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Effectiveness of the hill tribe audio computer assisted self interview versus self-administration questionnaires to assess sexual behaviors among the hill tribe youths

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ABSTRACT

Background: Human sexual behaviors are common, and some practices increase the risk contracting a diseass, however it is difficult to obtain accurate information from a particular population. The hill tribe audio computer-assisted self-interview (HACASI) was developed. The study aimed to compare its effectiveness with a paper-based questionnaire among hill tribe youths in assessing their sexual behaviors. **Methods:** Two different experimental assessments were performed to collect data from youths aged 15–24 years belonging to one of six main tribes: Akha, Lahu, Hmong, Yao, Karen, or Lisu. Purposive sampling was used to select sexually active participants. Questions regarding individuals' sexual behaviors were prepared and collected in two forms: paper-based questionnaires and HACASI. Chi-square and correlation tests were used to detect differences and correlations, respectively, at a significance level of α = 0.05. **Results**: A total of 600 participants were recruited for the study; 50.0% were male, 72.5% were aged 15–17 years (mean = 16.7, SD = 1.34), and 81.2% were Christian. Tribes were represented as follows: 20.0%, Akha; 16.7%, Lahu; 16.7%, Hmong; 16.7%, Yao; 16.7%, Karen; 13.3%, Lisu). A large proportion of the participants were students (84.0%). In the correlation test between the paper-based questionnaire and HACASI in classification by sex, answers to seven variables were found to be statistically significantly different in males (P-value<0.001): having sex experience, age at their first sexual intercourse, the number of partners, their first sexual intercourse, condom use, being MSM, being engaged in prostitution. Another seven variables were found to be statistically significantly different (P-value < 0.001) between the paper-based questionnaire and HACASI among female sexual behaviors on questions related to having sexual experience, age of their first sexual intercourse, the number of partners, with whom they had first sexual intercourse, condom use, past-year sexual intercourse with men, and being a prostitute. **Conclusion:** The HACASI is appropriate for gathering information on sexual behaviors among youths and should be promoted in surveillance systems to monitor sexual behaviors among hill tribe youths in the future.

Keywords: *Effectiveness, HACASI, Sexual behavior, Hill tribe, Youth*

Introduction

Sexual behavior is kept secret by individuals and is not usually made public [1]. Many sexual activities have been identified as routes to several diseases, such as hepatitis B [2], human immunodeficiency virus [3], syphilis [4], and gonorrhea [5]. However, obtaining information on sexual behavior in a particular population is very difficult; getting accurate data on the sexual behavior among those living in poor socioeconomic conditions is even more problematic [6]. In addition, most social norms in a community do not include sexual behaviors; thus, the accuracy of information is always doubtful, especially in some specific populations [7].

The hill tribe people in Thailand are classified as the minority population who have their own cultures

and norms, including expressing their sexual behaviors [8]. There are six main groups: Akha, Lahu, Hmong, Yao, Karen, and Lisu. The population of Thailand was more than 4.5 million in 2020, including 250,000–300,000 hill tribe people living in 749 hill tribe villages in Chiang Rai [9]. Those aged 15–24 years are classified as being sexually active and present a risk population for many sexually transmitted infetions (STIs) [10]. STIs have been reported to be highly prevalent in these populations [11]. Therefore, understanding sexual behaviors is critical and requires close monitoring. Since specific norms and cultures restrict expressing sexual behaviors, gathering this information requires a particular approach [12]. The hill tribe audio computer-assisted self-interview (HACASI) was developed by the team of the Center of Excellence, Hill Tribe Health Research from Mae Fah Luang University [13].

However, the effectiveness of HACASI has not yet been tested. HACASI has been created in six hill tribe languages: Akha, Lahu, Hmong, Yao, Karen, and Lisu. It is a computer program showing several icons on the screen. Each icon represents a specific question or answer relating to sexual behavior. The icon text is presented on the computer screen while participants hear the question through earphones. Participants select a response by pressing the button of the chosen icon that is transformed into a number form in Excel. The Excel sheet was used for further analysis. The specific feature of the HACASI is the method of gathering information on sensitive issues such as sexual behaviors (Figure 1).

