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Child-to-child school health program (CtCSHP): Its impact on the oral health behavior of grade 1 pupils in the division of La Union, Philippines

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Abstract

Objective To determine the effectiveness of the Child-to-Child School Health Program (CtCSHP) on the oral health behavior of Grade I pupils in the Division of La Union, Philippines within five months of implementation.

Methods A randomized trial was applied to the subjects. First, an assessment of the oral health behavior of the pupils in terms of toothbrushing and sodium fluoride mouth rinsing was conducted before the start of the study. The schools were randomly distributed to either the test group or control group. The Child-to-Child School Health Program (CtCSHP), utilizing the “Little Doctors’ Club,” and dental health education were provided to the test group, while only dental health education was provided to the control group. Toothbrushing and mouth rinsing with sodium fluoride (hereafter simply “mouth rinsing”) were the prevention methods used. Data was gathered using toothbrushing and mouth-rinsing cards. An assessment of the oral health behavior and an analysis of the significant differences between the oral health behaviors of the test and control groups were conducted after five months after the interventions. Eight public elementary schools were randomly chosen from the two districts in the Division of La Union to comprise the test group (four schools) and the control group (four schools). A total of 353 Grade 1 pupils took part in the study: 178 pupils in the test group and 175 pupils in the control group. To establish whether or not there is a significant difference between the oral health behaviors of the test and control groups, the data were entered in a statistical tool pack and analyzed with a t-test.

Results The oral health behavior of the test group in terms of toothbrushing and mouth rinsing improved during November but deteriorated during December. Great progress was observed during the succeeding months from January to March. The oral health behavior of the control group improved only during November, eventually declining from December to March. Moreover, although there was no significant difference between the test and control groups in toothbrushing for November ($p=0.1018$), a significant difference was noted from the months of January to March. Regarding mouth rinsing, it was found that there was a significant difference between the test and control groups in all the months (<0.001).

Conclusion The study reveals that the CtCSHP was effective in improving the oral health behavior of the pupils. This implies that the actual involvement of the little doctors in the CtCSHP in conducting the toothbrushing and mouth rinsing drills contributed immensely to the attainment of their objectives. The significant difference found between the oral health behaviors of the test and control groups revealed further that the CtCSHP has been successful in raising and at the same time sustaining the oral health behavior of the pupils.

Keywords: child-to-child approach, oral health behavior, toothbrushing, sodium fluoride mouth rinsing.

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I . Introduction

The last few decades have been a period of great debate and creativity regarding the philosophy of children’s rights,

especially child participation. The conventional concept of the child being dependent, incapable and helpless has been strongly challenged. In the new paradigm, children are no longer measured against adult parameters, whereby they

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are declared to “have not yet developed into adults” and therefore “are not sufficiently competent.” [1]

Today, the child-to-child approach is a growing trend across the globe to empower children and to recognize their potential in a nation's development. The child-to-child approach refers to a style of child empowerment where children are active participants in their own development and in the development of other children. In the Philippines, the child-to-child approach has become a powerful aid in the implementation of the “Bahay Tuluyan.” This program is aimed at improving the condition of abused or exploited children and street children by providing not only services but by also empowering and challenging them to improve the situation in which they find themselves [2].

