Continuous Survey on Child Health Assessed by Medical Checkups in Deprived Areas of the Philippines

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博　士　論　文

Continuous Survey on Child Health Assessed by Medical Checkups in Deprived Areas of the Philippines

（フィリピンの貧困地区における健診を通した子どもの健康状況についての継続調査）

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Abstract The aim of this study are to evaluate the current status of child health in deprived areas of the Philippines and to investigate the influence of poverty on health outcomes. Children and parents belonging to a preschool leaning center in Malabon city participated in this study over a five-year period. A questionnaire survey answered by parents concerning characteristics, child-rearing anxieties, and hygiene was undertaken. Kaup index was measured and medical checkups were performed by Japanese medical staff. The ratio of underweight children was 0%-3.8%, while those with obesity were 2.4%-7.7%. The ratio of students with dental caries was 54.8%-74.4%. Parents had various child-rearing anxieties. Poverty affected the Kaup index, caries, and hygiene. It is suggested that children in deprived areas had problems of nutrition, earwax plugs, caries, and hygiene and there might be an influence from poverty on health outcomes.

Keywords Medical Checkups, Child Health, Poverty, Health Outcomes, Child-rearing Anxiety, Hygiene, Philippines

1. Introduction

The Millennium Development Goal 4 (MDGs4) is to reduce the under-five mortality rate by two-thirds between 1990 and 2015 [1]. The under-five mortality rate has improved in the Philippines, but it has not reached to the desired requirements yet [2]. The major causes of child mortality are pneumonia, diarrhea and gastroenteritis of presumed infectious origin, and congenital anomalies [3], which are preventable, other than congenital anomalies. It has been reported that the proportion of children in the Philippines under age of five years who are moderately or severely underweight in 2011 is 20.7%, whereas that in Southeast Asia is 17.0% [4]. The nutritional status of Philippine children is worse than that of other Southeast Asian countries. In addition, the number of health facilities and medical professionals in the Philippines are in shortage [5]. The provision of healthcare services are sometimes canceled because of deficiencies in the related budget [6]. These issues contribute to the poor health condition of Philippine children. It is obvious that the provision of regular medical checkups and education are necessary to promote their health. Although Philippine people can receive charged medical checkups for young children in some private hospitals, there is no periodical public medical checkups for young children [7]. In particular, the poor cannot receive medical checkups. Previous studies on child health in deprived areas have focused on dental surveys and have not included a continuing survey [8,9].

Therefore, we performed medical checkups to evaluate the current status of nutrition, child-rearing anxieties, and hygiene on child health, and to investigate the influence of poverty on health outcomes in a preschool learning center in Malabon city, the Philippines.

2. Methods

2.1. Subjects

Medical checkups were carried out in the Abakadang Kayumanggi Community Development Foundation Preschool Learning Center (AKCDF) near a deprived area called East River Side, in Malabon city, the Philippines, in the middle of July each from 2009 through 2013. We carried out this research with the approval of the Ethics Committee of Kobe University Graduate School of Health Sciences (Approval Numbers 261). A representative of AKCDF explained the details of the medical checkups to the parents in advance, and the parents who had given their consent participated in the study. Written informed consents details were obtained from the AKCDF representative and all parents who participated in the medical checkups.

In total, two hundred and four children (82 male and 12 female) and the parents who belonged to the Nursery Class (3 to 5 years old) were enrolled in the medical checkups. This was the first time that all the participants had received a medical checkup.

2.2. Survey Contents

2.2.1. Reception and questionnaire answered by parents

The staff of AKCDF were in charge of reception. The questionnaire survey was undertaken in 2009, 2011, 2012, and 2013.The questionnaire consisted of characteristics (Name, Sex, Student Contribution Level (SCL)), Child-rearing anxieties (Anxiety about Eyesight, Hearing, Speech, Growth), and Hygiene (Hand-washing, Usual drink, Tooth-brushing, Ear cleaning). For its preschool program, AKCDF categorized SCL into five levels (1, 2A, 2B, 3A, 3B) depending on the family's income opportunities and owned property. SCL 1 was defined as one or both parents are professionals and regularly employed, with combined gross income of above 8,000 Philippine peso, highly adequate housing conditions, and with other sources of income or support. SCL 2A was defined as one or both parents are professionals and regularly employed, with combined gross income of above 8,000 Philippine peso, highly adequate housing conditions, but with no other source of income. 2B was defined as one or both parents are ordinary workers and regularly employed, low income and irregularity of work, and with adequate housing conditions. 3A was defined as one or both parents are employed with unstable income, and with inadequate housing conditions. 3B was defined as one or both parents are employed with unstable income, and with inadequate housing conditions, and families with crisis (sickness, abandoned by spouse, no regular source of income).

