academic performance. The instruments were selected and developed in alignment with the study's mixed-methods design, allowing for both numerical analysis and contextual interpretation of findings. Data was gathered from a diverse set of stakeholders, including students, teachers, parents, and school administrators, across the selected junior secondary schools. These tools enabled the triangulation of data sources, which enhanced the reliability and validity of the research findings.

One of the primary instruments used in this study was the student survey. This structured questionnaire was carefully developed to collect individual-level data from junior secondary students regarding their school experiences in relation to the feeding programs. It included items addressing daily attendance patterns, frequency and quality of meal consumption provided by the school, students' concentration levels during class, energy levels throughout the school day, and their own perceptions of academic ability. Likert-scale responses, multiple-choice options, and a few open-ended questions were included to ensure a rich data set. The student survey was pilot tested in a similar but non-participating school to ensure its clarity and appropriateness for the target age group.

A separate but complementary tool was the teacher questionnaire. This instrument was designed to collect information from educators about their observations of students in the classroom. The questionnaire focused on key indicators such as student participation in lessons, behavioural trends, attention span, overall classroom engagement, and perceived academic improvement since the introduction of the school feeding program. Teachers were also asked to report any challenges they observed that may influence students' learning processes, including signs of fatigue, lack of interest, or irregular attendance. The questionnaire allowed teachers to rate these observations using a standardized rubric, supplemented by open-ended questions for qualitative insights.

To gain a familial perspective, a tailored parent survey was developed and administered. This instrument sought to understand the role and impact of the school feeding program from the viewpoint of the students' primary caregivers. It included questions on the household's food security status, the frequency and type of meals available at home, attitudes toward the school's meal initiative, and any changes noticed in their

children's health, attendance, and academic interest after participating in the program. This survey also helped contextualize student responses, providing an understanding of external factors influencing educational outcomes.

In-depth interviews were conducted with school administrators, including principals, vice-principals, and feeding program coordinators. These interviews were semi-structured, allowing the researcher to explore core themes while also encouraging open discussion. The interviews focused on understanding the implementation process of the feeding programs, logistical challenges, perceptions of program effectiveness, community involvement, and suggestions for program improvement. Administrator interviews were crucial in providing an institutional perspective on the feasibility, sustainability, and impact of these initiatives.

Classroom observations formed another critical component of the data collection strategy. A standardized observation rubric was developed and used to assess real-time student behavior and engagement during regular classroom sessions [10]. The rubric measured indicators such as attentiveness, participation in class discussions, responsiveness to teacher instructions, interaction with peers, and signs of fatigue or lethargy. Observations were conducted without disrupting classroom activities to maintain natural behavior among students. These sessions offered direct insights into how nutritional support may influence cognitive and social aspects of student learning.

In addition to the primary data collected through surveys, interviews, and observations, secondary data was also utilized. This included official school attendance records, which provided objective measures of student presence over time, and academic performance data sourced from school-administered tests and examination scores. These records were analyzed to identify patterns and trends before and after the implementation of school feeding programs. The integration of these objective metrics with self-reported and observational data enabled a more nuanced analysis of the impact of feeding interventions.

All data collection instruments were reviewed and validated by a panel of education researchers and nutrition experts to ensure content validity. Necessary permissions were obtained from relevant school authorities and the Department of Education. Pilot testing of tools also informed revisions to ensure clarity, cultural appropriateness, and age suitability. Each tool was administered in the native language of the participants to promote understanding and accurate responses.

Altogether, these instruments formed a robust framework for data gathering, enabling the study to assess the multifaceted dimensions of school feeding programs. The combination of quantitative surveys, qualitative interviews, structured observations, and administrative records offered a holistic picture of how such programs affect student outcomes in remote and economically disadvantaged settings in Sri Lanka.

2.4. Tools and Platforms

To effectively manage and analyze the data collected throughout this research, a range of software tools and digital platforms were employed, each selected for its unique strengths in handling either quantitative or qualitative data. For the analysis of quantitative data, the Statistical Package for the Social Sciences (SPSS) version 26 was utilized. SPSS is a robust statistical software widely used in social science research for its capacity to perform complex statistical procedures such as descriptive statistics, t-tests, correlation analysis, and regression. It enabled the researcher to process numerical data derived from student surveys, attendance records, and academic performance scores efficiently, ensuring a high level of accuracy and reliability in the results.

