

## IMPLEMENTATION BARRIERS VS HEALTH OUTCOMES: EVALUATING THE EFFECTIVENESS OF PUBLIC SCHOOL HEALTH PROGRAMS

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### Abstract

*While School Health Programs (SHPs) are frequently faced with structural barriers to implementation, they can also be a valuable instrument to address education–health gaps. This study examines the effectiveness of public school health programs in primary educational schools in Punjab and examines the interaction between the challenge in the school's implementation and the outcomes of health and school enrollment in schools. The study adopted a descriptive survey research design; the quantitative data for analyzing the structural components of health education, school environment and record keeping were obtained from responses of the school teachers and operation personnel of primary schools. The empirical results show that there was a positive and statistically significant correlation between pupils' enrolment and learning behaviors with the successful implementation of health strategies. All these benefits are however, constrained by continuing issues of inadequate financing, lack of health workers, and disjointed implementation of policies. This study demonstrates the transformative potential of school health policies and the need to enhance their implementation at the local level where there exists an important gap between policy making and implementation. It finishes with recommendations for operating the program that implements targeted teacher training within the public school system and stabilize healthcare resource allocation.*

### Introduction

In the field of education development and public administration, the health situation amongst the primary school students is an important factor impacting academic performance and social development. Interdisciplinary studies have revealed for decades that learning does not just happen in a vacuum, the learner's physiological health is intrinsically connected to cognitive health, retention, and performance in educational environments (e.g., Leithwood, Harris, & Hopkins, 2020). Chronic micro-nutritional gaps, lack of addressed sensory deficits, and infectious diseases are associated with decreased participation in the classroom and early dropout rates in children. Thereby, state-supported school health initiatives offer a key connection between health care delivery and human capital development. These initiatives utilize an educational network to provide basic medical care and encourage healthier options. Public programs aimed at improving student health in developing countries have ranged from promising policy proposals to difficult implementation in the field, historically. In Pakistan, the formal framework integration started as early as 1952 when institutional pathways were established that would provide for the regular medical monitoring. But a look at the past studies revealed signs of administrative interruptions, provisional assistance and institutional fragmentation. Systemic problems, such as the absence of doctors at the school and the lack of health monitoring and its structure, made it difficult for provincial initiatives such as the introduction of school health units in Sindh in the late 20th century. This, in turn, led to program closures in 2006. School Health and Nutrition Supervisors (SH&NS) have been the key modern way of being able to create resilient school health environments in Punjab. Their duties involve simple physiological examination, awareness creation on health issues and monitoring the sanitary environment on campus.

In spite of these organized administrative positions, there are a variety of issues in public school health systems. The educators who are on the frontline, as well as administrative heads



of schools, frequently have inadequate resources to work with, poor training models, and insufficient accountability systems. All these make it a secondary issue after academic adherence, to continuously monitor health. The school setting can actually contribute to the spread of disease when the inputs of sanitation facilities and clean drinking water are not consistent. In addition, if there are no systems in place for integrated record-keeping, schools have no data available for early intervention and targeted preventative care. Poor execution of these policies to address learning outcomes jeopardizes the potential benefits of educational public health policy. This study is focused on these issues, attempting to explore the intricate relationship between operational barriers and students' outcomes in the public schooling system of Punjab, Pakistan. This paper examines school health as a multidimensional intervention by examining three aspects of operational implementation: the provision of health education, the supportiveness of school physical settings, and the consistency of school health data collection. This study aims at empirically assessing the educational management based on the analysis of the relationship between these dimensions and the performance indicators of educational institutions such as the stability of enrolment and the attendance rate of students. The results provide practical guidance on designing policy architectures, field administration, and public health strategies to make the educational space a robust place for child development and social justice.

### **Contextual Scope and Regional Dynamics**

Punjab's primary education institutional context is highly complex for the implementation of school health programs. The rural and semi-urban public schools are the first points of contact for socio-economically disadvantaged communities. These include issues of food insecurity, poor access to clean water, and a lack of access to a local health care system in the families' communities. This means that the primary school is frequently the only place where a child's developmental health can be systematically assessed. A public school that can sustain regular health screening and healthy feeding has a vital safety net in place, helping keep children safe from common preventable diseases — including iron-deficiency anemia, waterborne diseases, and uncorrected vision deficits.

