



Assessment of Physical School Environment of Public Sector High Schools in Pakistan and World Health Organization's Guidelines

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Abstract

The physical school environment influences the health and educational performance of students and staff. World Health Organization (WHO) has developed guidelines for developing countries to evaluate the Physical school environment. Hence this study analyzed the physical school environment of high schools to ascertain the extent of implementation of these guidelines in Multan. Ten core indicators water quality, water quantity, water facilities, hygiene promotion practices, toilets and handwashing facilities, control of vector-borne diseases, cleaning and waste disposal system, school building conditions, school safety and supportive classroom conditions were assessed by three research tools. The responses of 10 core indicators were scored and described. The study concluded that the 10 core indicators at the district level were not meeting the WHO desirable score and the district score (1.01) was below the WHO desirable score (1.5). The development of the Physical School Environment is in the positive trend of development in Pakistan.

Key Words: Physical School Environment, High Schools, Multan

Introduction

Education is important for economic and human development. However, it is influenced by the environmental conditions of the area (GOP, 2009). A good quality school environment plays a basic role in attracting and retaining students (WHO, 2002). The healthy and safe physical school environment has a significant key role in educational performance (WHO et al., 2003). Physical School Environment includes classrooms, sanitation, sufficient safe drinking water and handwashing facilities, boundary walls, playgrounds, thermal conditions and furniture (Marx et al., 1998). The school environmental factors influence and affect the educational performance of students and teachers and the whole educational process (Higgins et al., 2005). The “physical school environment” comprises the physical structure, site of school location and other items with which students may have interaction daily (WHO et al., 2003). A healthy physical school environmental condition assures that the infrastructure of the school is of good quality and it meets the minimum guidelines and standards (Maine, 2002). The physical school environment is recognized as an essential part of student health and educational performance. Studies evidenced that environmental factors in schools are leading agents for illness, low enrollment, poor educational performance, absenteeism and early increasing dropout rate (Bundy, 2011). The education sector was acknowledged to resolve the health-related issues of school children at the World Education Forum Dakar 2000 (UNESCO, 2000). The global partner agencies like WHO, UNESCO, UNICEF and the World Bank joined hands for the provision of guidance for the physical school environment as a part of a healthy and safe school environment. As a first initiative, the framework of FRESH was established for the provision of guidelines for the development of school health programs and policies and mechanisms for monitoring and assessment of implementations of policies (WHO et al., 2003, 2013; World Bank, 2012). The physical school environment is one element of a safe school environment (WHO et al., 2013). The physical school environment influences the overall educational process (Bundy, 2011; Jukes et al., 2008). The provision of safe water with sanitation facilities

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may increase 1863 million days attendance in the schools (WHO, 2004). The schools typically in rural areas are often completely lacking sanitation, water, and handwashing facilities (WHO, 2009). The safe water and hygiene facilities in an educational institute are directly linked to MDGs to achieve the objectives of UPE (WHO, 2009).

The healthy physical school environment increases enrollment, learning, and retention of students (UNESCO, 2010). The international organizations WHO, UNESCO, UNICEF, EDC, World Bank, PCD and Education International have jointly developed a document "The Physical School Environment" as an international initiative to (FRESH). The document provides guidelines for improvement in a physical school environment to individuals, school administration, communities members, teachers, parents, community leaders, NGOs, Government, planners, policy and decision-makers at international, national, provincial, regional, district and local levels (WHO et al., 2003). WHO (2009) described the guidelines for schools located in low-cost settings (developing countries) wherein it has been emphasized that each country should establish a supportive policy for school physical environment at local, district, provincial and national level for improvements in school physical environmental conditions (WHO et al., 2013).

The Global Competitiveness Index (GCI) indicated that the performance of Pakistan in health and education was weak as compared to India, Bangladesh, China, Malaysia and Sri Lanka (GOP, 2007). The education system of Pakistan is most backward and deficient in Asia (Economist Intelligence Unit, 2007). Regular progress has been made in these areas since 2000-01 (GOP, 2005). The infrastructural facilities in the school are highly inappropriate typically in rural areas. There is a high variation for the provision of facilities among rural and urban schools. About 63% of rural schools have access to drinking water while this facility is available to 90% urban schools. Similarly, 88% of urban schools have sanitation facilities while it is 56% to rural schools (GOP, 2009). To overcome all these deficiencies, the national education policy 2009 was framed to facilitate Pakistan to meet all its promises for achievements of the goals of MDGs and EFA (GOP, 2009).

