KNOWLEDGE, ATTITUDE, AND PRACTICE TOWARD *CLOSTRIDIUM BOTULINUM* OUTBREAK IN HOME-CANNED BAMBOO SHOOTS AT PAKALUANG SUBDISTRICT, BAN LUANG DISTRICT, NAN PROVINCE, THAILAND

Thanusin Saleeon[1,*], Pisit Sriprasert[2], Mark Robson[3,4], and Wattasit Siriwong[1,4]

[1]College of Public Health Sciences, Chulalongkorn University, Bangkok, Thailand
[2]Nan Provincial Public Health Office, Nan, Thailand
[3]New Jersey Agricultural Experiment Station, Rutgers University, New Brunwick, NJ, USA
[4]Thai Fogarty ITREOH Center at Chulalongkorn University, Bangkok, Thailand

ABSTRACT: This study aims to assess the level of knowledge, attitude, and practice (KAP) toward *Clostridium botulinum* outbreak in home-canned bamboo shoots at Pakalung SubDistrict, Ban Luang District, Nan Province, Thailand. A cross-sectional approach was conducted to assess KAP using a structured questionnaire. A total of 280 people, randomly selected responded by face to face interview. The results indicated that the knowledge and attitude of the participants were moderate and neutral (57.9 % and 51.8 %, respectively). The prevalence of good practice level was 89.6 %. Furthermore, the knowledge was significantly associated with social-demographic characteristics (Chi-square, $p<0.05$) i.e. education level ($p<0.001$), occupation ($p<0.029$), monthly incomes ($p<0.001$).The attitude was associated with age group ($p<0.001$), education level ($p<0.002$), monthly incomes ($p<0.001$) and monthly incomes ($p<0.001$) are associated with practice level . The information gained would be utilized for health promotion and use of appropriate tools to increase more knowledge, and changing wrong beliefs concerning food habits and changing some people's practices that might increase risk related to *C. botulinum* foodborne.

Keywords: Kap Survey, *Clostridium botulinum*, home-canned bamboo shoots.

INTRODUCTION: Food borne botulism is caused by eating foods that contain the botulism toxin. Botulism can cause death by respiratory failure. In the past 50 years, although the proportion of patients death has fallen from about 50% to 3-5%, many patients survived from botulism poisoning have suffer of fatigue and shortness of breath for years[1]. Long-term therapy may be needed to aid recovery. In the United States, averages of 145 cases are reported each year. Of these, approximately 15% are food borne, 65% are infant botulism, and 20% are due to wounds. Adult intestinal colonization and iatrogenic botulism also occur, but rarely. Outbreaks of food borne botulism involving two or more persons occur most years and is usually caused by eating contaminated home-canned foods[1].There is strong statistical evidence that the incidence of food poisoning caused by caterers is greater than in any other food sector, accounting for 70% of all bacterial food poisoning outbreaks. Seventy percent of these food poisoning outbreaks are due to the inadequate time and temperature control of food, while the remaining 30% are the result of cross-contamination[2]. In the year 2006, many patients sought treatment at Ban Luang district hospital, Nan province, Thailand with reports of gastroenteritis. An outbreak of botulism was suspected; a total of 209 villagers had the onset of symptoms compatible with botulism. Among the affected villagers, 64% were hospitalized with paralysis ranging from minor bulbar palsies to quadraparesis and 20% of patients required mechanical ventilation for respiratory depression [3].

MATERIALS AND METHODS: This study was a cross sectional study regarding the Knowledge, Attitude, and Practice (KAP) toward *C. botulinum* outbreak in home-canned bamboo shoots at Pakaluang SubDistrict, Ban Luang District, Nan Province, Thailand. The participants were local people living in Pakaluang Subdistrict, the botulism outbreak area. Data were collected by using face to face questionnaire from 280 randomly selected respondents. The licensed SPSS software (version 17.0) has been used for data analysis.

*To whom correspondence should be addressed.
E-mail: nuut_thanusin@hotmail.com Tel. 087-1801928

Descriptive statistics such as frequency, percentage, mean and standard deviation have been primarily used to summarize and describe the data. For analytical statistics, Chi-square has been used for associations to describe the strength and direction of the association between variables.

RESULTS: The majority of the participants in this study were male (54.6%). The age ranged from 22 to 69 years. The average age of the participants was 49.47 years (SD=9.61). The majority of the respondents were in the rage of 40-49 years (41.4%) and 50-59 years (27.5%), while 11.8% were in the rage 30-39 years, and 17.9% were older than 60 years. The majority of the participants were head of family (60.4%) and housewife were (34.6%). The majority was marital status was couple (76.4%). The single or widowed, and separated group were 6.8% and 16.8%. Regarding education level, Most of them were educated in primary school level (76.4%) followed by high school and upper level (16.4%) and lower secondary school level (2.9%). The majority of the respondents were agriculturist (77.5%) and non agriculturist group was (22.5%).Regarding monthly income, the majority had income < 5,000 baht (~152 USD) per month(58.2%), income between 5,000 – 10,000 baht was (24.6%) and the income > 10,000 baht was (17.1%). The mean of the monthly income was 6,964 baht per month (SD=8.73).

