

The Reality of School Nutrition Programs as Perceived by Teachers: A Case Study of Primary Schools in Khotang, Nepal

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Abstract

Background: The school environment is crucial in formulating healthy eating habits, promoting healthy action, and nutrition education. School Health and Nutrition (SHN) Programs conducted globally have improved students' nutrition knowledge, attitude, and behavior. Depending on the situation, such programs aim to improve school attendance and nutrition outcomes mainly through food or cash transfer. The Government of Nepal prioritizes SHNs for primary school students through the support of various national and international organizations. However, SHN Programs carried throughout the country are neither similar nor widespread. Nutrition education includes curriculum enhancement, parental involvement, hands-on activities, gardening, and physical activities. In this regard, teachers may influence the feasibility of nutrition education and improve dietary behavior among students of poor households. Sustainable SHN Programs envision long-term operation/functioning and local development by reducing external dependency with better program activities. The sustainability of such programs depends on parents' participation, resource availability, and the conduction of various activities. The sustainability of the SHN Program is crucial not only to improve students' diet quality and academic performance but also to enhance their physical and social functioning.

Objective: This study aims to assess teachers' perceptions of various nutrition modalities implemented at four different primary schools in the Khotang district of Nepal.

Methodology: The study was conducted at four schools in Eastern Nepal running different SHN Programs. Data was collected from extensive Focus Group Discussions (FGDs) with the school Principals, nutrition focal persons, and other teachers at each school. A total of four FGDs were conducted in the early months of 2022, with a total of 20 participants (teachers). The obtained data were analyzed qualitatively to gain an in-depth understanding of school nutrition modality in practice.

Results: The surveyed schools followed their own nutrition modality based on their suitability and effectiveness for implementation. Nutrition modalities, namely i) Home-based meals, ii) Direct parents' participation, iii) Government programs, and iv.) Catered-based programs were implemented in four different schools. Home-based nutrition with direct parent participation reduces the need for extra financial resources. Cash and catering-based modality require fund transfers to carry out the programs effectively. This kind of modality also incurs higher administrative costs. Modality with parents' involvement can overcome resource challenges and improve students' nutritious diet and academic performance.

Conclusion: Nutrition modality improves nutritional knowledge, develops healthy food perception, and alters eating habits among children. School nutrition modality ranges with various activities depending on the availability of resources and parents' participation. The dependency on external sources in the operational process undermines the sustainability of SHN programs, while parental involvement is crucial for its successful implementation. Therefore, there is a need for SHN programs to move beyond the traditional one-time feeding strategy towards continuous and well-monitored dietary programs for their sustainability.

Keywords: School Nutrition Program, sustainability, resource constraints, parental concern, teachers'

perspective

1. Introduction

1.1 School Nutrition Program and Practices

Health and nutrition programs have been receiving wider global attention in recent decades. The Education for All (EFA) initiative has considered health and nutrition as priority areas to achieve its various goals and targets in the wake of this century. Since then, significant efforts have been made to provide school health and nutrition services almost in all countries by providing meals or snacks to school children. Globally, it reached 368 million children through government programs (Drake et al., 2017). The School Nutrition Program highlights the significance of nutritional education as well as sustainable consumption and practice learning activities. Studies have shown that school-based nutrition intervention improves the nutritional status of children: knowledge, attitude, and behavior (Dixey et al., 1999; Pérez-Rodrigo & Aranceta, 2001; Wang & Stewart, 2012; EI Harake et al., 2018 and Kyere et al., 2020). Apart from reducing short-term hunger, school nutrition programs can enhance nutrition awareness, and food preferences and promote healthy eating behavior along with physical and cognitive development. Such improvements ultimately enhance dietary habits and health status (Gemily et al., 2020). School plays a vital role in improving health and nutrition conditions, especially in the first 8000 days of a child's life (Bundy et al., 2018). Urbanization has brought a change in the lifestyle and food habits of the entire population; thus, the school environment is crucial in the formulation of healthy eating habits, promoting healthy action, and nurturing nutrition education.

School Nutrition Programs practiced around the globe addresses the need for nutritious meals and healthy dietary behaviors along with informed food choice. Mid-day meals provided in India (Sikkim) show positive relation with school attendance and child nutrition, along with developing good food habits and social equality among children (Mishra, 2013). Further, the Japanese School Lunch Program serves as a means to educate children to understand proper dietary habits, food culture, and history, enrich school life, and nurture sociability (Tanaka & Miyoshi, 2012). In Brazil, School Nutrition Programs encourage healthy eating habits in school by preparing a healthy food menu that targets to meet the nutrition requirements of students as per their age group (Sampaio et al., 2017).

The school meal program is a crucial strategy of Nepal to reduce malnutrition, formulated in the School Sector Development Plan (SSDP) and National School Health and Nutrition Strategy (NSHNS). More than 600,000 school students were provided with mid-day meals either through food transfer (mainly in food-insecure areas) or cash transfer (Shrestha et al., 2020). The Government of Nepal manages the School Feeding Program mainly for primary school students through support from various national and international organizations; however, these programs carried throughout the country are neither similar nor widespread (Pant, 2020).

According to the SSDP (2016–2022), the mid-day meal has helped to reduce short-term hunger among students as well as help address micronutrient deficiencies of students through multi-fortified foods and even improved their academic results. In other words, the school feeding program has provided security to children and boosted their intellectual strength. The Nepalese government's annual funding for school lunches expands from 25 million dollars to approximately 72 million dollars between 2017 and 2020 (WFP, 2022).