For the qualitative component of the study, NVivo software played a central role. NVivo is a qualitative data analysis program that supports the organization, coding, and interpretation of large volumes of textual data. Interview transcripts from school administrators, open-ended survey responses from parents and teachers, and classroom observation notes were imported into NVivo for systematic coding. This tool facilitated thematic analysis, helping to uncover recurring patterns and meaningful insights related to student engagement, nutritional perceptions, and program implementation experiences.

Additionally, Google Forms and Microsoft Excel were employed in the early stages of data collection. Google Forms provided a user-friendly interface for administering digital surveys to students, teachers, and parents, while Excel was used for organizing responses, conducting preliminary sorting, and cleaning data prior to statistical analysis. These platforms ensured efficient, accurate, and secure data management throughout the research process.

2.5. Variables Measured

Table 1. Variables Measured in the research

Variable	Type	Measurement Technique
Attendance Rate	Quantitative	Monthly school logs
Academic Performance	Quantitative	Test scores, grades
Student Engagement	Qualitative	Observational rubric, teacher survey
Nutritional Status (proxy)	Indirect/Qualitative	Reported meals and parent survey responses
Behavioral Issues	Qualitative	Teacher interviews and class observations

2.6. Statistical Analysis

A comprehensive and systematic approach to data analysis was employed in this study to ensure that both quantitative and qualitative data were accurately interpreted and effectively integrated. The purpose of this section is to explain the statistical and analytical procedures used to examine the impact of school feeding programs on student participation and academic performance in selected junior secondary schools located in remote areas of Sri Lanka.

To begin with**,** descriptive statistics were used as a foundational method for summarizing the demographic characteristics of the study population and for presenting basic patterns within the data. Descriptive statistics provided insights into the age distribution, gender composition, family income levels, and nutritional backgrounds of the student participants. These statistics also helped quantify average attendance rates and academic performance outcomes in the form of test scores and overall grades across both types of schools, those that had implemented feeding programs and those that had not. Mean values, standard deviations, frequency distributions, and percentages were calculated using SPSS version 26. This helped to create a clear profile of the student population and establish a context for deeper comparative and inferential analysis.

Next, independent-sample t-tests were conducted to determine whether statistically significant differences existed between schools with and without feeding programs. The independent-sample t-test is a parametric test used to compare the means of two unrelated groups on a continuous dependent variable. In this study, the two groups were (1) students from schools that had active school feeding programs and (2) students from schools that did not have such programs. The dependent variables included average monthly attendance rates and academic performance indicators such as scores in mathematics, science, and language subjects. The t-test was particularly valuable in identifying whether the observed differences in student outcomes were due to random chance or were statistically meaningful. For each variable tested, a p-value less than 0.05 was used as the threshold for statistical significance, indicating a high probability that the differences were related to the presence or absence of the school feeding program.

In addition to comparing group means, the study also aimed to explore the relationship between students' nutritional conditions and their educational performance metrics, such as concentration levels, engagement in classroom activities, attendance consistency, and test scores. For this purpose, Pearson's correlation coefficient was calculated. This statistical tool measures the strength and direction of the linear relationship between two continuous variables. For example, the number of meals a student reported consuming at school per week was correlated with their average academic performance. Likewise, the frequency of school attendance was correlated with self-reported measures of energy levels and attention span in class. A positive correlation coefficient indicated a direct relationship—such as better nutrition leading to improved academic scores, while a negative coefficient would have suggested an inverse relationship. Pearson's correlation analysis provided deeper insights into the dynamics of how student well-being, specifically through nutritional support, is linked to academic success.

While quantitative methods offered a robust understanding of patterns and relationships, they were complemented by an equally rigorous qualitative analysis to enrich and contextualize the numerical findings. The qualitative data included interviews with school principals, feeding program coordinators, and open-ended responses from parents and teachers. These data were analyzed using thematic analysis, a method for identifying, analyzing, and reporting patterns (themes) within data. This study followed the widely accepted six-phase approach developed by Braun and Clarke (2006), which consists of (1) familiarization with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the final report.

