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Health-Related Quality of Life, Secondary School Students in Amphoe Mueang, Rayong Province, Thailand

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Abstract   This cross-sectional study was conducted from 1st November 2010 to 31th December 2011 in three early secondary schools in Amphoe Mueang, Rayong province, Thailand, to assess the health-related quality of life (HRQOL) among secondary school students and identify the related factors with different geographic environment. The data were collected from 249 students in industrial area (zone A), 268 students in urban area (zone B), and 256 students in rural area (zone C) by simple random sampling. Students's health-related quality of life was self administered by using PedsQLTM.

The results showed that among 773 students aged between 13 and 15 years old, 16.1 percent of students had low health-related quality of life in zone A, 16.8 percent in zone B and 11.0 percent in zone C. The multiple linear regression revealed that only four variables: self-esteem, gender, family crisis, and zone of students (p-value < 0.05) could predict the total mean health-related quality of life scores.

Based on the study results, it is recommended that schools should conduct more programs of life skill developments in family, community and school, which enables students to manage different problems more effectively and enhance more health-related quality of life.

Key words: **quality of life, health-related quality of life, secondary school students**

Introduction

Heath-related quality of life (HRQOL) measurement is an important tool of epidemiology. This epidemiological tool can be used for surveillance, prevention or dealing with factors affecting illness.[1] The quality of life (QOL) is a familiar phrase because it is often used in various fields of medicine, education or company advertisements as measured by HRQOL.[2]

The HRQOL measurement is a multidimensional concept that represents the overall impact of illness and its treatment on a person's health.[3]

Thai government is determined to develop chemical industry area in a master plan by allocating a large for Eastern Seaboard in Thailand, including Rayong, since 1985. The effects of the industries are increasing in Rayong province which is facing air, water and

soil pollution problems.

Secondary school students, who are in their importance period of life, are now facing two health risks: 1) risks due to communicable diseases and 2) risks from structural adjustment process of new production and changes in lifestyle due to the change of the physical, biological and social environment. Both health risks mentioned above are considered geographical environment both at home or while attending school[4].

To assess QOL in the health-related dimension of secondary school students, Amphoe Mueang, Rayong province, independent variables were classified by the PRECEDE-PROCEED Model into 3 groups: Predisposing factors, Enabling factors and Reinforching factors[5,6]. The objective of this study was to identify the factors related to the HRQOL of secondary school students in Amphoe Mueang, Rayong province, Thailand with differences on geographic environment, both at home and n school. This should provide a way to create a policy status and planning in the future.

Methods

Study Population and Study Site

The target population of this study was Thai children aged between 13 and 15 years old, both male and female, who studied at public secondary schools (Grade 7, 8, 9), and lived in Amphoe Mueang, Rayong province, Thailand.

Sampling Technique

Figure 1. Amphoe Mueang was divided into three zones, starting from the center of Map Ta Phut Industrial Estate: A) Industrial area, those within a radius of 10 kilometers from the center of the Map Ta Phut Industrial Estate, B) Urban area, those within the distance of 10-20 km, and C) Rural area, those beyond the distance 20 kilometers (but still within Amphoe

Mueang, Rayong province) as shown in figure 1. Simple random sampling was used to select a secondary school from the total number of secondary schools in each zone (Figure 2). Students meeting an inclusion criteria in Grade 7 to 9 in each classrooms, were selected by simple random sampling to select students passed inclusion criteria again.

Inclusion criteria

Selecting only secondary school students, those who both studied in a public secondary school, and had lived in each zone (A,B and C) for more than a year. Students who did not qualify, as living in each zone less than a year, or those with disabilities, were excluded from the study.

Sample Size Estimation

After, the selection of a secondary school from each zone (A, B, and C), the total number of secondary school students, were estimated by using the statistical formula of "determination of sample size for estimating means" from biostatistics[7] as follows:

$$n = \frac{NZ^2_{\alpha/2}\sigma^2}{d^2(N-1) + Z^2_{\alpha/2}\sigma^2}$$

n = The desirable calculated sample.

N = Total Number of secondary school students in the selected school sample in each Zone A,B, or C

$Z_{\alpha/2}$ = 1.96 (95% confidence level for two sided test)

σ^2 = Variance of students with Quality of life (0.374544 of SD = 0.612)

d = Acceptable error = 0.07

σ^2 value obtained from researchable result in Thailand, 2005 to assess factors related to the quality of life among primary school children in Bangkok metropolis with mean of quality of life score was 72.17.

Fig. 1 Map of Amphoe Mueang, Rayong Province was divided into 3 zones (Source by google)

The research was conducted by Takahashi T[9], using same assessment tool, PedsQL, as this research.

Zone A: With a total of 1,646 secondary school students; in the sample frame, sample size was calculated as follows:

$$n = \frac{(1,646)(1.96)^2(0.374544)}{(0.07)^2(1,645) + (1.96)^2(0.374544)}$$

$$n = 249.30 \sim 250$$

The sample size of zone A is estimated to be 250 secondary school students.