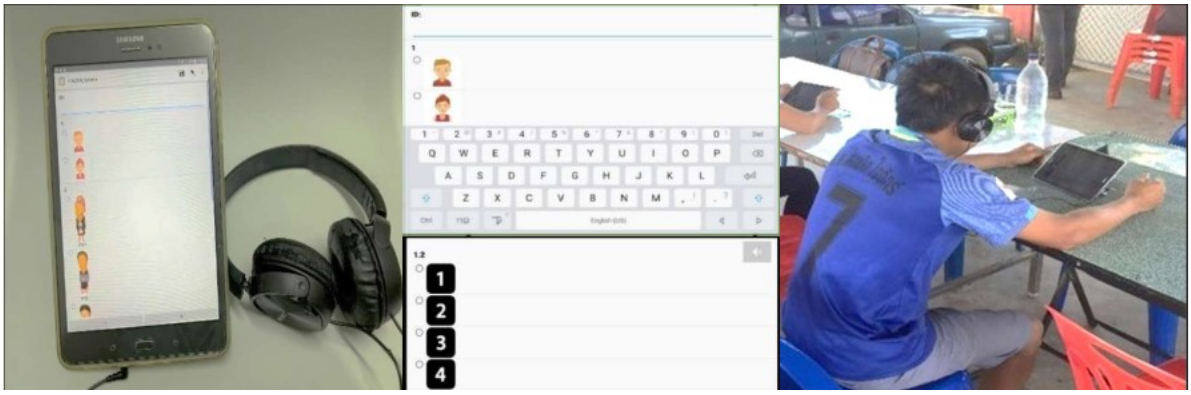

Figure 1 The hill tribe audio computer assisted self-interview (HACASI)

This study aimed to test the effectiveness of the HACASI compared to a paper-based questionnaire on sexual behaviors among hill tribe youths in northern Thailand.

Methods

Study design and participants

Two experimental assessments using two different approaches were performed to collect data on sexual behaviors in hill tribe youths.

Study population

The target populations were the hill tribe youths who belonged to six main tribes: Akha, Lahu, Hmong, Yao, Karen, or Lisu, and living in Chiang Rai province, Thailand.

Study sample

The study samples consisted of individuals aged 15–24 years. There are 749 hill-tribe villages in Chiang Rai province: 316 in Lahu, 243 in Akha, 63 in Yao, 56 in Hmong, 36 in Karen, and 35 in Lisu [14]. Purposive sampling was used to select two villages in each tribe in three districts: Muang District, Mae Chan, and Mae Fah Luang; participants lived in 12 selected villages. Those who could not provide all the essential information related to the study protocols were excluded from the study.

Research instruments

A questionnaire was developed by reviewing various literature sources of information. All the selected questions were validated using a small test group of 60 people from the six hill tribe groups who had similar characteristics to the targeted population of the study. The final set of questions prepared for data collection consisted of three parts. In part one, eight questions were used to collect the demographic characteristics of the participants. In part two, 16 questions were used to collect data regarding substance use. In part three, seven questions were used to collect data on sexual behaviors, with different questions for males and females.

The hill tribe audio computer-assisted self-interview (HACASI)

All questions were transformed into the six hill tribe languages and tested for accuracy by the forward and backward testing before use. Four people (two

males and two females) in each tribe who were able to use Thai and their own language fluently performed the testing. The HACASI was developed and used as previously mentioned.

Steps of data collection

The village headman granted access to each village for data collection. All village headmen were provided with all essential information regarding the study before the appointment was made. On the day of data collection, all participants, taking part voluntarily, were provided with information about the study.

All participants were asked to complete a paper-based questionnaire that lasted for 10 min. Then, two months later, all participants were asked the same questions again but in the HACASI format. The data collection was performed between April to June 2021.

Data analysis

Data were analyzed using SPSS version 24 (SPSS, Chicago, IL, USA), and are presented as percentages, means, and standard deviations depending on whether they were in the form of either categorical or continuous data. The chi-square test was used to test the proportions between the groups. In addition, Pearson correlation was used to assess the correlations between the information obtained from the paper-based and HACASI at a significance level of $\alpha = 0.05$.

Ethical consideration

All research protocols were approved by the Chiang Rai Provincial Public Health Office (CRPPHO No. 71/2563). All activities were performed following the relevant guidelines and regulations. Before implementation, all participants were provided with information about the study and asked to voluntarily provide their informed consent.

Results

General charcateristics of participants

Six hundred participants were recruited for the analysis; 50.0% were males, 72.5% were aged 15–17 years (mean = 16.7, SD = 1.34), and 81.2% were Christian. Tribe representation was 20.0% Akha, 16.7% Lahu, 16.7% Hmong, 16.7% Yao, 16.7% Karen, and 13.3% Lisu. A large proportion of the sample had vocational certificates (66.5%) and 84.0% were students (Table 1).

