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Original Article

A study of awareness and behavior of students about environmental issues in Makassar City

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Abstract

The seventh of the eight Millennium Development Goals (MDGs) set in 2000 is to secure the safety of drinking water. Water pollution in Indonesia has long been closely related to the lifestyles of people in their practices of illegal dumping of household effluents and garbage. So much so that it is essential for community residents to change their awareness. Thus, with the purpose of investigating methods of health-care and environmental education, we conducted a survey on environmental issues with 1,108 students of elementary and junior high schools in Makassar City in South Sulawesi State.

It was found that over 80% of these students had an interest in environmental issues. They thought, however, that water pollution resulted from industrial waste, and few students associated the problem with household effluents. Also, it was noted that a high ratio of students regarded rivers as dirty and considered playing in them as "dangerous and subject to disease". Only 24.9% of the students replied that they separated garbage at home. The students who sometimes separated garbage said that they did so for "no specific reason", while most students who did not separate garbage replied "there are no cans for separating garbage". Thus, it is necessary to organize the living environment such as the setting of the trash box. Moreover, most students who do not separate garbage answered that they were "not interested in" environmental issues or "did not know anything about" water pollution. This data suggested that students do not perceive water pollution as their problem. Accordingly, proper education on health and the environment is necessary from a young age.

Key Words

health-care and environmental education, awareness and behavior of students, water pollution, environmental issues, Indonesia

Introduction

The United Nations Millennium Summit held in New York in 2000 set the eight Millennium Development Goals for resolution of the problems of poverty in developing countries. The seventh of these goals, which is to "ensure environmental sustainability", aims to reduce the population of those who do not have access to safe drinking water and sanitary facilities continuously by half by the year 2015 [1].

The major environmental issues in the Republic of Indonesia (hereafter Indonesia) relate to air pollution in urban areas caused by automobile exhaust gas and other

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factors, unrestrained disposal of sewage resulting from the low maintenance rate of sewage system, and water pollution of river and groundwater due to industrial waste and household effluents. Water pollution can cause health problems such as dermatological disorder, diarrhea, and infection, because people use water directly for drinking and farming. In fact, there are many children who have been attributed to diarrhea, malaria and dengue hemorrhagic fever, and some of them die because of it. Some of these illness comes from environmental factors especially water pollution. Thus, the Ministry of the Environment of Indonesia has started a number of approaches to curb environmental pollution through the river water quality improvement program (PROKASIH), the evaluation and rating of business entities by the Environment Control Agency (PROPER), and cleaner production (CP) at small and medium-sized companies [2] in collaboration with local municipalities. Nonetheless, most of these are measures against industrial waste and little attention has been given to household effluent. Also, the sewage system across the nation is constructed at a mere 3.0% level, and most areas do not have such systems at all [3].

Not only is fifty to seventy-five % of water pollution in Indonesia caused by household effluents [2], but illegal dumping of garbage into rivers is another large contributing factor. Accordingly, the cause of water pollution is largely associated with the local people's lifestyle. Thus, changes in people's awareness are essential in improving the water pollution.

A number of reports have discussed initiatives to change the awareness of residents, including grassroots campaigns for environmental improvement through religious activities by Muslim activists [4], instructions given for hand washing by the Public Health Service, and environmental education by junior high school teachers [5]. However, local people's morals in preserving water resources and using river water are still low [6] in reality, and careless dumping of garbage into rivers and wasting of water are still a daily occurrence [5]. Furthermore, though an awareness survey of environmental education has been conducted in Surabaya City in Indonesia with students [5・7], the content of the survey was conceptual, and did not make connections to the actual lifestyles of the children studied. No reports have surveyed the status of lifestyles and awareness.

Thus, the purpose of this study was to research the awareness of environmental issues among students in elementary and junior high schools in Makassar City in South Sulawesi State, a region that has experienced economic development in recent years. Specifically, how students became aware of the problem and how they actually behaved, so that we may consider how to design our future education on health-care and the environment.

