Original Article/นิพนธ์ต้นฉบับ

The Determinants of Diarrheal Disease in the Community with Homestay Tourism: A Mixed-Methods Research

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Abstract

Background: Diarrheal epidemics in communities with homestay tourism can be more than health problems-they also can damage the local economies. This study investigated health determinants in a homestay village and its community resources that could contribute to diarrheal prevention and control.

Methods: This observational study employed a mixed-methods research design. Study population included all residents of the homestay village of Khok Kong (N=557). Quantitative data were obtained by a cross-sectional survey using a simple random sampling (n=47), and analyzed by chi-squared test and multivariate logistic regression. Qualitative data were collected by participant observations, and analyzed by content analysis.

Results: 23% of the samples experienced acute diarrhea in the last three months, which are associated with habit of washing hands before meals (odds ratio=0.16, p=0.010) and with female gender (odds ratio=0.19, p=0.025). The relationship remains significant after controlling for gender (odds ratio=0.22, p=0.048). Statistical analysis suggests the villagers with good hand hygiene less likely had diarrhea. No evidence of relationships between types of food and drinking water and diarrhea is found in this community. Content analysis revealed "adequate hygiene for cooking and eating within households", "poor sanitization of local restaurants and grocery stores", "good health literacy" and "community potentials for self-development".

Discussions: Statistical findings from the survey are matched with results from content analysis, which revealed that diarrheal prevention was empowered in most households. Outside the households, however, food safety appeared to be insufficient and could be a potential source of diarrheal widespread.

Keywords: diarrheal disease, health determinants, community potentials, disease prevention and control

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Introduction

Diarrheal disease is one of the most common diseases and a public health threat in developing countries[1]. In fact, severe diarrhea can threaten lives, especially young children, malnourished patients, and the patients with impaired immunity. Although the disease is preventable and treatable, approximately two millions of deaths worldwide are caused by diarrheal disease each year[2]. Most diarrheal patients suffer gastrointestinal infections, usually caused by a variety of bacterial, viral, and parasitic organisms. These sources of infection can be spread through contaminated food and drink, or from person-to-person contacts as a result of poor hygiene. Therefore, a significant proportion of diarrheal disease worldwide can be avoided by promoting clean food, safe drinking water, adequate sanitation and personal hygiene[3].

Thailand is one of lower-middle and upper-middle income countries that have been successfully implementing a variety of interventions to prevent diarrhea disease at the community level. The incidence of acute diarrhea in Thailand has decreased in the recent decades, partially from the more access to piped water supply in rural areas[4]. Nonetheless, acute diarrhea remains one of the most common diseases in many rural communities of Thailand nowadays[5].

Recently, a number of rural communities of Thailand established cultural tourism centers in their village and opened their households for both domestic and international visitors that want to learn their culture and experience a village homestay. Such tourism has contributed to the growth of local economies, including that of Khok Kong village in Kuchinarai district of Kalasin province. However, acute diarrhea remains one of the most common diseases in Kuchinarai, Thailand, where a cultural tourism village of Khok Kong is located. An epidemic of diarrheal disease in this community can have negative impacts beyond health of the villagers, as it could drive away the visitors from their homestay village and therefore damages their local economies.

To our knowledge, no previous studies have examined the situations of diarrheal disease in communities with homestay and cultural tourism centers. As a result, we do not know if there are different health determinants that play roles in how the communities deal with epidemic diseases such as diarrhea. Therefore, this study aimed to explore the determinants of acute diarrhea in Khok Kong village, a cultural tourism and homestay village in Kuchinarai district of Thailand. The community resources that potentially can contribute to prevention and control of the disease were also investigated.

Materials and Methods

Settings

Kuchinarai is a district of Kalasin province located in the center of the northeastern region of Thailand. Unfortunately, acute diarrhea remains one of the most common diseases in the district. The historical data from Kuchinarai Crown Prince Hospital, a 120-bed community hospital and the only hospital in the district serving the population of Kuchinarai, reported that diarrhea and gastroenteritis were the most prevalent among the patients admitted during the 2012 fiscal year[6]. Although a precise incidence rate in the communities was unknown, such a high prevalence among the inpatients also suggests a sizable problem of diarrhea in the local communities.

