The Effect of Squad Leader Mentors through Short Message Services for Mobile Phones in Promoting Safe Sex among First (Central) Army Area Conscripts of Thailand

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Background: *Conscripts are a vulnerable population group for HIV infection. Their serostatus has been monitored in Thailand as part of the national sentinel surveillance since 1997. Given the nature of the military environment, an innovative program is needed to promote safe sex to reduce the rate of sexually transmitted infections (STIs) and HIV.*
Objective: *The present study proposed to evaluate the program of "Squad Leader Mentors through Short Message Services on Mobile Phones" in improving the required knowledge, attitudes, and the safe sex practice among conscript groups.*
Material and Method: *A quasi-experimental design was applied in separate areas. The subjects were recruited by multi-stage sampling techniques. One hundred forty eight conscripts from the Lop Buri Military District were randomly selected to be the study group, and 114 conscripts from the Sara Buri Military District were the control group. The study and control groups were matched for background characteristics. The changes in knowledge, attitudes, and safe sex practice were measured by pre- and post-test questionnaires over a six-month period.*
Results: *There were significant changes in overall scores of knowledge of safe sex and STIs. Benefits of using SMS and squad leaders that acted as mentors in the study groups (p-value < 0.001**) were observed. The safe sex practices in the study group showed significant increase in condom use with risky partners such as sex workers and other men (p-value < 0.001**). Therefore, it is believe that conscripts can be mentors in promoting safe sex (p-value = 0.006*).*
Conclusion: *The presented program can genuinely increase knowledge and practice of safe sex among conscripts in the study group.*

Keywords: *Conscript, Mentor, Safe sex, Short message service, Squad leader*

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Conscripts are a vulnerable population for HIV infection and whose serostatus has been monitored in the Thailand national sentinel surveillance system since 1997. The Royal Thai Army (RTA) conducted widespread campaigns to disseminate information on HIV/AIDS in 1989 and 1990. They also implemented several models of peer-education programs on HIV and AIDS prevention for decades. However, HIV prevalence has not decreased between 2004 and the time of the present study and remains at 0.5%[1-3]. Given the male segregation of the military recruits' environment, conscripts are at risk for HIV infection due to exposure to unique pressures, constraints, long periods of separation from their regular partners, and peer pressure[4,5]. Thus, they need people that they can trust and rely on during their term of national service.

Squad leaders are one of the closest commanders to the recruits and who live with the conscripts both in the field and accompany them on peaceful missions. Most conscripts respect their squad leaders and whenever conscripts have problems (including health), squad leaders are the persons who provide initial care for the conscripts.

People mostly use SMS to communicate with others, for gaming and for competing in game shows on television[6]. In Thailand, the mobile phone has become a necessity for the new generation[7]. All conscripts have their own mobile phone and regularly use the short message services (SMS).

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The present study proposed to evaluate the program of Squad Leader Mentors through Short Message Services on Mobile Phones to see if it could improve knowledge, attitudes, and safe sex practice among conscripts, and to develop an effective and sustainable HIV prevention program in the Thai Army population.

Material and Method

A quasi-experimental design was used for the present study. Written informed consent was obtained from subjects prior to conducting any study-related procedures. All study's protocols and related documents were approved by the Ethics Committees of the Royal Thai Army Medical Center in accordance with the Declaration of Helsinki. The Lop Buri and Sara Buri Military District of the Royal Thai Army (RTA) were purposively selected because of the large number of military units in these areas. The subjects were recruited by Multi-stage sampling techniques (Fig. 1). One hundred forty eight conscripts from the Lop Buri Military District were randomly selected to be the study group and 114 conscripts from Sara Buri Military District were the control group. The study participants all had mobile phones and could access SMS during the study period. The present study and control groups were matched for background characteristics such as age, education, and monthly income.

Data collected

Data collection was performed between March 2010 and February 2011. The data from 17 participants were excluded due to their limited access to SMS during the present study period. During the end of January and early February, most of conscripts were assigned to the battlefield in Sri Saket Province. Therefore the total remaining number of conscripts in the present study comprised 81 and 77 in the study and control groups respectively.