Zone B: For a total of 1,957 secondary school students; in the sample frame, sample size was calculated as follows:

$$n = \frac{(1,957)(1.96)^2(0.374544)}{(0.07)^2(1,956) + (1.96)^2(0.374544)}$$

$$n = 255.52 \sim 256$$

The sample size of zone B is estimated to be 256 secondary school students.

Zone C: For a total of 607 secondary school students; in the sample frame, sample size was calculated as follows:

$$n = \frac{(607)(1.96)^2(0.374544)}{(0.07)^2(606) + (1.96)^2(0.374544)}$$

$$n = 198.05 \sim 199$$

The sample size of zone C is estimated to be 199 secondary school students.

Research Instrument

The data of students were collected by using self-administered questionnaire (PedsQL™)[7].

The questionnaire consists of 4 sections as follows:

Section I. Predisposing Factors consisted of socio-economic and demographic characteristics of students in each zone.

Section II. Enabling Factors consisted of questions about family crisis, family type, father's and mother's occupation.

Section III. Reinforcing Factors consisted of questions about rewards from family and ackno-
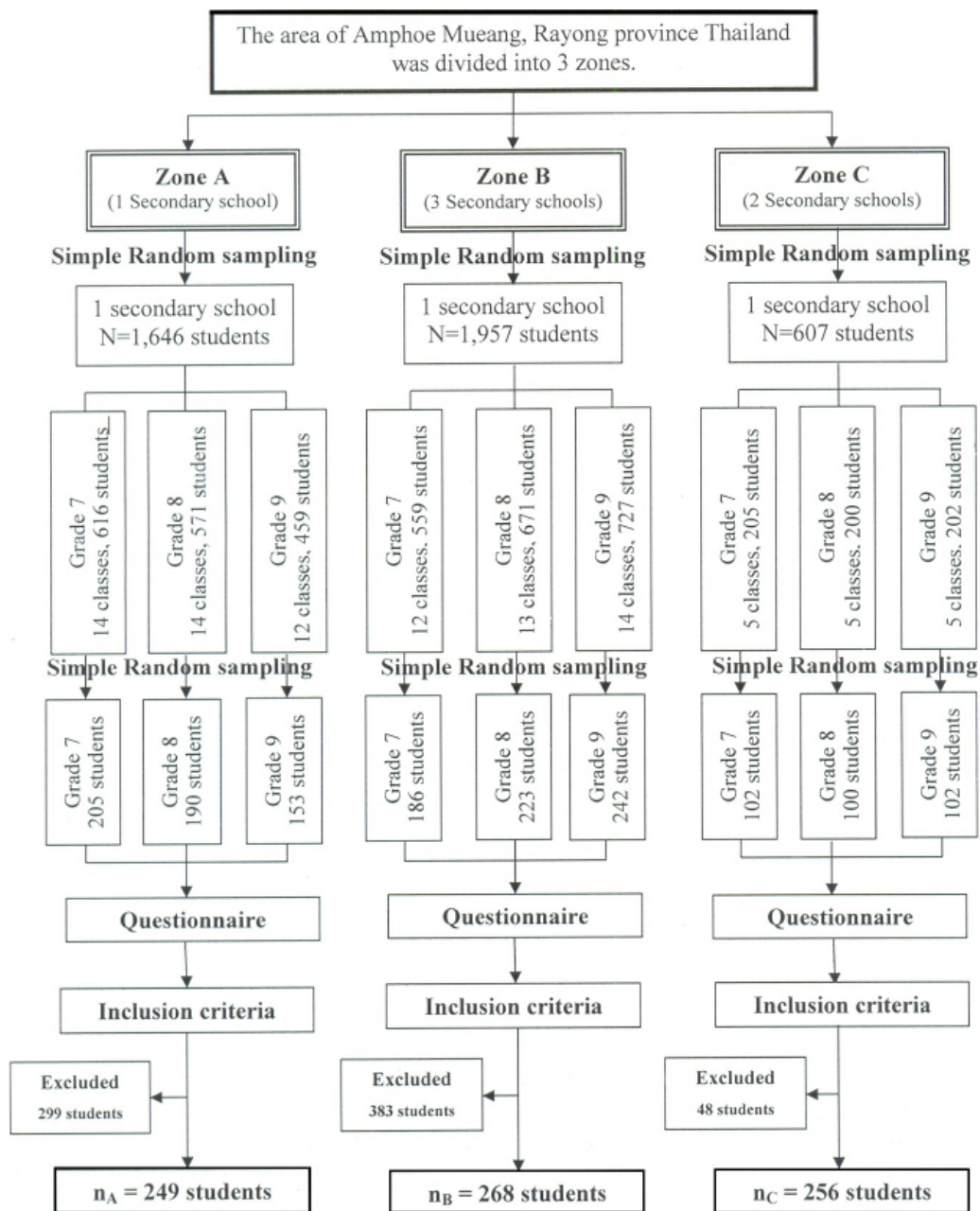
Fig. 2 Sampling procedures for this study

wledgement in school.