The village of Khok Kong is located in a rural area of Kuchinarai. The villagers are mainly comprised of people with Phu Thai ethnic origin, a minority population in the Northeastern part of Thailand[7]. Most villagers are farmers, but since 1998 they have run a Phu Thai cultural tourism center in the village and also opened their homes to both domestic and international tourists for homestay. In fact, the cultural tourism activities at Khok Kong village have been successful-the community was recognized as one of

the leaders in cultural tourism business, as it received the Thailand Tourism Awards in 2000[8]. Nonetheless, acute diarrhea remains one of the most common diseases in the district of Kuchinarai, thus an epidemic of diarrheal disease in Khok Kong village could drive away homestay tourists and damage its local economies. To date, however, the prevalence of the diarrheal disease in Konk Kong village is not known. It is also crucial to understand how the prevention and control of diarrheal disease is implemented in this particular community.

Study design

This research is an observational study, which utilized a mixed-methods design including both quantitative and qualitative data analyses[9]. A concurrent embedded research design was used to collect both quantitative and qualitative data simultaneously and thereafter compare the two data sets in order to determine if they are converged[10]. First, to examine individual and environmental risk factors of acute diarrhea in Khok Kong village, we collected an epidemiological data of acute diarrhea and its risk factors using a cross-sectional questionnaire survey. Then statistical analysis including chi-squared test and multivariate logistic regression were used to study the relationship between acute diarrhea and its risk factors, and the relationship among the risk factors themselves. Concurrently, we also used participant observations to collect a qualitative data in order to ensure comprehensiveness and triangulation of the findings. The written narratives of the observers were examined by using qualitative content analysis.

Data collection

We considered all permanent residents of Khok Kong village as the study population. According to the census, the total number of Khok Kong villagers is 557[6]. Thus, all permanent residents of Khong Kong village were constituted the recruitment basis for this study. For quantitative data analysis, data were obtained by a cross-sectional survey using a simple random sampling. With the estimate of diarrheal prevalence of 0.15 and the absolute precision of ten percentage-point, the calculated simple size was 49[11]. The researchers were able to obtain the data from 47 of 49 eligible samples (95.9%).

The epidemiological data was obtained from the questionnaire interviews, which comprised a total of nine questions. This questionnaire was adapted from the standard questionnaire for epidemiological surveillance normally used by the Bureau of Epidemiology, Department of Disease Control, Ministry of Public Health, Thailand[12]. The questionnaire interviewees asked the samples to report their symptoms of acute diarrhea within the past three month, which is consistent with the definition of acute diarrheal disease by provided World Health Organization (WHO). The samples were asked whether they had diarrheal symptoms such as abdominal pain, nausea, vomiting, or fever within the past three months before receiving our questionnaire interviews. This primary question was aimed to estimate a prevalence of acute diarrhea among the villagers. In addition, the questionnaire interviewers also asked the samples additional questions to examine their individual and the environmental risk factors of acute diarrhea. These secondary questions covered the basic demographic data of the samples (age, gender, occupation), personal hygiene (hand washing, kitchen utensils using), and the environmental factors (types and sources of foods and drinks). The interviewers provided the samples with pre-determined response alternatives (never, sometimes, always) to the samples. For some specific items, however, the interviewers asked an open-ended question (e. g. what type of food do you usually have?) to obtain a more details of information from the villagers, and then the answers were categorized into coherent groups (e.g. cooked, uncooked) later on. The researchers did not have a prior know-

ledge of such risk factors in this particular community and aimed to further explore a relationship between acute diarrhea and its determinants, so the data were obtained from the same group of samples without recalculating of sample size.

For qualitative data analysis, a team of 18 researchers stayed over for six nights with six households in Khok Kong village. During our stay, the researchers observed how they cooked and ate inside and outside their homes. We also participated in other daily activities of the villagers, such as their activities during a funeral ceremony. We also visited other villager's homes to conduct the questionnaire interviews, and we observed the environmental factors of acute diarrhea including the sanitization of their residential areas during those visits. Local food supplies, such as local groceries and restaurants, were also visited. All 18 researchers wrote narratives of what they observed, which subsequently were examined by qualitative content analysis.

Data analysis

The researchers managed the quantitative data and conducted statistical analysis using the statistical packages Epi Info™ version 7.1[11]. The characteristics of each variable were demonstrated on Table 1. First, both the mean and the distribution of each variable were estimated. Then the relationship between health determinants and acute diarrhea, as well as the relationship among risk factors were examined by Chi-squared test. Lastly, to control for the effects of confounding factors, a multivariate logistic regression was used to investigate the relationship of health determinants and acute diarrhea.