There is a School and Community Health Project (SCHP) in Nepal that was conducted through the Child Initiative Program for health-related activities in schools and communities, whereby a children's club with seven to nine members was formed and facilitated various activities, such as school-toilet and drinking-water management campaigns. [3] That project and the concepts discussed above gave this researcher the idea that the same approach could be utilized to improve the oral health status of schoolchildren. Therefore, the researcher launched the “Child-to-Child School Health Program” (CtCSHP) in 2006, in ten selected public elementary schools of the Division of La Union. The initial stage of the program's implementation was the forming of a “Little Doctors' Club” in each school. The club was composed of 10 pupils from Grades 3 to 5. Basic skills relative to good oral health practices were provided and in return, the pupils disseminated such acquired learning to their schoolmates, according to the concept of a Child-to-Child Approach. The program aimed at raising the oral health status and improving the oral health practices among the pupils, which is hoped to decrease the prevalence of dental caries. The survey indicated that the state of dental health in the Philippines is appalling, evident in the toothless smiles of the children. The 2005 National Oral Health Survey among the Public School Population in the Philippines revealed that 97.1% of 6-year-old children suffered from dental decay.[4] One of the researcher's studies, entitled: “An Assessment of the dental caries status of 12-year-old schoolchildren in the Division of La Union-Region 1: Basis for policy recommendations” revealed that the dental caries status of the subjects was poor. His findings are in fact, corroborated by the results of the 2009 Expanded Universal Medical and Dental check-up of the Division of La Union, wherein 88% of the Grade 1 pupils had dental caries, [5] which could be attributed to their poor oral health behavior.

The objective of this study is to determine the

effectiveness of CtCSHP in improving the oral health behavior, in terms of daily toothbrushing and mouth rinsing with sodium fluoride (hereafter simply “mouth washing”), among the Grade I pupils of the Division of La Union, Philippines after five months of the program's implementation. Specifically, it is intended to (1) determine the oral health behavior of the test group in terms of daily toothbrushing and weekly mouth rinsing, (2) determine the oral health behavior of the control group in terms of daily toothbrushing and weekly mouth rinsing, and (3) determine whether or not there is a significant difference between the oral health behavior of the test group and that of the control group in terms of daily toothbrushing and weekly mouth rinsing. In conducting the study, the researcher was guided by the following hypotheses: (1) the status of oral health behavior of the test group in toothbrushing and mouth rinsing is regular; (2) the status of oral health behavior of the control group in toothbrushing and weekly mouth rinsing is irregular; and (3) there is no significant difference between the oral health behaviors of the test and control groups in terms of daily toothbrushing and weekly mouth rinsing.

II. Methods

This study was a randomized trial conducted in the Department of Education, Division of La Union, Philippines. La Union is a Province of the Philippines, and it is located in the Ilocos Region in Luzon. *La Unión*, a Spanish phrase meaning “The Union” or “The Unity,” was formed in 1850 during the time of the Spanish colonial government. The economy is diversified with service, manufacturing, and agricultural industries spread throughout the province.[6]

The research paradigm of the study is illustrated in Figure I. First, an assessment of the oral health behavior of the pupils in terms of daily toothbrushing and weekly mouth rinsing was conducted before the start of the study. The schools were randomly distributed to both test and control groups. The Child-to-Child School Health Program (CtCSHP), utilizing the “Little Doctors' Club,” and Dental Health Education were provided to the test group. Dental Health Education only was provided to the control group.

Two methods of dental caries prevention were utilized in this study. The first was daily toothbrushing using fluoride toothpaste. The fluoride that remains on the teeth protects the teeth, so rather than rinsing the mouth with water after toothbrushing, it is best to just thoroughly spit out the remaining toothpaste.[7] The second method was weekly mouth rinsing with a 0.2% sodium fluoride solution. The solution is prepared by adding 2 grams of sodium fluoride to 1 liter of water. Two teaspoonfuls of the solution is placed

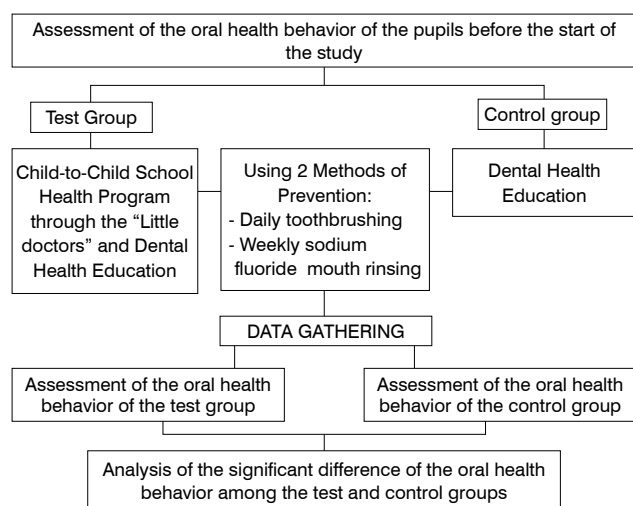


Figure 1. Research paradigm of the study

into the mouth then, gargled vigorously for 1 minute, and spit out.[8] The Philippine government encourages the use of sodium fluoride mouth rinsing, and it costs only Php 1.98/year per child.[9]

