HOUSEHOLD AND CHILD FEEDING PRACTICE FACTORS AFFECTING STUNTING STATUS AMONG RAGLAI CHILDREN UNDER FIVE IN VIETNAM

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ABSTRACT:

Background: Little is known about ethnic minorities in Vietnam, and few studies have been conducted about nutrition among these populations. Ethnic minorities living in mountainous areas like the Raglai have low socioeconomic status, which is strongly related to poor nutrition. This study assessed stunting prevalence in Raglai children under age five in Khanh Hoa Province, Vietnam and examined the relationships between potential risk factors and stunting status.

Methods: The study used data from a household survey conducted by the Khanh Hoa Department of Health during January to May 2013. The sample size of this study is 1,365 cases, which were selected by simple random sampling. To define the outcome variable, the children who had Z-score of length- or height-for-age below minus two are categorized as stunted, and those having the Z-score equal to or above the cut-off value are grouped as non-stunted. The household factors examined include educational attainment of the mothers, housing standard and water source, and child feeding practice factors including breastfeeding duration. Logistic regression analysis with odds ratio and 95% confidence interval was used to examine the relationship between the outcome variable and the selected factors.

Results: The study found that about two-thirds of the Raglai children are stunted. Age, gender and weight at birth of the children are found to be significantly related to stunting status. Older children are significantly more likely to have stunted growth compared with children aged under two, girls are twice as likely to be stunted as boys, and children whose birth weight was below 2,500 grams have significantly higher odds of being stunted than those who had a birth weight of 2,500 grams and above. When characteristics of children were controlled, household factors were also found to be important. Those whose mothers have no or low education are more likely to be stunted. Children who did not receive intestinal parasite treatment in the last 6 months also have significantly higher odds of stunting than those who did receive treatment.

Conclusions: The findings indicate that stunting of young children is a serious problem in the Raglai community, and is related to household-level socioeconomic factors that are shared by other ethnic minorities in Vietnam. Recommendations to reduce stunting call for improving the living conditions of Raglai people, providing and supporting education and enhancement of utilities, such as water and medical centers, for the community.

Keywords: Raglai ethnic minority, Stunting, Under-five children, Vietnam

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INTRODUCTION

Nowadays, the world still has to cope with the multiple burdens from malnutrition with people who are suffering from the consequences of stunted growth, micronutrient deficiencies, overweight/ obesity, and related non-communicable diseases (NCDs) [1]. However, while there have been many researches about malnutrition in general and stunting in particular, not many study has taken into account the high-risk groups, such as ethnic minorities, which are vulnerable and forgotten by the society. These groups have the same characteristics, which are low socioeconomic status and low educational level. The stunting prevalence among under-five children in those area is high because rate of stunting among children reflects poor nutrition in particular areas, and inadequate

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nutrition is reflected by poverty [2, 3]. For many families, unavailability nutritious food is not the reason why their children become malnourished or stunted, but because they cannot afford to buy it even they spend all of their income for food. Furthermore, caretakers, mostly the mothers, with low educational level may have less information about how to feed their children properly, thus, affecting negatively the child nutritional status. Besides, low birth weight, which is a powerful predictor of stunting, indicates that a child's mother may be malnourished due to their low status in community and in the family, and poor educational levels [2].

The prevalence of poverty among ethnic minorities in Vietnam has been well documented. A study in 2012 shows the positive situation of poverty among ethnic minorities despite unequal access to land, education, credit and other services. Nearly half of ethnic minorities are not poor, including 34% who have escaped poverty since 1993 [4]. However, it is evident that Raglai people in Khanh Hoa province still live with the very low socioeconomic status and educational level across the studies [5, 6]. The studies about Raglai communities in Vietnam are very limited so it is difficult to identify the well-being and the behaviors of the Raglai people recently. In a study about child malnutrition in Khanh Son district in 2001, the poverty proportion was about 60.6 percent of total households in 2000 and the Kinh people, who account for 87 percent of Vietnam's population, had better economic conditions than the Raglai. Thus, malnutrition, especially among children, became an emerged major health problem in Khanh Son [6]. Despite of the positive situation among ethnic minorities in Vietnam since 1993, there are the huge gaps in socioeconomic status between the Raglai and Kinh people. Since Raglai people have been the majority of these two mountainous districts, the low socioeconomic status among Raglai people has been a burden for the whole areas in which they live. The poverty also affected negatively to the child malnutrition and health, which should be urgency in provincial health care plans for these regions [6]. Another main target of this study, beside contributing to the improvement of stunting problem nation-wide and throughout the world, is to provide more information about Raglai community, which little is known, in order to better not only the nutrition but also the socioeconomic conditions in these regions. This can help to keep them above the poverty line and protect children from malnutrition and *"efforts to accelerate significantly economic development will be unsuccessful until optimal child growth and development are ensured for the majority"* [2, 6].