2.2.2. Height and Weight Measurements

The standing height was measured of barefoot children using a ruler taped to the wall. The measurements were recorded to the nearest 0.1 cm. Children were then weighed using an ordinary family scale, which had an accuracy of 1 kg. Weight was measured to the nearest 0.5kg with the subjects standing barefoot. We used the Kaup Index to judge the nutritional status. "Underweight" was defined as a Kaup index of 13 or lower; and "Obese" was defined as a Kaup index of 22 or higher [10].

2.2.3. Medical Checkups by Japanese Staff

A doctor, nurse, and physical therapist participated in the medical checkups. Ocular inspection, auscultation, otoscopic examination to check whether they have earwax plugs or not, and checkups of dental caries were performed.

2.2.4. Report on the Results of the Medical Checkups

We distributed the card in which the results of the medical checkups and awareness-raising hygiene details for preventing diseases such as diarrhea were listed to the parents.

2.3. Statistical Analyses

All statistical analyses were performed with EZR (Saitama Medical Center, Jichi Medical University), which is a graphical user interface for R (The R Foundation for Statistical Computing). More precisely, it is a modified version of R commander designed to add statistical functions frequently used in bio statistics [11]. Statistical significance between levels 1, 2A, 2B and 3A, 3B was determined using a one-way ANOVA and Fisher test, and values of $p < 0.05$ were considered significant.

3. Results

3.1. Characteristics of Subjects

Table 1 shows the characteristics of the subjects. The ratios of SCLs were 6.3% (SCL 1), 25.0% (SCL 2A), 50.0% (SCL 2B), 12.5% (SCL 3A), 6.3% (SCL 3B) in 2009. The mean of Kaup index was 15.9±2.1, 15.5±1.9, 16.1±2.2, 15.8±2.9, 15.3±1.5, from 2009 to 2013, respectively. The ratio of underweight children tended to be higher than that of obese children in all years.

3.2. Health Problems Assessed by Medical Checkups

We observed skin disease, fever, otitis media, congenital adrenal hyperplasia, murmur, and asthma (Table 2). Table 3 shows the ratio of the presence or absence of earwax plugs and dental caries in the children. Earwax plugs were observed in all years. On the other hand, the ratio of students with caries tended to be higher than that of students without caries in all years. The parents had various anxieties regarding eyesight, speech, hearing, and growth in child-rearing, and especially concerning speech and growth (Table 4).

3.3. Hygiene Concerning Hand-washing, Usual Drink, Tooth-brushing, and Ear cleaning

Table 5 shows hand washing, usual drink, tooth brushing, and ear cleaning under hygiene. Compared with the ratios of the students who answered “No” about hand washing before meals, those of the students who answered “Yes” tended to be high in all years in general. There were some students who drank unboiled water as their usual drink, although not so many. The ratio of students who answered “Yes” about tooth-brushing tended to be almost all in all years. “Cotton swab” was the most commonly used way to clean the ears in all years.

3.4. The Influence of Poverty on Child Health Outcomes

The mean Kaup index for level 3B in 2009, 2011, and 2012 were the lowest of all. There were no obese students in 3A and below in 2009, 2010, 2011, and 2013. The ratio of students without caries in 2B and above tended to be higher than those in 3A and below in all years.

As for hygiene, the ratio of students who drink unboiled water in 2B and above were 7.7% (2/26) in 2009, 4.5% (1/22) in 2011, 30.6% (11/36) in 2012, 3.0% (1/33) in 2013. On the other hand, the ratios of the students who dink unboiled water in 3A and below were 16.7% (1/6) in 2009, 23.5% (4/17) in 2011, 43.8% (7/16) in 2012, 20.0% (1/5) in 2013. The ratios of students who drink unboiled water in 3A and below tended to be higher than those in 2B and above in all years. There were no significant differences in the mean Kaup index and in the ratios of obesity, underweight, earwax plugs, and caries among SCLs (Table 6).

4. Discussion

This is the first demonstration of the current status of child health in deprived areas of the Philippines through medical checkups and the influence of poverty on health outcomes.

Although there were no significant associations between the average Kaup index and time trend, the ratio of obesity tended to increase, and the ratio of underweight children tended to be higher than those concerning obesity. Based on the 1998 and 2008 National Nutrition Survey, the ratio of overweight children under the age of five years increased from 0.4% in 1998 to 2.0% in 2008. The ratio of underweight children under five years old was 32.0% in 1998 and 26.2% in 2008 [12,13]. We infer from this that Philippine children are still suffering from poor nutrition.

