Assessment of physical environment
of primary schools in Mosul city

Waleed G. A. Al-Taee**, Redhaa Abd-Alhameed Al-Tuhafee*
* M.sc. Candidate, **Department of Community Medicine, College of Medicine, University of Mosul.

ABSTRACT

Background: Physical school environment considered one of the critical points for children growth and development. Schools are large places that present significant opportunities for getting an accident or infection.

Objective: To assess the physical environmental health criteria of primary schools in Mosul city.

Methods: A descriptive cross sectional study design has been adopted. A sample of 25 schools has been taken using multi-stage stratified stratum sampling technique. A special questionnaire form has been prepared depending on WHO criteria for schools environment. A separate questionnaire form has been filled by the investigator herself for each school.

Results: Study results revealed that 52% of the schools are near a main street, 80%of schools are close to sources of pollution specially garbages, 20% of schools have maintained gardens, 72% of schools have inadequate faucets, 92% of schools have inadequate toilets. Whereas only 24% of toilets founds have good sanitary conditions. On the other hand only 20% of classrooms were found to be appropriate, 48% of schools were having inadequate lighting and 28% have inadequate ventilation.

Keywords: School environment, primary school, physical.

الخلاصة

خلفية إجراء الدراسة: تعتبر بيئة المدرسة الفيزيائية أحد أهم النقاط المؤثرة على نمو الأطفال وتطورهم حيث تمثل المدارس مكانا مهما لاحتمالية حصول إصابات طارئة أو أخماج حادة.

هدف الدراسة: إجراء تقييم للمقومات الفيزيائية لبيئة المدارس الابتدائية في مدينة الموصل.

طريقة إجراء الدراسة: تم اختيار تصميم دراسة المقطع العرضي الوصفي وتم أخذ عينة من المدارس الابتدائية بلغت ٢٥ مدرسة بالاعتماد على طريقة أخذ العينة المتعدد المراحل وتم إعداد نموذج خاص لجمع البيانات بالاعتماد على خصائص البيئة المدرسية وفق معايير منظمة الصحة العالمية وتم ملأ استمارة منفصلة لكل مدرسة من قبل الباحث نفسه.

نتائج الدراسة: أظهرت نتائج الدراسة أن ٥٢% من المدارس قريبة من الشارع العام, ٨٠% من المدارس يوجد مصادر تلوث بالقرب منها معظمها من النفايات, ٢٠% من المدارس لديها حدائق مدامة, ٧٢% من المدارس لا يوجد فيها حنفيات كافية لشرب الماء و٩٢% من المدارس ليس فيها دورات مياه كافية في حين فقط ٢٤% من دورات المياه الموجودة كانت مطابقة للشروط الصحية. ومن جهة أخرى وجد أن ٢٠% من الصفوف كانت ملائمة لعدد الطلاب في حين ٤٨% من الصفوف كانت قليلة الإضاءة و٢٨% منها كانت قليلة التهوية.

Schools, an important developmental environment for children, is known to have an impact on children`s psychosocial development and mental health[1]. It is

important to provide an environment that is wholesome and supportive of learning[2]. As society continues to focus on the importance of academic achievement, the school physical environment should be addressed as a critical factor that influences academic outcomes[3].

The physical school environment encompasses the school building and all its contents, the site on which a school is located and the surrounding environment including the air, water, and materials with which children may come into contact, as well as nearby land uses, roadways and other hazards[4].

The American Academy of Pediatrics defines a "healthful school environment" as "one that protects students and staff against immediate injury or disease and promotes preventive activities and attitudes against known risk factors that might lead to future disease or disability[5].

It is important to the health of school children to have clean water to drink, enough water to use for hygiene, adequate sanitation facilities, clean air to breathe, safe and nutritious food, and a safe place to learn and play. A contaminated environment can cause or exacerbate health problems. These include short-term health effects such as infectious diseases, respiratory infections and asthma that can reduce school attendance and learning ability. Health effects such as cancer or neurological diseases may be delayed until much later in life, on the other hand a healthy school environment can directly improve children's health and effective learning and thereby contribute to the development of healthy adults as skilled and productive members of society. Furthermore, schools act as an example for the community; students who learn about the link between the environment and health will be able to recognize and reduce health threats in their own homes[4].

Study aim is to assess the physical environmental health criteria of primary schools in Mosul city.

Subjects and methods

Preliminary official permissions were obtained from both General Directorates of Health and Education in Nineveh Governorate.