Section IV. Health-related quality of life consisted of the PedsQL™ questionnaires[8] which was developed by Varni JW. It has a total of 23 items in 4 dimensions: 1) physical function (8 items), 2) emotional function (5 items), 3) social function (5 items) and 4) school function (5 items).

The student choosed on answers among 5 choices with his/her experience in past one month such as 1) Never, 2) Almost never, 3) Sometime, 4) Always, and 5) Almost always. The items were linearly transformed to 0-100 scale. To reverse answer, transform the 0-4 scale items to 0-100 points as follows: "Never" = 100 points, "Almost never" = 75 points, "Sometime" = 50 points, "Almost always" = 25 points and "Always" =

Table 1 Characteristics of predisposing factors by zones

Predisposing factors	Number of students (%)				p-value
	Total (n=773)	Zone A (n=249)	Zone B (n=268)	Zone C (n=256)	
Age (years)					
≤13	357 (46.2)	119 (47.8)	120 (44.8)	118 (46.1)	0.171
14	332 (42.9)	110 (44.2)	121 (45.1)	101 (39.4)	
15	84 (10.9)	20 (8.0)	27 (10.1)	37 (14.5)	
Mean, SD = 13.65, 0.67	χ^2= 6.40	df=4			
Gender					
Male	313 (40.5)	102 (41.0)	131 (48.9)	80 (31.2)	<0.001*
Female	460 (59.5)	147 (59.0)	137 (51.1)	176 (68.8)	
	χ^2= 16.92	df=2			
Class					
Grade 7 (Matthayom 1)	212 (27.4)	88 (35.3)	54 (20.2)	70 (27.3)	<0.001*
Grade 8 (Matthayom 2)	245 (31.7)	53 (21.3)	104 (38.8)	88 (34.4)	
Grade 9 (Matthayom 3)	316 (40.9)	108 (43.4)	110 (41.0)	98 (38.3	
	χ^2=124.53	df=4			
Nutrition status (weight/height)					
Thin (< 36)	117 (15.1)	41 (16.5)	27 (10.1)	49 (19.1)	0.002*
Normal (>36 to 60)	525 (67.9)	169 (67.9)	180 (67.1)	176 (68.8)	
Obesity (>60)	131 (17.0)	39 (15.6)	61 (22.8)	31 (12.1)	
Mean, SD =48.13, 12.06	χ^2= 16.71	df=4			
Nutrition status (height/age)					
Short (<145)	37 (4.8)	10 (4.0)	2 (0.7)	25 (9.8)	<0.001*
Normal (>145 to 170)	599 (77.5)	189 (75.9)	218 (81.3)	192 (75.0)	
Tall (>170)	137 (17.7)	50 (20.1)	48 (18.0)	39 (15.2)	
Mean, SD =157.73, 8.26	χ^2= 25.19	df=4			
Grade point average (GPA)					
Low (≤ 2.00)	91 (11.8)	28 (11.2)	20 (7.5)	43 (16.8)	0.007*
Moderate (2.00-2.99)	306 (39.6)	103 (41.4)	118 (44.0)	85 (33.2)	
High (≥ 3.00)	376 (48.6)	118 (47.4)	130 (48.5)	128 (50.0)	
	χ^2= 14.13	df=4			
Self-esteem					
Low(<71)	103 (13.3)	36 (14.4)	41 (15.3)	26 (10.1)	0.161
Moderate(71-92)	548 (70.9)	175 (70.3)	178 (66.4)	195 (76.2)	
High(>92)	122 (15.8)	38 (15.3)	49 (18.3)	35 (13.7)	
Min, Max		40, 100	40, 100	30, 100	
Mean, SD=81.61, 10.46	χ^2= 6.56	df=4			
Financial allocation/week (bath)					
Low than average	458 (59.2)	158 (63.5)	152 (56.7)	148 (57.8)	0.252
Average or higher	315 (40.8)	91 (36.5)	116 (43.3)	108 (42.2)	
Min, Max		40, 1000	150, 750	100, 1000	
Mean, SD=323.99, 112.55	χ^2= 2.75	df=2			
Underlying disease					
Yes (allergic rhinitis, asthma)	93 (12.0)	28 (11.2)	42 (15.7)	23 (9.0)	0.057
No	680 (88.0)	221 (88.8)		233 (91.0)	
	χ^2= 5.75	df=2			

*Chi-square test difference between predisposing factors and three zones (A, B, C). * p < 0.05*