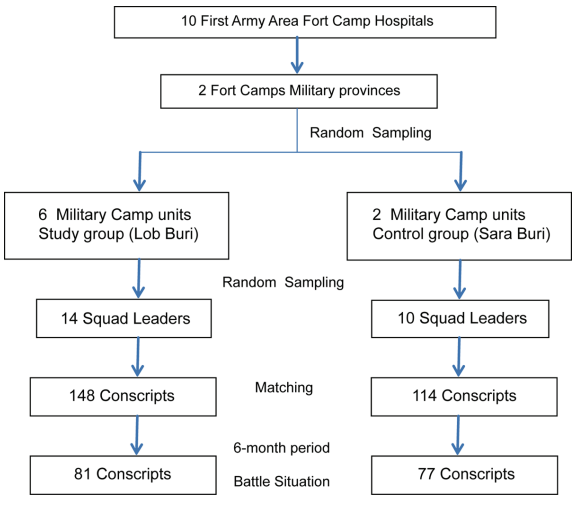

Fig. 1 Multi-stage sampling of selected subjects

Research tools

The research tools were questionnaires consisting of six parts. Part 1 measured demographic and background characteristics of the conscripts (Table 1). Part 2 was a Likert's scale questionnaire. There were three and five scales to measure knowledge about safe sex such as understanding of safe sex and knowledge of STIs. Part 3 was a five-scale questionnaire to measure attitude toward safe sex. Part 4 asked about safe sex practices with their sex partners and frequency of using condoms. In Part 5 conscripts were asked about how familiar they were using SMS and mobile phones. The last part documented details of squad leaders acting in the mentor role and their effect on conscripts' satisfaction. The questionnaires were tested for reliability in the group of conscripts recruited in November, 2009. The overall Cronbach's alpha score was 0.82. The content validity was reviewed by three experts in reproductive health and STIs, along with an expert who had experience working with Army conscripts for more than 20 years.

Intervention

Mentor training of squad leader was organized by initiating meetings every month to monitor the program over a six-month period. They received knowledge about the ABC strategy for promoting safe sex (A, Abstinence, B, Be Faithful and C, Condoms used correctly and Consistency)[8]. During the study, squad leaders monitored the safe sex behaviors of their conscripts and acted as the mentors. Safe sex information, materials and extra condoms were distributed to the conscripts by squad leaders. Conscripts in the present study group were trained in comprehensive safe sex. The present study group of conscripts created the messages about safe sex. The messages were screened by squad leaders, upper level commanders and youth communication experts. The rules of sending messages were set to define the appropriate time to send SMS messages and the two-way communication process. The messages were sent to the conscripts weekly and on special occasions over

Table 1. Baseline comparison between study and control groups

Variables	Study n (%)	Control n (%)	Totaln (%)	p-value
Number	148	114	262	
Age (years), mean	21.45 ± 0.96	21.38 ± 0.71	21.42 ± 0.86	0.52
	147 (100)	113 (100)	260 (100)	
Marital status				0.58
Single, separate and widow	109 (74.18)	82 (71.93)	191 (73.18)	
Married	38 (25.82)	32 (28.07)	70 (26.82)	
	147 (100)	114 (100)	261 (100)	
Housing area				0.15
Urban	47 (43.52)	29 (33.33)	76 (38.97)	
Rural	61 (56.48)	58 (66.67)	119 (61.03)	
	108 (100)	87 (100)	195 (100)	
Education				0.14
Elementary and lower	29 (20.28)	28 (25)	57 (22.35)	
Early secondary	94 (65.73)	78 (69.64)	172 (67.45)	
Late secondary and higher	20 (13.99)	6 (5.36)	26 (10.2)	
	143 (100)	112 (100)	255 (100)	
Previous occupation				0.09
Agriculture	29 (19.86)	19 (17.27)	48 (18.75)	
Government and private	5 (3.42)	3 (2.73)	8 (3.13)	
Laborers	63 (43.15)	62 (56.36)	125 (48.83)	
Students	35 (23.97)	13 (11.82)	48 (18.75)	
Unemployed	14 (9.59)	13 (11.82)	27 (10.55)	
	146 (100)	110 (100)	256 (100)	
Monthly income (Thai Baht)				0.18
No income	23 (16.08)	16 (14.55)	39 (15.42)	
Less than 3,000	17 (11.89)	14 (12.73)	31 (12.25)	
3,001-6,000	54 (37.76)	31 (28.18)	85 (33.6)	
More than 6,000	49 (34.27)	49 (44.55)	98 (38.74)	
	143 (100)	110 (100)	253 (100)	

Age: Data are means ± (SD) using independent-samples t test, marital status, education, previous occupation, monthly income (Thai baht), using Pearson's Chi-square test

a six-month period. Confirmation of exposure to the messages was obtained by providing pre-paid phone cards for conscripts who were instructed to call or SMS back to the research team after a message was read.

