

Original Article

Evaluation of quality of routine physical examination in urban public basic schools in Khartoum State, Sudan

Mona A Alfadeel (1), Yassin H M Hamid (2), Ogail Ata El Fadeel (3), Karimeldin M A Salih (4)

(1) College of Medicine, Al Maarefa Colleges for Science & Technology, Riyadh, Saudi Arabia

(2) Prince Abdullah Bin Khaled Celiac Disease Research Chair, King Saud University, Riyadh, Saudi Arabia

(3) Sudan National Population Council, Sudan

(4) King Khalid University, Abha, Saudi Arabia

ABSTRACT

The objectives of this study are to identify the availability of the service logistics in basic public schools (structure as quality concept), to assess steps of physical examination according to the ministry of health guidelines (process as quality concept) and to measure satisfaction of service consumers (pupils) and service providers (teacher and doctors). The study involved seven localities in Sudan using questionnaires and observations. The structure in form of material and human resources was not well maintained, equally the process and procedure of medical examination did not well fit with rules of quality, however, the satisfaction level was within the accepted level. As far as structure, process and outcome were concerned, we are still below the

standards in developed countries for many reasons but the level of satisfaction in the present study is more or less similar as in else studies.

Keywords:

School health; Khartoum; Teachers; Doctors; Pupils; Satisfaction; Sudan.

Correspondence to:

Mona Mohammed Hassan Ata Alfadeel,
College of Medicine,
Al Maarefa Colleges for Science & Technology
Riyadh, Saudi Arabia.
mona-diab@hotmail.com

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INTRODUCTION

School health is considered to be a useful tool for improving health and economic standards of any community, which moved from medical examination of pupils and student to the broader concept of comprehensive care of the health and wellbeing of children throughout the school years [1]. School health program consists of eight interactive components which are: health education, physical education, health services, nutrition services, counseling services, psychological services, healthy school environment, and health promotion for staff and family/community involvement [2]. Worldwide, schools educate millions of students and through these students they also educate their families [3]. In Sudan squires first initiated school health services in 1912 as part of the Sudan medical department, which was established in 1904 during the colonial era. However in Khartoum state, to the best of our knowledge, the activities of school health activated in 1994 for just the purpose of providing meningitis vaccine for pupils. Then by the year 2001, all primary and secondary schools in the state were enrolled. To our knowledge, no similar study was carried out before on this issue.

MATERIALS AND METHODS

This is a descriptive cross-sectional school based study, conducted in 30 urban basic public schools in the seven localities of Khartoum state, during the period from February 2009 to November 2009. The objectives were: to identify the availability of the service logistics in basic public schools, to assess steps of physical examination according to the ministry of health guidelines, to measure satisfaction of service consumers (pupils) and service providers (teachers and doctors), to identify constrains of medical examination at schools.

The study populations included: Medical teams (doctors, ophthalmic and dental assistants in addition to nutritional monitors) providing school health services, school health teachers, school pupils from: First, fourth and seventh classes in Khartoum State (who were targeted by the school health program). Inclusion criteria were: All Sudanese school children, the medical team and teachers who were selected to be included in the study population. Exclusion criteria were: pupils who were absent on the days of the study, visitors and none Sudanese. Sampling was of two stages clustering method. The sample size was calculated by the formula:

$$n = z^2 pq/d^2 \times \text{diff} \quad \text{where}$$

$$n = \frac{(1.96)^2 \times 0.5 \times 0.5 \times 2}{0.05 \times 0.05} = 768 \approx 770 \text{ pupil}$$

The schools were taken as clusters and 30 clusters constituted the sample. Then in each cluster (770/30 \approx 26 pupil) were taken for assessing the medical examination.

With sampling technique in the first stage, stratification was based on localities and gender classification for all basic schools, selection of clusters (schools) by using the probability proportional to size (PPS), and then in the second stage there was selection of the units (pupils) by systematic random selection. The number of doctors in the medical team = 65 doctors. The number of teachers = 30 teachers (one in each school).

The data were entered and analyzed by statistical package for social science (SPSS); chi-square to 95% confidence level was used. Ethical clearance from Technical Research Committee (Khartoum State Ministry of Health) was obtained; in addition to the individual verbal consent form the doctors and teachers. Consent from schools and educational authorities were also taken.