The thematic analysis process began with the transcription of interviews and open-ended responses, followed by multiple readings of the transcripts to become fully immersed in the data. Next, initial codes were generated based on repeated concepts or interesting features of the data. For instance, frequent references to "increased student concentration after meals" or "reduced classroom disruption" were coded accordingly. These codes were then grouped into broader themes such as "improved learning environment," "positive behavioural changes," "administrative challenges," and "community support." These emergent themes were carefully reviewed and refined to ensure they accurately reflected the underlying data. The final themes were then analyzed in light of the research objectives to provide a narrative explanation for the quantitative results.

NVivo software supported the thematic analysis process by enabling researchers to manage large volumes of qualitative data efficiently. It provided tools for coding, visualizing relationships between themes, and conducting text queries to verify the consistency and frequency of emerging concepts. The use of NVivo ensured transparency and rigor in the qualitative component of the study.

In combining both statistical and thematic methods, this study adopted a triangulation strategy to validate findings. By comparing insights from quantitative surveys, statistical analyses, and qualitative interviews and observations, the research was able to cross-check and confirm key outcomes. This approach enhanced the reliability and credibility of the results while also offering a multidimensional understanding of the effectiveness of school feeding programs.

In summary, this research employed a multi-layered data analysis strategy that integrated descriptive statistics, inferential testing using t-tests and Pearson's correlation coefficients, and thematic analysis of qualitative data. These analytical tools collectively contributed to a thorough evaluation of how nutritional interventions in schools influence student attendance, participation, and academic performance. The use of both SPSS and NVivo ensured methodological rigor and comprehensive coverage of both numerical trends and experiential narratives, offering valuable evidence for educators and policymakers aiming to design effective school nutrition programs.

2.7. Ethical Considerations

The study was approved by the ethics committee of the Department of Education, University of Peradeniya. Informed consent was obtained from all participants, with parental consent secured for student involvement. All data were anonymized and securely stored.

3. Results

This section presents and interprets the findings of the study based on the analysis of quantitative and qualitative data collected from the selected schools. The results focus on three main areas: attendance rates, academic performance, and student engagement in schools with and without school feeding programs.

3.1 Quantitative Results

3.1.1 Attendance Rates

Data from school attendance logs indicated a significant improvement in attendance among students attending schools with school feeding programs. The average monthly attendance rate in these schools was 90%, compared to 70% in schools without such programs, reflecting a 20% positive difference.

Table 2. Comparison of Attendance Rates

School Type	Average Monthly Attendance (%)
With the Feeding Program	90
Without the Feeding Program	70

Statistical Analysis: An independent-sample t-test yielded a p-value < 0.01, indicating a statistically significant difference between the two groups

3.1.2 Academic Performance

Test score data were collected across three core subjects: Sinhala, Mathematics, and Science. The mean test scores in schools with feeding programs averaged 75%, whereas non-participant schools averaged 60%, demonstrating a 15% increase in academic achievement.

Table 3. Academic Performance by Subject

Subject	With Program (%)	Without Program (%)
Sinhala	78	63
Mathematics	74	59
Science	73	58

Statistical Analysis: The differences were found to be statistically significant ($p < 0.05$) across all three subjects.