The data from National Institute of Nutrition of Vietnam also shows that all ten provinces with highest stunting prevalence are located in mountainous regions where often get lack of attention and cares from the government [7]. Raglai people in Khanh Hoa province mostly live in Khanh Son and Khanh Vinh districts, which also are highland areas. Likewise, similarly with the other mountainous regions, they receive the poor treatment from the society. A report from Khanh Hoa Department of Health indicates that there are 38.8% and 34% of under-five children who are stunted in Khanh Son and Khanh Vinh districts respectively [8]. However, the stunting prevalence among Raglai children is three times higher than the rate among Kinh children (Vietnamese major ethnic group) in these areas [8]. It can explain that stunted Raglai children affect the very high stunting prevalence in those regions and the high prevalences of stunting among the Raglai children in Khanh Son and Khanh Vinh district show that the nutrition is poor for the whole population and there exists a serious poverty in those areas and the problem should be more concerned.

METHODS

This study uses the data from an anthropometric research on among under-50 Raglai people in Khanh Son and Khanh Vinh district, Khanh Hoa Province, Vietnam. The study was conducted by Khanh Hoa Department of Health in order to identify the association between anthropometric status and related factors. The data collection took place from January to May in 2013. The sampling framework of the original research included all the rural communes and townships in the two districts, a total of 20 communes and two townships. The rural communes in those areas are dominated by agricultural practices while the townships are urban areas with more diversified economic base and higher population density. Two villages were chosen randomly from each rural commune and three villages were chosen randomly from each township. Simple random sampling was used to select children under age 5 from a listing of the children, which were provided by Khanh Hoa Department of Population and Family Planning, in the selected villages.

While the larger study included a sample of residents under age 50, this study uses the sample from the 0-4 age group (under-five) childrenThe resulting sample has 1,365 cases after dropping out ones containing implausible values (from total

Table 1 Frequency and percentage distribution of stunting status, child characteristics, household factors and child feeding practice factors

Variables (n=1,365)	Frequency	%
Child is stunted		
No	456	33.4
Yes	909	66.6
Residential area		
Rural commune	1,216	89.1
Township	149	10.9
Age (months)		
<24	261	19.1
24-35	383	28.1
36-47	414	30.3
48-59	307	22.5
Gender		
Male	700	51.3
Female	665	48.7
Birth weight		
≥ 2,500 gram	703	51.5
< 2,500 gram	304	22.3
Not remember	133	9.7
Not measure	218	16.0
No response	7	0.5
Mother's age at birth		
≥ 35 years	129	9.5
20-34 years	941	68.9
< 20 years	295	21.6
Mother's educational level		
High school level	137	10.0
Secondary school level	320	23.4
Primary school level	342	25.1
No education	538	39.4
No response	28	2.1
Housing standard		
Average/high standard	855	62.6
Low standard	502	36.8
No response	8	0.6
Water source		
Piped water	158	11.6
Well	461	33.8
Stream	745	54.6
No response	1	0.1
Latrine availability		
Yes	217	15.9
No	1,144	83.8
No response	4	0.3
Birth order/number of living children		
Only child	350	25.6
Oldest of two	135	9.9
Youngest of two	311	22.8
Among 3-4 children	370	27.1
Among ≥ 5 children	176	12.9
No response	23	1.7
Duration of breastfeeding		
≥ 24 months	497	36.4
< 24 months	767	56.2
Not remember	51	3.7
Has not breastfed	47	3.4
No response	3	0.2

Table 1 Frequency and percentage distribution of stunting status, child characteristics, household factors and child feeding practice factors (Cont.)

Variable (n=1,365)	Frequency	%
Vitamin-A supplement		
Yes	1,011	74.1
No/not remember	352	25.8
No response	2	0.2
Intestinal parasite treatment		
Yes	325	23.8
No/not remember	1,038	76.0
No response	2	0.2

1,420 cases). This study receives the ethical consideration approval from Institutional Review Board (IRB) of Institute for Population and Social Research on 23th July 2015 (COA. No. 2015/1-1-64).