School Nutrition Programs are not mandatory throughout the country, although they have been practiced widely. Earlier research reveals that they have been extended to 43 districts of Nepal with significant support from the World Food Program (WFP) (Pant, 2020). The delivery modality varies on the program intervention areas. In Nepal, government organizations, international agencies, and Non-Government Organizations (NGOs) have implemented small-scale health and nutrition programs in limited districts to ensure better learning and nutrition of school children cost-effectively. School Nutrition Programs depend on traditional models and external support for Program intervention, and the sustainability of such programs requires local institutions (Kretschmer et al., 2014). The effectiveness of these programs varies from country to country, depending on economic conditions, health conditions, and food supply (Ishida, 2015).

School Feeding Programs are widely implemented nutrition programs in schools that have received attention in both developed and developing countries (Dalma et al., 2016; Xu et al., 2021); primarily undertaken in two forms: school meals (hot meals at school) and take-home rations (providing food staples to school children). The aim of such programs is to provide nutritious meals to school children. Additionally, the WFP outlines take-home rations, unconditional cash transfers, and multimodal approaches as standard practices for School Feeding Programs (Borkowski et al., 2021). School Feeding Programs have higher non-transferred costs, which is due to additional resources and manpower. Schools delivering on-site meals and take-home rations account for higher administrative costs as it includes transportation, preparation, handling of food, and monitoring of students'

attendance. Interestingly, as shown in the analysis of India, Bangladesh, and Indonesia, programs delivering snacks have lower non-food costs (Bundy et al., 2009; Dalma et al., 2016). Funds allocated for School Health and Nutrition Programs are not able to implement all program interventions or further expand the program nationwide. Furthermore, because human and material resources are scarce, only limited activities of the program are conducted, leaving the School Health and Nutrition Program unfinished (Shrestha et al., 2019). Nutrition education includes curriculum enhancement, parental involvement, hands-on activities, gardening, and physical activities, in this regard, teachers may influence the feasibility of nutrition education and improve dietary behavior among students of poor households (Kupolati et al., 2019).

Sustainable School Nutrition Programs envision long-term operation/functioning and local development by reducing external dependency with better program activities (Kretschmer et al., 2014). The sustainability of school meals largely depends upon the logistics of school meals (food served, food production, transportation, and consumption) and food-eating habits (Oostindjer et al., 2017). The School Nutrition Program faces a list of hurdles in implementation in resource-scarce areas, including the lack of uniformity in program operation, low parental concern, and non-availability of physical and financial resources (Shrestha et al., 2019). This has been further stressed by Pant (2020), who argues that challenges in the implementation include unclear policy, the economic status of parents, and limited awareness of nutrition among people. While the implementation of nutrition programs could be challenging in general, it may be context-specific as well. Realizing this, the paper tries to assess the perception of teachers towards different nutrition modalities used at four different primary schools in Khotang.

This study explores the School Nutrition Programs, including the modality adopted and the suitability of the modality in low-resource settings as perceived by teachers. The study examines which modalities are suitable in areas with limited resources and explores the sustainability of school nutrition programs in such environments, drawing on insights gathered from focus group discussions (FGDs). This study provides essential information on the models practiced for School Nutrition Programs in a rural area of Nepal. The findings can be used to inform policy decisions related to School Nutrition Programs and to improve the programs' sustainability in similar contexts. To achieve these goals, this study has two main objectives.

- To evaluate the sustainable School Nutrition Programs in resource-constrained areas.
- To assess and analyze the different nutrition modalities practiced at four primary schools in remote areas of Nepal.

1.2 Focus Group Discussion (FGD)

FGD data from four School Nutrition Programs allowed us to analyze the sustainability of School Nutrition Programs in resource-constrained environments. The FGD involved four School Nutrition Programs, and the discussion was held in the presence of the School Principal, Nutrition Focal Person, and teachers of the schools. The purpose of involving these stakeholders was to get a better understanding of the nutrition conditions and to gain insight into the sustainability of the program.

A semi-structured questionnaire was prepared for the FGD, which focused on four major aspects: nutrition program, resources, challenges, and parental concerns. This questionnaire was designed to guide the discussion and ensure that all relevant information was covered. The first aspect, the nutrition program, focused on understanding the details of the nutrition program, such as what modality was implied, what kind of food was provided to the students, whether there was any nutrition-based training for teachers, and the impact it had on the student's nutrition. The second aspect, resources, focused on understanding the resources available for the program, such as the budget allocated for the program, insufficient staff training, and the facilities used for cooking and serving the food. Following this, challenges focused on understanding the challenges faced during program implementation, such as barriers in the program and measures for overcoming barriers. The fourth and final aspect, parental concerns, focused on understanding the concerns of the parents regarding the program, such as the quality of the food provided, the impact of the program on their children's health, and their overall satisfaction with the program.

The FGD provided valuable insights into the sustainability of School Nutrition Programs in resource-constrained environments. The data gathered from the FGD could be used to improve the program by addressing the challenges identified, improving the quality of the food provided, and addressing the concerns of the parents.