Data were gathered using the toothbrushing and mouth-rinsing cards. Checkmarks in the cards show the number of times the pupils had brushed their teeth and rinsed with sodium fluoride. In the test group, a teacher supervised the little doctors' initiation of the daily toothbrushing and weekly mouth-rinsing drills. In these drills, grade I pupils form a line and simultaneously brush their teeth (daily) and rinse their mouths with a sodium fluoride solution (weekly). After the drills, the little doctors record each pupil's participation by entering a check mark in their participation cards each day that the pupil participated and an x mark each day he/she did not participate, and submitted the cards to the teacher. Regarding the control group, the teacher distributed the cards directly to the pupils before the drills and collected them afterward. The data were consolidated by the teachers in both groups. Finally, an assessment and analysis of the significant differences between the oral health behaviors of the test and control groups was conducted after the 5th month of the drills for both groups.

The sample population was derived randomly from the two neighboring districts of San Juan and Bacnotan. These districts have almost the same number of schools, 16 and 17 respectively, and all of these schools are public elementary schools. Dental services are rendered by only one public health dentist covering both districts. The pupils of the schools of the identified districts should manifest similar oral health behaviors in terms of toothbrushing and mouth rinsing. Random selection was done in determining the four schools of each district. Two schools were assigned as the test group and another two schools were designated as the control group for each district.

A T-test was conducted in this study to find out if there was a significant difference between the oral health behavior of the test group and that of the control group. The T-test was used to compare two means to determine the probability that the difference between such means is greater than that expected by chance.[10] Stata 11 was used as statistical software.

Ethical approval for the study was obtained from the National Institute of Public Health (NIPH-IBRA # 10005), Wako City, Japan. The parents of the pupils were informed about the purpose and design, and they signed an informed written consent. The study was approved by the Department of Education through the Schools Division Superintendent of the Division of La Union, Philippines.

III. Results

This study was carried out from November 2008 to March 2009. There were 353 Grade 1 pupils who served as the subjects, of which, 178 were in the test group and 175 were in the control group (Table 1).

Table 1. Distribution of respondents according to school.

(D1) BACNOTAN DISTRICT				(D2) SAN JUAN DISTRICT				Grand total
TEST Group	Male	Female	Total	TEST Group	Male	Female	Total	
(S1) Baroro	24	16	40	(S3) Nadsaag	38	36	74	
(S2) Quirino	6	15	21	(S4) Urbiztondo	18	25	43	
	30	31	61	TOTAL	56	61	117	178
CONTROL Group				CONTROL Group				
(S5) Cabaroan	31	28	59	(S7) Bacsayan	16	7	23	
(S6) Zaragosa	29	28	57	(S8) San Felipe	22	14	36	
	60	56	116	TOTAL	38	21	59	175
GRAND total								353

*D= district *S= school

Table 2 shows the number of pupils brushing their teeth at each school. Among all the schools that participated in the study, a test group school—Urbiztondo school of San Juan district—consistently had the highest mean number in both January and March (20.98 in both months). On the other hand, a control group school—Bacsayan school of San Juan district—had the lowest mean number during December (2.30). Figure 2 further shows trends in the mean number of pupils toothbrushing at each school. All schools in both groups started with a high mean number of pupils toothbrushing during the month of November but showed a very marked decline in the mean number during December. There was a great difference between the groups in January, when the mean number of the test group increased dramatically, reaching the highest level, in contrast to the mean number of the control group's schools, which only slightly increased.