Data analysis

The data analysis was done by using Independent-samples t-test to compare the changes between the present study and control groups. The paired-samples t-test was used to compare changes in a participant's pre- and post-test scores within both study and control groups. Moreover, Pearson Chi-square, McNemar's test and Wilcoxon sign rank test were used to measure complete details for each key indicators including the self-reports of STIs and other diseases. A p-value of less than 0.05 was considered to be statistically significant.

Results

The 14 squad leaders participating in the study were trained to be mentors in this program. Their age ranged from 31 to 52 years. Most were married and had been squad leaders for ten to 20 years. One hundred forty eight and 114 conscripts were recruited into the present study and control groups respectively. To ensure that there were no major differences between the study and control group populations, the baseline comparison of demographic information, such as age, marital status, domicile, education and occupational background were also monitored as shown in Table 1. During the period of study (in November 2010), the squad leaders and conscripts were assigned to assist flood relief in many provinces of Thailand. SMS were still sent to them and the study progressed. However, between the end of January and beginning

of February 2011, there were border conflicts between Thailand and Cambodia, the Cobra-Gold exercise (a joint training course between RTA and United States Army) and a worsening situation in the three southern border provinces of Thailand. These unforeseen factors required that some sampled squad leaders and conscripts be assigned to serve in these problem areas. Changing the number of the sample populations in both the present study and control groups may have affected the results of the present study. However, the sample size calculation allowed a reduced number of sample respondents, and the power of the study still remained almost 100%, therefore, permitting the completion of the present study with 81 study group conscripts and 77 control group conscripts as shown in Fig 1.

The baseline pre-test comparison of overall means between study and control groups showed no difference in knowledge and attitudes (Table 2). After six months of the SMS intervention program, there was a statistical difference between study and control groups as shown in Table 3 for knowledge items, squad leader acting as a mentor, and SMS used.

Table 4 and 5 show the results of paired-samples t-test to measure the changes before and after the present program in both groups. The significant improvements are found for knowledge of safe sex in the study group. On the other hand, knowledge significantly worsened in the control group. However, there were significant improvements in knowledge STIs in both study and control groups.

The overall Means of the total score of safe sex practices were not found to be statistically significant. However, the important detailed measurement showed significant improvement in the study group when compared before and after the program as shown in Table 6, possibly due to their feeling closer to their squad leaders and the mentoring role of the squad leaders, which acted to promote safe sex among conscripts (Table 7).

The results "Receive diagnosis and treatment for an STI" do not show a statistically significant

Table 2. Pre-test comparison between study and control groups

Variables	Study		Control		p-value
	n (%)	Means (SD)	n (%)	Means (SD)	
Total scores knowledge of safe sex	134 (100)	5.7 (1.78)	100 (100)	5.6 (1.49)	0.29
Total scores knowledge of STIs	142 (100)	4.1 (2.10)	111 (100)	3.8 (2.10)	0.83
Total scores of attitudes	138 (100)	52.0 (5.90)	106 (100)	52.0 (5.80)	0.98
Advantage of SMS used on mobile phone	141 (100)	8.1 (1.97)	113 (100)	7.8 (2.06)	0.34
Frequency of using SMS on mobile phone	140 (100)	6.7 (4.60)	111 (100)	6.6 (4.70)	0.81
Total score of squad leader mentor roles	137 (100)	9.4 (3.24)	112 (100)	8.8 (3.05)	0.41

Data are means $\pm$ (SD) using independent-samples t-test

Table 3. Post-test comparison between study and control groups

Variables	Study		Control		p-value
	n (%)	Means (SD)	n (%)	Means (SD)	
Total scores knowledge of safe sex	80 (100)	6.3 (1.66)	71 (100)	4.5 (1.67)	<0.001**
Total scores knowledge of STIs	78 (100)	6.7 (1.98)	74 (100)	4.8 (2.00)	<0.001**
Total scores of attitudes	74 (100)	52.2 (8.94)	67 (100)	53.0 (4.92)	0.27
Advantage of SMS used on mobile phone	74 (100)	9.8 (2.08)	69 (100)	7.9 (2.16)	<0.001**
Frequency of using SMS on mobile phone	78 (100)	17.6 (5.60)	70 (100)	14.8 (4.60)	<0.001**
Total score of squad leader mentor roles	79 (100)	8.3 (3.51)	68 (100)	5.8 (3.05)	<0.001**