A descriptive cross sectional study design was adopted. Study period was two months, from the first of December 2010 to the end of January 2011. Study material was 25 primary schools all taken through a multi-stage stratified stratum sampling technique from a total of 280 primary school buildings in Mosul city. To start with primary schools of Mosul City have been divided into two groups (one at right side of Tigris River and the other at left side of the river). Later, the school of each group has been divided into schools for girls and for boys. Finally sample of schools has been selected according to simple random technique. Accordingly, a total 14 schools at left bank (7 schools for boys and 7 for girls) and 11 schools at right bank (5 schools for boys, 5 for girls and one mixed school) have been chosen as a study material. A special questionnaire form has been prepared utilizing the WHO criteria for physical school environment[6] and taking in consideration the consultation advise of specialized physicians at school health services sector in Mosul. The questionnaire form items included the following:

1. **Area surrounding the school** which includes distance between school and main street (ideally it must be more than 150 meters[6]) and presence and type of pollution sources nearby the school.

2. **School environment** which includes school wall height (standard height is 1.8-2 meters), school yard availability and adequacy (adequate school yard means 1-1.5 square meter/ student, including buildings, gardens and playgrounds) school cleanliness, power sources, garbage containers availability and state (standard garbage containers must have a lid), daily disposal of waste, chlorine levels checking, state and adequacy of faucets (standard water faucets means one faucet/50 students with the nozzle facing upwards and higher than edge of basin) and toilets adequacy and sanitation (one toilet per 25 students, constructed in appropriate places, properly ventilated, tap water available and continuously cleaned)[6].

3. ***Classroom specification*** which includes classroom size (appropriate size means one square meter / student), cleanliness, lighting, windows (should not be at the back or front of the classroom to avoid glare on blackboard), ventilation (either natural through windows, or mechanic using fans, preferably classroom ventilation is by placing 2 open windows on opposite sides of standard size i.e. 1/6 -1/4 of the floor), heating and cooling facility, adequacy of desks, age-appropriate desks (the height of the seat should be proportionate to the length of students leg), blackboard (appropriate blackboard must be dark and not shiny, with a place where chalk particles are deposited and placed in the middle of the wall with a distance of 1.5-2 meter from first desk row), and type of chalk[6].

A separate questionnaire form has been filled in by the investigator for each visited school.

Descriptive statistical measures have been used including numbers and percentages for each outcome variable used in assessing physical school environment.

Results

In regard to area surrounding the school, study results revealed that 52% of surveyed schools are near main street, 80% of them there was a nearby source of pollution which was solid waste aggregate in 80% of those schools (Table 1).

Table (1): Frequency distribution of surveyed schools according to surrounding area characteristics.

Surrounding area parameters		(N=25) No.	%
Distance from main street	Close	13	52.0
	Far	12	48.0
Nearby pollution source	Present	20	80.0
	Absent	5	20.0
Source of pollution	Garbage	20	80.0
	Stagnated water	8	32.0
	Noise	6	24.0
	Bucher shops	5	20.0
	Industrial	1	4.0

Regarding school environment the study revealed that 76% of surveyed schools have a standard wall, 80% of school yards are proportionate with the number of student, 56% of schools gardens are lacking maintenance while 24% of schools found without gardens and 28% of schools have in-proper cleanliness, 60% of schools found having only a general source of electricity while only 40% of schools having both general and local sources for electricity (Table 2).

Regarding environmental sanitation parameters; 12% of schools found without garbage containers, 80% of schools found lacking a daily disposal of waste, 40% of schools do not check the chlorine amount in their drinking water, 72% of schools having inadequate faucets and 44% of them are non-standard. 92% of schools founds having insufficient number of toilets and 76% of them having poor sanitary condition (Table 3).

Regarding classroom specifications study results revealed that 80% of classrooms are inappropriate to number of students, 48% of them have inadequate lighting & 28% of them have poor ventilation, 20% of them have inadequate cleanliness, 28% of them having inadequate number and partially appropriate desks. On the other hand 52% of blackboards were found to be appropriate, and 96% of chalk was oily (Table 4).

Table (2): Frequency distribution of surveyed schools in regard to building characteristics.

School building parameters		(N=25) No.	%
School wall height	Standard	19	76.0
	Not -standard	6	24.0
School yard proportionate with no. of students	Proportionate	20	80.0
	Not proportionate	5	20.0
School garden	Present	19	76.0
	Absent	6	24.0
Garden maintenance	Maintained	5	26.3
	Unmaintained	14	73.7
School cleanliness	Clean	18	72.0
	Not clean	7	28.0
Source of electricity	General only	15	60.0
	General and local	10	40.0

Table (3): Frequency distribution of studied schools according to environmental sanitation parameters.

Environmental sanitation parameters		N=25 No.	%
Presence of garbage container	Present	22	88.0
	Absent	3	12.0
Type of garbage container	Standard	10	40.0
	Not standard	12	48.0
Daily disposal of waste	Present	5	20.0
	absent	20	80.0
Chlorine amount checking	Present	15	60.0
	Absent	10	40.0
Number of faucets	Adequate	7	28.0
	Inadequate	18	72.0
Faucets state	Standard	14	56.0
	Not standard	11	44.0
Number of toilets	Adequate	2	8.0
	Inadequate	23	92.0
Toilet sanitation	Acceptable	6	24.0
	Unacceptable	19	76.0

Table (4): Frequency distribution of studied schools according to classroom specification parameters.