For the dependent variable, measured height and age of the children was used to calculate the Z-score in order to define whether a child is stunted or not. The Z-scores are calculated by *"dividing the difference between the age-and sex-specific anthropometric indicator of an individual child and the median of the same indicator from a reference population by the standard deviation of that indicator in the reference population"*. The reference standard used for calculating the Z-scores is from World Health Organization (WHO). *"This new WHO standard is based on the growth and weight development of children in six countries (Brazil, Oman, Ghana, India, USA and Norway) where a sample of children was monitored that followed WHO feeding guidelines and were not constrained by inadequate access to nutrition or health care"* [9]. Children who have Z-scores below minus two are determined as stunted. Household and child feeding practice factors are taken to examine the relationship between these predictor variables and the outcome variable. Household factors include educational level of the mother, housing standard, water source, latrine availability, and birth order and number of living children. Duration of breastfeeding, vitamin-A supplement and intestinal parasite treatment are child feeding practice factors. These variables are controlled by residential area, age, gender, birth weight of the children and mother's age at birth. Stata software is used for the data analysis. For calculating the Z-scores, this study uses WHO Anthro macro for Stata. Descriptive analysis is included to describe the frequency and percentage distribution of variables. Logistic regression is used to determine the relationship between outcome variable and household and child feeding practice factors.

RESULTS

As can be seen from Table 1, there are about two-third of under-five Raglai children were stunted. The majority of the children (89%) live in rural communes and the rest lives in townships. The age group having the highest percentage (about 30%) is 36-47 months while below 24 months age group takes account about 19%. The distribution between the genders of the children is fairly equal with a slightly greater percentage (51.3%) of boys. Comparing birth weight among the children, there are 304 children (22%) having their weight at birth below 2,500 grams while 703 children (51.5%) had a birth weight of 2,500 grams and above. Children with their mothers whose ages at birth were within 20 to 34 years are dominant with 69%. Nearly 40% of the children's mothers had no education while the percentage of those who attained high school level is 10%. More than one-third of the children (37%) live in houses with low standard. Among the children's households, using water from stream (54.6%) and well (34%) is more common than from piped water. Approximately 84% of households have no toilet. The children who were the only child, youngest of two children, and one of three to four children have a similar pattern, which take account one-fourth of the reported children. The proportion of children who had duration of being breastfed below 24 months is 56.2% and for those who had breastfeeding duration of 24 months and longer is 36.4%. There are 51 children whose mothers did not remember, and 47 children who had not been breastfed. There are about three-fourth of the children having vitamin-A supplement in the last six months. Approximately one-fourth of the children received intestinal parasite treatment.

The results from Table 2 suggest that, considering each child characteristic and controlling the other variables, children who lived in townships are about 1.7 times more likely to be stunted than those who lived in rural communes ($p<0.05$). The children whose age group was 24-35 ($p<0.05$),

Table 2: Odds ratio of child individual characteristics, household and child feeding practice factors for stunting status among under-five Raglai children with 95% confidence interval