Methods

1. Subjects of survey

Subjects were 363 sixth grade students from six middle-class public elementary schools and one public junior high school (51.5% boys and 48.5% girls), 403 first-grade students (47.9% boys and 52.1% girls) and 342 third-grade students (39.0% boys and 61.0% girls) in one public junior high school, with a total of 1,108 students in Makassar City. Subjects were selected by snowball sampling.

2. Survey period

The survey was conducted from September 2 to September 4, 2013.

3. Survey method

The survey was conducted by using anonymous self-report questionnaire developed originally using previous research [7]. Before the study was carried out, school principals were informed, both in writing and verbally, of the purpose of the study. The survey was performed during part of class time and homeroom time with the cooperation of researchers, Hasanuddin University teaching staff, students and assistant teachers who also collected the questionnaire at the end . The questionnaire was answerable within 15 minutes, and where possible it was conducted such that it did not interfere with school work.

4. Content of the survey

The survey included students' basic attributes like age and sex as well as their knowledge of environmental issues and their actual coping behaviors. The questionnaire was translated into Indonesian, and it was make sure whether the questions were suitable to understand for students before the survey. Collected data was translated into English by same translator, and it was checked together.

5. Analysis method

For statistical analysis, the computer software SPSS for Windows Ver. 19.0 was used, with the ratio comparison put to chi-square test.

Table 1. Interest in environmental issues n (%)

	N	Total	6th grade n=363	7th grade n=403	9th grade n=342	P-value
Are you interested in environmental issues?	1090					.872
Yes		930 (85.3)	306 (84.5)	340 (85.6)	284 (85.8)	
No		160 (14.7)	56 (15.5)	57 (14.4)	47 (14.2)	
Do you know the water pollution?	1097					.008**
Yes		935 (85.2)	316 (87.5)	320 (80.8)	299 (87.9)	
No		162 (14.8)	45 (12.5)	76 (19.2)	41 (12.1)	
Cause of the water pollution (Multiple answers) [a]	1090					
Industrial waste		732 (67.2)	213 (59.8)	281 (71.3)	238 (70.0)	.002**
Garbage		588 (53.9)	182 (51.1)	180 (45.7)	226 (66.5)	.000***
Household effluent		195 (17.9)	30 (8.4)	54 (13.7)	111 (32.6)	.000***
Natural cause		28 (2.6)	12 (3.4)	11 (2.8)	5 (1.5)	.268
Others		122 (11.2)	40 (11.2)	43 (10.9)	39 (11.5)	
Source of information on water pollution (Multiple answers) [b]	929					
Classrooms, Book		633 (68.1)	182 (58.0)	224 (70.7)	227 (76.2)	.000***
Media		448 (48.2)	122 (38.9)	139 (43.8)	187 (62.8)	.000***
Parents, Friends		350 (37.7)	96 (30.6)	131 (41.3)	123 (41.3)	.006**
Others		26 (2.8)	5 (1.6)	7 (2.2)	14 (4.7)	

Note. [b]Object is the students who answered I know the water pollution. [a,b]Multiple answers, the number of 'Yes'(%).Chi-square test **p<.01, ***p<.001

6. Ethical consideration

Local researchers explained the questionnaire to the subjects in Indonesian. The subjects were told that their participation in the survey was voluntary, and their answers in the questionnaire would not disadvantage them in any way. Moreover, they were free to stop answering the questionnaire midway if they so wished.

Students' names were not indicated on the questionnaires, and care was taken to fold the questionnaires in half so that students' answers could not be seen when collected. Collected questionnaires and data were stored strictly in a locked shelf to prevent leakage, theft, and loss.

Furthermore, the study was approved by the Medical Ethics Committee of Kanazawa University (permission number 460).

Results

1. Basic attributes of subjects

Responses were received from all 1,108 subjects (retrieval rate 100%), with boys accounting for 45.2% and girls 54.8%. Some answers were found invalid in part, but as many answers as possible were taken in for analysis, resulting in cases where the total numbers of respondents did not correspond to the answers. Also a significant difference was observed only by grade as analyses on all the data. Therefore, the results are shown by grade.