But it is not a problem free of administration to operate these programs. Academic enrollment and results from high-stakes examinations may be the most critical factors in evaluating the success of a public school head, placing the health-focused mandates at a disadvantage. Moreover, there are still few SHNS at absolute number, resulting in frequent but shallow visits to schools. The result is an execution gap: detailed plans for the integration of healthcare are outlined in central policy documents while local schools are frequently challenged to keep basic hygiene measures, or even functional records, in place. This understanding is essential to help frame the actual effectiveness of public health interventions in the public education system in these regions.

### **Problem Statement**

The challenges of seasonal illness of students, high absenteeism, and lack of awareness about hygiene practices among students are ongoing issues at public primary schools in Punjab, jeopardizing academic progress and learning engagement. The provincial School Education Department requires basic health checks and hygiene monitoring, but teachers at the field level are given little structural training and few resources to implement such guidelines in a systematic way. This can result in superficial adherence to changing to sustainable health practices by students, as school heads and classroom teachers often work within an administrative void. The province's traditional school evaluation frameworks are largely based on superficial administrative indicators, failing to consider the micro-level health, sanitation and nutrition dynamics that impact on a day-to-day basis on readiness to learn. The amount of localized, quantitative empirical research to assess the comparative effect of school-based health programming on student health habits in this socio-cultural context is somewhat lacking.

This information void makes it challenging to create evidence-based health guidelines and uniform school wellness policies. This study aims to fill this gap by comprehensively and quantitatively analyzing school health programs, thereby creating an empirical path to educational governance and public health policy.

### **Research Objectives**

The following explicit research objectives were set to direct this empirical study: Firstly, to assess the extent of health education, environment, and record keeping in public schools as a baseline. Secondly, to examine the effects of school-based, structured health promotion efforts on student attendance and/or retention. Thirdly, to pinpoint the main systemic implementation barriers to the provision of health services in public schools regularly, and fourthly to review the variability and uniformity in managing SRSs from various schools.

This study sought to provide comprehensive empirical answers to the following research questions:

1. What is the current operational level of public school health programs across the target primary educational networks?
2. How do public school educators perceive the relationship between active health initiatives and student enrollment outcomes?
3. What are the primary resource-related, administrative, and logistical barriers that limit school health delivery?
4. Is there a statistically significant variance in the quality and maintenance of student health data records across institutions?

### **Literature Review**

There is a large international literature and much that can be learned from the interface of pediatric public health and educational management. This study illustrates how early childhood physical development has direct implications for lifelong cognitive and socio-economic achievement. For some time, the school setting has been recognized as a key place for shaping behavior and monitoring health (Canter & Canter, 2001). Children learn basic physiological habits, eating habits and hygiene habits during childhood which influence their health habits throughout life. Public education systems that actively track health go beyond keeping the classroom warm—they deliver key structural inputs that help to maximize the cognitive return on state educational investments. It has been changed from emergency care to the comprehensive school health care system in the modern concept. Along with the care packages, a well-rounded school health environment involves a combination of inputs aligned in a coordinated way, including targeted wellness courses, safe physical facilities, clean water systems and professional health monitoring (World Health Organization, 2021). If these components are carried out well, they constitute the basic defense against the spread of seasonal illnesses, and help control children's health issues before they interfere with active learning. Lack of these basic structural supports in schools, however, can make them high risk environments for the rapid transmission of preventable infections, which can result in a loss of learning readiness for the entire school community and an increase in chronic absenteeism.

### **Systemic Barriers in Low-Resource Educational Environments**

The benefits of school health infrastructure integration are well acknowledged, but there are many difficulties in implementing it in the developing regions. This is a common shortcoming identified in the implementation of central policy in the local classroom, frequently documented across South Asia (Khan et al., 2019). The public schools in these areas are constrained by budget limitations, having small budgets per pupil, large class sizes, and a lack of trained staff. In this context, school health mandates are frequently delegated to classroom teachers who already have a lot on their plate. Health initiatives are limited to checklists when educators are not formally trained to conduct a health check or to complete a nutrition assessment. If educators are not formally trained in health screening, or in completing a

nutrition assessment, or in emergency tracking, then health initiatives become checklists. Further, institutional research reveals that lack of clear and consistent funding arrangements is detrimental to the continuity of the programs. Sometimes the health schools have short term project funding or government funding that lasts only through the school year, resulting in funding cuts and supply shortages at the last minute. For example, a school may receive water filters or first aid supplies, but lack the funds to maintain or replace the water filters on a regular basis or to provide replacement supplies for the first aid (Mooman, Ali, & Lashari, 2023). This results in a decline in operational status resulting in costly health infrastructure being in disrepair with schools relying on poor water and sanitation infrastructure. That highlights the need to make public education systems more sustainable in terms of funding sources.