In addition to the epidemiological data, qualitative data was also obtained using participant observations to ensure comprehensiveness and triangulation of findings. While our research team had been staying with the villager's families for seven days and six nights, we observed the related behavioral risk factors of acute diarrhea, such as personal hygiene, type of food and drink, knowledge regarding health education. The environmental risk factors of diarrhea such as sanitization of cooking and eating were also observed. The researcher daily noted the findings from their observations.

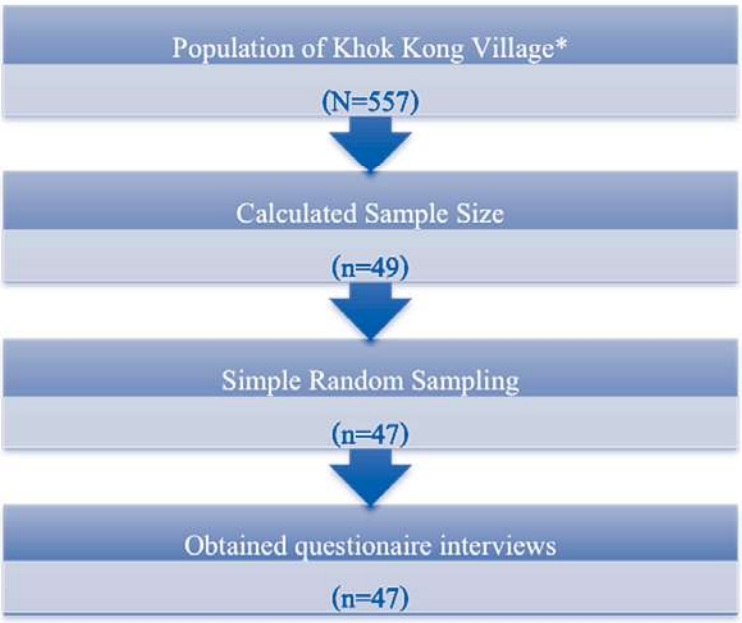

Figure 1 *Summary of the sampling protocol*

The protocol for qualitative data analysis is shown in Figure 2. Each researcher used a logbook to daily note the findings from his or her observations. After the field trip, the research team shared their observation to each other. Researchers then discussed among themselves to come up with a more coherent narratives of their observations. Lastly, such narrative data were analyzed by using the protocol for qualitative content analysis as recommended by Strauss & Corbin[13]. The protocol for qualitative data analysis included: 1) open coding to summarize information of core phenomenon, and categorized such findings into emerging themes; 2) axial coding to summarize information of related phenomenon or consequences of core phenomenon and categorized them into themes; 3) create propositions or hypotheses); and 4) discussion and compare to existing concepts or theories in the literature. The principal investigator was primarily responsible for synthesizing themes and sub-theme using the protocol, but had consulted with the co-investigators during the process of content analysis in order to compare and contrast their interpretations and to ensure that all emerging themes were grounded from the collected data.