Pakistan is a signatory of all international agreements including MDGs regarding access to education, safe drinking water, and sanitation facilities to all citizens including schools by 2015 (GOP, 2013). Pakistan formulated a National Plan of Action 2013-16 to meet the educational MDGs and launched "Education Sector Reforms Programs" to provide the missing facilities. The provinces of Pakistan also launched action plans (GOP, 2013). The "Punjab Education Sector Reform Program (PESRP)" was launched for the provision of missing facilities (GoP, 2012). Punjab School Education Sector Plan (PSESP) 2013-2017 was executed for improvement in the physical school environment (GoP, 2013). Due to a lack of guidelines and standards for the physical infrastructure of the school, the difficulty has been faced (GoP, 2013). The school education department Punjab issued a school safety plan containing instructions and precautionary measures to be taken in each school (GoP, 2016).

The assessment of the school environment provides opportunities to proceed for a healthy school environment for better educational performance (Lunenburt, 2011). The school's physical environment influences educational performance (Usaini et al., 2015). The physical school facilities and scores of educational achievements of students are directly related to each other, (Dahie et al., 2017). Poor school environmental conditions were responsible for the poor educational performance of students (Baidoo-anu, 2018). Researchers have diverted their attention towards evaluation and assessment of school facilities and it has become an area of research interest (Zepatou et al., 2016).

Statement of the Problem

The students' performance in developing countries is less than those in developed countries due to inappropriate and poor physical school environmental conditions (Mwamwenda & Mwamwenda, 1987). Schools typically in rural areas are often facing a lack of facilities like sanitation, water and hand washing or of very poor quality and quantity (WHO, 2009). The schools in Pakistan are lacking in the provision of basic facilities (GOP, 2005; GOP 2009b). The National Education Policy 2009 focused on improving school environment in collaboration with allied departments at the National, Provincial, district and local levels (GOP, 2009). Pakistan launched national efforts to improve the Physical School Environmental conditions in the last decade. In pursuance of international commitments, Pakistan formulated the National Plan of Action to meet the educational MDGs and launched "Education Sector Reforms Programmes" for the provision of missing facilities to improve the "physical school

environment” (GOP, 2013).

Pakistan is a signatory of all international agreements including Millennium Development Goals (MDGs) regarding access to education, drinking water and sanitation to all citizens including schools by 2015 (GOP, 2013). MDGs have been converted into SDGs. Pakistan is making efforts to ensure compliance with global commitments.

Keeping in view the above situation, importance, and role of school physical environment in educational performance and health of students and staff, it is the dire need of the time to assess and critically analyze the prevailing condition of physical school environmental parameters in Pakistan.

Significance of the Study

International organizations like WHO, UNESCO, UNICEF and World Bank are providing guidelines to member states to evaluate “Physical School Environment” to save the students' health and management and improve the educational performance. The results of this study have provided information to educational administrators at local, regional and national levels to divert more attention to provision of basic school facilities to improve the Physical School Environment. The study is useful for educational stakeholders including Government administrators, educational planning and policymakers, students, school facility managers, community leaders, NGOs and other organizations working in the field of education for the improvement of physical school environment. The study is useful at international, national, provincial, district and local levels due to the following aspects:

- i) The study has evaluated the prevailing situation of physical school environmental conditions of high schools in Punjab.
- ii) It is useful for educational administration to improve the school's environment to enhance quality education.

Objectives of the study

The study was designed to evaluate the prevailing Physical School Environmental conditions of public sector high schools in District Multan in the light of WHO guidelines and standards. The specific objectives of the study were:-

- i) The extent to which schools are meeting the WHO guidelines for the physical school environment in District Multan.
- ii) The assessment of water supply system, hygiene promotion practices, toilets, and handwashing facilities, control of vector-borne diseases, cleanliness and waste disposal practices, school building conditions, school safety and supportive classroom conditions according to WHO guidelines.

Delimitations of the study

The study was delimited to:

- i) Government high schools (boys and girls in non-boarding schools) located in urban and rural areas of district Multan.
- ii) Heads of high schools.
- iii) Senior-most science teacher of 10th class (of chemistry/biology subject).
- iv) Recording of diary observations by the researcher during visits of schools.