2. Interest in environmental issues (Table 1)

Students with interest in environmental issues accounted for 85% in all grades. Although a significance difference was found between grades ($p < .01$) in the number of students who answered as having knowledge of water pollution, over 80% of students did have such knowledge across all grades, indicating that a high ratio of students had both interest and knowledge of environmental issues or water pollution. Students answering that water pollution resulted from industrial waste accounted for 67.2%, garbage for 53.9% and household effluent for 17.9%, each significant difference between school grades. The higher the grade, the more the students thought widely about causes of water pollution, but the ratio of those who thought of household effluent was low. Their sources of information on water pollution were classrooms and books, which accounted for 68.1%, the highest in all grades, followed by the media, such as TV and the Internet with 48.2%, and parents and friends with 37.7%.

3. Garbage disposal method (Table 2)

As for the method of garbage disposal at out of the house, although there was difference by each grade, over 90% of students answered that they threw garbage in cans nearby. Meanwhile, 24.9% of students separated garbage at home, and 49.9% of students sometimes separated garbage at home with significant difference by grade ($p < .05$). As for the reason for separating garbage, "bad for the environment, dirty, or dangerous" accounted for a high ratio of 63.6%, while "no specific reason" also had 26.2%. Some junior high school students answered other

causes such as protecting the environment, recycling, and prevention of diseases. Asked about how separated garbage at home, a higher ratio of students in upper grade answered that they separated "organic garbage" from "inorganic garbage". Besides, the ratio of students who separated "dry garbage" from "wet garbage" was lower among students in higher school grades, indicating that students' awareness of how to separate garbage differed depending on grade ($p < .001$). Sixth grade in elementary schools showed a high ratio of students who could not answer how separated garbage. As for the reason not separating garbage, 73.1% of the students in all grades answered "there are no cans for separating garbage".

4. Awareness of sanitation and behavior in the daily living (Table 3)

Seventy-seven point seven percent of students thought that rivers were dirty, and a higher ratio of students in upper grades answered that playing in the river was "dangerous or might cause disease" ($p < .01$). On the other hand, many sixth grade students and seventh grade students in junior high school answered that they "love playing in the river because it is fun". As for behavior to keep rivers clean, 87.4% of students answered "don't throw garbage in rivers".

Students who wash by hand at home were found at a lower ratio in higher grades.

5. Thoughts about environmental issues (Table 4)

Those students who thought that citizens should take the initiative in protective measures for the environment comprised 93.3% of all the students, while 54.3% thought companies should do so, and 67.1% thought the government should do so. For each of the answers, students in upper grades showed higher ratios ($p < .001$).

6. Separating garbage and relative factors (Table 5)

Separating garbage at home is considered to be one behavior that shows students' awareness of environmental issues and necessary actions to be taken. Thus, we grouped students in three categories and compared with other factors; "Active Group" of students who separate garbage at home, "Potential Group" of students who sometimes separate garbage at home, and "Non-Active Group" of students who do not separate garbage at home.

The Active Group had a higher ratio of students who were "interested" in environmental issues and also "knew" about water pollution, and the Non-Active Group had a higher ratio of students who were "not interested" in environmental issues and "did not know" about water

Table 2. Garbage disposal method

n (%)