As for abnormal findings, we observed skin disease, fever, otitis media, congenital adrenal hyperplasia, murmur, and asthma. We believe that this relates to the clinical effectiveness of medical checkups. According to the AKCDF, the poor cannot see a doctor because of their poverty, although we proposed them to take an examination for abnormal findings in a hospital. This remains still an issue to be resolved.

Earwax plugs were observed in all years. We speculated that earwax plugs could contribute to child-rearing anxieties concerning hearing [14]. Using cotton swabs was the most common way to clean the ears in all years. We infer one plausible reason for earwax plugs is cotton swab use. The use of cotton swabs maybe associated with cerumen accumulation [15,16]. It is essential that health professionals teach the parents the correct method of cleaning ear wax.

The ratio of students with caries tended to be higher than those of students without caries in all years. The National Oral Health Survey in the Philippines reported that 97.1% of 6 year-olds with dental caries should be treated [17]. Although there are some differences in the age of the subjects, the rate of caries in AKCDF students tend to be better than those in the national data. Contrary to expectations, the ratio of students who answered “Yes” about tooth-brushing were high in all years. Poor methods of tooth-brushing may result in the discrepancies between the results for caries and those for tooth-brushing. Thus, it will be important to investigate the students’ mode of tooth brushing and to provide tooth-brushing instructions. This remains an issue for further research.

It was demonstrated in this study that the parents had various child-rearing anxieties. It is important that our health professionals pay serious attention to such anxieties through medical checkups. There may be a possibility that the parents have excessive anxieties about child-rearing, and counseling by health professionals may relieve their concerns.

As for hygiene, there were some students who drank unboiled water, although not many. The Philippine tap water might be contaminated by Escherichia Coli, water storage tank for tap water are also contaminated [18]. Drinking unboiled water may be one of the causes of diarrhea, malnourishment, and underweight issues. It is essential to provide education and knowledge about hygiene to the students through health checkups and to investigate medical history such as diarrhea which is one of leading causes of child mortality. These are the subjects of further study.

The next discussion deals with the influence of poverty on health outcomes. The average Kaup index for level 3B tended to be lower than that for other levels. There were no students suffering from obesity in 3A and 3B. The definition of SCL 3A and 3B are unstable income and inadequate housing conditions. It is obvious that the students in level 3A and below are in a state of poor nutrition. According to the AKCDF teacher, there are some students who are not given sufficient food except for the school lunch provided by AKCDF, and they usually eat candy instead of a meal. These facts may lead to the results that the ratio of no caries in 2B and above were higher than those in level 3A and below in all years. The ratio of students who drink unboiled water in 3A and below tended to be higher than those in 2B and above. This may be based on differences in the level of education of the parents among the SCLs. According to the Annual Poverty Indicators Survey, heads of the families belonging to the bottom 30% income stratum tend to be less educated compared to heads of families in the upper 70% income stratum [19]. Hence, it is even more important that the questionnaire be improved to help parents of levels 3A and 3B to answer more easily.

It was a limitation of this study that it was conducted in a single facility in the Philippines. Of course, the data cannot be generalized to all facilities in the country. Future studies will be necessary to improve the efficacy of health checkups for the early detection of abnormalities and for general health promotion. Based on the results of this study, we have already started research work to investigate the effects of education on the use of cotton swabs and the correct method of tooth-brushing on health outcomes.

5. Conclusions

In conclusion, the results of health checkups for a 5-year period indicate that the children in deprived areas in the Philippines suffer from problems with regards to nutritional condition, earwax plugs, caries, and knowledge about hygiene. It also indicates that poverty could influence nutritional condition, caries, and knowledge about hygiene. These findings suggest that the provision of health checkups are important to improve the detection of health problems and health promotion for children in deprived areas.