Design of research study

The 10 core indicators of the physical school environment were framed according to WHO guidelines (WHO, 2009; WHO et al., 2013):

1. Water quality
2. Water quantity
3. Water facilities and access to water
4. Hygiene promotion practices

5. Toilets and handwashing facilities
6. Control of vector-borne diseases
7. Cleaning and waste disposal
8. School building conditions
9. School safety
10. Supportive classroom conditions

Development of Questionnaires and Checklist

The questionnaires and checklist for 10 core indicators were developed in accordance with WHO guidelines (WHO et al., 2013) and assessment checklist (WHO 2009) for the following key informants for collection of data:

- i) Questionnaire for schools' heads.
- ii) Questionnaire for senior most science teacher.
- iii) Checklist for recording diary observations by the researcher during school visits.

Each sub-indicator was assigned the following three options (WHO et al., 2013):

1. No work
2. Yes it is ok up to 50%
3. Yes it is ok more than 50%

The respondent was to mark one option. The scores were computed according to WHO guidelines as under (WHO et al., 2013):

1. No work = 0
2. Yes it is ok up to 50% = 1
3. Yes it is ok more than 50% = 2

The scores of 10 core indicators were computed according to the responses of three key informants. The stages of development of core indicators were described according to Table 1 (WHO et al., 2013).

Table 1. Who Fresh pillar policy criteria (P) for development of core indicator of the physical school environment

Not yet established	Between emerging	Emerging	Between emerging and established	Well established	WHO desirable score
P = 0	0 < p < 1	P = 1	1 < p < 2	P = 2	P ≥ 1.5

Development and Validation of Research Tools

The questionnaires for school heads and science teachers and a checklist for recording diary observations were finalized containing 90 questions for 10 core indicators after pilot testing in consultation with a group of experts.

Reliability of Questionnaires and Checklist

Cronbach's alpha (α) was used to compute the coefficient of reliability of checklist and questionnaires (DeVellis, 2016) and were 0.939, 0.946 and 0.9740 for heads of schools, teachers and diary observations respectively which is an excellent level of acceptance (George & Mallery, 2003; Gliem & Gliem, 2003). The detailed reliability of questionnaires and checklist is given in Table 2.

Table 2. Cronbach's Alpha Coefficient of Reliability for Questionnaires

Variable	N	Heads	N	Teachers	N	Diary observations
Water quality	6	0.590	6	0.598	6	0.787
Water quantity	5	0.721	5	0.793	5	0.872
Water facilities and access to water	4	0.804	4	0.804	4	0.882
Hygiene promotion practices	13	0.549	13	0.723	13	0.888
Toilets and hand washing facilities	13	0.824	13	0.906	13	0.939

Control of vector borne diseases	8	0.720	8	0.703	8	0.886
Cleaning and waste disposal	13	0.831	13	0.831	13	0.941
School building conditions	10	0.727	10	0.755	10	0.800
School safety	8	0.548	8	0.648	8	0.670
Supportive classroom conditions	10	0.789	10	0.789	10	0.853
Overall	90	0.939	90	0.946	90	0.974

Population

The unit of the analysis in this study was the school. The population comprised of 188 school heads and 188 senior most science teachers of 188 government high schools in district Multan.

Sample

The 30 schools taken in pilot testing were excluded and the remaining 158 government high schools in district Multan were selected as sample schools (Gay et al., 2009). The distribution of school samples with respect to a category, urban and rural and tehsil wise is given in Tables 3, 4, 5.

Table 3. Sample high Schools in District Multan

Category	Frequency	Percentage
Boy	105	66.45
Girls	53	33.55
Total	158	100

Table 4. Urban and Rural Sample High Schools in District Multan

Category	Frequency	Percentage
Urban	73	46.20
Rural	85	53.80
Total	158	100

Table 5. Tehsil wise Sample High Schools

Tehsil	Frequency	Percentage
Multan (city)	52	32.91
Shujabad	31	19.62
Multan (Saddar)	50	31.65
JPPW	25	15.82
Total	158	100

Data Collection

The data from school heads and science teachers were collected by Google form and diary observations were recorded by the researcher during school visits.

Data Analysis and Interpretation

- i. Scores of 10 core indicators based on responses of three key informants were computed and described according to WHO guidelines.
- ii. The mean scores of the results of 10 core indicators of three key informants were calculated and compared with the WHO desirable score.
- iii. Comparative analysis:

- a) Urban schools Vs rural schools
- b) Boys schools Vs girls schools
- iv. Tehsil wise comparative analysis:
 - a) Multan city
 - b) Shujabad
 - c) Multan Sadar
 - d) Jalal Pur Peer Wala

Results

Descriptive Analysis of Core Indicators of Physical School Environment

The results of scores of 10 core indicators of three key informants were described for the development of core indicators (Table 6). The results indicated that 50% of core indicators are in the initial stage of development “between the emerging” and 50% are in the second stage of development “between emerging and established”. However, no one is well established and meeting the WHO desirable score (1.5).