Comparisons of sexual behaviors between sexes in information obtained by HACASI approach

Comparing sexual behaviors between sexes in data collected by the HACASI method, three factors were found to be statistically different between males and females: having sexual experience (*P*-value = 0.022), the number of partners (*P*-value < 0.001), and a person they had their first sexual intercourse with (*P*-value = 0.025) (Table 2).

Table 1 Characteristics of participants

Characteristics	n	%
Total	**600**	**100.0**
Sex		
Male	300	42.0
Female	300	58.0
Age (years)		
15-17	435	72.5
18-21	165	27.5
Min=15, Max=21, Mean=16.7, SD=1.34		
Tribe		
Ahka	120	20.0
Lahu	100	16.7
Hmong	100	16.7
Yao	100	16.7
Karen	100	16.7
Lisu	80	13.3
Marital status		
Single	600	100.0
Religion		
Buddhist	113	18.8
Christian	487	81.2
Education		
Illiterate	13	2.2
High school	188	31.3
Vocational	399	66.5
Occupation		
Unemployed	96	16.0
Student	504	84.0
Health insurance		
Universal health Coverage	600	100.0

Comparisons of substance use behaviors by chracteristics in information obtained by HACASI approach

In responses to the HACASI program on substance use, two features were found to show a statistically significant difference: sex ($p < 0.001$) and occupation ($p = 0.007$) (Table 3).

Comparisons of sexual behaviors between information obtained by HACASI approach and paper-based

In the correlation analysis between answering paper-based questionnaire and in HACASI by sex, seven variables differed in giving answers to questions on sexual behaviors among males: sex experience ($r = 0.911$, *P*-value < 0.001), first sexual intercourse ($r = 0.964$, *P*-value < 0.001), number of partners ($r = 0.923$, *P*-value < 0.001), first sexual intercourse ($r = 0.909$, *P*-value < 0.001), condom use ($r = 0.911$, *P*-value < 0.001), sexual intercourse with men who have sex with men (MSM) ($r = 0.911$, *P*-value < 0.001), and prostitution ($r = 0.911$, *P*-value < 0.001). Seven

Table 2 Comparison between sexes and sexual behaviors in HACASI

Characteristics	Total		Sex				χ^2	*P*-value
			Male		Female			
	n	%	n	%	n	%		
Having sex experience								
Yes	127	21.6	75	59.1	52	40.9	5.28	0.022*
No	473	78.4	225	47.6	248	52.4		
Age at first sexual intercourse (years)								
≤15	88	69.3	48	54.5	40	45.5	2.41	0.121
>15	39	30.7	27	69.2	12	30.8		
Number of partners								
Only one	97	76.4	45	46.4	52	53.6	27.23	<0.001*
More than one	30	23.6	30	100.0	0	0.0		
Having first sexual intercourse with whom								
Boy/Girlfriend	116	91.3	72	62.1	44	37.9	5.03	0.025*
One night stand	11	8.7	3	27.3	8	72.7		
Condom use								
Yes	84	66.1	45	53.6	39	46.4	3.08	0.079
No	43	33.9	30	69.8	13	30.2		
Being prostitution								
Yes	0	0.0	0	0.0	0	0.0	NA	NA
No	127	100.0	75	59.1	52	40.9		

**Significant level at α= 0.05*
[a]Fisher's exact test

Table 3 Comparison between characteristics and substance use behaviors in HACASI

Characteristics	Smoking		Alcohol use		Other substance use		χ^2	*P*-value
	n	%	n	%	n	%		
Total	43	100.0	77	100.0	13	100.0	N/A	N/A
Sex								
Male	37	44.6	35	42.2	11	13.3	22.40	<0.001[a]*
Female	6	12.0	42	84.0	2	4.0		
Age (years)								
15-17	18	46.2	18	46.2	3	7.7	4.82	0.090
18-21	25	26.6	59	62.8	10	10.6		
Tribe								
Ahka	10	40.0	12	48.0	3	12.0	10.50	0.364[a]
Lahu	7	50.0	5	35.7	2	14.3		
Hmong	5	22.7	16	72.7	1	4.5		
Yao	6	50.0	5	41.7	1	8.3		
Karen	9	31.0	17	58.6	3	10.3		
Lisu	6	19.4	22	71.0	3	9.7		
Religion								
Buddhist	11	23.4	31	66.0	5	10.6	2.66	0.264
Christian	32	37.2	46	53.5	8	9.3		
Education								
Illiterate	6	60.0	3	30.0	1	10.0	9.10	0.055
High school	14	37.8	17	45.9	6	16.2		
Vocational	23	26.7	57	66.3	6	7.0		
Occupation								
Unemployed	15	25.0	34	56.7	11	18.3	10.03	0.007*
Student	28	38.4	43	58.9	2	2.7		