Table 2 Characteristics of enabling factors by zones

Enabling factors	Number of students (%)				p-value
	Total (n=256)	Zone A (n=773)	Zone B (n=249)	Zone C (n=268)	
Family crisis (Number)					
None	467 (60.4)	147 (59.0)	172 (64.2)	148 (57.8)	0.039*
1	209 (27.0)	67 (26.9)	58 (21.6)	84 (32.8)	
≥ 2	97 (12.6)	35 (14.1)	38 (14.2)	24 (9.4)	
	$\chi^2=10.11$	df=4			
Family type					
Nuclear family	526 (68.0)	171 (68.7)	183 (68.3)	172 (67.2)	0.933
Extended family	247 (32.0)	78 (31.3)	85 (31.7)	84 (32.8)	
	$\chi^2=0.14$	df=2			
Father's occupation					
Skilled labor	213 (27.6)	69 (27.7)	96 (35.8)	48 (18.8)	<0.001*
Non-skilled labor	485 (62.7)	165 (66.3)	144 (53.7)	176 (68.7)	
Others such as Dead,	75 (9.7)	15 (6.0)	28 (10.5)	32 (12.5)	
Separation or Divorce.	$\chi^2=19.02$	df=2			
Mother's occupation					
Housewife or none	145 (18.7)	64 (25.7)	50 (18.7)	31 (12.1)	<0.001*
Skilled labor	153 (19.8)	46 (18.5)	67 (25.0)	40 (15.6)	
Non-skilled labor	442 (57.2)	132 (53.0)	139 (51.9)	171 (66.8)	
Others such as Dead	33 (4.3)	7 (2.8)	12 (4.4)	14 (5.5)	
Separation or Divorce.	$\chi^2=24.75$	df=4			

*Chi-square test showing difference between enabling factors and three zones (A, B, C). * p < 0.05*

0 points[8].

Validity and reliability

Content validity. After the questionnaire was created from literature reviews and related researches, it was submitted to child and adolescent experts and psychiatrists to check validity of content.

Content reliability. After the questionnaire was checked content validity by experts, it was then tried out with a small sample (n=30) of secondary school students from a public school in Amphoe Mueang, Rayong Province. Its reliability, by using the formula of Cronbach's alpha coefficient, showed an estimated reliability coefficient of more than 0.70.

The results of this study as:

- The PedsQLTM 4.0 questionnaires = 0.876
- The self-esteem questionnaires = 0.718

Data Analysis

The completed questionnaires will be analyzed by using SPSS. The statistical analysis of variables as follow:

1. Descriptive statistics

Independent variables were described by using descriptive statistics such as frequency, percentage, mean, SD, and minimum and maximum.

2. Inferential statistics

1. Chi-square was used to test association between predisposing, enabling, and reinforcing factors and three zones (A, B, C).

Table 3 Characteristics of reinforcing factors by zones

Reinforcing factors	Number of students (%)				p-value
	Total	Zone A	Zone B	Zone C	
	(n=773)	(n=249)	(n=268)	(n=256)	
Rewards from the parents					
Low (<60)	256 (33.1)	85 (34.1)	83 (31.0)	88 (34.4)	0.108
Moderate (60 to 80)	403 (52.1)	133 (53.4)	135 (50.4)	135 (52.7)	
High (>80)	114 (14.8)	31 (12.5)	50 (18.6)	33 (12.9)	
Min, Max		33.3, 100	20, 100	26.7, 100	
Mean, SD=69.11, 13.57	χ^2=7.59	df=4			
Acknowledgement in school					
Low (<30)	164 (21.2)	57 (22.9)	53 (19.8)	54 (21.1)	0.890
Moderate (30 to 60)	521 (67.4)	162 (65.1)	186 (69.4)	173 (67.6)	
High (>60)	88 (11.4)	30 (12.0)	29 (10.8)	29 (11.3)	
Min, Max		33.33, 100	20, 100	20, 100	
Mean, SD=45.75, 16.82	χ^2=1.13	df=4			

Chi-square test showing difference between reinforcing factors and three zones (A, B, C). * p < 0.05

Table 4 Comparison of HRQOL scores in some independent variables classified into two categories.

Independent variables	Mean	SD	t	p-value
Gender				
Male	76.90	13.80	3.631	<0.001*
Female	73.43	12.49		
Underlying disease				
Yes	74.01	13.44	-2.108	0.048*
No	76.04	12.62		
Financial allocation/week (bath)				
Lower than average	72.32	13.71	-1.978	0.035*
Average or higher	75.18	13.03		
Family type				
Nuclear family	74.90	13.07	0.182	0.855
Extended family	74.71	13.31		
Father's occupation				
Skilled occupation	74.68	13.55	-0.224	0.823
Non-skilled occupation	74.92	13.21		

*p<0.05

Table 5 Comparison of HRQOL scores in some independent variables classified into three categories.