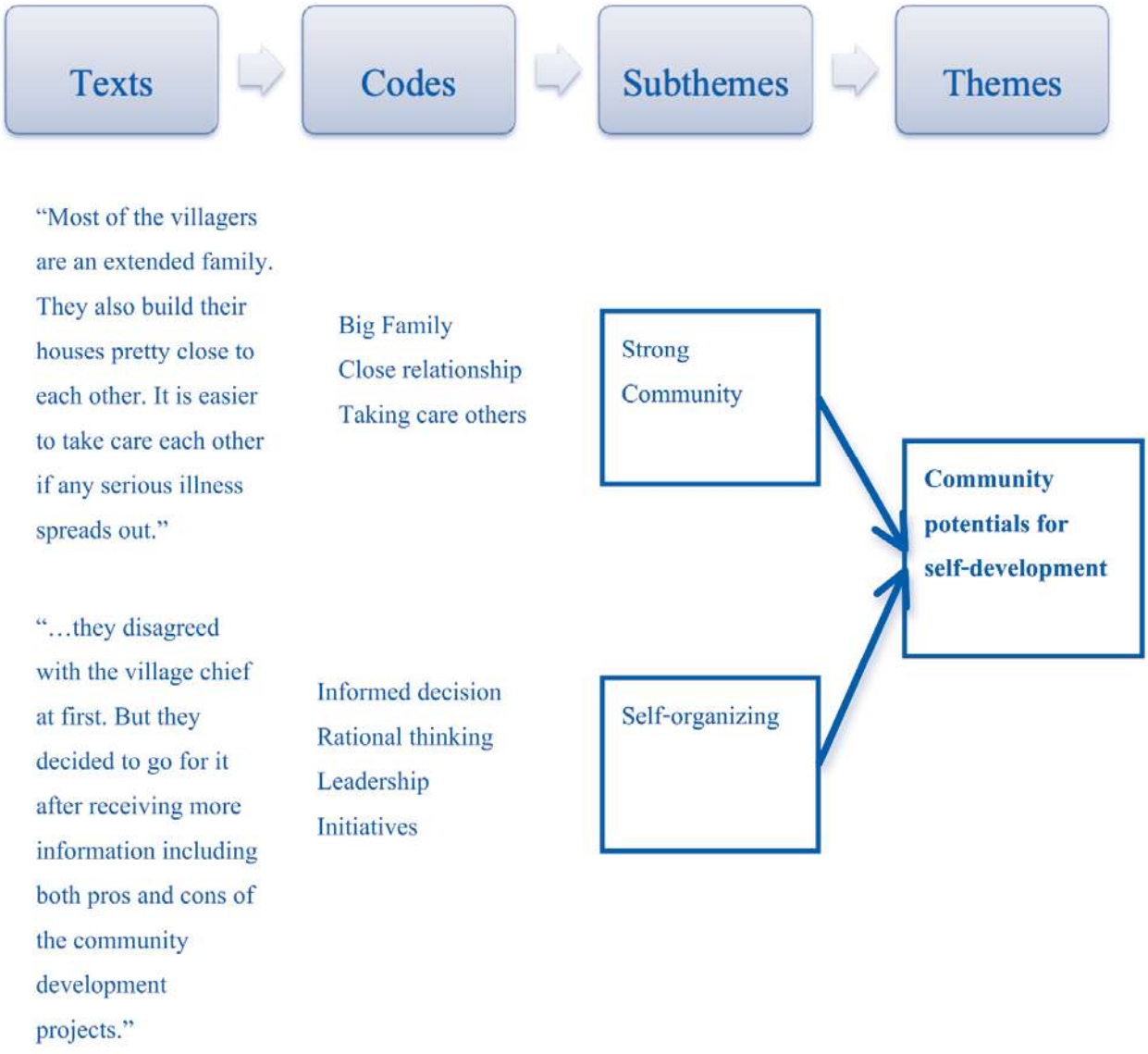

Figure 2 *Protocol for qualitative data collection and content analysis*

Results

Quantitative findings

The descriptive statistics of the data obtained from the questionnaire interviews are demonstrated on Table 1. The average age of the samples was 48.9 years old (ranges from 8-90 years old with a standard deviation of 23.4), while the majority of samples were made up with the female (78.8%). We found that 23.2% of the samples had reported an experience of acute diarrhea in the past three months. Regarding the individual behaviors that potentially can cause acute infectious diarrhea, 65.9% of the samples reported they usually eat uncooked food, especially raw meat and raw fish. Regarding their hand hygiene, while 87.2% of the samples do not use utensils but instead eating with their hands, 31.9% of the samples reported they never washed their hands before having meals, only 12.8% reported they never washed their hands after using the restroom. Other environmental risk factors include sources of their drinking water. We found that 55.3% of the samples reported that their drinking water primarily came from tap water, while 61.7% regularly use potash alum to prepare their drinking water.

The summary of statistical analysis is demonstrated on Table 2. The chi-squared test revealed that the villager's experiences of acute diarrhea in the last three months are significantly associated with the habit of hand washing before meals (OR=0.16, p=0.010) and male gender (OR=0.19, p=0.025). We found no evidence to suggest that age, type of food and drink, habit of hand washing after toileting, or hand eating has a relationship with acute diarrhea. However, gender and habit of hand washing before meals also

Table 1 Descriptive statistics of the data obtained from the questionnaire interviews

Variable	n (percentage)
Diarrheal symptoms	11 (23.3%)
Age (mean, S.D.)	48.9 (23.4)
Female gender	37 (78.9%)
Eating uncooked food	31 (65.9%)
Drinking tap water	26 (55.3%)
Using potash alum to prepare drinking water	29 (61.7%)
Washing hands before having meals	32 (68.1%)
Washing hands after toileting	41 (87.2%)
Eating with hands	41 (87.2%)