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REFERENCES

[1] United Nations, REDUCE CHILD MORTALITY, Online available: http://www.un.org/millenniumgoals/childhealth.shtml

[2] United Nations, Maternal mortality ratio per 100,000 live births, Online available: http://data.un.org/Data.aspx?d=MDG&f=seriesRowID%3A553

[3] Republic of the Philippines Department of Health, Leading Causes of Child Mortality, Online available: http://www.doh.gov.ph/kp/statistics/child_mortality.html

[4] Central Intelligence agency, Children under the age of 5 years underweight, Online available: https://www.cia.gov/library/publications/the-world-factbook/rankorder/2224rank.html

[5] Philippine Statistics Authority, Health Facilities and Government Health Manpower Health Service of Philippine, Online available: http://www.nscb.gov.ph/secstat/d_vital.asp

[6] Ministry of Foreign Affairs of Japan, Health Service of Philippine, Online available: http://www.mofa.go.jp/mofaj/gaiko/oda/shiryo/hyouka/kunibetu/gai/philippines/gd02_01_0202.html

[7] Republic of the Philippines Department of Health, Child Health and strategic plan, Online available: http://www.doh.gov.ph/node/342.html

[8] K. Kato, H. Kimura. The Volunteer Dental treatment in a Slum near Manila City, Aichi-Gakuin j. dent. sci, 37(2), 385-393, 1999.

[9] A. Abe, A. Kinoshita. Physical Development and Eruption of First Molars in Filipino Children in Queson City, the Philippines, Aichi-Gakuin j. dent. sci, 43(2), 221-224, 2005.

[10] SEADICT, Kaup index, Online available: http://www.seadict.com/ja/ja/

[11] Y. Kanda. Investigation of the freely-available easy-to-use software 'EZR' (Easy) for medical statistics, Bone Marrow Transplant, 48, 452-458, 2013.

[12] Food and Nutrition Research Institute, National Nutrition Survey 2008, Online available: http://www.fnri.dost.gov.ph/images/stories/7thNNS/anthrop/anthrop_preschool_adoles.pdf

[13] M. Cabotaje, Nutrition Overview, Online available: http://www.wpro.who.int/nutrition/documents/docs/phl.pdf

[14] The Merck Manuals, Impaction, Online available: http://merckmanual.jp/mmpej/sec08/ch088/ch088e.html

[15] M. Macknin. Effect of Cotton-tipped Swab Use on Earwax Occlusion, Clinical Pediatrics, 1, 14-18, 1994.

[16] W. Robert. Wax plugs and cotton buds, Clinical Pediatrics, 102, 575-576, 1988.

[17] A. David. The global increase in dental caries. A pending public health crisis, Am J Dent, 22, 3-8, 2009.

[18] Ministry of Foreign Affairs, Basic date for safety , Online available: http://www2.anzen.mofa.go.jp/info/pcsafetymeasure.asp?id=13

[19] Philippine Statistics Authority, Characteristics of Poor Families in the Philippines (Findings from the 2008 Annual Poverty Indicators Survey), Online available: http://www.census.gov.ph/content/characteristics-poor-families-philippines-findings-2008-annual-poverty-indicators-survey

Table 1. Characteristics of the Students

Year		2009 (n=32)		2010 (n=42)		2011 (n=39)		2012 (n=52)		2013 (n=39)	
Sex (n) (%)	Male	14	43.8	12	28.6	19	48.7	24	46.2	13	33.3
	Female	18	56.2	30	71.4	20	51.3	28	53.8	26	66.7
Age (n) (%)	3y	3	9.4	4	9.5	3	7.7	4	7.7	7	17.9
	4y	21	65.6	34	81.0	35	89.7	46	88.5	30	76.9
	5y	8	25.0	4	9.5	1	2.6	2	3.8	2	5.1
Mean Age (y) (Mean ± SD)		4.2±0.6		4.0±0.4		4.0±0.3		4.0±0.3		3.9±0.5	
SCL (n) (%)	1	2	6.3	5	11.9	3	7.7	5	9.6	3	7.7
	2A	8	25.0	6	14.3	5	12.8	8	15.4	5	12.8
	2B	16	50.0	21	50.0	14	35.9	23	44.2	25	64.1
	3A	4	12.5	6	14.3	11	28.2	15	28.8	5	12.8
	3B	2	6.3	2	4.8	6	15.4	1	1.9	0	0.0
	Unknown	0	0.0	2	4.8	0	0.0	0	0.0	1	2.6
Kaup index (n) (kg/m^2) (Mean ± SD)	Total	31	15.9± 2.1	42	15.5± 1.9	39	16.1± 2.2	52	15.8± 2.9	37	15.3± 1.5
Kaup index (n) (%)	Obesity	0	0.0	0	0.0	1	2.6	2	3.8	0	0.0
	Underweight	1	3.2	1	2.4	1	2.6	4	7.7	2	5.4

Table 2. Abnormal findings

Year	Abnormal findings	n	%
2009 (n=32)	Skin disease	1	3.1
2010 (n=42)	Fever	1	2.4
2011 (n=39)	Otitis media	1	2.6
2012 (n=52)	Fever	2	3.8
	Congenital adrenal hyperplasia	1	1.9
2013 (n=39)	Murmur	1	2.6
	Asthma	1	2.6