Child is stunted	Odds ratio	Standard error	Confidence interval (CI)	*P-value*
Residential area				
Rural commune (reference)	1.00			
Township	1.72	0.41	1.08-2.74	0.021
Age (months)				
<24 (reference)	1.00			
24-35	1.57	0.31	1.06-2.32	0.023
36-47	1.84	0.37	1.24-2.74	0.003
48-59	2.02	0.44	1.32-3.08	0.001
Gender				
Male (reference)	1.00			
Female	2.17	0.28	1.68-2.79	0.000
Weight at birth				
≥ 2,500 grams (reference)	1.00			
< 2,500 grams	1.77	0.29	1.28-2.45	0.001
Not remember	1.46	0.36	0.91-2.36	0.116
Not measure	1.70	0.34	1.15-2.52	0.008
Mother's age at birth				
≥ 35 years (reference)	1.00			
20-34 years	1.07	0.30	0.62-1.85	0.811
< 20 years	1.49	0.50	0.77-2.86	0.237
Mother's educational level				
High school level (reference)	1.00			
Secondary school level	1.53	0.35	0.98-2.41	0.063
Primary school level	1.33	0.31	0.84-2.12	0.225
No education	2.15	0.52	1.33-3.45	0.002
Housing standard				
Average/high standard (reference)	1.00			
Low standard	1.37	0.20	1.03-1.81	0.031
Water source				
Piped water (reference)	1.00			
Well	2.20	0.50	1.41-3.43	0.000
Stream	1.66	0.36	1.08-2.56	0.020
Latrine availability				
Yes (reference)	1.00			
No	1.00	0.18	0.70-1.43	0.985
Birth order/number of living children				
Only child (reference)	1.00			
Oldest of two	0.94	0.23	0.59-1.51	0.804
Youngest of two	1.28	0.26	0.86-1.91	0.228
Among 3-4 children	1.69	0.38	1.09-2.62	0.018
Among ≥ 5 children	2.00	0.63	1.08-3.70	0.028
Duration of breastfeeding				
≥ 24 months (reference)	1.00			
< 24 months	0.84	0.13	0.62-1.13	0.251
Not remember	0.69	0.25	0.34-1.39	0.299
Has not breastfed	0.51	0.18	0.26-1.01	0.053
Vitamin-A supplement				
Yes (reference)	1.00			
No/not remember	1.12	0.18	0.82-1.53	0.480
Intestinal parasites treatment				
Yes (reference)	1.00			
No/not remember	1.32	0.21	0.97-1.79	0.076
Constant	0.13	0.06	0.05-0.34	0.000

n=1,290, R2=0.0944

36-47 and 48-59 months (both with p<0.01) have significantly greater odds of being stunted than those who were within below 24 months age group. Girls have double chance to be stunted than boys (p<0.001). Children who had their birth weight below 2,500 grams and had no birth-weight measurement are more likely to have stunted growth than those whose birth weight is 2,500 grams and above (both with p<0.01). In contrast with other control variables, mother's age at birth is found not significantly related to child stunting.

Regarding to household factors, controlling other variables, children whose mothers have no education have significantly greater odds of stunting than those whose mothers attained high school level (p<0.01). Children living in houses with low standard are significantly more likely to be stunted than those living in houses with average or high standard (p<0.05). Children who lived in households using water from wells (p<0.001) and stream (p<0.05) have significantly greater risks having stunted growth than children living in households using water from piped water. Children living in households with three to four, and five children and above are significantly more likely to be stunted (both with p<0.05). Latrine availability has no significant relationship with stunting. Besides, none of child feeding practice factors (duration of breastfeeding, vitamin-A supplement and intestinal parasite treatment) is found significantly related to the dependent variable.

DISCUSSIONS

As can be seen from the results that the common residential areas of the reported Raglai children are rural communes (89%). This also describes the status of the areas in which the original study conducted. The study found that children living in townships are significantly more likely to be stunted than those who lived in rural communes. There is a contrast between the results of this study and a study in Nghean, Vietnam, which showed the greater risk of being stunted among children living in rural area. It can be explained that in Khanh Son and Khanh Vinh districts, the gap of socio-economic conditions between townships and rural communes is not much different, so children in the rural communes were advantaged since they had more available food [10].

The relationship between age of the children and stunting status in this study is significant, and it shows the same pattern with previous studies. The older the child is, the more likely the child has stunted growth. However, there is a limitation about this variable. The data contains a very small number of children whose age were below 12 months (3.5%), thus, they were combined with the next older group, which is 12-23. A possible reason why there are so few children below 24 months old is that the data collection was done at the health centers, so the children aged 0 to 11 months were less likely to be brought to the health centers because the caretakers might be inconvenient to bring too young babies and afraid that their children are still vulnerable [6, 11].

About the gender of the children, girls are twice as likely to get stunted than boys. According to the data, though there is no significant association between the child feeding practice factors and child gender, it can be explained that there exists son preference in the community and the boys were fed by more nutritious food than girls. However, the result is different from the finding in a previous study in Khanh Son district, which found the significantly greater odds of stunting among boys [6].

The results suggest that the children who had a birth weight below 2,500 grams and was not measured their birth weight have higher odds of being stunted than those having a birth weight of 2,500 and above. The study in Nghean, Vietnam, also found the significant relationship between birth weight and stunting with the same pattern. Children who was not measured their birth weight have higher risk of being stunted probably because they were born in the places where people there were not aware of the children's health status [10].