RESULTS

The study was conducted in 30 schools distributed in 7 localities (Table 1). The total number of pupils was 793 of which 269 (33.9%) pupils were in the 1st class, 268 (33.8%) in the 4th class and 256 (32.3%)

in the 7th class. School health teachers interviewed in the study were 27 distributed in 25 schools while there was no school health teacher in the remaining 5 schools.

Table 1- Distribution of schools according to localities

Locality	Number of schools	Number of teachers	Number of pupils
Ombadda	6	5	157
Omdurman	3	3	80
Karary	4	4	105
Khartoum	5	4	134
Jebal Awlia	5	5	159
Sharg Alneel	3	4	80
Bahry	4	2	78
Total	30	27	793

Among the 30 schools which have been studied only 10 of them had couches, none had a screen, only 7 schools had height measuring scales, there was no

suitable place for examination in 27 of them and there were complete medical teams in only 4 schools (Table 2).

Table 2- Availability of examination's equipment at schools

Tools	Available	Not available
Couch	10 (33.3%)	20 (66.7%)
Stethoscope	26 (86.7%)	4 (13.3%)
Tuning fork	23 (76.7%)	7 (23.3%)
Measuring tape	20 (66.7%)	10 (33.3%)
Height meter	7 (23.3%)	23 (76.7%)
Weighing scale	28 (93.3%)	2 (6.7%)
Torch	23 (76.7%)	7 (23.3%)
Screen	0 (0.0%)	30 (100.0%)
Recording book	27 (90.0%)	3 (10.0%)
Snelling chart	17 (56.7%)	13 (43.3%)
Tongue depressor	24 (80.0%)	6 (20.0%)
Suitable place	3 (10.0%)	27 (90.0%)
Complete medical team	4 (13.3%)	26 (86.7%)

Regarding the steps of examination, height was recorded correctly in less than one quarter of pupils, which counts to 16% of boys and 26% in girls, and was wrongly done in 75.5% of girls, which was statistically significant (Table 3). The examination was not done at all in 17% of the 7th class and 1% of

the 1st class and again that was statistically significant (P value = 0.000).

Weight was done correctly in 81%, wrongly done in 12% (Table 4), although there was no significant statistical difference in gender (P value=0.239) (Table 4). Similarly, visual acuity, dental and respiratory

examinations have shown statistically significant difference between different classes with regards to whether done correctly or in a wrong way or not being done at all (Table 4).

Speech was measured correctly in 84% (Table 3), in 95% of girls and 69% of boys and the difference is statistically significant (P value =0.000) (Table 3). Hearing was tested correctly in only 28%, incorrectly in 42% and not done at all in 29% (Table 3), done

correctly in 21% of boys, 36% of girls and not done in 46% of boys and 16% of girls and those were statistically significant differences (P value =0.000) (Table 3). Eyes examination was done correctly in 73% and not done in 4% (table 4) , done correctly in 64% of boys and 80% of girls, not done in 9% of boys and none in the girls and there was statistical significant difference (P value =0.000) (Table 3).

Table 3- Steps of examination according to gender and whether correctly done or not

