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EFFECT OF INNOVATIVE SCHOOL HEALTH PROGRAM ON THE STUDENT'S ORAL HEALTH IN BASIC SCHOOLS IN KHARTOUM STATE 2011-2012.

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ABSTRACT

The school health programs are an important component of community health and every citizen must pass through this institution. Promoting oral health of adolescents through health promoting schools had been prioritized by the World Health Organization (WHO) for the improvement of oral health globally. Poor oral hygiene in terms of increasing accumulation of plaque and calculus with increasing age had been reported among children and adolescents in both developed and undeveloping countries. A cross sectional study was performed in public schools. This study aimed to assess the effect of innovative school health program on the student's Oral health in basic schools in Khartoum state 2011-2012. **Methods and material**: Quasi-experimental study non equivalent control group, pre-post-test design was used in this study. Sample size was 356. **Results:** Results of test of oral health, no significant difference p =.314, in oral health was seen when compare at pre test between group. More tooth decay and other oral health problems was seen in control participants (37.3%, 25.4%), the others problems were included tooth deviation, fluoride pigmentation and gingivitis. While normal was seen (37.3%) in control group. **Conclusion**: Oral health, tooth decay and other health problems such as tooth deviation, gingivitis and fluoride pigmentation are common in control group.

KEYWORDS: School health Program, Oral Health.

INTRODUCTION

The school health programs are an important component of community health, and every citizen must pass through this institution. Child spends more time at school than anywhere else place except home. Schools play a major role on children's health, by teaching about health and promoting healthy behaviors. The school building and environment should be a safe and healthy place for the child.[1] The national association of school nurses showed that practice of school health nursing began in the United States on October 1, 1902 when the initial role of the school nurse was to reduced absenteeism by intervening with students and families regarding health care needs related to communicable diseases. The school nurse supports student success by providing health care assessment, intervention, and follow-up for all children within the school setting.[2]

School nurses collaborate with parents, teachers, social workers, and other health care providers to develop care plans, identify available health resources and identify the need for health referrals to address specific health problems discovered through mandated health screenings and assessments. The future nursing in the schools is pre-directed for ever-changing communities. There are increasing numbers of children come to school with health-related problems that require management during the school day and engage in negative health behaviors that decrease their motivation to learn, so school nurse has a crucial role in providing comprehensive health services to children and youth.[3]

The school environment was regarded as a good setting for the promotion of health interventions among children because no other institution has as much contact time with the target population. [4] Schools provide an environment where almost all children can be reached repeatedly and continuously, and where health education can be combined with health promoting environmental changes. [5] According to[6] the history of school health services were first initiated in 1912 as a part of the Sudan Medical Department. The school health services at that time included periodic screening, school meal, immunization against meningitis, and some sanitation services. After the School Health Act in 1972, more organized services came and school health departments were established in Khartoum, Northern and Gezira provinces.

School health in Khartoum State Ministry of Health was started as unit of PHC in 1994 the goal at that times vaccination against meningitis for students in school, development of the program and completed of the structure in 1996. The program cover all governmental basic and higher schools including private schools in 2001. The last screening 2010 was showed that most common problems dental carriers (12.8%), malnutrition (9%), psychological disorders (6.4%) and other health problems (16.2%).[5] Promoting oral health of adolescents through health promoting schools had been prioritized by the World Health Organization (WHO) for the improvement of oral health globally. Poor oral hygiene in terms of increasing accumulation of plaque and calculus with increasing age had been reported among children and adolescents in both developed and developing countries. A cross sectional study was performed in public schools.[6] A sample size of 2000 student in rural and urban schools, Socio-demographic factors were assessed in terms of age, gender, place of residence, father's and mother's education, household socio-economic status Oral health related behaviors were assessed in terms of tooth brushing .Oral clinical examination was carried out by one trained, and calibrated dentist assisted by dental assistant for recording the results, the result showed majority in both samples were brushed their teeth on a daily basis (76.5% and 74.5%) and had not visited a dentist during the past 2 years (87.4% and 88.7%). Only about 5% was reported that they had tried cigarettes and about 50% reported intake of Sugar sweetened soft drinks on weekly basis .Urban residents, those having parents with high education, belonging to the least poor wealth category and having high family status performed regular tooth brushing and dental attendance more frequently.[7]