	N	Total	6th grade n=363	7th grade n=403	9th grade n=342	P-value
Method of garbage disposal at out of the house (Multiple answers) [a]	1106					
Throw garbage in garbage cans nearby		1032 (93.3)	347 (95.6)	366 (91.0)	319 (93.5)	.042*
On the street		70 (6.3)	15 (4.1)	33 (8.2)	22 (6.5)	.069
Take home and throw it in garbage cans		18 (1.6)	3 (0.8)	7 (1.7)	8 (2.3)	.274
Do you separate garbage to type?	1078					.024*
Yes		268 (24.9)	93 (26.1)	107 (27.6)	68 (20.4)	
Sometimes		538 (49.9)	160 (44.9)	191 (49.2)	187 (56.0)	
Never		272 (25.2)	103 (28.9)	90 (23.2)	79 (23.7)	
Reason for separating garbage (Multiple answers) [b]	760					
Bad for the environment, Dirty, Dangerous		483 (63.6)	186 (80.5)	150 (53.8)	147 (58.8)	.000***
No specific reason		199 (26.2)	50 (21.6)	78 (28.0)	71 (28.4)	.169
Adult praise		42 (5.5)	11 (4.8)	20 (7.2)	11 (4.4)	.316
Others		140 (18.4)	13 (5.6)	71 (25.4)	56 (22.4)	
Kind of separating garbage [c]	706					.000***
Organic and inorganic garbage		232 (32.9)	7 (3.1)	100 (38.0)	125 (56.8)	
Dry and wet garbage		212 (30.0)	104 (46.6)	71 (27.0)	37 (16.8)	
Others		262 (37.1)	112 (50.2)	92 (35.0)	58 (26.4)	
Reason for not separating garbage (Multiple answers) [d]	260					
There are no cans for separating garbage		190 (73.1)	55 (55.6)	74 (90.2)	61 (77.2)	.000***
Bother		68 (26.2)	39 (39.4)	7 (8.5)	22 (27.8)	.000***
No one say to separate		13 (5.0)	8 (8.1)	4 (4.9)	1 (1.3)	
Others		9 (3.5)	7 (7.1)	0 (0.0)	2 (2.5)	

Note. [b,c] Object is the students who answered I separate garbage and I sometimes separate garbage.[d] Object is the students who answered I do not separate garbage. [a,b,d] Multiple answers, the number of 'Yes' (%). Chi-square test *p<.05, ***p<.001

pollution. Also, the Non-Active Group mentioned the media with a high ratio ($p < .001$) as the source of information on water pollution.

As for the method of garbage disposal at house, the Potential Group had a high ratio of students who had "no specific reason" for separating garbage ($p < .05$), while the Non-Active Group had a high ratio of students who disposed of garbage "on the street" while out of the house ($p < .001$).

Regarding washing hands after getting home, the Active Group had a high ratio of students who answered "always washed their hands" ($p < .001$).

7. Separating garbage and thoughts about environmental issues (Table 6)

Over 90% of students thought that citizens should take the initiative in protective measures for the environment in comparative analyses among the three groups. The Non-Active Group had a low ratio of students who thought that the government and companies should take protective measures for the environment.

Discussion

Located in South Sulawesi State on the Island of Sulawesi in central Indonesia, Makassar is a city with 1.2 million populations, with marked economic growth. In the city, local ordinances prohibit garbage dumping at non-designated upheld, but the streets are littered with garbage, and the rivers are murky with garbage. Students play in bare feet on the street and swim in the river[8]. This study conducted in this situation, is intended to provide support for future health-care education. Interest

Table 3. Awareness of sanitation and bahavior in the dairy living

n (%)

	N	Total	6th grade n=363	7th grade n=403	9th grade n=342	P-value
Do you think that the river is clean?	1030					.663
Yes		230 (22.3)	75 (21.2)	89 (23.9)	66 (21.8)	
No		800 (77.7)	279 (78.8)	284 (76.1)	237 (78.2)	
How do you think about playing in the river? (Multiple answers) [a]	568					
Dangerous, Might cause disease		334 (58.8)	136 (52.1)	118 (61.8)	80 (69.0)	.005**
Love plaing in the river because it is fun		179 (31.5)	107 (41.0)	55 (28.8)	17 (14.7)	.000***
Dirty		74 (13.0)	23 (8.8)	28 (14.7)	23 (19.8)	.010**
Others		28 (4.9)	11 (4.2)	10 (5.2)	7 (6.0)	
Action to keep rivers clean	1065					.517
Don't throw garbage in rivers		931 (87.4)	308 (85.6)	343 (88.9)	280 (87.8)	
Pick up garbage from rivers		64 (6.0)	28 (7.8)	19 (4.9)	17 (5.3)	
Others		70 (6.6)	24 (6.7)	24 (6.2)	22 (6.9)	
Do you wash your hand after you come home?	1105					.000***
Yes		615 (55.7)	240 (66.5)	215 (53.5)	160 (46.8)	
Sometimes		450 (40.7)	114 (31.6)	171 (42.5)	165 (48.2)	
No		40 (3.6)	7 (1.9)	16 (4.0)	17 (5.0)	