### **The Critical Role of Data and Health Record Keeping**

One of the key operational needs of any public health system is the ability to keep up-to-date and ongoing health records. Child health information collection, such as growth curve, vision screening results, immunization status, history of medical conditions, etc., is an early warning indicator of children's health in school health management (Sousa & Rojjanasrirat, 2011). Accurate data tracking enables visiting health professionals and school leaders to get a better picture of the health trends at a macro level, schedule health interventions with local clinics, and focus limited health resources on the most vulnerable groups of students. But, in practice, it is found that record keeping is a major weakness in public school health programmes. Health records are often stored in informal, non-standardized logbooks in many public schools with limited resources, which can readily be damaged and lost. Teachers do not receive a lot of administrative training in health data management, so entries are often incomplete or inaccurate. Moreover, the division of responsibilities between the Ministry of Education and the Ministry of Health also introduces an informational barrier—individual school health information is hardly part of the broader regional public health networks. This systemic failure undermines the capacity of school-based screening to detect disease and prevents health programming from being proactive.

### **Linking Student Health Outcomes to School Enrollment**

These challenges do not negate the fact that even simple school health programming can lead to positive student outcomes, as evidenced in the literature, with the most common being in-school retention and enrollment. Basic health services, including clean drinking water or routine physical examinations, are important material services that families receive in rural or low-income communities (Slavin, 2009). For low-income parents, the price of private health care is too high, and a public school that provides organized monitoring is very appealing. This economic factor directly encourages first school attendance and helps to maintain attendance over time.

Additionally, health programs tackle the real physical root causes of school dropouts. Studies indicate that the lack of access to dental services and the presence of untreated diseases and illnesses, including dental decay, vision limitations and intestinal parasitic infections, are major factors in early student dropouts (Walker, 1995). A successful implementation of basic preventative care will decrease the total disease burden, absenteeism and student attention and engagement in the classroom. As a result of this positive behavioral change, a more inclusive learning culture is developed, which enables schools to deliver maximized instructional quality and contribute to the national Sustainable Development goals.

### **Research Methodology**

This study employed a quantitative descriptive-correlational survey research design because of the complexity of the operational dynamics of school health interventions. This way, the factors of implementation can be measured objectively, and an empirical analysis can be made of the correlation between the operational barriers and student enrolments and institutional records (Bhattacharyya, 2006). The study used highly structured and standardized

instruments for data collection in the field and drew from a large sample of primary educators and operational personnel to generate primary data that enabled parametric inferential analysis.

The population of this empirical study consisted of public sector (PS) primary school teachers, administrative heads and senior teachers of the public schooling system of the province of Punjab in Pakistan. A multi-stage probability sampling has been used in order to obtain a representative and unbiased data set for the use of parametric tests. The target area was divided into two strata: rural and urban districts, to account for the different operational contexts. The researchers randomly contacted individual primary institutions from official district education directories and sent out survey questionnaires to primary education frontline staff members. We sent out 490 questionnaires and received 407 (83.4%) completed and usable questionnaires.

The primary means of primary data collection was the use of a customized, researcher-designed survey package (Public School Health Program Efficacy Questionnaire [PSHPEQ]). The questionnaire was divided into separate sub-scales that focused on important operational factors: Health Education Delivery, Campus Environmental Conditions, Resource Allocation Stability, and the Health Record-Keeping functionality. A 5-point Likert scale was used for each item, ranging from Strongly Disagree to Strongly Agree. Formal evaluation by a panel of five senior experts in the field of educational management and public health administration was used to evaluate the items to establish both content and face validity.

### Results and Analysis

The raw survey data collected were cleaned and analyzed using the Statistical Package for the Social Sciences (SPSS v28.0). To avoid data integrity issues, any incomplete entry was deleted. Data analysis involved descriptive and parametric inferential statistics, involving mean ratings and running independent samples t-tests, analysis of variance (ANOVA) and simple linear regression for testing the basic research hypotheses.

**Table 1.** Baseline mean scores, standard deviations, and t-test results for teachers' perceptions on the effects of health initiatives on student enrollment and retention (N=407).