Classroom specification parameters		N=25 No.	%
Classroom size in proportion to number of students	Proper	5	20.0
	improper	20	80.0
Lighting	Adequate	13	52.0
	Inadequate	12	48.0
Ventilation	Good	18	72.0
	Poor	7	28.0
Classroom cleanliness	Acceptable	20	80.0
	Unacceptable	5	20.0
Number of Seats	Adequate	18	72.0
	Inadequate	7	28.0
Age-appropriate desks	Appropriate	10	40.0
	Partially appropriate	7	28.0
	Inappropriate	8	32.0
Blackboard appropriateness	Appropriate	13	52.0
	Inappropriate	12	48.0
Type of chalk	Oil	24	96.0
	Other type	1	4.00

Discussion

Being more than 50% of surveyed schools near a main street, this can reflect the high possibility of noise pollution and the higher risk of getting accidents and/ or hazardous effect upon students health and learning abilities among such schools. Such result go with the findings of a similar study conducted at Al-Muthanna Governorate in Iraq during the year 2008 [6]. However a nearby pollution source was present in 80% of surveyed schools which is mainly garbage collections, in comparison to only 20% of schools in Baghdad/ Al-Karkh [6], such point looks to be a very dangerous in regard to communicable diseases transmission and respiratory problems occurrence among both students and teaching staff of Mosul schools. Such high rate can reflect the poor services introduced by Ministry of Municipalities and poor supervision activities of Ministry of Environment in Mosul city.

In regard to school cleanliness, 72% of surveyed schools found to be acceptable. Such result is nearly equal to the findings of a similar study conducted in Baghdad /Al-Rusafa [6]. From other point of view, majority of school gardens found to be unmaintained in comparison to only 30.8% of schools through a similar study in Sulaymaniyah/Iraq [6]. This can reflect the poor monitoring and health educational role of administrative staff of such schools in maintaining a healthy school environment.

Regarding safe water supply, 72% of surveyed schools, found having inadequate faucets and 92% have inadequate toilets (76% of them have poor sanitation). Such high rates go with the findings of a similar study conducted in Mesan Governorate/Iraq [6] and with the Dubai International Humanitarian Aid and Development report" more than half of primary schools in developing countries have no adequate water facilities and nearly two thirds lack adequate sanitation.[7] It reflect the highly neglected school health supervision services.

Discussing classroom specifications, 80% of classrooms found with improper size in comparison to 20% only in Basra/Iraq[6] ; and 48% of blackboards are inappropriate. Such

high rate can express the stressful classroom conditions and one of the difficult learning environmental problems which might affect students school performance in addition to their ill-health effect in regard to proper vision and respiratory health of students. The wellbeing of such student is very important because primary school age children constitute 16.3% of the total Iraqi population. On the other hand 80% of visited classrooms were clean which is better than that of Baghdad /Al-Karkh which 61.5% [6]. From other point of view, although the study has been conducted during winter, no any heating facility found available among visited classrooms. Such point can expose school children to a lot of cold months respiratory health problems and increase the risk of school absenteeism.

Conclusions

The present study concluded that the primary schools in Mosul city found to have a number of improper physical environmental conditions. 52% of visited schools found to be constructed near a main street, 80% of them have a nearby source of pollution, 72% of them have inadequate faucets, 92% have inadequate toilets, 76% of toilets found lacking proper sanitation and 80% of classrooms found with inappropriate size in regard to number of students.

The present study recommended the improving environmental conditions around the schools need a proper coordinated activities between the Ministries of Education, Environment and Municipalities. Furthermore improving primary schools infrastructures (faucets, toilets and sanitation). Lastly number of students in each classroom must be proportionate to its size and availability of air conditioning facilities.

References

1. Somersalo H. School environment and children`s mental well-being. MSc. Thesis. 2002.p.7.
2. Herman K, Michael B. Handbook of environmental health, volume 1, Lewis Puplisher 2003 :457.
3. Sherry E J, Robert A, Wendy A, Wattigney M. Healthy and Safe School Environment, Part II, Physical School Environment: Results From the School Health Policies and Programs Study 2006. Journal of School Health October 2007; 77(8) : 545.
4. WHO information series on school health document 2, The physical school environment an essential component of a health-promoting school 2003: 1-3.
5. American Academy of Pediatrics. Committee on School Health, School Health Policy and Practice, Fifth Edition, 1993.
6. WHO. Health promoting schools project. Student health status and environmental assessment of primary schools 2009 /Iraq.
7. UNNICEF and Partner. Lack of safe water and sanitation in schools affect children learning and lives, Dubai International Humanitarian Aid and Development (DIHAD), 5 April- 2010.