1.3 School Nutrition Sustainability Framework

Previous studies have focused on the implication of community-based intervention in School Nutrition Programs in order to tap into local and indigenous resources, which requires parental support and resources to facilitate

program activities (Engelbrecht, 2005; Kwatubana & Makhalemele, 2015; Bundy et al., 2017 and Cory et al., 2021). Based on the previous study, the sustainability framework is designed with three indicators: i). Parental concerns, ii). Funding, and iii). Resources. Against this framework, the paper determines the sustainability of a particular modality. Qualitative data extracted from Focused Group Discussion (FGD) will further support the framework.

The sustainable nutrition framework is based on the FGD and secondary literature that guides sustainable nutrition grounded on the availability of operational resources, sources of finances, and parental concern. Resources include the material and human resources required for the operation of the school nutrition modality. The funding and finances contribute to the sufficiency of the nutrition program, and parental concern adds to their positive involvement in the school nutrition modality.

Table 1. Framework for Measuring the Sustainability of School Nutrition Program

Availability of resources	Funding (Financial support)	Parental concern
Human	Self-funded	Direct involvement
Physical	External support	Indirect involvement

2. Methodology

2.1 Study Setting

This paper is a cross-sectional study that was conducted in the rural area of Khotang district in Nepal from February 25 to March 10, 2022. The aim of the study was to explore the models practiced for School Nutrition programs through FGDs with school teachers.

Purposive Sampling was used to select four primary schools from the Khotang district for the study. Two of these schools were government schools at the higher secondary level, one was a private school at the lower secondary level, and the remaining one was a private school at the primary level. The reason for selecting these schools is that they have implemented their own nutrition programs and have banned the consumption of junk food. These programs are carried out through various modalities such as meal modality, parent-based approach, or home meal, which makes these schools suitable for this study.

The study's data collection involved conducting FGDs with school teachers from the selected schools. The semi-structured questionnaire used in the FGDs was based on the sustainability framework, which helped to ensure that all relevant aspects related to the sustainability of School Nutrition Programs were covered. The data collected from the FGDs provided insights into the models practiced for School Nutrition programs in the selected schools, which can be used to improve the programs and make them more sustainable.

2.2 Data Collection Procedures and Analysis

The focus group discussion was held at all surveyed schools with the presence of the school principal, focal person for nutrition, and teachers. The aim of the discussion was to determine the school nutrition program, resources required for the nutrition program, challenges faced in the nutrition program, and parental involvement in the nutrition program. The FGDs were conducted on different days and at different times in each school to ensure that a representative sample was obtained. Prior to the FGDs, the schools were observed regarding their nutrition modality, and verbal consent was taken to perform FGDs. The FGDs were recorded, transcribed, and translated into English to facilitate analysis.

This approach to data collection allowed for a thorough and comprehensive exploration of the School Nutrition Programs in the surveyed schools. The recorded, transcribed, and translated FGDs provide a valuable resource for analysis and can help inform policy decisions to improve the sustainability of School Nutrition programs.

Table 2. Details of the FGDs at schools and participants

Schools	Types	Grade levels	FGD participation
YouMe School	Private	Up to Grade 8	School Principal, Nutrition Focal person, and 3 Teachers.
Shree Durhchim Secondary School	Government School	Up to Grade 10	School Principal, Nutrition Focal Person, and 3 Teachers

Shree Mahendralaya Secondary School	Government School	Up to Grade 10	School Principal, Nutrition Focal Person, and 3 Teachers
Halesi Pathshala	Public School	Up to Grade 5	School Principal, Nutrition Focal Person, and 3 Teachers
Total			Total 20 Teachers

3. Results

The involvement of the school principal, focal person for nutrition, and teachers ensured that the FGDs covered a range of perspectives related to School Nutrition programs. By conducting FGDs at each surveyed school, the study was able to capture the unique context and experiences of each school, which can help inform policy decisions related to School Nutrition programs in similar contexts.

3.1 Sustainable Nutrition Framework

Table 3. Sustainable school nutrition framework

Schools	Modality	Availability of Resources (Operation)	Funding (financial support)	Parental concern
Youme School	Home-based modality	Minimum physical and human resources are required. Financial resources for nutritional activities. Meal logistics prepared by parents.	Finances not required to provide a meal	Face-to-face interaction through timely home visits. Provide nutrition information to parents
Shree Dorchim Secondary School	Cash-based modality	Additional human resources for the program monitoring and management. Financial resources are required as per the number of students. Meal logistics are managed by parents.	Government support of Rs 15 per student	Indirect parent participation. No specific parental activities.
Shree Mahendradaya Secondary School	Catered-based modality	Less physical and human resources are required. Resources are managed by external sources. Meal logistics are handled by the caterer.	External organization support of Rs 45 per student for lunch. Government support of Rs 15 per student.	Indirect parent participation. No specific parental activities.
Halesi Pathshala	Parents involvement modality	Minimum physical and human resources. Financial resources are less required. Meal logistics are handled by parents.	Self-manage finances through student fees.	Regular parental involvement during school lunch hours. Emphasis on nutrition awareness to parents.

The study identified four different nutrition modalities currently practiced in four schools: Youme school (home-based meal), Halesi Pathshala (Direct-parents' participation), Shree Dorchim school (government cash-based), and Shree Mahendradaya school (Catering-based).

3.2 School Nutrition Program Modality

Youme School:

Youme School conducts a home-based meal modality as a nutrition program along with nutrition screening and home visits. The modality is practiced with the goal to reduce malnutrition in rural areas and spread awareness of the nutrition diet required for children and inform about a balanced diet.