Independent variables	Mean	SD	F	p-value
Age				
≤13	75.20	13.94	0.468	0.627
14	74.31	12.68		
15	75.37	11.38		
Zone of students				
Zone A	73.58[A]	13.51	3.071	0.047*
Zone B	4.51	12.32		
Zone C	76.41[A]	13.14		
Nutrition status (weight/height)				
Thin	74.81	13.25	0.244	0.783
Normal	75.02	13.05		
Obese	74.13	13.04		
Nutrition status (height/age)				
Short	76.31	11.52	0.249	0.779
Normal	74.79	13.34		
Tall	74.66	12.73		
Grade point average (GPA)				
Low	73.45	14.54	0.731	0.482
Average	75.33	13.04		
High	74.77	12.88		
Self-esteem				
Low	71.59[B]	14.67	10.914	<0.001*
Moderate	74.44[B]	12.76		
High	79.37[B]	12.41		
Mother's occupation				
Housewife	75.47	13.71	1.184	0.307
Skilled labor	73.39	12.81		
Non-skilled	75.11	13.10		
Family crisis (number)				
None	75.89[C]	13.16	9.496	<0.001*
1	74.93[C]	12.39		
> 1	69.57	13.49		
Rewards from the parents				
Low	73.34[D]	14.08	3.411	0.033*
Moderate	74.60[D]	12.94		
High	77.59	12.73		
Acknowledgement in school				
Low	73.27	14.76	1.517	0.220
Moderate	75.21	12.62		
High	75.55	12.89		

*p<0.05. The LSD post-hoc test revealed that as: A) zone of students was statistically significant difference mean HRQOL score of zone A compared to zone C, B) self-esteem of students was statistically significant difference mean HRQOL score of moderate self-esteem and high self-esteem compared to low self-esteem, C) family crisis of students was statistically significant difference mean HRQOL score of no family crisis and one family compared to more than one family crisis, D) rewards from the parents was statistically significant difference mean HRQOL score of low rewards from parents and moderate rewards from parents compared to high.

2. Independent sample t-test was used to test for a difference between two independent groups on the means of a HRQOL score among the students in three zones (A, B, C).

3. One way ANOVA was used to test for differences among the three zones (A, B and C) by comparing means among the independent variables and HRQOL of 3 zones. Along with multiple comparisons any those with significant differences.

4. The multiple linear regression was used to predict equation or model associated between significant independent variable and HRQOL score, analyzed by the Stepwise Method (forward selection and backward elimination).

Ethics in human research

This study was approved in December 28th, 2010 by the relevant medical ethics committee from SIRB: Siriraj Institutional Review Board and both students and their parents gave written information consent form.

Results

From collected data, there were 773 students aged between 13 and 15 years old: 249 students are in industrial zone (zone A), 268 in urban zone (zone B) and 256 in rural zone (zone C).

Health-related quality of life

The health-related quality of life (HRQOL) of students was assessed by PedsQL™ 4.0 (Thai version). It was found that, in three zones, most students (27.6%) have HRQOL in class of score 80-89.9. The total average score was 74.84 with SD 13.14. There was not much difference in the HRQOL among the three zones. Zone C showed the highest average of 76.41 with SD 12.32. Zone A showed the lowest average of 73.58, SD was 13.45 and the lowest minimum score of 13.04 was also in zone A.

Most students among the three zones (A, B, C) marked a moderate HRQOL. The low level of HRQOL was among zone A and zone B, showing rather similar percentage of 16.1 and 16.8 percent respectively. The lowest percentage HRQOL of 16.8 percent was also in zone B while the highest percentage HRQOL of 32.0 percent was in zone C.

The students who got low HRQOL showed the highest percentage of absence because of illness was 92.9 percent in zone C. The lowest percentage of absence because of illness was 77.5 percent in zone A. The visiting doctors due to illness showed rather simi-

Table 6 Multiple linear regression for Independent variables and HRQOL.

Variables	b	SE$_b$	β	t	p-value
self-esteem	3.681	0.854	0.151	4.309	<0.001*
gender	-3.340	0.944	-0.125	-3.539	<0.001*
family crisis	-2.043	0.655	-0.110	-3.118	0.002*
zone of students	1.497	0.569	0.092	2.628	0.009*
Underlying disease	2.367	1.411	0.059	1.678	0.094
Rewards from the parents	1.116	0.876	0.047	1.274	0.203
Financial allocation/week	1.084	0.947	0.041	1.145	0.253

Constant= 72.816; SE$_{est}$ = ± 2.713

R = 0.853; R^2 = 0.727; F = 13.146; p-value < 0.001

*p<0.05

lar on the percentage ranged 82.2 to 85.7 percent.