Totals of 44.8% had fair to poor oral hygiene whereas 81.1%, 74% and 33% had at least one tooth with plaque, calculus and bleeding, respectively. The mean score was 1.1, SD 0.8 range (0-4, good-bad) corresponding to a clinical level of fairly good oral hygiene. The most frequently reported impacts were eating problems (36.8%) and problems tooth cleaning (28.9%), whereas the least frequently reported impacts were problems speaking (14.5%) and problems school work (9.9%) (Mbawalla. 2010).[8]

Tooth decay (dental caries) affects children in the United States more than any other chronic infectious disease. Untreated tooth decay causes pain and infections that may lead to problems; such as eating, speaking, playing, and learning. The good news was that tooth decay and other oral diseases that children complain from, are preventable. The combination of dental sealants and fluoride had the potential to nearly eliminated tooth decay in school-age children (CDC 2011).[9]

According to Stokes et al (2009) study was done about promotion of oral health within the Healthy School context in England. Qualitative study design was conducted; Semi-structured interview was selected to assist respondents in speaking freely. A study result was revealed that all respondents felt that it was appropriate to promote oral health within healthy schools. Other respondents placed oral health promotion within the healthy eating strand. Also six respondents recognized the appropriateness of locating oral health promotion within other strands of the program, other respondents felt that there was no distinction between oral and general health for the purposes of promoting oral health within Healthy Schools[10] There was also recognition that oral health had historically been separated from general health, but that it should now be included as part of general health, and the healthy school approach was therefore a positive thing in this context. Eight participants gave schools or school nurses the responsibility for oral health promotion, others felt that the responsibility lay solely with specialist oral health promotion teams or jointly between healthy schools teams, schools and oral health promotion teams, pupil participation may impact on oral health through promoting psychological health and wellbeing. In one area pupil participation was being used to promote oral health specifically.[11,12]

Batwala et al (2007) study was done about oral health conditions among primary school children in Mbarara, Uganda. Dental caries and gum diseases had been reported to be major oral health problems in Africa and elsewhere. Clinical survey that was employed quantitative techniques. A stratified two-stage cluster sample of 437 children was selected. Two trained and calibrated dental assistants examined the children. Children were examined for dental caries, dental plaque, calculus, gingivitis, maxillary over jet and fluorosis under field conditions.[13]

The current situation of students in basic schools is suffering from many related problems such as malnutrition, obesity, dental caries, psychological disorders screening 2010, these common problems it lead to absenteeism that could have burden on educational performance, this health problems occur due to lack of implementation of special health education program in school setting.

Not many researches were done before in this area school health program in Sudan so this study will be conducted to show that school health program are needed for improving student's health status to achieve their maximum goal of learning outcomes.

METHODS AND MATERIALS

Study designs and subjects

A quasi-experimental study non equivalent control group, pre-post-test design was used To assess the effect of innovative school health program on the student's Oral health in basic schools in Khartoum state 2011-2012. The target population for this study was all level six in public basic schools who were enrolled in

Omdurman locality basic schools there, was total of approximately students in level six about 1182.

The sample for the study was students level six from selected schools. This was justified that level understand the health education messages and according to the other researches that had done before. The students were meet the following criteria: Be eligible for the study and willing to participate in the study at the time of the research.

Sampling Technique and Sample size

Khartoum State ministry of education divided Khartoum State in to two groups localities with urban schools only which includes (Khartoum, Umbadah & Jabal Awlia) these localities according to inclusion criteria were excluded . The other group localities with urban and rural schools which includes (Karri, Omdurman, Baharri & Sharq Alneel) these were included according to inclusion criteria to see the effect of school health in urban and rural area. From the four localities of urban and rural schools one locality was selected (Omdurman) using simple random by lottery due to lack of financial resources. In Omdurman locality we found only seven schools meet the criteria (because some schools occupied level six by 10 others by 20 up to 30 students), from the seven schools one selected by simple random using lottery for pilot study, and from the remaining six three again was selected randomly using lottery to be as study group and the other three as control group. Simple random sampling procedure was used, generally recommended and argued to be the most rigorous in allowing for generalizability.

Inclusion criteria

- Students in level six.
- Willing to participate in the study
- School has level six more than 120 students
- Locality has both rural and urban schools.

Exclusion criteria

- The students in private schools. (Because the education environment was better than public schools, also most private schools had good school health program).
- Sick students (not to affect my study result).
- Handicapped students (could not understand the messages).