Note. [a] Multiple answers, the number of 'Yes' (%) .Chi-square test **p<.01, ***p<.001

Table 4. Thoughts about environmental issues

n (%)

	N	Total	6th grade n=363	7th grade n=403	9th grade n=342	P-value
Citizens should protect measures for the environment	1073					.057
Yes		1001 (93.3)	330 (95.9)	362 (92.3)	309 (91.7)	
Y/N		52 (4.8)	12 (3.5)	23 (5.9)	17 (5.0)	
No		20 (1.9)	2 (0.6)	7 (1.8)	11 (3.3)	
Companies should protect measures for the environment	806					.000***
Yes		438 (54.3)	104 (41.8)	153 (52.0)	181 (68.8)	
Y/N		166 (20.6)	49 (19.7)	79 (26.9)	38 (14.4)	
No		202 (25.1)	96 (38.6)	62 (21.1)	44 (16.7)	
The goverment should protect measure for the environment	827					.000***
Yes		555 (67.1)	155 (59.8)	192 (64.2)	208 (77.3)	
Y/N		157 (19.0)	49 (18.9)	74 (24.7)	34 (12.6)	
No		115 (13.9)	55 (21.2)	33 (11.0)	27 (10.0)	

Note. Chi-square test ***p<.001

Table 5. Separating garbage and relative factors n (%)

	N	Active Group n=268	Potential Group n=538	Non-Active group n=272	
Are you interested in environmental issues?	1061				.022*
Yes		233 (87.9)	460 (87.1)	216 (80.6)	
No		32 (12.1)	68 (12.9)	52 (19.4)	
Do you know the water pollution?	1071				.000***
Yes		241 (90.3)	461 (86.2)	211 (78.4)	
No		26 (9.7)	74 (13.8)	58 (21.6)	
Cause of the water pollution (Multiple answers) [a]	1066				
Industrial waste		170 (64.4)	374 (70.2)	173 (64.3)	.129
Garbage		131 (49.6)	290 (54.4)	156 (58.0)	.150
Household effluent		43 (16.3)	103 (19.3)	43 (16.0)	.393
Natural cause		9 (3.4)	11 (2.1)	8 (3.0)	.492
Others		34 (12.9)	49 (9.2)	36 (13.4)	
Source of information on water pollution (Multiple answers) [b]	907				
Classrooms, Book		171 (72.2)	316 (68.7)	132 (62.9)	.104
Media		91 (38.4)	234 (50.9)	115 (54.8)	.001***
Parents, Friends		89 (37.6)	188 (40.9)	68 (32.4)	.109
Others		10 (4.2)	10 (2.2)	6 (2.9)	
Reason for separating garbage (Multiple answers) [c]	760				
Bad for the environment, Dirty, Dangerous		163 (64.7)	320 (63.0)		.649
No specific reason		52 (20.6)	147 (28.9)		.014*
Adult praise		16 (6.3)	26 (5.1)		.484
Others		56 (22.2)	84 (16.5)		
Kind of separating garbage [d]	706				.212
Organic and inorganic garbage		72 (28.8)	160 (35.1)		
Dry and wet garbage		82 (32.8)	130 (28.5)		
Others		96 (38.4)	166 (36.4)		
Method of garbage disposal at out of the house (Multiple answers) [e]	1076				
Throw garbage in garbage cans nearby		263 (98.5)	500 (93.1)	240 (88.2)	.000***
On the street		4 (1.5)	33 (6.1)	32 (11.8)	.000***
Take home and throw it in garbage cans		3 (1.1)	12 (2.2)	3 (1.1)	
Do you wash your hand after you come home?	1075				.000***
Yes		176 (66.4)	279 (51.9)	141 (51.8)	
Sometimes		83 (31.3)	241 (44.8)	115 (42.3)	
No		6 (2.3)	18 (3.3)	16 (5.9)	