Predisposing factors

Table 1 shows that there were more female (68.8%) than male students in zone C and the proportion was higher than in zone B. Weight for height index showed that the students in the three zones have normal nutritional status, while students (19.1%) in zone C were thin and 22.8 percent of students of zone B were more obese than other zones. The highest percentage of low Grade Point Average (GPA) of 16.8 percent was in zone C. It also showed that the highest percentage of both moderate and high GPA of 44.0 and 48.5 percent, respectively, was in zone B. The total average self-esteem score was 81.61 with SD 10.46. Zone B showed the highest percentage of high self-esteem of 18.3 percent while zone A and zone B showed rather similar on the low self-esteem percentage of 14.4 and 15.3 percent respectively. Zone B showed the highest percentage of 15.7 percent in their marking "yes" on underlying disease implying allergic rhinitis and asthma.

Chi-square test showed differences between predisposing factors and the three zones (A, B, C). There was a significant difference between the three zones (A, B, C) on predisposing factors such as gender, class, nutritional status and GPA (p-value<0.05).

Enabling factors

Table 2 regarding the enabling factors, respecting family crisis, Zone B showed the highest percentage of family not encountering any family crisis which was 64.2 percent. The lowest percentage of family encountering any family crisis in Zone C, greater or equal to 2, was 9.4 percent. The results also showed that 32.8 percent of students in zone C lived in extended family and the proportion was higher than zones A and B while students (68.7%) in zone A lived in nuclear family, higher than zones B and C. Sixty-eight point

seven percent of parents in zone C was non-skilled labor and the percentage higher than in Zone A while 35.8 percent of fathers and 25.0 percent of mothers in zone B were skilled labor and the percentage was higher than in Zone A and C.

Chi-square test showed differences between enabling factors and three zones (A, B, C) of students. There was a significant difference between the three zones (A, B, C) on enabling factors such as family crisis, father's occupation and mother's occupation (p-value<0.05).

Reinforcing factors

Table 3 shows that 18.6 percent of students in zone B received higher rewards from their family than zones A and C, and 12.0 percent of students in zone A received higher acknowledgement in schools than zones B and C.

There was no significant difference between the three zones (A, B, C) on reinforcing factors (p-value>0.05).

Table 4 The independent sample t-test revealed results as follows:

1. There was a significant difference between the mean HRQOL score of male and female students (t= 3.631, p<0.001). HRQOL score in male group was significantly higher than in female group.

2. There was a significant difference between the mean HRQOL score of the students marking "yes" on underlying diseases and the students marking "no" on underlying diseases (t= -2.108, p 0.048). HRQOL score of the students marking "no" on underlying diseases was significantly higher than in the students marking "yes" on underlying diseases.

3. There was a significant difference between the mean HRQOL score of the students receiving financial allocation per week lower than average and the students receiving average or high of financial allocation per week (t= -1.978, p 0.035). HRQOL score

of the students receiving average or high of financial allocation per week was significantly higher than the students receiving lower than average financial allocation per week.

Table 5 The one-way ANOVA revealed that there was a statistically significant difference between the mean HRQOL score of variables in each group: zone of students (F=3.071, p 0.047), self-esteem (F= 10.914, p<0.001), family crisis (F=9.496, p<0.001) and rewards from the parents (F=3.411, p 0.033).

Table 6 The multiple linear regression (MLR) analysis was used to predict association between significant (p<0.05) independent variable and total mean HRQOL score among students in the three zones (A, B, C). These seven independent variables were gender, financial allocation per week (Baht), underlying disease, zones of students, self-esteem, family crisis and rewards from the parents and were analyzed by the Stepwise regression method which is a combination of forward selection and backward elimination. According to this analysis, there were only four independent variables that could predict the total mean HRQOL score; which were self-esteem, gender, family crisis and zones of students. The four independent variables were emphatically associated to positive total mean score of HRQOL (R = 0.853, R^2 = 0.727, SEest = (2.713 P<0.001).

The multiple linear regression yielded the equation as follows:

$$Y_{HRQOL} = 72.816 + 3.681_{self-esteem} - 3.340_{gender} - 2.043_{family\ crisis} + 1.497_{zone\ of\ students}$$

Discussion

The HRQOL assessment of students found that the total average HRQOL scores varied with different geographic environment, both at homes and in schools. Comparing with the result of other research by using the same PedsQL™ questionnaire, the percentage of low quality of life of students, 17.7 percent of total

three zones, mean 74.84, SD 13.14, was similar to the previous studies[9] which reported that low quality of life among primary school children were 17.7 percent (mean 72.17, SD 10.92).

The statistical analysis revealed that there was a significant difference between the mean HRQOL score of gender, self-esteem, family crisis and HRQOL of students (p-value<0.05). Congruent with the previous study, male children were reported slightly to have better quality of life than female children in an urban area of USA (mean score was 68.7 and 65.5 for male and female respectively)[10]. Students who have low self-esteem are more likely to be reported to have much lower quality of life[11]. Children who have high self-esteem are more likely to have close and affectionate relationship with their parents than those who do not[12]. Ninety-six point sixteen percent of the subject had good quality of life because of having good relationship with their guardians even though they suffered from illness[13].