Data Collection Methods and Tools

Procedure of data collection

Letters was sent to Ministry of Education, Omdurman locality, and Basic Schools Education for ethical approval and permission to conduct the study. Subsequent to ethical approval was obtained; the eligible students were identified from the class. Researcher made it very clear to students their participation was voluntary and they were free to withdraw at anytime. Participants from the study, and control schools completed the pre-test questionnaires. Both the study and control group post- tested was done after 6 months. Data of this study includes asking question, observation and measurement of weight and height, hemoglobin measuring by Sahl, stool examination was done by laboratory technician for detection of worms and others health problems .Oral examination was done by assistant dentist for identification of tooth decay and others health problems.

Tools & Instruments

Data was collected by well constructed questionnaire self fill based on previous studies for student's knowledge, and check list for practice. Weighting scale, and tape for measurement of weight and height, measurement of hemoglobin, oral and stool examination. For measuring hemoglobin peripheral blood sample was taken using manual measurement by Sahl. Anthropometric measurements included height and weight was done by researcher itself made all anthropometric measurements following standard techniques. Height was measured without shoes correct to the nearest 0.1 cm using a tape meter, and weight was measured in light clothes to the nearest 0.0 kg using a portable digital scale. The digital weighting scale was calibrated daily before the first measurement was taken, height and weight were recorded.

Data management and analysis

This study was conducted in different basic schools data collected personally by researcher. Manual coding was used to check any error in coding. The coding manual and dummy tables were developed before entering the data. Double entry of data by researcher was done to prevent potential data entry error. The data were checked and cleaned by performing preliminary frequency distribution to enhance accuracy and reliability.

3.8.2 Data Analysis

Data was analyzed by computerized method Statistical Package for the Social Sciences (SPSS) version 17. Descriptive statistics was used to describe demographic data (age, gender, mother education background). The descriptive statistics included frequencies, means and standard deviations.

The main dependent variables were the student's nutritional status, personal hygiene score, hemoglobin level and health education knowledge score compared between study and control groups. Different test was done to test statistical significant differences such as chi-square test, independent sample t-test, one sample t-test and one way ANOVA.

Ethical considerations

The study grant ethical approval from the University of Medical Sciences and Technology & Research Ethics Committee (UMST IRB00008867) and permission from the Ministry of Educations, Omdurman locality and from Managers of basic schools, inform consents form sign by managers on behave of the students. All potential

participants in this study were given verbal information about the study and their rights. They were informed that participation in the study was voluntary and that they could withdraw at any time without explanation, and that withdrawal would have no effect on their current or future study.

RESULTS

Oral health of the students at pre-test and post

Oral health was included examination for normal, tooth decay, and other health related problems such as gingivitis, tooth deviation and fluoride pigmentation. At pre test Eighty five (85) students were participated to see the picture of oral health among the groups twenty six (26) in study and fifty nine (59) in control group. Chi –square test was used to test whether the proportions of participants are different values. The results shows that more than half appear normal in study group 14 (53.8%), tooth decay and others problems found more in control group (37.3%, vs. 25.4%), there was no significant different was seen by using chi-square (2, n = 85) = 2.315, *p*-value = 0.314. After six months of intervention oral exam was conducted sample of (278) students were examined, (124) in study group and (154) students in control group. The result reveals that more normal was seen in control group 85(54.5%), while 65 (52.4%) in study group, but tooth decay and others problems were seen nearly similar 27 (21.8%), vs. 32 (20.8%) and 32(25.8%), vs. 38(24.7%). Chi –square test was used to test whether the proportions of participants are different values. There was no significant difference was seen. Chi –square test x^2 (2, n = 278) = .125, *p*-value = 0.936

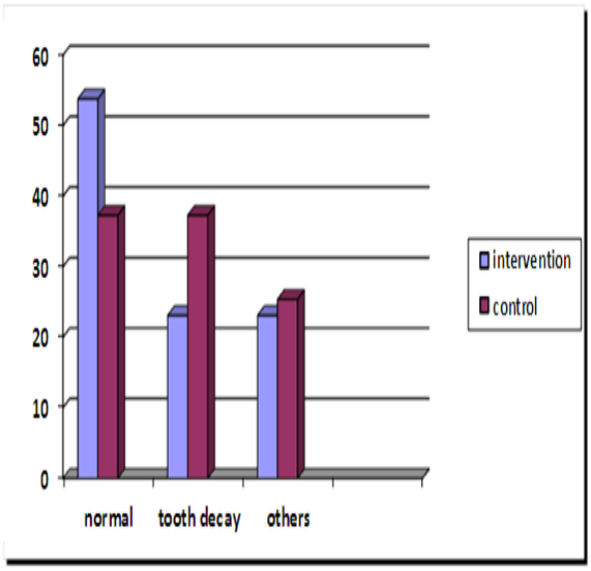

Figure 4.8. Bar diagram shows oral health of the students in public basic schools at pre test.