“School conducts annual nutrition screening along with home visits to determine the food eating patterns and nutrition awareness of parents. The school ensures improved health, and students have no barriers to education and extra activities due to ill health. The school aims to generate healthy citizens.”- Youme School, Nutrition Focal Person.

The home visit program was conducted with the participation of teachers to collect nutrition information and sanitation data along with parents’ suggestions for improvement of school activities. Such programs ensure the parents are aware of the school and student activities as well as provide feedback and suggestions to the school and vice-versa. The school has made it compulsory for students to bring home-based lunch and prohibited junk or fast foods on the school premises. Most students bring home-cooked foods such as *daal bhat*, maize, and other cooked foods, says the nutrition focal teacher of Youme School.

“The school has been running its program for the last five years, where health-related activities are of prime concern, including nutrition screening and home visits. Prior to this program, hygiene, and sanitation of students at school were mostly focused.” - Youme School, Principal.

The school does not have defined guidelines for the program but has included in the school yearly activities, self-concern about student health status, eating habits, and nutrition has resulted to include the program of nutrition. The program has resulted in improved nutrition knowledge, belief, and behavior of both students and parents through successful nutritional awareness that reflects the strength of the Youme program.

“Previously, most of the students brought junk or fast foods during lunch hours. As the program started to ban junk foods and educate students on nutritious foods, changes were seen in students. Also, parents started sending homemade lunches and discouraged junk food. However, here most of the parents are uneducated, and the low level of nutritional awareness has made it difficult to educate all parents.” - Youme School, Principal.

Additionally, the program intervention is proportional to positive changes in both students and parents with increased home-prepared lunch preference and reduced junk food consumption at school. The home-based nutrition transcends the lunch facilities and aims to provide nutrition awareness among students and parents by conducting a range of activities. To that end, annual teachers’ training is part of the modality, primarily focusing on the hygiene and sanitation of students. Remarkably, BMI measurement of students and guidance to nutritional practices for the last five years were aimed at improving the nutrition education of students, parents, and the school as a whole.

Shree Durchhim Secondary School:

Durchhim School follows the government modality of a cash-based nutrition program, where Rs 15 per student is provided by the municipality (as per the government plan) for school lunches. The amount is provided quarterly based on the attendance of students. The government-based nutrition modality encourages active attendance of students and ensures to receive nutritious food as per the region.

“To provide nutritious food to students, we encourage them to bring home-based lunch, and we have banned junk or fast-food consumption. The school has a low possibility of operating a canteen on its own, so such a nutrition program has been run. Student attendance has improved as compared to past years as students fear not receiving the money, so they are encouraged to attend class on a regular basis.” -School Teacher.

Even though government policy has not mandated a junk/ fast foods ban, the school has prohibited such foods. Most students bring home-cooked meals such as *roti*, maize, fried rice, *daal bhat*, and others, say teachers. The government-based modality has been running for the past two years; back then, bringing lunch to school was not compulsory, so limited students brought lunch. Now, the school has made it compulsory to bring lunch for grades 1-5, which has seen an increase in the attendance of students as well as an improvement in the activeness of students.

“Initially, the school had planned for the self-providing of school lunch, but due to the low number of students and problems with food preparation, it could be successful. Also, we reached out to nearby hotels for catering and the municipality for further help, but it was not possible, so to ensure students receive nutritious food, we encouraged them to bring home-cooked foods, especially regular food available such as daal bhat, encouraged

more.” - Shree Durchim Secondary School, Principal.

Moreover, the compulsory meal has improved the eating habits of students and discouraged students from going home during lunch hours. Teachers see changes in students through the nutrition program as students bring home-cooked food, are less hungry, and receive the right food portion as per their requirements. Teacher training or workshops related to nutrition has not been included in the government modality of nutrition program, but some teachers believe that providing teachers training would be helpful to improve the existing nutrition program.

Shree Mahendradaya Secondary School:

Shree Mahendradaya operates a school nutrition program through organizational support for school lunches through catering services. The nutrition program ensures that children are not hungry during school hours and face no obstacles in the learning process. Also, the school receives government support of Rs 15, which is provided to students mainly to improve student attendance.

In the catering system, schools, hotels, and organizations enter into a tri-party agreement based on the agreement that lunch is provided. Even though the nutrition program is yet to have defined guidelines, it aims to increase student attendance, improve the physical fitness of students and improve learning ability, in view of parents' inability to provide daily meals to their children.

“Nutrition program of the government has been running since last year (2019), but it has been more than four years that we have been receiving support from the Ac Sherpan Ranjung organization, where Rs 45 per student is provided for lunch from a nearby hotel with a cyclic menu. Prior to that, the school was not able to provide nutritional programs, so parents used to give money to students for lunch while some brought lunch from home.”
- Shree Mahendradaya Secondary School, Teacher.

Teachers see positive change in students as previously students did not come to school after the lunch break, as now they receive lunch at school, they are active during school hours, and regularly attend class. With the provision of incentivized lunch during school hours, the students are found to have preferred joining classes after the lunch break, previously, cutting the class was rampant. The cyclic menu lunch provides seasonal fruits to students, which has improved the students' physical activity, and they are less hungry after lunch hour, adds the Nutrition focal teacher. The current nutrition practice is limited to lunch to students; it does not provide teachers with nutrition-related training or workshops as similar to other school nutritional modalities.