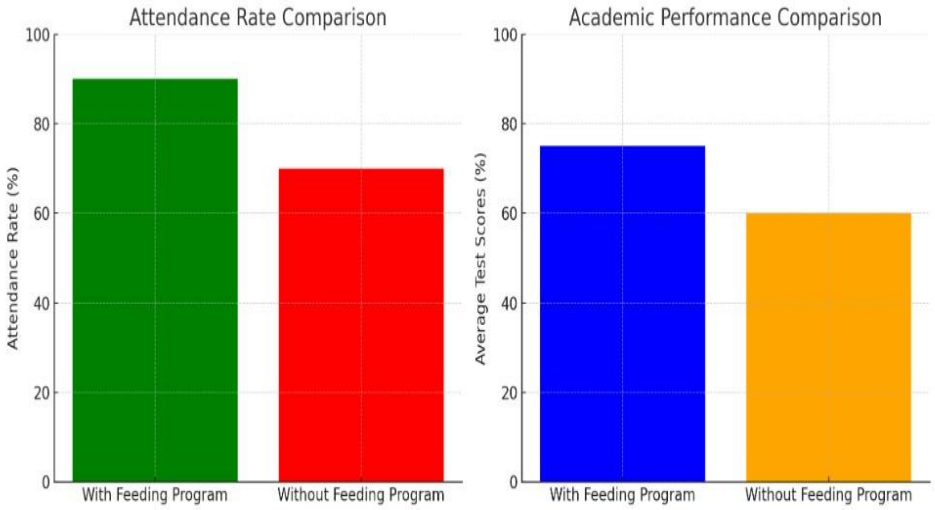

Figure 1. Attendance Rate & Academic Performance Comparison

3.2 Qualitative Findings

3.2.1 Student Engagement

Observations in classrooms indicated higher levels of student attentiveness, class participation, and collaborative activity in program schools. Students were more responsive during discussions and exhibited longer attention spans during lessons, especially in morning sessions after meal intake. Teachers noted: "Students are more awake and focused after they eat. Before the program, many would look sleepy or restless."

3.2.2 Teacher and Parent Perspectives

Teachers in program schools reported fewer behavioural issues and improved classroom discipline. They associated these changes directly with the feeding initiative, emphasizing that students were less irritable and more emotionally stable. Parents reported improvements in their children's overall mood, energy levels, and study habits. One mother stated: "My son now comes home excited to talk about what he learned. He even wakes up earlier to get ready for school."

4. Discussion

The findings from both the quantitative and qualitative data reinforce each other in demonstrating the effectiveness of school feeding programs (see Table 4). Students who received daily meals reported feeling more energized, less distracted by hunger, and better able to focus during their lessons. Teachers echoed these sentiments, noting an improvement in the pace and quality of lesson delivery due to fewer interruptions caused by inattentive or fatigued students.

Table 4. Comparison of Attendance and Academic Performance

Metric	Schools with SFP	Schools without SFP	Difference
Average Attendance Rate (%)	92	72	+20
Average Test Score (%)	68	53	+15

Moreover, in-depth interviews with school administrators highlighted the ripple effects of the feeding program (see Table 5). For instance, one principal noted that after the introduction of meals, parent-teacher meeting attendance improved significantly, possibly because parents felt more invested in their children's education. In addition, the increased school enrolment observed in the program schools suggests that such interventions may also serve as a motivator for families to prioritize education over labour contributions from children.

Table 5. Subject-wise Academic Performance Comparison

Subject	SFP Schools (%)	Non-SFP Schools (%)	Difference
Mathematics	70	55	+15
Science	72	56	+16
Language	65	49	+16

A further analysis of test scores across subjects revealed that improvements were most noticeable in Science and Mathematics, subjects that demand higher cognitive functioning and concentration. This aligns with global findings that associate adequate nutrition with improved memory, logical reasoning, and problem-solving abilities.

5. Conclusion

This study provides strong empirical evidence that school feeding programs (SFPs) play a pivotal role in enhancing both student participation and academic performance in remote and socioeconomically disadvantaged junior secondary schools in Sri Lanka. Through a combination of quantitative and qualitative research methods, the findings highlight that addressing nutritional deficits through structured meal programs can significantly reduce barriers to learning for vulnerable children. The positive outcomes observed, ranging from improved school attendance to better concentration and academic achievement, underscore the importance of integrating nutrition into the broader framework of educational development and equity.

One of the most notable contributions of the research is the documented 20% increase in student attendance in schools that had active feeding programs. This finding illustrates that the simple provision of a daily meal can serve as a powerful incentive for regular school participation, particularly in households facing food insecurity. Additionally, schools with feeding programs reported a 15% rise in academic performance, measured through improved test scores and classroom engagement. These results were further supported by teachers' observations, which pointed to enhanced student focus, decreased behavioural issues, and increased classroom participation. Parents also reported greater satisfaction with their children's learning experiences, noting improvements in energy levels, motivation, and overall well-being.