Table 2 Summary of findings from chi-squared test of the relationship between diarrheal disease and its risk factors

Risk factors of diarrheal disease	Having diarrhea	Having no diarrhea	Odds ratio	p-value
Female gender	6	31	0.19	0.025**
Eating uncooked food	9	22	2.86	0.205
Washing hands before meals	4	28	0.16	0.010**
Washing hands after toileting	10	31	1.61	0.676
Eating with hands	0	41	0.01	0.147

**indicates the statistical significance at the level of 0.05

Table 3 Findings from logistic regression analysis of the relationship between diarrheal disease and the two risk factors

Risk factors of diarrheal disease	Odds Ratio	95% Confidential Interval	p-value
Female gender	0.29	0.06-1.50	0.140
Washing hands before meals	0.22	0.05-0.99	0.048**

* Variables included in the model: eating uncooked food, washing hands after toileting, hand eating

** indicates the statistical significance at the level of 0.05

have a statistically significant relationship (χ^2=4.61, p=0.032). After controlling for gender by using multivariate regression analysis, however, the relationship between hand hygiene and acute diarrhea remains statistically significant (OR=0.22, p=0.048). The findings of regression analysis are demonstrated on Table 3.

Qualitative findings

Qualitative content analysis revealed "adequate hygiene for cooking and eating within households", and "poor sanitization of local restaurants and grocery stores", "good health literacy", and "community potentials for self-development". These emerging themes suggest social determinants that potentially can contribute to the prevention and control of acute diarrhea epidemic of Khok Kong village. The examples of texts from researcher's logbooks that reflect such emerging themes are demonstrated below.

1. Adequate hygiene for cooking and eating within households

The researcher team had direct experiences of the hygiene of the villagers' households during our stay. When whey were preparing and having meals, the research team also observed good practices by the villagers. This suggests an adequate hygiene for cooking and eating within the households.

"I think the villagers know how to prevent acute infectious diarrhea. They also have a pretty good personal hygiene. Most people I talked to wash their hands before meals and after toileting."

"From our own meals, we can see the villagers know a safe way to preserve their food in the households. But more importantly, most of their meals are not from industrial food processing-they use more natural ingredients in their cooking. So I think their meat and vegetables are less contaminated than food we have in the big cities."

2. Poor sanitization of local restaurants and grocery stores

Even though the research team observed an adequate hygiene for cooking and eating within the households, when we went outside the households we also noticed an inadequate standard of food safety in the facilities such as local restaurants and grocery stores.

"Some of the items sold in the local grocery store are probably not that clean. For instance, I noticed the ice they stored and sold is probably contaminated."

"Although most of the houses that we visited have shown clean kitchen and food storage. But we are pretty surprised by how dirty the food storage in the local restaurant is. I suspect that their foods are safe at home, but that is not the case when they eat outside."

3. Good health literacy

Most villagers whom the researcher team has observed and talked to demonstrated a high level of health literacy. This is very important factor that could be attributed to effective health education in the past. It also suggests a potential for effective communication of procedures for prevention and control of diarrhea in this community should an epidemic occurs.

"The villagers have knowledge of prevention of diseases more than what I thought. Although they usually started with folk medicine such as using herbs

for self-care, generally speaking they know when they need to see a health professional, either at the nearby health station or the downtown community hospital."

"There is a primary health center (Sukasala) located in the village, and the volunteers who work there actually are the villagers trained to help each other-they know how to cope with common diseases. For instance, they also worked with other villagers to prevent infectious diseases such as dengue hemorrhagic fever by monitoring and destroying mosquito larva."

4. Community potentials for self-development

The community has a long history of being self-sufficient. It has a strong culture to work together as a community. This suggests the community have potentials for self-development, which is essential for developing infrastructure needed for prevention and control of diarrheal epidemics. The examples of the observer's narratives that suggest this emerging theme are shown below.

"Most of the villagers are an extended family. They also build their houses pretty close to each other. I think, it is easier to take care each other if any serious illness spreads out."

"If an epidemic occurs, I believe the community has potentials to solve problems by themselves because of their abilities to analyze problems and make rational decision-makings as a community. Considering when the village chief (Phuyai Baan) informed the villagers about an idea to establish a cultural tourism center within the village years ago, everyone had a chance to voice out their own opinions. In fact, they disagreed with the village chief at first. But they decided to go for it after receiving more information including both pros and cons of the project."