Halesi Pathshala:

Halesi Pathshala fosters parents' involvement in the lunch hour of students, part of the home-based meal nutrition program, where parents are physically present in school to feed their children. There has been a limited nutritional program practiced in the school, while its provision of a lunch program aims to improve nutrition, encourage a balanced diet and be healthy.

The school also runs a canteen facility that accommodates students living far from school or whose parents are not able to bring lunch. Schools actively engage parents and teachers in nutrition programs by monitoring students' lunch and eating habits, ensuring parents bring healthy foods, and educating students on hygiene and sanitation.

“We encourage parents to bring organic foods and discourage junk food consumption. We believe prior to students, parents need to be aware of healthy eating and nutrition. The program has been running for the last 3-4 years where the teacher is provided the duty to monitor the lunch and ensure neither student is hungry nor they consume junk or outside foods” - Halesi Pathshala, Principal.

Reduction in junk food consumption, awareness of the right food for children, and changes in students' knowledge and behavior are the result of program implementation. Through parents' involvement and ban on junk foods, the nutrition knowledge of students has improved with the spillover effect of more aware parents regarding the importance of healthy food.

As with many schools' nutrition programs, there is no provision for teachers' training or workshops related to nutrition. The school states that lunch brought by parents is healthier and often includes food cooked at home. However, the availability of the school canteen has increased the consumption of sweets among students.

3.3 Resources

School nutrition programs require a range of resources for their effective implication of the program and to achieve their intended goal. The scarcity of resources, especially in resource-constrained areas like Khotang, poses remarkable challenges to program effectiveness. In all surveyed schools, resources required for the

nutrition program are quite similar and seem to be a significant hurdle for extending the program and achieving the targeted goals. As illustrated earlier in this paper, the limited availability of physical and human resources limits the efficient operation of the nutrition program.

Youme School:

The current resources are supported by the Youme Nepal organization for conducting its health and education-related activities, such as school building, teaching materials, and playing resources for children. Still, the unavailability of physical and human resources has been a significant barrier to the nutrition program. The need for a canteen building, skilled manpower, and sufficient water facility for both drinking and food preparation add obstacles to nutrition programs.

“We need kitchen utensils, trained manpower who can maintain proper food hygiene and serve children. Currently, we lack many physical resources, but we are managing our available resources in the best way”- Youme School, Nutrition Focal Person.

The school requires financial resources for conducting any health or nutrition-related activities, it has been managed through resources supported by the organization. The cost incurred in the nutrition program is minimal as nutrition screening has a low cost associated as well as the home visit conducted are cost-effective as measured from the cost-benefit perspective.

“In our first phase of running the canteen, we allocated Rs 60 per plate for students. Our main concern is a healthy diet and food portion, which we monitor on a regular basis. We are trying our best not to compromise on food portions for students and teachers. As we have a water problem, we are bound to include water cost in the food.” - Youme School, Teacher.

The sustainability of the program can be assured with the availability of a school canteen and trained manpower where students can receive hot and freshly prepared foods. It also depends upon the availability, accessibility, and utilization of local resources. One of the teachers said that local foods are found in every student's home, so they are discouraged from eating them and instead prefer spicy foods, so awareness of healthy eating habits is required. Also, some teachers argue that training local people in handling food preparation would be less costly and reduce the human resources scarcity. As of now, even for developing skills, they need to travel to city areas which are both time-consuming and expensive.

Shree Durchhim Secondary School:

Durchhim School operates based on the government nutrition program and suffers from resource insufficiency, mainly in terms of finance and management. The nutrition focal person stresses that the availability of a canteen in school would be effective for providing nutritious food for students. However, it requires additional space for a canteen, manpower, utensils, desks, and student benches, which the school cannot finance. Despite teachers being engaged in monitoring students' activity during lunch hours, manpower shortage has been a significant hurdle to managing the program efficiently.

“Despite the need for additional manpower for running the nutrition program, the possibility of additional manpower is low due to low funding from government, resources required cannot be managed effectively with the current finance.” - Shree Durchim S. School, Teacher.

Significant financial resource is associated with initiation management where canteen facility, utensils, and manpower are required. Current government practice of providing Rs15 is neither able to manage the resources nor is it effective to provide nutritious food for children, adds the nutrition focal teacher.

“Government guidelines of the school nutrition program include the provision of managing the school meal committee. Committee formation has been delayed due to covid-19 pandemic; if the committee is formed, it will manage and monitor the meal program, which reduces the problem of management and make the program sustainable.” - Shree Durchim S. School, Principal.

Teachers argue that hotels are unwilling to provide lunch due to low cost and schools cannot run canteen facilities; had that amount been Rs 50, the school could manage to provide nutritious food. One of the teachers highlights that to make the program sustainable and practical, a canteen facility with trained manpower is required. The government can support the school with the required resources as well as monitor and manage the program timely.

Shree Mahendradaya Secondary School:

The organization and the government support Shree Mahendradaya's catering-based nutrition program, so it faces less resource shortage comparatively. Still, the school fears if the organization backs off or stops support to

the school, it cannot manage nutrition programs. The government support is minimal, which cannot be sufficient for providing nutritious food for children. It would be effective if the school had its own canteen facility. However, it requires an additional building to do so. This requires high finance, which is not possible with the current financial status of the school. The school itself cannot maintain financial stability, nor can parents bear the additional cost. Teachers stress that the local government needs to manage the financial and manpower problems.