Table 3. Presence or Absence of Earwax plugs and Dental caries

Year		2009 (n=32)		2010 (n=42)		2011 (n=39)		2012 (n=52)		2013 (n=39)	
Earwax plugs (n) (%)	+	5	15.6	8	19.0	15	38.5	11	21.2	8	20.5
	−	27	84.4	34	81.0	24	61.5	41	78.8	31	79.5
	Unknown	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Dental caries (n) (%)	+	18	58.1	26	68.4	29	74.4	28	54.8	25	64.1
	−	13	41.9	12	31.6	10	25.6	24	46.2	14	35.9
	Unknown	1	3.1	4	9.5	0	0.0	0	0.0	0	0.0

Table 4. Child-rearing anxiety

Year	2009 (n=32)		2011 (n=39)		2012 (n=52)		2013 (n=38)	
Eyesight (n) (%)	0	0.0	1	1.1	2	3.8	2	5.1
Speech (n) (%)	0	0.0	12	30.8	2	3.8	3	7.7
Hearing (n) (%)	1	3.1	2	5.1	0	0.0	2	5.1
Growth (n) (%)	0	0.0	2	5.1	9	17.3	3	7.7

Table 5. Hygiene concerning Hand washing, Usual drink, Tooth-brushing, and Ear cleaning

Year		2009 (n=32)		2011 (n=39)		2012 (n=52)		2013 (n=39)	
Hand washing (n) (%)	Before meal	32	100.0	39	100.0	41	78.8	39	100.0
	After excretion	30	93.8	39	100.0	42	80.8	39	100.0
Usual drink (n) (%)	Unboiled water	3	9.4	5	12.8	18	34.6	2	5.1
	Boiled water	3	9.4	2	5.1	3	5.8	8	20.5
	Mineral water	27	84.4	31	79.5	30	57.7	31	79.5
	Juice	13	40.6	3	7.7	21	40.4	8	20.5
	Cola	2	6.3	1	2.6	6	11.5	2	5.1
Tooth-brushing (n) (%)	Yes	32	100.0	39	100.0	41	78.8	39	100/0
Ear cleaning (n) (%)	Leave undone	0	0.0	0	0.0	0	0.0	1	2.6
	Ear pick	4	12.5	2	5.1	5	9.6	3	7.7
	Cotton swab	28	87.5	37	94.9	27	51.9	35	89.7
	Other	0	0.0	0	0.0	1	1.9	0	0.0

Table 6. Influence of poverty on Kaup index, Earwax plug and Dental caries

Year		2009		2010		2011		2012		2013	
Kaup index (kg/m^2) (n) (Mean ± SD)	1	2	15.2± 0.2	5	16.1± 1.5	3	16.1± 1.1	5	16.3± 1.4	3	14.7± 1.5
	2A	8	16.1± 2.0	6	14.0± 1.1	5	15.7± 1.3	8	14.9± 1.4	5	14.7± 1.3
	2B	16	15.7± 2.2	21	15.5± 2.1	14	16.4± 2.5	23	16.1± 3.4	24	15.7± 1.3
	3A	3	18.2± 1.1	3	16.3± 1.7	11	16.1± 2.0	15	15.8± 2.9	4	14.4± 1.3
	3B	2	14.4± 0.4	2	15.8± 1.7	6	15.5± 2.7	1	13.1± 0.0	0	–
	p-value	NS		NS		NS		NS		NS	
Obesity (n) (%)	Above 2B	0	0.0	0	0.0	1	4.6	1	2.8	0	0.0
	Below 3A	0	0.0	0	0.0	0	0.0	1	6.3	0	0.0
	p-value	NS		NS		NS		NS		NS	
Underweight (n) (%)	Above 2B	1	3.8	1	3.1	0	0.0	3	8.3	1	3.1
	Below 3A	0	0.0	0	0.0	1	5.9	1	6.3	1	25.0
	p-value	NS		NS		NS		NS		NS	
No Earwax plug (n) (%)	Above 2B	21	80.8	27	84.4	16	72.7	30	83.3	27	81.8
	Below 3A	6	100.0	5	62.5	8	47.1	11	68.8	4	80.8
	p-value	NS		NS		NS		NS		NS	
No Dental caries (n) (%)	Above 2B	12	48.0	11	36.7	6	27.3	19	52.8	14	42.4
	Below 3A	1	16.7	1	12.5	4	23.5	5	31.3	0	0.0
	p-value	NS		NS		NS		NS		NS	