Table 2. Number of Brushing in each school

Group	District	School		Nov.	Dec.	Jan.	Feb.	Mar.
Test	(D1) Bacnotan	(S1) Baroro	Mean	14.75	7.45	17.13	17.33	17.13
		(N=40)	SD	5.40	2.24	3.35	2.45	2.52
		(S2) Quirino	Mean	16.24	4.52	18.86	18.76	18.52
		(N=21)	SD	2.36	1.47	1.49	1.64	1.50
	(D2) San Juan	(S3) Nadsaag	Mean	10.81	6.86	15.61	16.61	15.42
		(N=74)	SD	2.73	2.04	3.64	3.30	4.17
		(S4) Urbiztondo	Mean	10.23	5.88	20.98	20.37	20.98
		(N=43)	SD	4.04	3.26	1.12	1.02	1.12
Control	(D1) Bacnotan	(S5) Cabaroan	Mean	18.34	11.41	8.03	6.42	5.42
		(N=59)	SD	1.56	3.05	3.31	0.70	1.46
		(S6) Zaragosa	Mean	13.86	8.63	6.63	6.68	4.75
		(N=57)	SD	6.04	4.10	2.19	1.23	1.01
	(D2) San Juan	(S7) Bacsayan	Mean	6.00	2.30	6.74	6.39	5.70
		(N=23)	SD	5.15	3.10	0.54	0.50	3.23
		(S8) San Felipe	Mean	8.39	4.39	7.17	8.81	6.42
		(N=36)	SD	7.72	3.75	2.30	3.72	2.97

* D= district * S= school

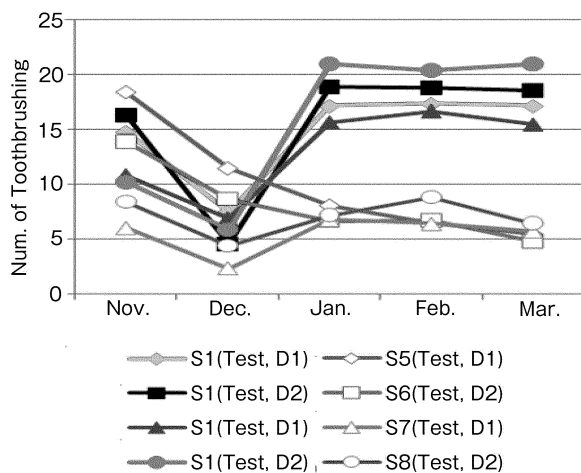
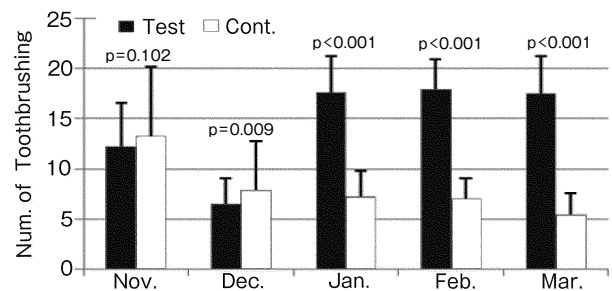

Figure.2 Trends in mean number of Toothbrushing of each school

Figure 3 presents trends in the groups' mean numbers of pupils toothbrushing daily from November '08 to March '09. It can be seen from the figures that there was no significant difference in the mean number during November ($p=0.1018$). The control group did show a higher mean number, but the difference was not great. In December, the control group again showed a higher mean number of pupils toothbrushing daily, though there was not a significant difference between the two groups ($p=0.009$). However, from January to March a significant difference between the two groups was seen. The test group showed a marked difference as compared to the control group (<0.001). The test group had a higher mean number of pupils toothbrushing daily than that of the control group.