Note. [b] Object is the students who answered I know the water pollution. [c,d] Object is the students who answered I separate garbage and I sometimes separate garbage.
[a,b,c,e] Multiple answers, the number of 'Yes' (%) . Chi-square test *p<.05, ***p<.001

Table 6. Separating garbage and thoughts about environmental issues n (%)

		Active Group n=268	Potential Group n=538	Non-Active group n=272	
Citizens should protect measures for the environment	1046				
Yes		246 (95.3)	492 (93.7)	237 (90.1)	
Y/N		8 (3.1)	26 (5.0)	17 (6.5)	
No		4 (1.6)	7 (1.3)	9 (3.4)	
Companies should protect measures for the environment	788				.007**
Yes		109 (57.1)	221 (57.1)	96 (45.7)	
Y/N		32 (16.8)	86 (22.2)	44 (21.0)	
No		50 (26.2)	80 (20.7)	70 (33.3)	
The goverment should protect measure for the environment	809				.089
Yes		140 (71.4)	270 (68.5)	130 (59.4)	
Y/N		34 (17.3)	71 (18.0)	51 (23.3)	
No		22 (11.2)	53 (13.5)	38 (17.4)	

Note. Chi-square test **p<.01

in environmental issues was quite high as 85% among all grade students, and 85% of students answered that they knew about water pollution. The same question was posed in a 2010 survey [7] in Surabaya City, with the result that 53% of children knew about water pollution. This data, though from a different region, suggested that the awareness of water pollution among children in Indonesia is increasing.

In contrast, while it is reported that 50 to 75% of water pollution results from household effluent [2], the most common cause given in this survey was industrial pollution. This is probably because the issue of industrial pollution was in the mind of citizens, given that the government had conducted the PROKASIH and PROPER programs to tackle this problem, and as such it had been taken up by the media [2]. This kind of information provision through the media as a government initiative is likely to have a powerful effect on people's awareness of water pollution. Furthermore, as just 17.9% of children gave household effluent as their answer, very few children thought that their lifestyle was causing water pollution.

Furthermore, although over half of the students associated garbage with water pollution, only 24.9% of students separated garbage as a part of daily life. This suggested that few students saw the link between garbage problems and water pollution and went on to take appropriate action. Thus, though most children said that they knew about water pollution, they thought of it as just some phrase they had heard rather than a problem related to them. Moreover, 37% of children did not know how to separate garbage, and in lower school years this figure rose to around 50%. The laws for the separation of garbage are established by the Indonesian government, however concrete measures are consigned to local government. As no measures have been taken in Makassar City to clarify methods for separating garbage, it is hardly surprising that children do not do so correctly.

Moreover, the major reason for not separating garbage at home was "there are no cans for separating garbage". Naturally, students are not likely to take action if the environment is not suitable. When we visited the city, there were almost no garbage cans on the streets. Even the few garbage cans located in schools were empty, and garbage was scattered everywhere in the school yard. Thus, even though 90% of students answered that they threw garbage into garbage cans, there was a gap between awareness and behavior.

As a result of comparative analyses among the Active Group, Potential Group and Non-Active Group in separating garbage at home, the Active Group had a high ratio of students who were "interested" in environmental issues and "knew" about water pollution, while the Non-Active Group had a low ratio. This suggests that students who are very interested and aware of the issue are capable of taking appropriate action. Many students in each group obtained information on sources of water pollution from school classes and book, however they did not make the connection to the separation of garbage. Thus, the environment for provision of information was not sufficient to prompt children to change their behavior. Rather, as many students in the Non-Active Group answered media as the information source, this source of information seems to have no connection to changing children's behavior. Based solely on the present results it is not possible to draw the simple conclusion that the relevant information was provided poorly by the media, however it may be that the media, which tends to be a one-way provider of information, was not getting the message across accurately to those without sufficient awareness of the issue.