There was no significant difference in the mean HRQOL score (p-value=0.627) between students of different age group which was inconsistent with that of the previous study as the younger age tended to mark higher assessment on their quality of life[14].

There was no significant difference in the mean HRQOL score (p-value>0.05) between different nutritional status of student. The descriptive statistics of this study also showed that 22.8 percent of students in zone B (urban zone) were obese higher than other zone which is congruent with the previous study of national survey in 2001 that found 11.8 percent of children in urban zone were obese and higher than in rural zone[15,16].

There was no significant difference in the mean HRQOL score (p-value 0.482) between students who had different Grade Point Average (GPA) which was inconsistent with the previous study. It was found that the students who had higher GPA score marked higher

quality of life than students with lower GPA score[9].

There was significant difference in the mean HRQOL score (p-value=0.035) between students who had different financial allocation. The descriptive statistics of this study also showed that most students in the three zones (A,B,C) had lower financial allocation than average. The result was similar to the previous study[9], it was mentioned that "some family could be rich enough but not providing a lot of money to their child because they do not want to spoil their children".

There was significant difference in the mean HRQOL score (p-value<0.001) between students of different family crisis groups which was congruent with the previous study that found 96.16 percent of the students had good quality of life because of having good relationship with their guardians even though they suffered from illness[13].

There was no significant difference in the mean HRQOL score (p-value=0.855) between students from different family types. Yet in the previous study[11], it was found that the presence of the adults at home had a significant association with adolescent's harmful behavior such as tobacco and alcohols consumptions.

There was no significant difference in the mean HRQOL score (p-value>0.05) between different types

Fig. 3 Model of HRQOL score of secondary school students in Amphoe Mueang, Rayong Province

of occupation of parents. On the contrary, the previous study, it showed that full-time employment of father was associated with better quality of life of the child[10]. The descriptive statistics of this study indicated that the highest percentage of 25.7 was in housewife group. Mother who was a housewife had positive effect on the child's behavior[11].

There was a significant difference in the mean HRQOL score (p-value=0.033) between students who got different rewards from parents which was congruent with the previous study which mentioned that these rewards given to the students could act as the motivation for student's positive attitude on their quality of life. The orphaned children marked good quality of life if they did not feel that they were neglected[13].

There was no significant difference in the mean HRQOL score (p-value=0.220) between students who had different acknowledgement in school which was inconsistent with the previous study.

Acknowledgement in the school showed no significant association with HRQOL of students (p-value 0.220). Inconsistent with this study, it was found that the students who had low acknowledgement in school had low quality of life if compared to those with high acknowledgement in school[9]. Children are good enough on the basis of their competence whether they are accepted by others as it was described in book " You child, emotional, behavioral, and cognitive development from birth through preadolescence"[12].

Limitation of the Study

This study was conducted in only 3 selected public secondary schools located in the three zones in Amphoe Mueang, Rayong province.

The area of study was divided into three zones: industrial zone, urban zone, and rural zone, by measuring the distance from the center of the Map Ta Phut Industrial Estate. This method may not divide correct area, affecting division the wrong group of students;
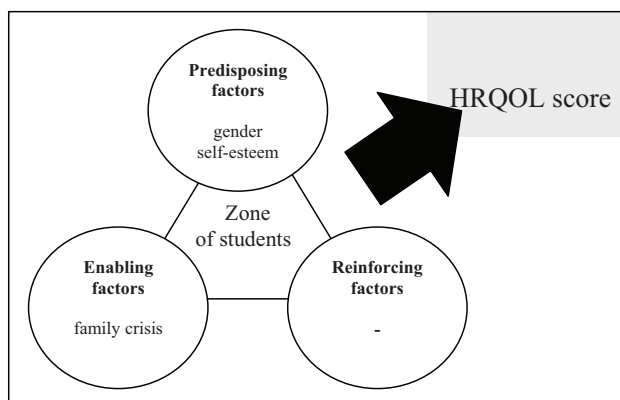
this is called "Misclassification bias (Misclassification of exposure). Sampling secondary school may be in industrial zone in this study but in fact it may be located in urban zone then the HRQOL scores of students used in this analysis might not match the study group. As a result, the HRQOL scores of the students among the three zones may not be different or slightly different.

Conclusion

The study reveals that most early secondary school students marked a moderate Health-related quality of life (HRQOL) scores. Sixteen point one percent of students in zone A had low HRQOL scores, also 16.8 percent in zone B and 11.0 percent in zone C respectively. The study also showed 77.5 percent of students in zone A who marked a low level of HRQOL scores were absent from school because of illness, 84.4 percent in zone B and 92.9 percent in zone C respectively, while 82.5 percent of students in zone A who marked a low level of HRQOL scores visited doctors due to illness, 82.2 percent in zone B was in 85.7 percent in zone C.