** Significant level at α= 0.05*
[a]Fisher's exact test

Table 4 Comparison between the answers in paper-based questionnaire and HACASI in males and females of their sexual behaviors

Sex	Items	Sexual behaviors	Correlation	
			r	*P-value*
Male	Paper-based questionnaire / HACASI	Sex experience	0.911	<0.001*
	Paper-based questionnaire / HACASI	Age at first sexual intercourse	0.964	<0.001*
	Paper-based questionnaire / HACASI	Number of partners	0.923	<0.001*
	Paper-based questionnaire / HACASI	Having first sexual intercourse with whom	0.909	<0.001*
	Paper-based questionnaire / HACASI	Condom use	0.911	<0.001*
	Paper-based questionnaire / HACASI	MSM	0.911	<0.001*
	Paper-based questionnaire / HACASI	Being prostitution	0.911	<0.001*
Female	Paper-based questionnaire / HACASI	Sex experience	0.869	<0.001*
	Paper-based questionnaire / HACASI	Age at first sexual intercourse	0.869	<0.001*
	Paper-based questionnaire / HACASI	Number of partners	0.869	<0.001*
	Paper-based questionnaire / HACASI	Having first sexual intercourse with whom	0.866	<0.001*
	Paper-based questionnaire / HACASI	Condom use	0.873	<0.001*
	Paper-based questionnaire / HACASI	Having sexual intercourse with men one year prior	0.866	<0.001*
	Paper-based questionnaire / HACASI	Being prostitution	0.869	<0.001*

** Significant level at α = 0.05*

variables differed in answers to questions on sexual behaviors among females: sex experience (r = 0.869, *P*-value < 0.001), first sexual intercourse (r = 0.869, *P*-value < 0.001), number of partners (r = 0.869, *P*-value < 0.001), first sexual intercourse (r = 0.866, *P*-value < 0.001), condom use (r = 0.873, *P*-value < 0.001), past one-year sexual intercourse with men (r = 0.866, *P*-value < 0.001), and prostitution (r = 0.869, *P*-value < 0.001) (Table 4).

In terms of male sexual experience, only 91.1% gave a consist responses in being MSM and being male prostitutes between the paper-based questionnaire and HACASI. Examining further the 8.9% who responded, the following was found: 60.0% were Lisu, 30.0% were Karen, and 10.0% were Lahu; 50.0% were 16–17 and 50.0% were 18–20 years of age; 90.0% were Buddhists and 10.0% were Christians; 80.0% possessed a vocational degree and 20.0% were at high school; 90.0% were students and 10.0 % were unemployed (Table 4).

When answering the question of "age at first sexual intercourse" in males, 96.4% gave consistent responses to the paper-based questionnaire and HACASI. Among those who did not respond (3.6%), 71.4% were Lisu, 14.3% were Karen, and 14.3% were Lahu; 57.1% were 17 years and 42.9.0% were 18–20 years; 85.7% were Buddhists and 14.3% were Christians; 71.4% had a vocational degree and 28.6% were at high school; 85.7% were students and 14.3% were unemployed (Table 4).

Regarding the "number of partners" in males, 92.3% gave consistent responses to the paper-based questionnaires and HACASI. Those who did not respond (7.7%), 33.3% were Lisu, 33.3% were Karen, and 33.3% were Lahu; 66.7% were 18 years and 33.3% were 20 years; 66.7% were Buddhists and 33.3% were Christians; 100.0% had a vocational degree; 66.7% were students and 33.3% were unemployed (Table 4).

Responding to the question on people they had their first sexual intercourse with, in males, 90.9%

gave consistent responses to the paper-based questionnaire and HACASI. Those who did not respond (9.1%), 60.0% were Lisu, 30.0% was Karen, and 10.0% was Lahu; 50.0% were 16–17 years and 50.0% were 18–20 years; 90.0% were Buddhists and 10.0% were Christians; 80.0% had a vocational degree and 20.0% were at high school; 90.0% were students and 10.0% were unemployed (Table 4).

When answering the question on "condom used while having sexual intercourse" in males, 91.1% gave consistent responses in the paper-based questionnaire and HACASI. Among those who did not respond (8.9%), 80.0% were Lisu, 10.0% was Karen, and 10.0% was Lahu; 40.0% were 17 years, 40% were 18 years, and 20.0% were 20 years; 80.0% were Buddhists and 20.0% were Christians; 60.0% had a vocational degree and 40.0% were at high school; 80.0% were students and 20. % were unemployed (Table 4).