Regarding mother's educational attainment, nearly 40% of the children having illiterate mothers. It reflects how poor the socio-economic condition was in those areas, because high educational attainment can represent the well-being of a particular population. Besides, mothers with low educational level do not know how to feed their children properly. The results from this study prove that mother's educational attainment contributed to stunting status among Raglai children with its significant association with the outcome variable. The study in Nigeria found the similar pattern that children who were born to mothers with no formal education were four times more likely to be stunted than those born to mother who had completed more than primary education [12].

Housing standard reflects wealth of households. Parents living in houses with good standard are more likely to afford not only more nutritious food, because they have higher income, but also better hygiene and sanitary conditions for their children because a good house may provide better sewage system and safe water than a low-standard house. A study by Fenske in 2013 found a relationship

between lower wealth index score and higher chance of having stunted child. This can indirectly explain why children living in houses with low standard are more likely to be stunted than those living in houses with average or high standard [13].

The results of this study show the small percentage of children living in households using piped water (11.6%). Most of the reported households used the water from wells and surface water (mostly from stream). It indicates that those areas had low infrastructure-level, which reflects the low economic status and lack of attention from the local government. Even though in Le's study, water from wells is considered as a good water source, the current findings found that using water from well is the highest risk factor affecting stunting comparing with the other categories. Using water from stream is also found significantly related to child stunting. To clarify the results, it's probably because people in those areas did not keep the sanitation for the good water sources, such as water from wells, and did not regularly boil the water for feeding the babies. Because drinking unsafe water will lead to higher chance of getting diarrhea, which affects child nutrition. However, it shows an improvement in the Raglai community since there existed no water supply system more than 10 years ago [6].

According to current findings, children who were born in the families with many children (more than two) are more likely to be stunted than those who were born in smaller families. From cross-tabulation between several variables, the Raglai women tended to give many births, especially among those with low educational level. The relationship between family size and stunting is found and explained in Horton's study [14]. Birth order of the children and number of children affect child nutrition due to availability of family resources and parents' attention. This explanation is appropriate for the current results when the economic status is low among Raglai people. Therefore, sharing food, care and other resources may lead the children into poor nutrition [14].

None of child feeding practice factors is found significantly associated to child stunting status. It is hard to define how well the children were fed by using the selected factors. Because the ideal child feeding practices during the first two years include exclusive breastfeeding for the first six months, continuing breastfeeding for two years and complementary feeding starting at the age of six months [15]. And even the children having proper feeding duration, they should be fed by nutritious food also. It is considered as another limitation when there is lack of information about feeding practices, such as what food given to the children and exclusive breastfeeding. Besides, vitamin-A supplement and intestinal parasite treatment are not the direct factors affecting child stunting even though they are found related to stunting in some previous studies [16, 17]. These factors are assumed that they are related to child nutrition because the parents who concern and put effort to do these kinds of health-related behaviors are likely to know more about child health such as how to feed their children properly. Though latrine availability is not found significantly related to stunting, the high rate of households having no toilet may cause the low hygienic level, which further can affect the child nutritional status.

In conclusion, stunting prevalence among Raglai community in Khanh Hoa province is very high, that two-thirds of children are stunted. The statistics show the evidence of low socio-economic status in the society even though there have been some improvements since more than 10 years ago. Among the household and child feeding practice factors, mother's educational attainment and water source are the most important factors since they can represent the well-being of a community, which strongly affect the nutritional status of the children. Residential area, age, gender, weight at birth and birth order of the children are also found significantly related to child stunting.

According to the findings in this study, certain recommendations are given in order to improve the stunting status of the children in Raglai community. Encouraging Raglai people to go to school and attain the highest level of basic education. Infrastructure and utilities, especially for education, medical centers, and hygiene and sanitation, should be enhanced in the community. Introducing and providing income generating activities should be applied because when the parents do not have to concern about the basic needs, they are more likely to send their children to school. Beside that, they can improve their living condition and increase family resources, which can affect positively child nutrition, especially in households with many children. Improving the skills of health personnel in counseling and giving adequate information about child nutritional status after the women giving birth, including encouraging them to measure their children's birth weight. For further study, it is suggested that detailed child feeding practice information, such as exclusive breastfeeding and feeding food, should be included. For household factors, incomes per capita and number of family members are necessary to be examined. Small mothers can also affect child stunting, so it is

suggested that further study should include mother's height.

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