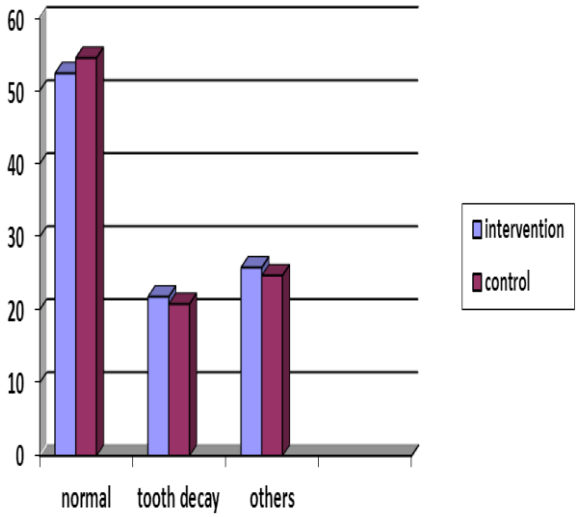

Figure 4.9. Bar diagram Oral health of the students in public basic schools at post test.

Table 4.3 shows oral examination of students before and after intervention.

Items: oral examination at pre test	Study group n (%)			Control group n (%)			Chi-square test	p-value
	No	Yes	Total	No	Yes	Total		
Tooth decay	20(76.9)	6(23.1)	26(100)	37(62.7)	22(37.3)	59(100)	2.31	.314
Others	20(76.9)	6(23.1)	26(100)	44(74.6)	15(25.4)	59(100)		
Normal	12(46.2)	14(53.8)	26(100)	37(62.7)	22(37.3)	59(100)		
Oral at post test:	Study group n (%)		Total	Control group n (%)		Total		
Tooth decay	97(78.2)	27(21.8)	124(100)	122(79.2)	32(20.8)	154(100)	.13	.936
Others	92(74.2)	32(25.8)	124(100)	116(75.3)	38(24.7)	154(100)		
Normal	59(47.6)	65(52.4)	124(100)	70(45.5)	84(54.5)	154(100)		

Table 4.1. Age of participants in study & control group in basic school in Khartoum State.

Age	Mean	Minimum	maximum	*p*-value
Study group	12.30	10 years	17 years	< 0.01
Control group	11.60	10 years	15 years	

Table 4.2. Demographic characteristics of participants in basic schools (study & control group).

Variables	Intervention n (%)	Control n (%)	Chi square	*p*-value
Group size	178 (50)	178 (50)	.00	1.000
Gender: Male Female	 118 (66.3) 60 (33.7)	 65 (36.5) 113 (63.5)	.28	.596
Residence: Urban Rural	 57 (32) 212(68)	 128 (72.7) 48 (27.3)	.55	.458
Mother Education Background: Illiterate Basic Intermediate Secondary University	 33 (18.5) 61 (34.5) 2 (1.1) 26 (14.6) 56 (31.5)	 23 (12.9) 50 (28.1) 5 (2.5) 27 (15.2) 73 (41)	134.90	< 0.01

DISCUSSION

Results of test of oral health, no significant difference *p* =.314, in oral health was seen when compare at pre test between group. More tooth decay and other oral health problems was seen in control participants (37.3 %, 25.4%), the others problems were included tooth deviation, fluoride pigmentation and gingivitis. While normal was seen (37.3%) in control group. When compare at post test also there was no significant difference *p*-value = .936, normal was seen nearly similar between the groups 65 (52.4%) study and 84 (54.5%) in control group, the number of cases had tooth decay was seen more in control group 32(20.8%) vs. 27 (21.8%) case in study group.