Indonesian students, obliged to live in polluted environments, seem to care less about home towns, which are usually littered with garbage. In recent years Indonesia has experienced rapid economic growth alongside an expanding population. At the same time, the amount of garbage thrown out by citizens has increased, but government initiatives such as the collection of garbage and number of garbage cans have not increased accordingly [9・10]. In particular, it has been pointed out that in Makassar City the organization of the living environment is lagging behind, and the level of environmental pollution is extreme. Accordingly, rapid action on the part of the government is needed. However, among the problems that are facing Japan is that even when a suitable environment is prepared, the low moral level among individuals is holding back appropriate behavior [11]. Therefore, moral standards will have to be raised at the level of the individual citizen. This survey showed that children do not perceive water pollution as their problem, suggesting that water pollution and environmental issues are not a pressing problem for them. Accordingly, proper education on health and the environment is necessary from a young age. As regards

what should be taught, children must understand that their lifestyle causes environmental pollution and that environmental pollution affects their health detrimentally. In short, they need to know that appropriate behavior on their part protects not only the environment but also their own health. Thus, they must reflect upon their lifestyle, realize where the problems lie, and come to see environmental problems as their own problems. Moreover, as the home environment and experiences of nature during childhood have an influence on students' pro-environmental behaviors and practices of social activity [12], to raise students' awareness about the environment it is important first and foremost to modify the awareness and involvement of adults near to the students. This survey investigated knowledge and coping behaviors of parents and teachers as well as students. This information will be used in future work to further investigate health-care and environmental education.

This survey focused on six public elementary schools and one public junior high school in Makassar City which has a lot of schools. Therefore, there are limitations in generalizing this research's results as results that reflect entirely the reality of Indonesia and Makassar City.

Conclusion

The following has come to light in our survey of students of elementary schools and junior high schools in Makassar City about environmental issues:

1. Students in elementary and junior high schools had a high ratio of interest in environmental issues and knowledge of water pollution. However, the ratio of students who separated garbage at home was low at 24.9% and it was suggested a discrepancy between knowledge and behavior.

2. As for separating garbage, the Active Group had a high ratio of positive respondents who had an interest in environmental issues and knew about water pollution. Meanwhile, many of the Non-Active Group respondents had little interest in environmental issues and the ratio of those who knew nothing about water pollution was high.

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マカッサル市における環境問題に関する子どもの知識と行動の調査

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要　旨

2000 年に掲げられた 8 つのミレニアム開発目標（Millennium Development Goals: MDGs）の 7 番目には安全な飲料水などの確保がうたわれている。インドネシアにおける水質汚染の原因は、生活排水やゴミの不法投棄など地域住民のライフスタイルと大きく関連しているため、地域住民の意識改革が不可欠である。そこで、健康教育・環境教育の方法を検討するために、南スラウェシ州マカッサル市における小中学生 1108 人を対象に、環境問題に関する調査を行った。

小中学生の 80% 以上は環境問題に関心があり、水質汚染を知っていると回答していた。しかし、その原因については工場排水と考えている子どもが多く、水質汚染と家庭排水を結び付けて考えている子どもは少なかった。また、多くの子どもは川を汚れていると考えており、川で遊ぶことを「危ない・病気になる」と考えていた。家でゴミの分別をしている子どもの割合は 24.9% と低かった。また、ゴミの分別を時々している子どもは、分別する理由について、「特に理由はない」と答えていた。ゴミの分別をしていない子どもは、分別しない理由について「分別用のゴミ箱がない」ためと回答していた。そのため、ゴミ箱の設置といった生活環境の整備が必要であると考える。さらに、ゴミの分別をしていない子どもは、環境問題に「関心がない」、水質汚染を「知らない」と回答した割合が高かった。このことから、子どもたちは水質汚染を自分たちの問題として認識していないことがうかがえる。したがって、子どもの頃から適切な健康教育や環境教育を行うことが重要である。