Discussion and Conclusion

Discussion

To our knowledge, this is one of the first empirical studies in Thailand to explore the social determinants of acute diarrhea in a community that offers an experience of village homestay to domestic and international travelers. The mixed-method study design allowed for the researchers to gain an understanding of both individual and environmental risk factors of the disease in this specific context. It also allowed us to conduct an in-depth evaluation of the community potentials to manage the prevention and control of diarrheal disease. By using the protocol adapted from the standard questionnaire for the Ministry of Public Health's epidemiological surveillance, the data obtained from questionnaire interviews addressed the most important risk factors of acute diarrhea epidemic in Thailand. The written narratives from participant observations not only elicited the villagers' views on how they dealt with this particular health problem, but also captured how the researchers interpreted their direct experiences in the field. Although this study have some limitations as it suffers from the nature of a cross-sectional study, as no causal relationship can be estimated from our empirical data. Yet we found our findings from the fieldwork led us to important lessons regarding the health determinants in the community with homestay tourism.

From statistical analysis, there is enough evidence to suggest that the villagers with habit of hand washing before meals less likely had acute diarrhea. The chi-squared test shows that the male villagers were less likely than the female villagers to wash their hands before meals. However, because gender and habit of washing hands before meals also are statistically correlated, gender is considered a confounding factor in the relationship between hand hygiene and acute diarrhea. This relationship is confirmed when we ran a multiple logistic regression with both gender and hand washing habit as the independent variables-the relationship between hand hygiene and acute diarrhea remains statistically significant. In fact, the protective effect of hand washing is well aligned with the findings of other studies from

other developing countries[14-17].

There is no evidence of relationship between age, type of food and drink, hand washing after toileting, or hand eating and acute diarrhea in this tourism-oriented community. Such findings are matched with qualitative content analysis-our participant observations reveals the emerging themes that suggest the villagers were empowered of knowledge and skills of diarrheal prevention in their households. Nevertheless, our participant observations also show "adequate hygiene for cooking and eating within households", and hence sanitization of foods and drinks outside the households appeared to be insufficient and could be a potential source of diarrheal widespread. This particular finding provides a new insight on health determinants of diarrheal disease in the communities, that health behaviors of the villagers in their households are not necessarily well aligned with their behaviors outside their households.

This study has some limitations due to its nature of exploratory research and its cross-sectional dataset. Given our limited time in data collection, we can afford the absolute precision of ten percentage-points only. Future study should collect data from more samples in order to reach a higher precision of estimations. Moreover, this cross-sectional study can determine only the association, but not causation, of risk factors and diarrheal disease. The future research may utilize case-control research design to inverstigate a causational relationship between risk factors and prevalence of diarheal disease in the community. Lastly, public helath practitioners should investigate other determinants of diarhea that are not included in this study, as well as social determinants that could help developing a systematic prevention and control of diatrheal disease in other comparable communities.

Conclusion

This empirical study contributes to an increased understanding of health determinants in the community settings of homestay villages in Thailand. Although it is found that personal hygiene particularly hand washing before meals are significant associated with the incidence of acute diarrhea, other sociocultural and environmental factors such as community potentials for self-development may also contribute to the disease prevention and control.

An epidemic of acute infectious diarrhea in communities with homestay tourism potentially can damage the local economies, as it could drive away the visitors from staying within their community. But after all, the fact that the villagers are empowered to organized their own cultural center and homestay tourism in the community suggests that they already have possessed a great potential to manage health determinant by themselves, especially when it comes to the social determinants of health related to the prevention and control of acute diarrhea epidemic in their community.

Acknowledgement

The authors are very grateful to all medical staffs of Kuchinarai Crown Prince Hospital that helped coordinating the fieldwork schedule of our research team during the month of January 2013. We also would like to thank the third-year medical students from the Faculty of Medicine Ramathibodi Hospital, including Satawat Jaiua, Apirat Chulalaksananukul, Parima Voharnsuchon, Satima Wanachate, Warat Mahatumarat, Janejira Euaputtajunya, Tipanan Puttapornpattana, Preeda Tiyaratanakornkul, Priengrutai Prasopchoknapaporn, Rungrojn angwatcharaprakan, Anyamanee sewarit, Vipada grajangdara, Supanat Thitipatarakorn, Navitha Rattanavipapong, Sasagorn Radsadornpakdee, Dhnatip Tantidhnazet, and Sarita Ratana-Amornpin, for their assistance in collecting both quantitative and qualitative data. Lastly, we would like to give a special thank to the village chief and all residents of Khok Kong village for their hospitality and all valuable lessons they had provided during our research team's homestay.