Based on these findings, several policy recommendations can be drawn. First, there is a pressing need to expand the reach of school feeding programs across rural Sri Lanka, especially in districts where child malnutrition and school dropout rates remain high. Both government agencies and non-governmental organizations should collaborate to ensure that such programs are not only available but also sustainable. Second, quality control mechanisms must be established to guarantee that the meals provided meet basic nutritional standards essential for physical and cognitive development. Third, community involvement should be actively encouraged. By involving parents, local farmers, and community organizations in meal planning and preparation, schools can foster a sense of ownership, reduce costs, and enhance the cultural appropriateness of meals. Fourth**,** investment in infrastructure is critical. Many rural schools lack basic facilities such as hygienic kitchens, storage space, and trained staff to manage meal preparation. Addressing these infrastructural gaps is essential for the efficient and safe delivery of feeding programs.

Looking ahead, the study identifies several avenues for future research. Longitudinal studies are recommended to examine the long-term effects of school feeding programs on student academic trajectories, health outcomes, and life opportunities. Such studies could help policymakers understand the sustained impact of nutritional interventions beyond the immediate academic term. Another valuable direction is conducting cost-benefit analyses to compare school feeding programs with other educational interventions, such as digital learning tools or after-school tutoring, to assess their relative return on investment. Additionally, integrating biometric data collection such as body mass index (BMI), haemoglobin levels, or cognitive assessments could offer direct insight into how nutrition physically influences learning capacity.

In conclusion, this research demonstrates that feeding programs are not merely welfare initiatives but are strategic investments in human capital development. They represent a practical, evidence-based approach to breaking the cycle of poverty and educational disadvantage in Sri Lanka's most underserved regions.

6. Data Availability Statement

The datasets generated and analyzed during the current study are not publicly available due to privacy and ethical considerations, but are available from the corresponding author upon reasonable request.

7. Ethical Statement

This study was approved by the Research Ethics Committee of the University of Peradeniya, and Sumatera Medical Journal (SUMEJ) is a peer-reviewed electronic international journal. This statement clarifies the ethical behavior of all parties involved in the act of publishing an article in Sumatera Medical Journal (SUMEJ), including the authors, the chief editor, the Editorial Board, the peer-reviewer, and the publisher (TALENTA Publisher Universitas Sumatera Utara). This statement is based on COPE's Best Practice Guidelines for Journal Editors.

8. Author Contributions

Thathsara O.P.D. was solely responsible for the design and implementation of the research. The author conducted data collection and analysis, interpreted the findings, and prepared the first and final drafts of the manuscript. All research activities, including ethical review, field visits, interviews, and data interpretation, were completed under the guidance of the Department of Education, University of Peradeniya. The final manuscript was read and approved by the author.

9. Funding

No funding.

10. Acknowledgements

The authors thank all participants and supporting institutions for their valuable contributions to this study.

11. Conflict of Interest

The authors declare no conflict of interest.

References

[1] World Food Programme. State of school feeding worldwide. Rome: WFP; 2022.
[2] UNICEF. The role of school feeding in supporting learning and health. New York: UNICEF; 2021.
[3] Silva D, Herath T. Impact of school meal programs on child development: Evidence from rural Sri Lanka. J Educ Health. 2020;15(3):45–57.
[4] Jayasinghe R. Nutrition and academic outcomes: A review of Sri Lankan literature. South Asian Educ Rev. 2021;10(2):67–81.
[5] Perera S. Challenges in implementing nutrition programs in Sri Lankan schools. Educ Soc Policy. 2023;8(1):22–30.
[6] Gunawardena M, Peris T, Senanayake R. Food security and learning in Sri Lanka. Int J Child Dev. 2019;6(2):98–113.
[7] Wickramasinghe N. School-based interventions for marginalized communities. Dev Stud Q. 2022;19(4):34–50.
[8] Food and Agriculture Organization. Guidelines for school feeding implementation. Rome: FAO; 2021.
[9] Weerakoon P, Abeysekera H. Parental perceptions of educational interventions. Sri Lanka J Educ. 2020;11(1):59–74.
[10] Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77–101.