Step	Gender*	Correctly done	Wrongly done	Not done	P value
Height	M	58(16.7%)	26 (17.9%)	27(7.8%)	0.003
	F	119 (26.7%)	302 (79%)	25(5.6)	
Weight	M	274(79%)	47(13.5%)	26(7.5%)	0.239
	F	373(83.5%)	48(10.8%)	25(5.6)	
Speech	M	240(69.2%)	65(18.7%)	42(12.1%)	0.000
	F	426(95.5%)	15(3.4%)	5(1.1%)	
Hearing	M	76(21.9%)	109(31.4%)	162(46.7%)	0.000
	F	162(36.3%)	226(50.7%)	73(16.4%)	
Eyes	M	223(64.3%)	90(25.9%)	34(9.8%)	0.000
	F	357(80%)	89(20%)	0(0%)	
Visual acuity	M	91(26.2%)	97(28%)	159(45.8%)	0.007
	F	126(28.3%)	83(18.6%)	237(53.1%)	
Dental examination	M	78(22.5%)	111(32%)	158(45.5%)	0.000
	F	231(51.8%)	168(37.7%)	47(10.5%)	
Lymph nodes	M	220(63.4%)	108(31.1%)	19(5.5%)	0.001
	F	257(57.6%)	182(40.8%)	7(1.6%)	
Respiratory	M	157(45.2%)	162(46.7%)	28(8.1%)	0.000
	F	207(46.4%)	238(53.4%)	1(0.2%)	
Cardiovascular	M	157(45.2%)	154(44.4%)	36(10.4%)	0.000
	F	196(43.9%)	249(55.8%)	1(0.2%)	
Abdomen	M	159(45.8%)	146(42.1%)	42(12.1%)	0.000
	F	224(50.2%)	197(43.9%)	25(5.6%)	
Genitalia	M	63(46.9%)	78(22.5%)	206(59.4%)	0.000
	F	17(3.8%)	68(15.2%)	361(80.9%)	
Urinary	M	76(21.9%)	124(35.7%)	147(42.4%)	0.000
	F	161(36.1%)	217(48.7%)	68(15.2%)	
Limbs	M	62(17.9%)	107(30.8%)	178(51.3%)	0.000
	F	133(29.8%)	209(46.9%)	104(23.3%)	
Skin	M	112(32.3%)	50(14.4%)	185(53.3%)	0.000
	F	324(72.6%)	21(4.7%)	101(22.6%)	

F- Females; M- Males
 *Males = 347, Females = 446

Table 4- Weight, visual acuity, dental and respiratory examinations according to class

Examination	Examination done or not	1 st class	4 th class	7 th class	Total	P value
Weight	CD	234 (87%)	222 (82.8%)	191(74.6%)	647 (81.6%)	0.000
	WD	33 (12.3%)	37 (13.8%)	25 (9.8%)	95 (12%)	
	ND	2 (0.7%)	9 (3.4%)	40 (15.6%)	51 (6.4%)	
	Total	269 (100%)	268 (100%)	256 (100%)	793 (100%)	
Visual acuity	CD	69 (25.7%)	86 (32.1%)	62 (24.2%)	217 (27.4%)	0.012
	WD	71 (26.4%)	52 (19.4%)	57 (22.3%)	180 (22.7%)	
	ND	129 (48%)	130 (48.5%)	137 (53.5%)	396 (49.9%)	
	Total	269 (100%)	268 (100%)	256 (100%)	793 (100%)	
Dental examination	CD	123 (45.7%)	111 (41.4%)	75 (29.3%)	309 (39%)	0.000
	WD	76 (28.3%)	86 (32.1%)	117 (45.7%)	279 (35.2%)	
	ND	70 (26%)	71 (26.5%)	64 (25%)	205 (25.9%)	
	Total	269 (100%)	268 (100%)	256 (100%)	793 (100%)	
Respiratory examination	CD	126 (46.8%)	127 (47.7%)	111 (43.4%)	364 (45.9%)	0.006
	WD	142 (52.8%)	125 (46.6%)	133 (52%)	400 (50.4%)	
	ND	12 (4.5%)	13 (4.9%)	12 (4.7%)	37 (4.7%)	
	Total	269 (100%)	268 (100%)	256 (100%)	793 (100%)	

CD- Correctly done; ND- Not done; WD- Wrongly done

Dental, lymph nodes, respiratory system and cardiovascular system examinations were done correctly in 39%, 60%, 45%, and 45% respectively. There were variations in the performance of the examination between boys and girls and between different classes. Significant variations between boys and girls were found in lymph nodes (P value =0.001), respiratory system (P value = 0.000) and cardiovascular system (P value =0.000) examinations. Significant variations between the different classes were identified in dental (P value =0.000) and respiratory system examinations (P value = 0.006) (Table 4).

When comparing respiratory system examination in schools with a couch, 55.6% were conducted correctly compared with 41% in those who had no couch, and 38% wrongly conducted compared to 56.7% without couch, with a highly significant statistical difference (P value = 0.000) (Table 10). With regards to cardiovascular system examination in schools with a couch, 58.6% was done correctly compared with 37.4% in those who had no couch and 32.7% wrongly done with the use of a couch compared to 60% without giving a highly significant statistical difference (P value = 0.000) (Table 5).