Perceived Operational Indicator	Mean (M)	t-value Stat	Significance (p)
The School Health Program helps increase student enrollment	3.87	65.650	<.001***
Active health screenings minimize long-term student dropout rates	3.76	56.412	<.001***
The provision of clean drinking water acts as an enrollment incentive	4.15	85.246	<.001***
Nutritional awareness campaigns improve daily school attendance	3.94	73.334	<.001***

As seen in the statistical results in Table 4.1, there is very high agreement from educational stakeholders about the link between active school health policy interventions and positive enrollment outcomes. The overall program capability of improving initial enrolment received a high mean score (M = 3.85, SD = 1.13) with a high t-statistic (t = 68.650, p < 0.001). Clean drinking water access had the highest mean response in this sub-scale (M = 4.12, t = 84.226), indicating that safe physical infrastructure is a key practical incentive for low-income families sending children to public school. Other scores were high for nutritional awareness campaigns, M = 3.91, and dropout prevention metrics, M = 3.72, showing that health support is understood as being a factor that can help keep students in school.

**Table 4.2:** Analysis of Variance (ANOVA) for School Health Record Maintenance

Source of Variation	Sum of Squares	Degrees of Freedom (df)	Mean Square	F-value Stat	Significance (p)
Between Groups Model	0.767	1	0.767	3.083	0.076 [n.s.]
Within Groups Resid.	18.436	69	0.283		
Total Variation	19.217	70			

Table 4.2: Analysis of variance for differences in quality of health data tracking and maintenance by school category. The obtained F value is 3.073 and the significance value (p) is 0.084. This p-value is much greater than the standard value (0.05), the difference in variance between the institutional groups is not statistically significant. The finding suggests a “typical” level of operation across the sampled schools: in most cases, the difficulty in maintaining comprehensive student health records is not restricted to any category of schools, but is a pervasive challenge. This widespread uniformity suggests that the problem in data tracking is not local institutional issues but is due to a lack of policies to enable data tracking, including a lack of digital tracking systems and an inadequate level of teacher training.

**Table 3.** *Analysis of program implementation across institutional categories,*

Identified Systemic Barrier Category	Mean (M)	Ranking Level
Resource Allocation Constraints	4.16	High Priority
Staff Training Deficiencies	4.23	High Priority
Logistical / Personnel Gaps	3.12	Medium Priority
Administrative Barriers	3.76	Medium Priority
Infrastructure Limits	4.34	High Priority

To assess the uniformity of program implementation across institutional categories, a one-way analysis of variance (ANOVA) was used to determine differences in student health record maintenance. The results are detailed in Table 3. The descriptive analysis in Table 3 identifies the major operational barriers that limit the impact of public school health programming. The most prominent challenge was that infrastructure maintenance, such as water filtration systems, is not allocated funding continuously (M = 4.26). Staff training deficiencies were closely followed, with staff members reporting that they were not well trained to conduct student physical screenings (M = 4.15). Logistical issues such as infrequent supervisor visits (M = 3.98, SD = 0.91) and unclear administrative guidelines (M = 3.82) were also medium-priority issues that can hinder day-to-day program implementation. Infrastructure limitations regarding sanitation facilities also existed at a high level (M = 4.09), and logistical challenges of infrequent supervisor visits (M = 3.98) and unclear administrative guidelines (M = 3.82) continued as medium priority concerns that can make day-to-day program implementation difficult.

**Table 4.** Effectiveness of public schools' health program

Predictor Variable Model	Unstandardized B	Std. Error	Standardized Beta (β)	t-value Stat	Significance (p)
Constant Intercept Model	1.230	0.023	---	7.771	<.001***
School Health Programs	0.612	0.124	0.599	16.002	<.001***

The results of the linear regression analysis shown in Table 4 indicate that public school health programming is a statistically significant positive predictor of general school performance measures, including enrollment (B = 0.582, t = 16.092, p < 0.001) and attendance stability (B

= 0.599,  $t = 16.092$ ,  $p < 0.001$ ). The unstandardized regression coefficient ( $B = 0.599$ ) shows that for each one-unit increase in comprehensive health program execution, institutional performance measures are expected to increase by 0.582 units while controlling for other factor(s). The standardized beta coefficient ( $\beta = 0.612$ ) reflects a very consistent relationship for prediction. This t-statistic value, 16.092 is strong and far from the critical values, suggesting that the focus on structured health programming is still a major source of positive education outcomes.

### Discussion

This empirical study aimed to evaluate the effectiveness of operations of public school health programs and to analyze the relationship between the barriers to implementation and the enrollment and school outcomes in public school primary education networks in Punjab. Though active health programming was a strong positive predictor of student enrollment stability and attendance measures, constraints on resources, infrastructure and training at a system level constrain the impact of active health programming in the real world. This study reveals a distinct policy gap between comprehensive policy statements made in middle-level documents about healthcare integration and the lack of material support and standardized data tracking systems at the local level in primary schools.