“The lunch is provided with organizational support, so additional manpower is not required, as caterers are responsible for managing and preparing food. If we had to rely on a government program, we need additional manpower as well as management of that manpower. Without organizational support, it would be difficult to conduct a nutrition program. Here, we face water shortage, physical resource shortage as well as human resources shortage, if we have to rely on the government, we need to have all the resources for the successful implication of the program.” -Shree Mahendradaya Secondary School, Teacher.

Teachers argue that the budget per student needs to be Rs 50; below that amount, it would be difficult as the cost of food items prices are expensive nowadays. Schools require various financial and non-financial resources to initiate a canteen facility, as the catering system has reduced the resource requirement.

“At present, we do not see any alternative to the current nutrition program. The organization is planning to engage parents through harvesting fruits and vegetables in school areas, which will generate income for parents to provide lunch for students. It can be sustainable but requires time.” - Shree Mahendradaya Secondary School, Nutrition Focal Person.

“Sustainability of the program can be achieved through two ways: first if the government provides Rs 15 and an additional Rs 20 is collected from students per day for lunch. Secondly, if parents are not able to provide additional costs, then other organizations willing to support us provide us Rs 25, then we could provide lunch to students.”-Shree Mahendradaya Secondary School, Teacher.

Additionally, self-sustaining nutrition programs are challenging for schools. Even though the school has an area for harvesting, it requires additional manpower, and harvested products are difficult to cover the entire year, especially in Khotang, where water scarcity is a serious challenge for most people.

Halesi Pathshala:

Halesi Pathshala is run by the trust with a major source of income from students' fees, which is minimal, school implication of the parents-participation meal program requires fewer financial resources as parents bring lunch at school. Pathshala strives to provide nutrition and balanced diet food to its students but faces similar resource scarcity as other schools. The resource constraints—physical, financial, and human - hinder the schools' motive to provide nutritional food to students.

“School cannot afford additional manpower in our canteen nor can it expand the canteen facility, the cost of expansion is high. If the school was financially sound, it could reduce manpower shortage and improve canteen facility” - Halesi Pathshala, Teacher.

The tight financial condition of the school has limited various activities of school, as school relies on student fee and no support is received from the government or organizations for running its activities. Schools cannot invest additional resources for canteen management and providing lunch to students so the suitable and nutritious approach of school was to invite parents to provide lunch to students.

“The sustainability of the program can be achieved through parents' involvement in the nutrition program. As most children prefer sweet and junk food, it's about their habits which need to be changed from home and school. Parents' awareness of healthy eating habits and providing a nutritious home environment is best for the sustainability of the program. Parents' education is also essential. School alone cannot improve the nutrition of students. The best they can do is encourage parents to bring home-made food and reduce junk food consumption.” - Halesi Pathshala, Principal.

Sustainability of school nutrition programs requires efforts from school and parents. The concern of improving nutrition, practice of healthy eating, and knowledge of nutritious diet can be improved from the effort of both parents and school.

3.4 Nutrition Program Challenges

Nutrition program faces a list of hurdles, as illustrated earlier in the literature. The challenges faced during the design and implementation of the school nutrition program as well as measures taken for addressing the problem, were focused on the FGD. Schools faced the similar kind of challenges, including physical, financial, and human

resources challenges.

Youme School:

During the nutrition program implementation, Youme faced the challenges of limited parental involvement. Gradually, it was able to involve parents in the nutrition program through home visit programs and providing nutritional booklets, which act as an awareness-building tool with parents. Parents' involvement enables schools to reduce junk food consumption and make aware parents to send homemade food. At present, the school suffers from low manpower as the canteen responsibility is handled by a single person.

“Current program is in need of skilled manpower which has become a major hurdle in the nutrition program. Also, a canteen building is required for proper management of lunch for students.” – Youme School, Nutrition Focal Person.

School teachers are mostly mobilized for the management of nutrition programs, including home visits and providing of booklets as well as monitoring of student lunch. The school ensure the best utilization of resources for improving the nutritional practice of students and parents.

Shree Durchhim Secondary School:

Durchhim school has limited parental involvement in nutrition programs. and the school has faced the increasing consumption of junk and fast foods previously. After the implication of the program, junk and fast foods consumption was prohibited. Currently, the program is able to educate students about the importance of homemade food and educate students on unhealthy eating practices, still, the management of the program can be made more effective.

“School follows the guidelines of Nepal government, where meals provided are listed, but the major problem is the management of school nutrition, including resources for operating canteen and food resources. The management of the nutrition program is the prime challenge at present.” -Shree Durchhim Secondary School, Principal.

School emphasize on a school nutrition committee to be formed, which will take active measures for addressing the nutrition problem and overcoming such challenges in an effective manner.

Shree Mahendradava Secondary School:

The nutrition program-supported organization created a committee for carrying out its activities, but the committee is not active as expected. Teachers fear that if schools have to squeeze a government program of Rs 15, then they won't be able to provide lunch to students. While now, with organizational support, the school faces no challenges in the nutrition program.

“The future plan to involve parents in harvesting fruits and vegetables is a challenge as parents are not available for harvesting activities and it requires adequate water, which is often in shortage.” - Shree Mahendradava S. School, Teacher. The scarcity of water facilities in the Khotang area has made it challenging to grow spinach and other vegetables. Therefore, it will be difficult to involve parents in harvesting activities and ensure long-term benefits from it.