Table 6. Summary of results of Scores of core indicators at district level

Core Indicator	Results of the school head's responses		Results of science teacher's responses		Results of diary observations		Mean score of three responses	
	Scores	Status according to WHO guidelines	Scores	Status according to WHO guidelines	Scores	Status according to WHO guidelines	Mean scores	Status of mean score according to WHO guidelines
Water quality	0.72	Between Emerging	0.4	Between Emerging	0.54	Between Emerging	0.55	Between Emerging
Water quantity	1.13	Between Emerging and established	1.14	Between Emerging and established	1.16	Between Emerging and established	1.14	Between Emerging and established
Water facilities and access to water	0.98	Between Emerging	0.93	Between Emerging	0.93	Between Emerging	0.95	Between Emerging
Hygiene promotion practices	0.80	Between Emerging	0.83	Between Emerging	0.87	Between Emerging	0.83	Between Emerging
Toilets and handwashing facilities	0.94	Between Emerging	0.97	Emerging	1.08	Between Emerging and established	1.0	Emerging
Control of vector-borne diseases	0.96	Emerging	0.99	Emerging	1.18	Between Emerging and established	1.04	Between Emerging and established
Cleaning and waste disposal	1.11	Between Emerging and established	1.25	Between Emerging and established	1.25	Between Emerging and established	1.20	Between Emerging and established
School building conditions	1.14	Between Emerging and established	1.07	Between Emerging and established	1.08	Between Emerging and established	1.10	Between Emerging and established
School safety	1.10	Between Emerging	1.45	Between Emerging	1.45	Between Emerging	1.33	Between Emerging and established

Supportive classroom conditions	1.01	and established Between Emerging and established	0.94	and established Between Emerging	0.94	and established Between Emerging	0.96	Between Emerging
District score	0.99	Between Emerging	1.0	Emerging	1.05	Between Emerging and established	1.01	Between Emerging and established
WHO desirable score	1.50		1.5		1.5			

Status of Physical school Environment at District Level

The results of the physical school environment based on mean scores of the core indicators of three key informants at the district level were described in Table 7.

Table 7. Status of physical school environment of district Multan

Core Indicator	Scores	Status according to WHO Guidelines
Water quality	0.55	Between Emerging
Water quantity	1.14	Between Emerging and established
Water facilities and access to water	0.95	Between Emerging
Hygiene promotion practices	0.83	Between Emerging
Toilets and handwashing facilities	1.01	Between Emerging and established
Control of vector-borne diseases	1.04	Between Emerging and established
Cleaning and waste disposal	1.20	Between Emerging and established
School building conditions	1.10	Between Emerging and established
School safety	1.33	Between Emerging and established
Supportive classroom conditions	0.96	Between Emerging
District score	1.01	Between Emerging and established
WHO desirable score	1.50	

The results (Table 7) indicate that the core indicator of water quality, water facilities, hygiene promotion practices, and supportive classroom conditions were in “between emerging” stage and that of water quantity, toilet and handwashing facilities, control of vector-borne diseases, cleaning and waste disposal system, school building conditions and school safety were in the second stage of development “between emerging and established”.

The results indicated that the score of core indicator of water quality (0.55) is at the bottom indicating low progress to improve the water quality while the provision of water quantity score (1.13) is observed better. School safety score 1.32 is at the top indicating improvements. The scores of core indicators of water facilities and access to water, hygiene promotion practices, and supportive classroom conditions are less than 1.0 indicating “between emerging” stage which indicates continuous improving in a positive trend. However, mean scores of 10 core indicators and mean district score (1.01) are not meeting the WHO desirable score (1.5).

Comparative analysis

Tehsil wise comparison

The results of the mean scores of four tehsils are shown in figure 1.