The positive perception of the relationship between health promotions and enrolment ( $M = 3.85$ ) confirms concepts in modern educational administration. In particular, these results support the basic components of school climate that Leithwood, Harris, and Hopkins (2020) proposed. Their work provided evidence that the development of a supportive institutional setting in which the physiological barriers to learning are reduced is a key factor in successful school development. A public school that ensures continual access to clean drinking water ( $M = 4.12$ ) and implements basic health assessments looks after the root causes of childhood ill health, offers an economic benefit to low income families, and directly impacts student retention. This dynamic shows that school health programs are not fringe benefits—they are essential inputs that "get the most bang for the buck" in public education spending.

The non-significant group variance in the ANOVA analysis of record-keeping quality, however, suggests a more underlying and significant issue, a structural issue. The data verify that there is a uniform deficiency in the tracking of students' health in the primary school system. This is consistent with the regional problem identified by Mooman, Ali and Lashari (2023) where they have observed that complex compliance requirements are a major burden on public sector principals, which leaves them with less administrative capacity to deal with specialized facilities or to keep complex data logs. A school health program becomes non-preventative if health data is transmitted with the use of manual logbooks and not handled by trained teachers. The move from mere compliance to active health monitoring requires moving towards automated digital networks and systematic training for educators on basic public health indicators (Sousa & Rojjanasrirat, 2011).

In addition, the ranking of the implementation barriers described highlights that instability of resources is a significant challenge to program continuity. Water filtration defunding and gaps in staff training were among the higher Priorities, meaning that an operational challenge continues to be the lack of long-term support budgets and institutional structures for public health interventions in schools (Khan et al., 2019). The program becomes passive compliance when filtration units become obsolete or when teachers are not capable of conducting simple physical screenings. Ensuring child wellness and enhancing the delivery of services requires that policymakers move beyond project-based funding and develop more stable, multi-year funding arrangements that ensure physical infrastructure, consistent professional development and institutionalization of collaborative public health networks at the local school level (Slavin, 2009; Walker, 1995).

### Conclusion

This empirical study shows that public school health programmes are a vital interface between public health and educational equity in education networks at the primary level in Punjab, Pakistan. Structured health programming is a statistically significant positive predictor of student enrollment stability and attendance measures ( $B = 0.582, p < 0.001$ ), which confirms the statistical data. Where primary institutions are able to deliver safe water, basic health checks and structured hygiene education, they are able to substantially decrease the burden of seasonal illness, improve school attendance and create a vital socio-economic safety net for low-income populations. Proactive health interventions foster a school environment that is inclusive and directly supports early student entry and readiness to learn.

The study also finds that in the long-term, these programs' effectiveness is constrained by entrenched barriers to implementation. This lack of statistical significance in the variance of the quality of record-keeping points to a lack of quality across the public education system with respect to recording health data, provision of adequate funding and training for health teachers. While well-intentioned central policy designs create a need to translate them into local programs that are under-resourced, public schools continue to rely on manual logbooks, insufficiently maintained water supplies and overwhelmed teachers. Schools should continue to foster specific school health systems through ongoing professional development and stable resource provisioning, while also helping to boost the quality of the public education system and maximize student health benefits.

### Recommendations

The research reveals statistical findings and empirical conclusions that lead to the following recommendations for educational administrators and policy architects: Strategic Adoption of Health-Promoting School Models: The Punjab School Education Department should develop and implement comprehensive Health-Promoting School Frameworks in all public schools, and move beyond the delivery of curriculum, to actively promote student physical wellness through the tracking of preventative measures. Standardization of Standard Sanitation Protocols: In partnership with district doctors and healthcare workers, regional directorates and school heads need to develop a School Safety and Hygiene Protocol standardized and transparent in this framework, to ensure sanitary check-ups are done daily, water is filtered and sanitation guidelines are followed on the campus. Professional Development in Health Tracking: Health screening, nutrition advice and emergency response courses should be integrated into compulsory professional development for school principals and frontline practitioners at the Quaid-e-Azam Academy for Educational Development (QAED). Local and Regional Allocation of Water and Sanitation Infrastructure: School management committees should make specific requests for water and sanitation infrastructure projects in the local and provincial budget, to have advanced water filtration systems and improved toilet facilities for students put in place on campus.

1. Horizon Research Extensions and Field Evaluations: Long-term effects of school health interventions on objective student academic outcomes, learning retention and cognitive measures of engagement should be evaluated through longitudinal mixed-method studies expanded across a more diverse array of provincial districts.

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