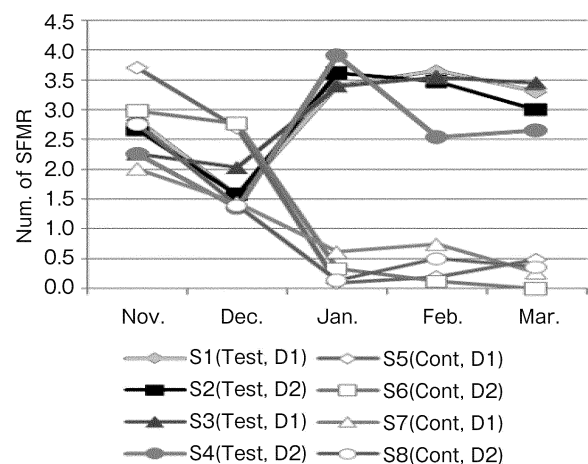
Table 3 shows the number of pupils participating in sodium fluoride mouth rinsing (referred to as SFMR in the table) in each school. It shows that among the test group's schools, Urbiztondo of San Juan district had the highest

mean number (3.91) from November '08 to March '09. A control group school, Zaragosa of Bacnotan district, had a zero value during March (0.00). Figure 4 further shows trends in the mean number of pupils mouth rinsing at each school. All schools in both groups had a high mean number during November but showed a very marked decline in December. In January, there was a great difference between the groups: the test group was significantly higher in terms of mouth rinsing than the control group's schools, which


Figure.4 Trends in mean number of Toothbrushing of each group
Table 3. Number of SFMR in each school

Group	District	School		Nov.	Dec.	Jan.	Feb.	Mar.
Test	(D1) Bacnotan	(S1) Baroro	Mean	2.83	1.55	3.40	3.65	3.30
		(N=40)	SD	1.30	0.78	0.90	0.86	0.72
		(S2) Quirino	Mean	2.67	1.57	3.62	3.48	3.00
		(N=21)	SD	0.58	0.81	0.80	0.68	0.00
	(D2) San Juan	(S3) Nadsaag	Mean	2.26	2.03	3.39	3.54	3.45
		(N=74)	SD	0.83	0.88	0.86	0.50	0.50
		(S4) Urbiztondo	Mean	2.26	1.35	3.91	2.53	2.65
		(N=43)	SD	0.79	0.95	0.29	0.83	0.78
Control	(D1) Bacnotan	(S5) Cabaroan	Mean	3.69	2.69	0.10	0.20	0.49
		(N=59)	SD	0.50	0.56	0.36	0.76	0.95
		(S6) Zaragosa	Mean	2.98	2.77	0.33	0.12	0.00
		(N=57)	SD	1.01	0.42	0.93	0.54	0.00
	(D2) San Juan	(S7) Bacsayan	Mean	2.00	1.43	0.61	0.74	0.26
		(N=23)	SD	1.28	1.12	1.12	1.05	0.86
		(S8) San Felipe	Mean	2.75	1.39	0.14	0.50	0.36
		(N=36)	SD	1.65	0.93	0.35	0.97	0.83

* SFMR= sodium fluoride mouth rinsing


Figure.4 Trends in mean number of SFMR of each school

displayed a dramatic decline with a very low mean number in all months except for November.

Figure 5 shows trends in the mean number of pupils mouth rinsing in each of the test and control groups' schools from November '08 to December '09. It can be gleaned from the figures that the difference between the two groups was significant. For November and December, the control group had a higher mean number as compared to the test group. However, for the succeeding months, the test group showed a significantly higher mean number of pupils mouth rinsing than the control.

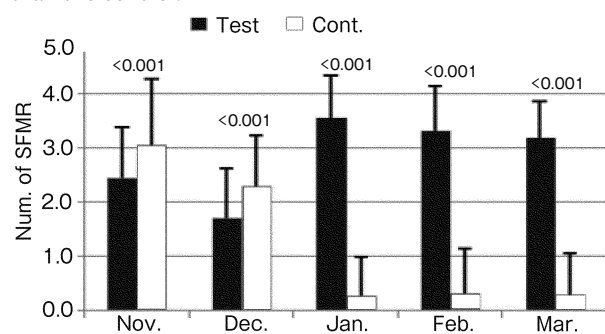


Figure.5 Trends in mean number of SFMR of each group

IV. Discussions

The child-to-child approach has already been used in the Philippines, for example in "Bahay Tuluyan,"[2] which continues to integrate the child-to-child approach into all parts of the program, as it is an effective tool for child participation.