Data are means $\pm$ (SD) using independent-samples t-test
** Highly statistically significant, * Statistically significant at p-value < 0.05

Table 4. Comparison of means of the overall dependent variable between pre and post-test of study group

Variables	Pre-test		Post-test		p-value
	n (%)	Means (SD)	n (%)	Means (SD)	
Total scores knowledge of safe sex	81 (100)	5.6 (1.83)	81 (100)	6.3 (1.67)	0.01*
Total scoresknowledge of STIs	79 (100)	4.1 (2.18)	79 (100)	6.7 (1.97)	<0.001**
Advantage of SMS used on mobile phone	60 (100)	5.2 (2.32)	60 (100)	6.8 (1.97)	<0.001**
Frequency of using SMS on mobile phone	73 (100)	12.9 (4.88)	73 (100)	17.6 (5.69)	<0.001**
Total scores of squad leader mentor roles	69 (100)	7.6 (3.20)	69 (100)	8.2 (3.55)	0.34

Data are means ± (SD), using paired-samples t-test
** Highly statistically significant, * Statistically significant at p-value < 0.05

Table 5. Comparison of means of the overall dependent variable between pre and post-test of control group

Variables	Pre-test		Post-test		p-value
	n (%)	Means (SD)	n (%)	Means (SD)	
Total scores knowledge of safe sex	61 (100)	5.7 (1.52)	61 (100)	4.4 (1.70)	<0.001**
Total scores knowledge of STIs	72 (100)	3.9 (1.98)	72 (100)	4.8 (2.05)	0.006*
Advantage of SMS usedon mobile phone	64 (100)	6.2 (1.95)	64 (100)	6.8(2.05)	0.06
Frequency of using SMS on mobile phone	56 (100)	13.2 (4.90)	56 (100)	14.1 (4.38)	0.27
Total scores of squad leader mentor roles	63 (100)	5.8 (2.95)	63 (100)	5.6 (3.01)	0.67

Data are means ± (SD), using paired-samples t-test
** Highly statistically significant, * Statistically significant at p-value < 0.05

difference. However, the percent of conscripts who experienced an STI in the last six months in the present study group decreased from 23.5% to 21.8% compared to the control group (in which it increased from 15.3% to 19.5%).

Fig. 2 shows the number of SMS and phone calls which conscripts made to the research team to confirm that all sent messages were read. The highest return rate of SMSs and phone calls occurred in the 9, 10, 11, 21, 23 and 34 weeks of the study, because these were times of special occasions such as Loy Kratong's day, New year's day and Valentine's day festivals.

Discussion

The present study found that increasing the squad leader role, not only as a commander, but also as a mentor to promote safe sex practice in conscripts was reliably achieved. In general, conscripts are more likely to practice unsafe sex and are at risk of STIs and HIV infection. Therefore, having a respected and trusted person who can provide information and resources is important. From its experience in counseling and training, Family Health International (FHI) has shown that the mentor structural model is a solid channel for promoting safe sex in adolescents[9], the same as in the United States Army in which squad leaders could