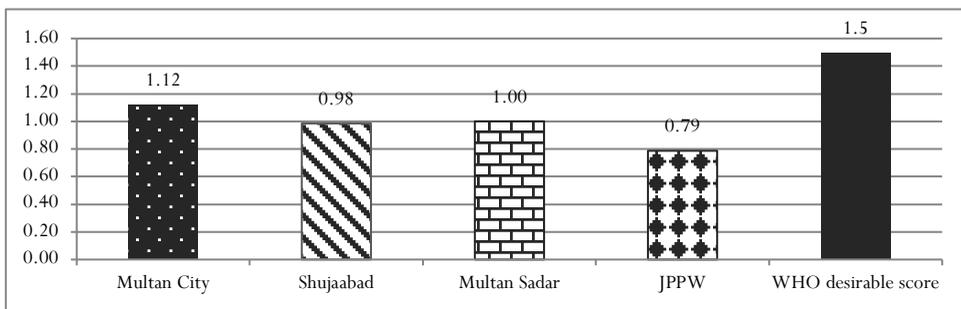


Figure 1: Tehsil wise Comparison of Physical School Environment

The results (figure 1) indicate that the mean score of Multan city (1.12) is at the top while that of JPPW is at the bottom (0.79). The score of Multan Saddar (1.0) is higher than Shujabad (0.98). The results revealed that the physical school environment of Multan city is better than the other three tehsils. The order of scores is as: Multan city > Multan Saddar > Shujabad > JPPW.

Comparison of Urban and Rural Schools

The results of urban and rural schools are shown in figure 2.

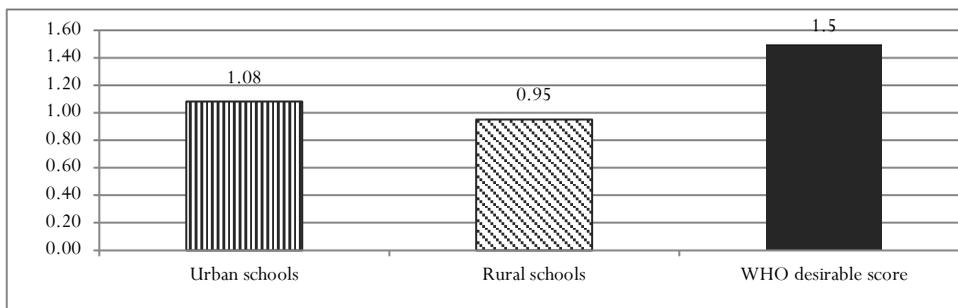


Figure 2: Comparison of urban schools and rural schools

The results (figure 2) indicate that urban schools' mean score (1.08) is greater than that of schools in rural areas (0.95). Results revealed that the physical school environment of urban schools is better than that of rural schools and none is meeting the WHO desirable score (1.5).

Comparison of Girls and Boys Schools

Results of core indicators for boys' and girls' schools are shown in figure 3.

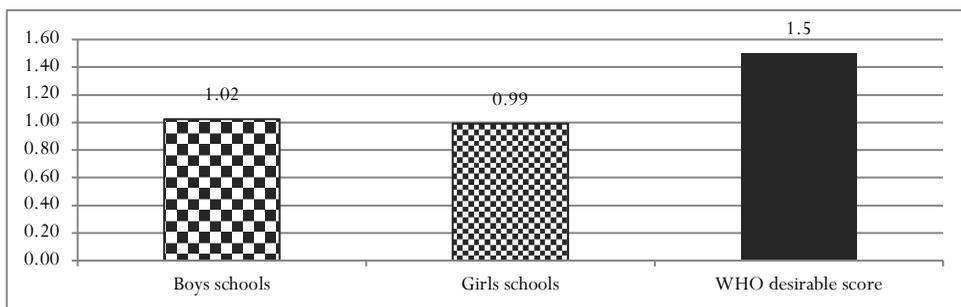


Figure 3: Comparison of Girls and Boys Schools

Results (figure 3) indicate that the mean score of boys schools (1.02) is slightly greater than that of girls' schools (0.99). Results revealed that the physical school environment of boys schools is slightly better than that of girls' schools. Mean scores of boys and girls' schools are below the WHO desirable score (1.5).

Discussion

In this study, the physical school environment of high schools at the district level has entered from the initial stage “emerging” to the second stage “between emerging and established” having score 1.01.