To assess the knowledge of the participants, they answered a total 15 questions. Each correct answer was given one point with a total 15 points. The average knowledge score from the respondents was 9.04 (SD=2.62) out of possible 15 points. The knowledge score was in the range of 0-14. The distribution of the knowledge on foodborne botulism in home-canned bamboo shoot of the respondents showed that 42.1 % of subjects had "Low knowledge", 57.9 % of them had "Moderate knowledge" as shown in Table 1.

Table1: Distribution of Knowledge level contamination of foodborne Botulism in home-canned bamboo shoots (n=280)

Knowledge level	Number	Percentage
Moderate (10-12 score)	162	57.9
Low (00-09 score)	118	42.1

For the attitude, the participants answered a total of 15 questions with the total score of 60. The distribution of attitudes regarding perceived severity of *C.botulinum* and consumption behavior of respondents are shown in Table 2, the average attitude score was 37.8 points (SD=5.4) from 60 points. Respondents with "positive attitude" were 48.2% with "neutral attitude" were 51.8%.

Table 2: Distribution of attitude level regarding perceived severity of *C.botulinum* and consumption behavior (n=280)

Level of attitude	Number	Percentage
Positive (41-60 score)	135	48.2
Neutral (21-40 score)	145	51.8

The distribution of practice to prevent health effect of *C. botulinum* toxin of respondents is shown in Table 3. There were 89.6% of respondents who had "Good practice". The percentage of fair (10.4%).

Table 3: Distribution of practice level to prevent health effect of *C. botulinum* toxin (n=280)

Level of practice	Number	Percentage
Good (11-15 score)	251	89.6
Fair (06-10 score)	29	10.4

DISCUSSIONS: The majority of the local people (58.2%) had the income less than 5,000 baht (~152 USD) per month. This result was aligned with a previous study as poverty likely drives more persons to conserve food; lack of reliable energy sources, clean water, and cooking supplies

makes food preservation practices riskier; and food shortage compels persons to rely on preserved food for a larger proportion of their diet[4]. In our study 43.2% produced home-canned bamboo shoot for consuming in their family and 96.8% ate home-canned bamboo shoot in uncertain up on occasion.

Other factors may include cultural preferences and inadequate awareness of attendant risks. Changing practices will be difficult because the intervention needs to be home-based and must account for the various forces that compel persons to eat improperly preserved food[4].

In the study 42.1% of subjects had Low knowledge level, and 57.9% of them had moderate knowledge of food borne botulism. There were 48.2% respondents with "positive attitude". Attitudes, an important factor besides knowledge and enforcement, ensure a downward trend of foodborne illnesses[7]. The necessary link of positive behavior, attitudes and continued education of food handlers towards the sustainability of safe food handling practices has been highlighted[7].

Whether consumers misperceive the nature and source of food borne illness, it would imply that they misjudge the frequency and would be less motivated to change behaviors related to food safety. This obviously has implications for any food safety education effort developed[8, 9]. In this study the question "A canned food with enclosed, air can't get *C.botulinum?* Has 54.6% "Neutral" answer and suggest to give more education to people who are less educated. 82.1% participants knew that before eating a home-canned bamboo shoots they should boil it at least 30 minutes to kill *C.botulinum*. Because of the absence of sterilization and pressure cooking, *C. botulinum* spores can survive and produce toxin in solutions that are relatively neutral with low salt and sugar content. As well as, the failure to heat food before eating may increase risk[10].

Educating consumers about preventive methods to reduce food safety threats will lead to more concerns and changes in food consumption habits. Although home and artisan production remain the principal causes of botulism outbreaks, the proportion of cases attributable to commercial products is increasing, especially in Europe where recent outbreaks have been linked to commercial foods.[11] The literature clearly states that food safety should be a collaborative approach between the government, food industry, and the consumers[12]. As regards this study, thirty five percent followed the recommendation from Ministry of Public Health to produce home-canned bamboo shoot with acidifier method. It is known that food borne illnesses are often not perceived as significant health problem by consumers, and even be considered a normal consequence. Generally, consumers tend to ignore the role of food and food handling in the transmission of diarrhea and attributed their symptoms to other factors i.e., indigestion[9].

Education level is an important indicator of knowledge regarding both contamination of botulism in home-canned bamboo shoots and foodborne diseases. The association with higher income supports this result. The correlation between education level and knowledge of pathogens related to food transportation has been reported in the survey conducted among food handlers[13]. It is easy to understand that respondents with high education level, have more knowledge.

In conclusion, the information gained would be utilized for health promotion and use of appropriate tools to increase more knowledge, and changing wrong beliefs concerning food habits and changing some people's practices that might increase risk related to *C. botulinum* foodborne.

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