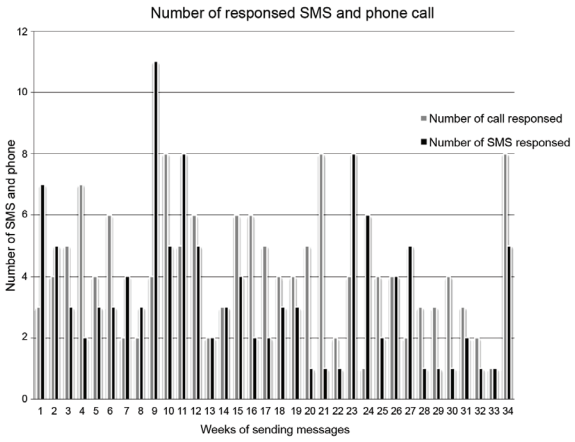

Fig. 2 Shows the number of SMS and phone calls which conscripts made

Table 6. The comparison of safe sex practices between study and control groups

Variables	Z		p-value	
	Study	Control	Study	Control
If you were married, in the last 6 months, you used condoms with your wife	-3.31[a]	-1.58[a]	0.01*	0.11
In the last 6 months, you had sex with a man (only 1) and used condoms	-2.84[a]	0.00	0.004**	1.00
In the last 6 month, you had sex with men (more than 1) and used condoms	-4.42[a]	-8.61[a]	<0.001**	0.38
In the last 6 months , you had sex with sex workers and used condoms	-5.85[a]	-0.65[a]	<0.001**	0.51
In the last 6 months, you had sex with non-steady partners and used condoms	-3.47[a]	-1.5[a]	0.001**	0.13

[a] Using Wilcoxon signed rank test

** Highly statistical significant, * Statistical significant at p -value < 0.05, [a] Based on negative ranks

Table 7. The comparison of squad leader safe sex mentor roles between study and control groups of conscripts

Variables	X^2		p-value	
	Study	Control	Study	Control
Your squad leader is involved with sexual health information and condom distribution	1.63	1.16	0.20	0.28
You are close to your squad leader	3.69	-	0.05	1[+]
Your squad leader has knowledge and ability to promote safe sex behaviors	7.60	0.65	0.006**	1.41

Using McNemar test

** Highly statistical significant, * Statistical significant at p-value < 0.05, [+] Exact p-value

deliver a safe sex program and serve as counselors to their conscripts[10]. In a study of Finland's conscripts, using upper-level commanders to monitor physical exercise and Body Mass Index was also an effective program[11]. The present study has also shown the conscripts' satisfaction with their squad leaders as mentors in promoting safe sex and they significantly changed and felt closer to their squad leaders. To sustain the practice of safe sex, the squad leader is a key person to implement this program because, in the RTA system, squad leaders are the persons who work and stay with their conscripts throughout their tour of duty.

The present study found that the SMS forum is a beneficial channel in promoting safe sex. Conscripts were interested in their own SMSs that were sent during the present study period. Overall significant improvements in knowledge about safe sex and the benefits of using SMS as the channel of communication were also found. Among safe sex practices, changes in some key indicators were statistically significant especially condoms used with risky sex partners and using condoms every time when having sex with men (more than 1) and sex workers. The present study also found that SMS can reach the target population easily and privately, as with the SMS program in Uganda that found that SMS via mobile phones was effective for promoting antiviral adherence in resource-limited settings[12]. These findings are similar to those of the Randomized Controlled Trial of an SMS-Based Physical Activity Intervention that found that SMS increased frequency of PA and walking for exercise in the targeted group[13]. Several studies found that using SMS to change behavior had positive impacts, both in the hospital-based and community-based setting, such as the community study which compared the effects of a weight control program in Korea[14].

Developing the program by integration of existing RTA resources and basic personal devices to promote safe sex and awareness regarding HIV and many other communicable diseases is a very promising approach to educate and motivate the at-risk conscript population which is the back bone of the Army. SMS is cheapest and easiest to access for the underserved population. For most people who are

working, text messages can be sent to them without disturbing them (*i.e.*, if they use the vibrate mode or silent function). It gives them the opportunity to open the SMS privately. Therefore, an SMS-based program can be created to counsel them to promote safe sex and other health messages throughout the RTA network.

Conclusion

The presented program can genuinely increase knowledge and safe sex among conscripts in the study group. At present, there are 70 million subscribers of mobile phones in Thailand and a 30% increasing trend in use of non-voice communication such as instant message and SMS[7]. Therefore, this program can be expanded to other vulnerable groups such as men who have sex with men, injection drug users and other at-risk populations. Moreover, SMS can effectively function well with teenagers and other populations to decrease the rate of HIV infection, STIs, unsafe abortion and unwanted pregnancy.

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Potential conflicts of interest

None.