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Original Article/นิพนธ์ต้นฉบับ

ปัจจัยเสี่ยงของโรคท้องเสียเฉียบพลันในชุมชนที่จัดการท่องเที่ยวแบบโฮมเสตย์: การศึกษาแบบผสม

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บทคัดย่อ

บทนำ: การระบาดของโรคท้องเสียเฉียบพลันในชุมชนที่จัดการท่องเที่ยวแบบโฮมเสตย์เป็นปัญหาสาธารณสุข และยังอาจส่งผลลบต่อเศรษฐกิจของท้องถิ่นอีกด้วย การศึกษาชิ้นนี้มีวัตถุประสงค์เพื่อสำรวจปัจจัยเสี่ยงรวมทั้งทรัพยากรชุมชนที่อาจส่งผลต่อการควบคุมและป้องกันโรคท้องเสียเฉียบพลันในหมู่บ้านท่องเที่ยวแบบโฮมเสตย์

วิธีการศึกษาวิจัย: การวิจัยชิ้นนี้เป็นการศึกษาเชิงสังเกต ใช้ระเบียบวิธีวิจัยแบบผสม กลุ่มประชากรได้แก่ ประชาชนทั้งหมดที่มีถิ่นฐานในหมู่บ้านโคกโก่ง จ.กาฬสินธุ์ จำนวน 557 ราย เก็บข้อมูลเชิงปริมาณโดยใช้แบบสำรวจแบบภาคตัดขวาง สุ่มกลุ่มตัวอย่างแบบง่ายได้กลุ่มตัวอย่างรวม 47 ราย ทำการวิเคราะห์ข้อมูลด้วยการทดสอบไคสแควร์และสมการถดถอยโลจิสติกส์ และเก็บข้อมูลเชิงคุณภาพจากการสังเกตแบบมีส่วนร่วมและวิเคราะห์ข้อมูลด้วยการวิเคราะห์เนื้อหา

ผลการศึกษา: ร้อยละ 23 ของกลุ่มตัวอย่างรายงานอาการของโรคท้องเสียเฉียบพลันในระยะเวลา 3 เดือนที่ผ่านมาซึ่งมีความสัมพันธ์กับนิสัยการล้างมือก่อนรับประทานอาหาร (odds ratio=0.16, p=0.010) และเพศหญิง (odds ratio=0.19, p=0.025) ความสัมพันธ์ดังกล่าวยังคงมีนัยสำคัญทางสถิติแม้ว่าจะกำหนดให้เพศเป็นตัวแปรควบคุม (odds ratio=0.22, p=0.048) การวิเคราะห์ทางสถิติแสดงให้เห็นว่าชาวบ้านซึ่งมีนิสัยล้างมือก่อนรับประทานอาหารมีโอกาสเป็นโรคท้องเสียเฉียบพลันน้อยกว่า แต่ไม่พบหลักฐานของความสัมพันธ์ระหว่างชนิดของอาหารและน้ำดื่มกับการเป็นโรคท้องเสียเฉียบพลัน การวิเคราะห์ข้อมูลเชิงคุณภาพพบว่า “ชาวบ้านมีสุขอนามัยในการปรุงและรับประทานในบ้านที่เหมาะสม” “ร้านอาหารและร้านของชำในท้องถิ่นไม่สะอาด” “ความแตกฉานด้านสุขภาพอยู่ในเกณฑ์ดี” และ “ชุมชนมีศักยภาพในการพัฒนาตนเอง”

อภิปรายผล: การวิเคราะห์ทางสถิติให้ผลสอดคล้องกับการวิเคราะห์ข้อมูลเชิงคุณภาพ ซึ่งแสดงให้เห็นว่า พลังความเข้มแข็งในครัวเรือนส่วนใหญ่ช่วยป้องกันและควบคุมโรคท้องเสียเฉียบพลันในชุมชน อย่างไรก็ตาม ความปลอดภัยของอาหารนอกครัวเรือนยังไม่เพียงพอและอาจเป็นแหล่งแพร่เชื้อโรคท้องเสียเฉียบในชุมชนได้

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