Halesi Pathshala:

During the beginning of the nutrition program, limited parents were involved in providing home-based food, while now most of the parents bring lunch to school. The change in parents' attitudes is remarkable as it improves nutritional lunch at school and increases parents' participation.

“Most of the parents used to provide students with junk or fast food or provide money to buy at the canteen. When the parents' participation increased, more parents were involved in bringing lunch. It's like competition among parents. Now more than 95% of parents bring homemade lunch.”- Halesi Pathshala, Principal.

When parents were encouraged to bring lunch to school during lunch hour and highlighted the significance of homemade food, parents' participation eventually increased in school. As most parents bring lunch from home, no challenges have been seen nowadays.

3.5 Parental Concern

Youme school:

The school includes parents in the nutrition program through home visits and provides them with nutritional booklets to spread nutritional awareness. The involvement of parents benefits the program to achieve its goal of the program. During the home visits, parents are consulted regarding their health and nutrition, as well as

provided charts and informative posters on nutrition.

“Home visits have been run for more than five years, and it has been effective to improve parents' knowledge of nutrition. Even though parents' awareness has not met our expectation, it has supported the nutritional outcome in both parents and students.” - Youme School, Teacher.

The major strategy to include parents is by providing posters during yearly home visits and banning junk foods in school premises. The school also encourages students to share nutritional information with parents and help to maintain good sanitation and hygiene.

Shree Durchhim Secondary School:

The school has limited provision for involving parents in the nutrition program, parents are involved through providing homemade food to students. The school seems to have limited direct contact with parents. Also, the school is planning to include parents in the school nutrition program and inform them about the ongoing nutrition programs.

“Parents; role in school nutrition is through preparing the home-based lunch for students. Parents' involvement needs to be compulsory for child development. The school is planning to form a parent committee which cannot be formed due to covid-19 restrictions. Involving parents in the nutrition program will be beneficial for both students and school” - Shree Durchhim Secondary School, Teacher.

Teachers argue that the nutrition program has seen a change in the physical and mental fitness of children. Previously, most of the students after lunch hour used to feel lazy, hungry, and dizzy; now, it has greatly reduced. Also, the students bring enough food so that they are not hungry.

Shree Mahendradaya Secondary School:

The school has included parents during the meeting with the organization, where parents were encouraged to send their children to school and aware parents about the lunch modality at school. Teachers believe that parent participation is beneficial for the nutrition program as the school provides lunch to students and ensures there are no barriers to studying.

Even though no training or workshop with parents was conducted, parents' suggestions were taken in the initial meeting.

“No training has been provided to parents or teachers, but parents' suggestions for the sustainability of the program were addressed in the initial phase of the program. The organization has said they are ready to provide training for parents, still no such action is taken.” - Shree Mahendradaya Secondary School, Teacher.

The school has made parents aware of the nutrition modality and food served to parents. Teachers say that they have noticed changes in students as they are more active during school hours.

Halesi Pathshala:

The school involves parents the most in its nutrition program, which parents the nutrition program would not be successful. Parents' involvement has been beneficial in terms of cost reduction and ensuring a long-term program. Even though parents are involved in the nutrition program, no definite training or workshop has been provided. Still, parents' awareness of healthy eating and encouraging their children to have healthy foods is carried.

“Parents are informed about food nutrition and encouraged to bring regular homemade food. School emphasis on providing nutrition education for parents so that parents are aware of the food they bring for their children.” Halesi Pathshala, Teacher.

Parental engagement has been a remarkable change in their knowledge, belief, and behavior as most of the parents bring homemade food such as *roti*, *jaulo*, and others, says a teacher. Also, parents; involvement ensures the student receives the right portion of food and teaches them the importance of a healthy lunch.

In this way, School Nutrition Program financing is neither sufficient for wide coverage nor for the expansion of the existing program. Therefore, the sustainability of the program is assured by the financial mobility of the schools. What can be inferred from the above is that a modality that requires minimal finances has the prospect of running effectively. Home-based nutrition with direct parental participation reduces the need for extra financial resources. Cash and catering-based modality require the transfer of funds to carry out the program effectively and incur higher administrative costs.

4. Discussion

As evident in this study, several studies have shown (Kyere et al., 2020; EI Harake et al., 2018; Wang & Stewart, 2012), school-based nutrition intervention is effective in the improvement of the students' nutrition knowledge, attitude, and practice. Studies show parents have a more substantial role in school nutrition to overcome lack of resources, basic supplies, and water and linkage to local resources as well as improve health status and academic performance (Kwatubana & Makhalemele, 2015). Adding to it, a modality with parents' involvement is able to overcome resource challenges and improve the nutritious diet and academic performance of students. Youme and Durchhim School mandate parents to send lunch for their children, while parents in Halesi Pathshala are physically present to feed their children in school, and such practice requires minimum finances for operation. To be more cost-effective, Durchhim School practices home-packed lunch as a meal though it follows a cash-based modality. Another alternative of meals in school is not feasible due to constraints in material and financial resources.