Table 5- Respiratory system examination according to availability of couch

	Available	Not available	Total
Correctly done	148 (55.6%)	216 (41.0%)	364 (45.9%)
Wrongly done	101 (38.0%)	299 (56.7%)	400 (50.4%)
Not done	17 (6.4%)	12 (2.3%)	29 (3.7%)
Total	266 (100.0%)	527 (100.0%)	793 (100.0%)

P value = 0.000

Pupils' satisfaction was assessed in all students of the seventh class. Satisfaction regarding the components of the examination ranged between 84% -98%, except for privacy which was only 51%. Seventy four percent (n=20/27) of school health teachers were satisfied with medical examination, 11% (n=3/27) were satisfied to some extent and 15% (n=4/27) were unsatisfied. This was quite different from doctors' satisfaction where only 8% (n=5/65) of doctors were satisfied with the service compared with 45% (n=29/65) who had some satisfaction and 47% (n= 31/65) not being satisfied.

DISCUSSION

Medical examination in the school health program is a very important issue because it provides a chance for screening of children at school ages that have not been screened before and as many diseases do not present to medical care because they don't produce significant symptoms or illness. Many of these diseases would have better prognosis if they were discovered earlier. The present study showed that Medical examination tools were found to be deficient in schools especially that most schools have no suitable places for examination, no medical examination couch and no screen at all in any of the schools. This made the process of medical examination difficult and not reliable and it does not provide privacy for pupils, which led to more than half of them not being satisfied with privacy.

More than 70% of pupil's height was checked in the wrong way this was due to the fact that there was no height measuring scales in more than three quarters of schools which is not in agreement with the standard procedure [4].

Weight was not checked in 15% of seventh class pupils compared to 0.7% of first class students this may be due to the fact that nutritionists were not aware of the importance of weight for older pupils which is not in agreement with the standard recommendation [4].

This work showed that the structure and process for school health in Sudan, despite early recognition of its importance in history, yet it is still far away from other developed such as the European countries and Australia and even some developing countries like India [5-9]. The improvement in the component of quality (structure, process, outcome) in these countries was enhanced by the World Health Organization (WHO), which fostered many of these initiatives, supported by health and educational bodies and a variety of non-government organizations [10-12].

Although hearing examination is important and essential for learning, the process and the only way of discovering hearing problems is the routine examination at school entrance, hearing was not checked at all in about 30% of the pupils in the study. This may be due to lack of knowledge in doctors or due to the short time of examination. Visual acuity was not checked in about 50% of pupils in the study, the assistant ophthalmologist who was absent in many schools should have done this step.

Examination of abdomen, cardiovascular, and respiratory systems were done in the wrong way in 50% of the pupils, this was due to the fact that there was no suitable place, couch and screen for the examination.

Genital examination at this age is very important, as many problems and congenital problems can be detected, but unfortunately was done correctly in only 10% of pupils this was due to difficulty of securing students privacy.

Medical teams were not completed in more than 86% of schools, the deficiency was mostly in assistant dentist and assistant ophthalmologists this made visual acuity checked correctly in only 27% of pupils and dental examination done correctly in less than 40%.

Doctors involved in medical examination were juniors and do not have enough experience in examining children and all of them were in their civil services

and more than 90% of them were not satisfied with medical examination, despite that they discovered a lot of problems and diseases .

All studies in school health showed that these problems are preventable and could be dealt with cost-effectively and efficiently with carefully designed need based programs [13-15]. The degree of achieved satisfaction in this study is similar to other studies in literature, although full satisfaction should be the target [16]. Improvement in the quality will need a lot of effort to achieve great outcome even in the developed countries [17].

CONCLUSION

Although the concept of school health in form of medical examination exists in Sudan since the colonization period throughout independence, however no progression was achieved since then towards the new concept of school health. All the developing countries, in general, and Sudan in particular, have some economic constrains that disable the application of new concept of school health. WHO should play a basic role in this issue and further larger size study would be highly recommended.

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