World Bank (2012) conducted the assessment of safe school environment of six countries and reported that the safe school environment of Dominica and Barbados countries was “established” and that of four countries Guyana, St.Lucia, St.Vincent, and the Grenadines were in “emerging” stages (World Bank, 2012). The core indicator of water quality in this study is at the initial stage “between emerging” and lowest among all core indicators at the district level. The main source of drinking water in schools is groundwater. The chemical analysis indicated that 1% of samples are fit and 99% of samples are unfit for chemically analyzed parameters. 99% of samples are unfit due to the presence of Arsenic concentration exceeding the WHO permissible limit (10 µg/l). Chemical analysis of samples has validated the opinions of all the respondents. The majority of groundwater samples in Dera Ghazi Khan were found unfit for drinking (Malana & Khosa, 2011). South Punjab has the groundwater of brackish quality which is unfit for drinking. (PCRWR, 2004). The groundwater is unsafe for human consumption due to bacterial and chemical concentration in many cities of Pakistan (PCRWR, 2004). United Nations Children’s Fund Pakistan (2017) reported that 80% of water for drinking in Pakistan was contaminated with bacteria and is unsafe for drinking. The results of the above groundwater studies in Pakistan are similar to this study.

In this study core indicators of water quantity, toilets and handwashing facilities, control of vector-borne diseases, cleaning and waste disposal system, school building conditions and school safety are at the second stage “between emerging and established”. The core indicators of water facilities and access to water, hygiene promotion practices and supportive classroom conditions are at an initial stage “between emerging”. The similar results were reported in the following studies. The provision of facilities in schools increased at a low pace. In 2005-06, only 60.2% of schools had a drinking water facility while it increased to 63.9% in 2007-08. In 2005-06, 54.2% of schools had sanitation facilities and it increased to 60.8% in 2007-08. In 2005-06, 50.8% of schools had boundary walls and it increased to 60% in 2007-08. Regular progress has been made in these areas since 2000-01 (GOP, 2005). The infrastructural facilities in the school are highly inappropriate typically in rural areas. About 40% of schools are deficient in boundary walls, 36% in safe water, 39% without sanitation and 61% without electricity, and 6% of schools have no buildings. There is a high variation for the provision of facilities among rural and urban schools. The rural schools have poor facilities than urban schools. 63% of rural schools have access to drinking water while this facility is available to 90% urban schools. Similarly, 88% of urban schools have sanitation facilities while it is 56% to rural schools (GOP, 2009). UNESCO (2010) reported that 56% of government primary schools are without latrines and 61% have no drinking water, 33% have no electricity facility and 87% are without a boundary wall. WHO (2009) reported that rural schools are often complete lack of facilities like sanitation, water and handwashing facilities. The results of the current study indicated that improvements have been made in the provision of facilities as prescribed in the physical school environment and no school is found where any of the core indicators are missing. The results of this study are in agreement with the above studies. The child friendly schools exhibited better school environment including hygiene than conventional schools (Anwar et al., 2016). The framework for child-friendly schools was established and movement for creating child-friendly schools was launched and satisfactory results have been obtained. However, there is much space for improvement and meeting the SDGs (Khan, 2018). The results of the above studies support the results of this study.

In this study, the physical school environment of urban schools has been found better than that of rural schools. United Nations Children’s Fund Pakistan (2017) reported that 94% of the urban population has access to better sanitation facilities and only 12% of the rural population has access to improved sanitation. The UNICEF (2017) study in Pakistan supports the results of this study.

Findings

The physical school environment of high schools at the district level has entered from the initial stage “emerging” to the second stage “between emerging and established” and district score 1.01 is below the WHO desirable score (1.5).

- i) The core indicator of water quality, water facilities and access to water, hygiene promotion practices and supportive classroom conditions are at initial stage “between emerging” and water quality is lowest among all core indicators at district level and that of water quantity, toilets and handwashing facilities, control of vector-borne diseases, cleaning and waste disposal system, school building conditions and school safety are at second stage “between emerging and established”.
- ii) None of the 10 core indicators at the district level is meeting the WHO desirable score (1.5).
- iii) The physical school environment of Multan city is better among four tehsils and that of JPPW is lowest.
- iv) The physical school environment of urban schools is better than that of rural schools.
- v) The physical school environment of boys schools is slightly better than the girls' schools.

Conclusion

Pakistan has taken initiatives for the development and improvement of the physical school environment to implement the WHO policy and to achieve the objectives of the Sustainable Development Goals (SDGs). The development of the physical school environment is in a positive trend according to WHO guidelines and it has improved the school's conditions. The school leadership is struggling to raise the district score 1.01 to WHO desirable score 1.5

Recommendation

The government should launch programs to meet the parameters of the physical school environment in each school (10 core indicators) according to WHO guidelines and develop a system for implementation and monitoring

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