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ผลของการใช้รูปแบบการนำผู้บังคับหมู่เป็นพี่เลี้ยงร่วมกับการส่งข้อความสั้นทางโทรศัพท์มือถือเพื่อการส่งเสริมการมีเพศสัมพันธ์ที่ปลอดภัยของทหารเกณฑ์ในเขตพื้นที่กองทัพภาคที่ 1

หทัยรัตน์ ขาวเอี่ยม, สุรศักดิ์ ฐานีพานิชสกุล, รัตนา สำโรงทอง,บุญเติม แสงดิษฐ,สมรัตน์ เลิศมหาฤทธิ์

ภูมิหลัง: *ทหารเกณฑ์จัดเป็นประชากรกลุ่มเปราะบางที่เสี่ยงต่อการติดเชื้อ เอช ไอ วี และเป็นกลุ่มประชากรที่ได้รับการเฝ้าระวังการติดเชื้อ เอช ไอ วี ตั้งแต่ปี พ.ศ. 2543 เนื่องจากลักษณะของการทำงานประกอบกับสภาพแวดล้อมและความเป็นอยู่ของทหารเกณฑ์ส่งผลให้ทหารเกณฑ์มีความเสี่ยงสูงต่อการมีเพศสัมพันธ์ที่ไม่ปลอดภัย จึงจำเป็นอย่างยิ่งต้องสร้างรูปแบบการส่งเสริมการมีเพศสัมพันธ์ที่ปลอดภัย เพื่อลดอัตราการติดเชื้อทางเพศสัมพันธ์รวมถึง เชื้อ เอช ไอ วี ให้กับทหารเกณฑ์ และคู่นอน*

วัตถุประสงค์: *เพื่อประเมินผลของการใช้ โปรแกรม การนำผู้บังคับหมู่เป็นพี่เลี้ยงร่วมกับการส่งข้อความสั้นทางโทรศัพท์มือถือเพื่อส่งเสริมการมีเพศสัมพันธ์ที่ปลอดภัย ในกลุ่มทหารเกณฑ์ เพื่อเพิ่มความรู้ ทัศนคติ และการมีเพศสัมพันธ์ที่ปลอดภัย*

วัสดุและวิธีการ: *ศึกษาแบบวิจัยกึ่งทดลอง โดยแบ่งกลุ่มการทดลอง เป็น 2 กลุ่ม ในพื้นที่แยกจากกัน คัดเลือกประชากรด้วยวิธีการสุ่มตัวอย่างแบบหลายขั้นโดยทหารเกณฑ์ในจังหวัดทหารบก ลพบุรี จำนวน 148 นาย ได้รับการสุ่มให้เป็นประชากรกลุ่มทดลอง และจังหวัดทหารบกสระบุรี 114 นาย เป็นประชากรกลุ่มควบคุม ก่อนดำเนินการทดลองได้จับคู่ประชากรระหว่างกลุ่มทดลองและกลุ่มควบคุม เพื่อให้ได้ประชากรในการศึกษาที่มีคุณสมบัติ และภูมิหลังคล้ายคลึงกัน การศึกษานี้วัดการเปลี่ยนแปลงด้านความรู้ ทัศนคติ และการปฏิบัติตนด้าน การมีเพศสัมพันธ์ที่ปลอดภัย ในห้วงระยะเวลา 6 เดือน*

ผลการศึกษา: *ทหารเกณฑ์ในกลุ่มทดลองมีความรู้เกี่ยวกับการมีเพศสัมพันธ์ที่ปลอดภัย และโรคติดต่อทางเพศสัมพันธ์รวมถึงการใช้ประโยชน์จากข้อความสั้นของโทรศัพท์มือถือ และความสามารถในการเป็นพี่เลี้ยงของผู้บังคับหมู่เพิ่มขึ้นอย่างมีนัยสำคัญทางสถิติ (p-value < 0.001**) และมีอัตราการใช้ถุงยางอนามัยเมื่อมีเพศสัมพันธ์กับคู่นอนที่มีความเสี่ยง เช่นกับคู่นอนชายมากกว่า 1 คน และกับหญิงบริการ เพิ่มขึ้นอย่างมีนัยสำคัญทางสถิติ (p-value < 0.001**) และทหารเกณฑ์ยังมีความเชื่อมั่นว่าผู้บังคับหมู่ของตน สามารถเป็นพี่เลี้ยงในการส่งเสริมให้ตนมีเพศสัมพันธ์ที่ปลอดภัยมากขึ้น (p-value = 0.006*)*

สรุป: *โปรแกรมที่ศึกษาสามารถเพิ่มความรู้ และการปฏิบัติตนให้มีเพศสัมพันธ์ที่ปลอดภัยในประชากรกลุ่มทดลอง*