The prediction of the factors affecting health-related quality of life of students by using multiple linear regression analysis. There were only four independent variables that could predict the total mean HRQOL score which were self-esteem, gender, family crisis, and zone of students and the coefficient of determination was 72.7 percent. (Fig. 2)

The study showed that self-esteem and family crisis were associated with health-related quality of life of early secondary school students of all three zones. Twenty-three point three percent of students of the three zones with low health-related quality of life (HRQOL) also had low self-esteem, while only 9.0 percent of them had high self-esteem. The results also found that 26.2 percent of students of the three zones with low HRQOL encountered parents' divorce or

separation. Twenty-four point seven percent of students of three zones with low HRQOL missed school because of illness, while 24.55 percent of them met doctors due to illness.

Therefore, it is recommended that schools should conduct more programs of life skill developments in family, community and school, which enables students to manage different problems more effectively and enhance more health-related quality of life.

It is also recommended that parents should take more action to improve children's self-esteem such as to praise their effort more instead of criticizing, to help them learn and accept their own identity. The parents should be good example of self-confidence using words or expression to promote to them because children are very sensitive to the words of his parents. For further study, the researcher should conduct the survey involving guardians and teachers of children to compare the difference of the HRQOL assessment between children, their guardians and teachers.

The next study should collect data from several secondary schools in Rayong province or in Thailand and use the method that can correctly divide data collecting area into industrial zone, urban zone, and rural zone.

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บทคัดย่อ   **คุณภาพชีวิตที่เกี่ยวข้องกับสุขภาพของนักเรียนมัธยมศึกษาตอนต้นในอำเภอเมือง จังหวัดระยอง**

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การศึกษาภาคตัดขวางได้ดำเนินการตั้งแต่วันที่ 1 พฤศจิกายน 2553 ถึง วันที่ 31 ธันวาคม 2554 ใน
โรงเรียนมัธยมศึกษาในเขตอำเภอเมือง จังหวัดระยอง จำนวน 3 โรงเรียน เพื่อประเมินคุณภาพชีวิตที่
เกี่ยวข้องกับสุขภาพและจำแนกปัจจัยที่เกี่ยวข้องซึ่งนำไปสู่การขาดเรียนและการพบแพทย์ เนื่องจากการเจ็บ
ป่วยของนักเรียนมัธยมศึกษาตอนต้น ที่มีความแตกต่างในเรื่องสิ่งแวดล้อมทางกายภาพ รวบรวมข้อมูลจาก
จำนวนนักเรียนมัธยมศึกษาตอนต้น 249 คนของพื้นที่อุตสาหกรรม 268 คนของพื้นที่เมือง และ 256 คนของ
พื้นที่ชนบท โดยสุ่มเลือกแบบ simple random sampling คุณภาพชีวิตที่เกี่ยวข้องกับสุขภาพของนักเรียนถูก
ประเมินโดยแบบสอบถามคุณภาพชีวิตสำหรับเด็กอายุ 13-15 ปี (PedsQLTM) โดยนักเรียนตอบ
แบบสอบถามด้วยตนเอง

ผลการศึกษาแสดงให้เห็นว่านักเรียนมัธยมศึกษาตอนต้น 773 คน อายุระหว่าง 13 ถึง 15 ปี มีระดับ
คุณภาพชีวิตที่เกี่ยวข้องกับสุขภาพในระดับต่ำคิดเป็นร้อยละ 16.1 ในเขตอุตสาหกรรม ร้อยละ 16.8 ในเขต
เมือง และร้อยละ 11.0 ในเขตชนบท และพบว่าปัจจัยในเรื่องเพศ การมีความเคารพในตนเอง การเผชิญภาวะ
วิกฤตของครอบครัวของนักเรียน และเขตพื้นที่ของนักเรียน (p-value <0.05) มีผลต่อความความสัมพันธ์ของ
คะแนนคุณภาพชีวิตที่เกี่ยวข้องกับสุขภาพของนักเรียนมัธยมศึกษาตอนต้นในพื้นที่ 3 เขตที่มีความแตกต่าง
กันในสิ่งแวดล้อมทางกายภาพทั้งบ้านและโรงเรียน

จากผลการศึกษาควรแนะนำให้โรงเรียนชี้แนะนักเรียนในเรื่องการพัฒนาทักษะชีวิตในการอยู่ร่วมกับ
ครอบครัว ชุมชน และโรงเรียน ซึ่งจะช่วยให้นักเรียนสามารถจัดการปัญหาต่าง ๆ ได้อย่างมีประสิทธิภาพ
และช่วยทำให้ระดับคุณภาพชีวิตที่เกี่ยวข้องกับสุขภาพของนักเรียนดีเพิ่มขึ้น

คำสำคัญ: **คุณภาพชีวิต, คุณภาพชีวิตที่เกี่ยวข้องกับสุขภาพ, นักเรียนมัธยมศึกษาตอนต้น**