In harmony with this approach, a researcher in the Division of La Union launched the "Child-to-Child School Health Program" (CtCSHP), wherein pupils take an active role in improving the oral health behavior and practices of their schoolmates, such as daily toothbrushing and mouth rinsing.

Before the start of the study, it was shown that both the test group and control group manifested almost the same state of oral health behavior, that is, neither were performing the daily toothbrushing and weekly mouth rinsing at school.

The mean numbers for toothbrushing and mouth rinsing obtained during November for both the test group and control group suggested an improved state of oral health behavior. The deterioration in the oral health behavior of both groups during December was not alarming or surprising because there were days in this month which were not regarded or counted due to the semester break and holidays, when pupils were not at school.

The data obtained during January, February and March created an opposing trend in the oral health behavior of

the respondents between the control and test groups as reflected in figures 2 and 4. The figures portray that the oral health behavior of the subjects of the test group progressed, while the oral health behavior of those of the control group deteriorated.

The oral health behavior of the test group, both in terms of toothbrushing and mouth rinsing escalated, especially during January, and was sustained in the following months of February and March. In fact, the pupils of the test group had almost perfected the tasks of brushing their teeth daily and using mouth rinse weekly at school.

As the test group advanced in their oral health behavior, the control group seemed to lag behind, which is evident in the downward trend shown in figures 2 and 4. The reason for the improved oral behavior of the control group in November would have been their excitement in using their toothbrushes and their eagerness to use the sodium fluoride for mouth rinsing. However, when their excitement and eagerness had waned, their oral health behavior went back to a poor state, as seen in the following months. This shows that there are still pupils who are not regularly exposed to fluoride or who are not adequately informed about dental hygiene practices, thus, there is potential for public health interventions to improve their dental health.[11]

Moreover, the findings disclosed in figure 3 show that there was a statistical difference in daily toothbrushing between the test and control groups every month except November ($p=0.1018$), when the control group showed a higher mean number of daily toothbrushing. In the month of December, the control group also showed a higher mean number of daily toothbrushing, but there was not a significant difference between the two groups ($p=0.009$). That the control group had a higher mean number could be due to the exposure of such program. The little doctors of the test group had to find time and set their minds to the program. However, from January to March, a significant difference between the two groups was seen. The test group showed a marked difference as compared to the control group (<0.001) and had a higher mean number of pupils toothbrushing daily. This indicates that the test group had better performance in daily toothbrushing, which may have been due to the little doctors who were in charge of the program, while the control had no little doctors and performed the toothbrushing drill on their own. Figure 5 shows that for November and December, the control group had a higher mean number of pupils mouth rinsing as compared to the test group. However, for the following months, the test group showed a significantly higher mean number of pupils mouth rinsing than the control. Hence, it can be further inferred that the CtCSHP utilizing the little doctors was effective in bolstering the oral health

behavior of the pupils in terms of their daily toothbrushing and weekly sodium fluoride mouth rinsing. The findings of this study support the idea that children, from whatever circumstances, are capable of helping themselves. Children who have acquired the appropriate skills, knowledge and attitude through various training programs are then able to share those assets with other children. Children who are able to effectively share their skills with other children are generally good leaders, role models and facilitators.²⁾ Schoolteachers also served a vital role in this study: the oral health knowledge was transferred from the dental professionals to the schoolteachers, and then to the children and their parents. Schoolteachers helped schoolchildren establish a healthy lifestyle that is both productive and satisfying.[12] In this study, the teachers supervised and monitored the pupils' daily toothbrushing and mouth rinsing drills in school.

Based on the study results, the null hypothesis in question was rejected. The Child-to-Child School Health Program" (CtCSHP) was an effective way to improve oral hygiene and establish positive oral health behavior in the Division of La Union, Philippines.

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