Compare to others study by Batwala et al (2007)[6,7] study was done about oral health conditions among primary school children in Mbarara, Uganda. Dental caries and gum diseases had been reported to be major oral health problems in Africa and elsewhere. Clinical survey that was employed quantitative techniques. A stratified two-stage cluster sample of 437 children was selected. The recent study result of oral health test, was showed no significant difference in oral health when compare at pre test between group and residence. More tooth decay was seen in control participants (37.3 %,) other oral health problems also were noticed in control groups while normal was seen (37.3%) in control group. When compare to post test also there was no significant difference p-value = .936 normal was seen nearly similar between the groups 65 (52.4%) intervention and 84 (54.5%) in control group, the number of cases had tooth decay was seen more in control group 32(20.8%) vs 27 (21.8%) case in study group. The result of Batwala et al (2007)[6] was indicated that Twenty (4.6%) children had dental caries in their permanent teeth and 95(27.1%) had dental caries in milk teeth. The Decayed Missing and Filled permanent teeth (DMFT) index was 1.5 (±0.8SD) with a "D" component of 1.25. Only one child had a permanent tooth filled. Males had less caries in permanent teeth (DMFT: 1.3±0.7SD) compared to females (DMFT: 1.6±0.8SD), although the difference was not statistically significant. The decayed milk teeth (dt) index was 2.7 (±1.8SD). Males had more caries in milk teeth (dt: 3.1±2.1SD) compared to females (dt: 2.4±1.6SD) Dental caries in permanent teeth increased with age (p<0.0001) while that in milk teeth decreased with increase in age (p<0.0001). Children in private had more caries compared to those in government schools in both milk teeth (dt: 2.9±1.9SD vs. 2.4±1.7SD) and permanent teeth (DMFT: 1.6±0.9SD vs. 1.3±0.7SD respectively). The differences were included the study design in Batwala et al (2007)[6] was quantitative techniques, while the recent study was used quasi-experimental with intervention. Sample size was higher than recent study (437), vs. (303). The Batwala et al (2007),[6] not mention the exact age group, but in recent study age group was ranged from 10 to 17 years.

Nurelhuda et al (2010)[7,8] Sudan Khartoum State study was done about evaluation of oral health-related quality of life among Sudanese in schoolchildren. A school-based survey was conducted. Cluster sampling design was conducted. Sample size was total of 1117 healthy 12-year-old. A study result was showed.4%. A total of 18.1% reported one impact, 11.7% reported two impacts, 10.5% reported three impacts, 6.4% reported four and the remaining 7.9% reported more than four impacts. In the weighted sample, the highest impact was reported on eating (35.5%) followed by cleaning (28.3%) and the lowest impacts were on speaking (8.6%) and social contact (8.7%) Private school attendees reported the highest and lowest impacts on eating (40%) and speaking (4.3%), respectively. Public school attendees reported highest impact on eating (34%) and the lowest impact on both social contact and speaking (9.2%). Also was reported impacts on smiling and emotional status differed statistically significantly between public and private school attendees ($p < 0.05$). There were no significant differences between girls and boys in any performance. The intensity of impact was illustrated for the total study group, most private (44.1%) and public (46.4%) school attendees' reported on impact were of moderate intensity. The variables gender, tooth-brushing

frequency, fluorosis and dental trauma did not show significant association in unadjusted analyses. Active caries maintained a significant association with the whole sample (OR 2.0 95% CI 1.4-2.6) and public school attendees (OR 3.5 95% CI 2.1-5.6).

The different recent study was used quasi- experimental design, and done in one locality, while in Nurelhuda et al (2010)[7,8,9] was only survey, and done in seven localities Also was used larger sample size 1117 vs. 303, other the study was done in private and public ,while the recent study was done only in public schools.

Comparison to Department School health Sudan[9,10], screening 2010 was showed that most common problems dental carriers (12.8%), malnutrition (9%), psychological disorders (6.4%) and other health problems (16.2%).While the recent study the result was showed that the number of cases had tooth decay was seen more in control group 32(20.8%) vs. 27 (21.8%) case in study group, is higher than[8,11,12] the difference was related to design recent study was used quasi-experimental with intervention, while a survey was conducted in seven localities with larger sample size 788991 students, but recent study smaller sample size 303 students and was conducted in one locality.[13]

CONCLUSION

1. Oral health, tooth decay and other health problems such as tooth deviation, gingivitis and fluoride pigmentation are common in control group.

Recommendations

1. Commitment of higher authorities in the ministry of health and ministry of education to the school health program.
2. Full support to the infrastructure of the school health program (human resources development, equipments, material and financial support).
3. Special consideration and support for the training of nurses to be over all supervise the program and teachers for daily basis supervision about the school health program by ministry of education and ministry of health.

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