The home-based modality of Youme School stands out with a requirement of mandatory lunch from home, consistent with the past study by Andersen et al. (2015), which reveals that home-packed lunch enables parents to understand their child's needs and tastes. Halesi Pathshala's teacher shared similar practices where parents were conscious of their child's food requirements and preferences, which improved the child's eating habits. Further, Shree Durchhim School and Shree Mahendradaya School modalities follow indirect parent involvement where parents' engagement is done through messenger (invitation for events, newsletter). This increases adaptation and implementation rates of programs but is less likely to assist in nutritional awareness. The close engagement between school and parents plays a supportive role in nutrition programs such as Youme School and Halesi Pathshala.

This study is consistent with past study (Shrestha et al., 2019), which shows the School Nutrition Program suffers from insufficient funds, a lack of material resources, and a lack of trained manpower. Home-based modality of Youme School and Halesi Pathshala do not receive any support in the form of food or cash; both are self-funded, as parents bear the burden of food costs involved. However, Youme School conducts a range of other nutrition programs which require finance for conducting nutrition and health-related projects. As Halesi Pathshala, which is run by Trust, faces similar scarcity as Youme School in terms of resources, direct parents' involvement reduces their financial burden. But low availability of water, and physical as well as human resources, make the programs difficult to self-sustain. Moreover, Shree Durchhim School's marked financial insufficiency jeopardizes the prospect of providing nutritious food at school.

Durchhim School suffers from ineffective management of the nutrition program, as it requires additional human resources for monitoring and administering the program. Such conditional cash transfer increases administrative capacity as it requires means of verification and cost monitoring (Narayanan, 2011). Additionally (Hoffman et al., 2018) identify similar challenges of administrative capacity, hiring of qualified staff, and insufficient physical infrastructure for running school meals in rural areas, which can be overcome through peer support, external assistance, and technology. The home-based and direct-parent participation is characteristically not dependent on external support, operating at minimal physical and human resources, but inadequate administrative resources for staff nutrition training adds challenges to nutritional knowledge exchange with parents. Youme School mobilizes teachers' in-home visits, which largely compensates for the lack of financial and human resources in conducting nutrition-related activities.

Nutrition programs with high dependence on program management, commodities, and funding make them unsustainable as they cannot continue if it is withdrawn (Kretschmer et al., 2014). As such, the modality that entails funding support in the case of Shree Mahendradaya School (Meal support of Rs 45 from the organization) and Shree Durchhim (Cash support of Rs 15 from the government) are always at risk in terms of their sustainability. The school cash provision is not adequate to provide nutritional food to students. Thus, parents' involvement and effective management of resources are imperative to ensure the use of funds, timely cash flow and not distract teachers from teaching, as shown in the previous study (Shrestha et al., 2020). Completely dependent on organizations and the government for cash support, the withdrawal of funding will leave these programs in a predicament and uncertainty. Therefore, over-dependence on external support exposes such nutrition programs to vulnerabilities, and as a result, their termination is inevitable.

The modality that manages to operate at low cost and less human resources without compromising the nutritional outcomes obviously can be considered the best alternative. Similarly, reconsideration of resource dimensions will be of immense help before the introduction of a particular modality. The aspiration of schools to successfully implement programs aiming at the overall nutrition of children is undermined mainly by

sustainability concerns in terms of finance, resources, and parental involvement. From a sustainable standpoint, with a notable exception of the home-based modality, the other modalities will struggle to sustain owing to huge challenges in terms of parental involvement and resources. Although home-based modality conspicuously has some shortcomings, based on the findings of the present study, it can be trusted as the most sustainable.

5. Limitations

The study was conducted in schools that run nutrition programs and lack a control group to determine the cause and effect of modality. The sample size is small, as FGD participants' numbers were low, while a large sample size would be effective to study the modality in depth. Observation of the schools and its program prior to data processing, such as before questionnaires and interviews, was limited.

6. Conclusion

The School Nutrition Programs share positive results in raising nutritional awareness, attitude towards food eating, and food dietary behavior of students. School Nutrition Programs have been adopting various modalities primarily to enhance healthy eating habits and sustainable food choices, depending on economic, health, and food availability.

Although there are multiple indicators of a sustainable nutrition program, this paper is confined to parental engagement, adequate material resources, and a trained workforce. Through the Sustainability framework, four distinct nutrition modalities operating with the common theme of improving the nutritional needs of students have been studied to determine the sustainability of school nutrition modality. A home-based modality that conducts a series of activities with minimal resources and involves parents directly through regular interaction shows the greater capacity for lifelong healthy behavior of students and parents. Additionally, the direct-parent participation modality has a provision of close interaction with parents and requires low operational resources. In sharp contrast, cash-based modality and catering-based modality operate with external support and imply indirect parental involvement. The dependency on external sources in the operational process undermines the sustainability of such a modality and is less likely for parents to be aware of healthy food habits. Despite the fact that all nutrition programs have met their objectives somehow, the findings above suggest that home-based modality should be selected in resource-constrained areas for its sustainability. The study found that nutrition programs with parents' participation are effective to promote sustainable food choices and develop healthy eating habits in children.

In addition, this paper urges School Nutrition Programs to move beyond feeding strategies and towards extensive nutritional activities, including home visits along with direct parents' participation to develop sustainable nutritional behavior in the community. Program practicing a range of activities to improve the nutritional outcomes of students and parents needs to be strengthened. The study further recommends School Nutrition Programs include timely monitoring measures and follow-up programs to identify the needs of various stakeholders (students, parents, teachers, and the school).

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