Responding to questions on "having sexual experience," "age of first sexual intercourse," "number of partners," and "being prostitution, 86.9% of females gave a consist responses in the paper-based questionnaire and HACASI. Among those who did not respond (13.1%), 36.4% were Akha, 27.3% were Yao, 18.1% were Karen, 9.1% were Lahu, and 9.1% were Lisu; 63.6% were 15 years, 27.3% were 16 years, and 9.1% were 20 years of age; 90.9% were Buddhists and 9.1% were Christians; 54.5% were at high school and 45.5% had a vocational degrees; 90.9% were students and 9.1 % were unemployed (Table 4).

Responding to the question of "whom to have their first sexual intercourse with," and "having sexual intercourse with men in the past year," 86.6% gave consistent responses in the paper-based questionnaire and HACASI. Among those who did not respond (13.4%), 36.4% were Akha, 27.3% were Yao, 18.1% were Karen, 9.1% were Lahu, and 9.1% were Lisu; 63.6% were 15 years, 27.3% were 16 years, and 9.1% were 20 years of age; 90.9% were Buddhists, 9.1% were Christian; 54.5% were at high school and 45.5% had a vocational degree; 90.9% were students and 9.1 % were unemployed (Table 4).

Among females responding to the question of "condom use" in females, 87.3% gave consistent answers to the paper-based questionnaires and HACASI. Among those who did not respond (12.7%), 36.4% were Akha, 27.3% were Yao, 18.1% were Karen, 9.1% were Lahu, and 9.1% were Lisu; 63.6% were 15 years, 27.3% were 16 years, and 9.1% were 20 years of age; 90.9% were Buddhists and 9.1% were Christians; 54.5% were at high school and 45.5% had a vocational certification; 90.9% were students and 9.1 % were unemployed (Table 4).

Discussion

This study assessed the accuracy of responses to questions related to individuals' sexual behaviors using two methods:HACASI and paper-based questionnaires. Seven variables were found in different responses to the questions between the paper-based and HACASI in males: having sexual experience, age at first sexual intercourse, with whom they had their first sexual intercourse, condom use, the number of partners, being MSM, and being prostitutes. Seven variables were found in different responses to the questions between the paper-based and HACASI in females: having sexual experience, age at first sexual intercourse, the number of partners, being in prostitution, having sexual intercourse with men one year ago, and condom use.

The HACASI approach presented more accurate responses to the questions related to sexual behaviors among hill tribe youths. This might be because the HACASI used the hill tribe languages and also kept responses to questions private. The accuracy of the HACASI approach was confirmed by Jaranit et al. [15-16]. Moreover, in the context of norms and culture in not talking about sensitive issues, especially sexual behaviors, in public, gathering this information in the form of HACASI is much more accurate. A study in India in domestic violence was presented that using ACASI (Audio computer-assissted self-intervieweing) was presented in better accuracy compared to face-to-face interview [17].

One of the advantages of HACASI is that it can be used to gather information on sexual behavior by applying regular data collection. This could lead to the development of a proper sexual behavior surveillance system in the minority population, such as the hill tribe. This would greatly impact understanding the change in sexual behaviors among hill tribe youths. Information could also be used to develop a proper public health intervention to reduce the incidence of STIs. Previous dtudies [18-20] greatly supported the idea on the using the HACASI or ACASI (Audio computer-assissted self-intervieweing) to monitor sexual behaviors among young adults and obtained more accurate information. Moreover, it was found that gathering sensitive information from the participants using HACASI was more feasibility and acceptability than paper-based. This was supported by a study in Sudan and Ethiopia [21].

This study has some limitations. First, only those who could use Thai met the inclusion criteria because the participants were required to answer the question in both the paper-based and HACASI; the study accuracy did not include those who could not use Thai. Second, the gap between answering the paper-based and HACASI was a bit long. The reason for leaving two

months between testing the two approaches was to reduce the possibility that the participants simply repeated responses from the previous round. However, during the two-month gap, participants might have acquired knowledge and experience by learning from the question that might have made the two responses different. Last, with the norm and culture of not talking about sexual behaviors in public, the responders might not tell the truth; however, it was not the objective of the study.

Conclusion

With the norms and cultures of the hill tribe people, especially in response to sexual behaviors, HACASI is the better method to gather this information than responding to a paper-based questionnaire. Therefore, it should be encouraged that the HACASI instrument is used in health institutes for sexual behavior surveys and other purposes such as setting up surveillance systems for monitoring long-term sexual behaviors and STIs among the minorities with specific norms and cultures.

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