UNIVERSITI PUTRA MALAYSIA

EFFECTIVENESS OF FEER EDUCATION PROGRAM IN IMPROVING KNOWLEDGE, ATTITUDE AND RISK BEHAVIOUR PRACTICES AT UNIVERSITI PUTRA MALAYSIA

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Effectiveness of Peer-led education on HIV prevention amongst students at a Malaysian public university

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Abstract:

The objectives of the study were to develop a peer-led education program module on HIV prevention, implement it and examine its effectiveness on university students. A randomized controlled study design was used in this study. A total of 276 respondents were randomly allocated into an intervention or control group. The intervention group received a five hour peer-led education program on HIV information and life skills on HIV prevention while the control group was given sessions on stress management and effective communication skills of similar duration. A validated, pretested questionnaire was used to measure the outcome on knowledge, attitude and risk behaviour practices related to HIV at baseline, immediate post test and three months follow up. The results showed there was a significant improvement in respondents' HIV knowledge in the intervention group at immediate post test and three months follow up with a small effect size ($p = 0.0001$, partial $\eta^2 = 0.056$). The intervention module was also effective in improving attitude related to HIV at immediate post test with a large effect size ($p = 0.0001$, partial $\eta^2 = 0.202$). The improvement in substance risk behaviour was significant at three months follow up with a small effect size ($p = 0.006$, partial $\eta^2 = 0.027$). However, there was no significant improvement in sexual risk behaviour observed after intervention ($p = 0.993$, partial $\eta^2 = 0.004$). The interaction between group, time and ethnicity was significant for attitude related to HIV ($p = 0.017$) and substance risk behaviour ($p = 0.0001$). There was also significant interaction between group, time and gender for sexual risk behaviour ($p = 0.039$).

Keywords:

HIV/AIDS, Peer-led education, knowledge, attitude, HIV risk behaviour practices, university students

Introduction:

Young people account for 41% of new cases of Human Immunodeficiency virus (HIV) infection worldwide (UNAIDS, 2010). College or university students who make up a great deal of youth population were reported to be the epicenter of the HIV/AIDS epidemic worldwide (CDC, 2002). It was estimated that about 0.2% or 1 in 500 college students was infected with HIV (Gayle, et al., 1990). In fact**,** the number of HIV infection among students attending colleges and universities has shown an increasing trend in view of higher risk posed to them particularly through sexual contact (Hightown, et al., 2005). Young university students are very susceptible to various risk behaviours activities such as early drugs and sexual experimentation because campus living environment provides opportunity for independence and self determination, and peer influence may trap them into risky situations (Hightow, et al., 2005).

In Malaysia, about 35.9% of youth aged 13 to 29 years old were infected with HIV (MOH, 2010: Statistics of HIV/AIDS in Malaysia 1986-2009). The increasing trend of premarital sex, from 9% in 1995 to 13% in 2000, and early sexual debut among young people which may contribute to HIV sexual transmission has signaled an alarm that a preventive measure to tackle these problems is of prime importance (Zulkifli & Low, 2000; Zulkifli, Low & Yusof, 1995) A study on students in a local university reported that 5.4% of them were involved in a sexual relationship before marriage and of 2.2% who had multiple sexual partners, only one third of them practiced safe sex by using condoms (Rozina, et al., 2009). It was reported that co existence of high risk behaviours, particularly unsafe sexual behaviour, together with inadequate knowledge and major misconceptions regarding HIV/AIDS contribute to increased vulnerability of university students to HIV infection (Inungu, et al., 2009).

The existing preventive measures have been unsuccessful in arresting the disease progress extensively. Only limited coverage has been achieved specifically involving most at risk population such as sex workers and drug users (Haliza & Pataki-Schweizer, 2002). Besides, existing community-based support to assist the country's efforts at prevention is insufficient. Local preventive measures through information and knowledge dissemination to young people have shown to be effective in improving knowledge and awareness on HIV/AIDS but have placed lack of emphasis on life skills behaviour such as negotiating sex, condom use and wise decision making pertaining to risk behaviour practices related to HIV/AIDS (MOH, 2001).

Peer-led education in promoting health has been increasingly popular in colleges and universities (Klein & Sondag, 1994). The positive effect of peer influence on students' population rests on the assumption that they are more receptive towards people of equal stands on certain issues related to youth and who share similar interests and values. They relate more comfortably and grasp information more readily from their peers than from their adult counterparts. This in turn facilitates discussion with peer educators, enhances understanding of health information and promotes behavioural change amongst recipients.

In the light of this, the study was aimed at developing and implementing a peer-led education module on HIV prevention which would benefit young people towards changing their behaviour in relation to HIV prevention by acquiring sound knowledge about HIV, developing favourable attitude towards HIV/AIDS and instilling adaptive life skills behaviour. The module aims to meet the objectives of improving knowledge and attitude, raising the level of awareness and more importantly, reducing risk behaviours related to HIV/AIDS among young people in Malaysia.

Methods:

Study design

A randomized controlled study design was used in the study. The respondents were first and second year undergraduate students of a health sciences faculty at a Malaysian public university. Two-hundred and seventy six respondents were randomly assigned to receive Peer-led Education Program in HIV prevention in the intervention group or Peer-led Education Program in Human Resource Development (HRD) in the control group. The respondents in the control group were exposed to all conditions of the experiment except for Peer-led Education Program in HIV prevention. Respondents in both groups were single blinded in such a way that none of them knew which program the intervention one was.

A baseline measurement on knowledge, attitude and risk behaviour practices related to HIV was performed on respondents in both intervention and control groups prior to the introduction of intervention program. The efficacy endpoints were measured immediately and three months after the completion of intervention program.

Inclusion and exclusion criteria

The inclusion criteria included all first and second year students studying at the faculty. The age of inclusion was 18 to 40 years old at the time of informed consent and respondents were able to complete the five hours intervention program during the study period. The exclusion criteria for the study were respondents who were not able to complete the five hours intervention program during the study period. International students were also excluded from the study due to differences between them and local students with regards to demographic, social and cultural backgrounds.

Randomization and blinding procedure

The list of all names of first and second year students in six undergraduate programs in the faculty served as the sampling frame of the present study. At the initial stage, 290 names were randomly selected from the list names using simple random sampling method. The selected 290 names from the sampling frame were then randomly assigned into the intervention or control group using a table of random numbers. The number of respondents in each group was determined whereby both intervention and control groups had 145 respondents in each group. The names were divided into five smaller subgroups in each intervention and control group. The subgroup lists were given to the faculty Students' Affairs Unit. All respondents were contacted personally in the subgroups with assistance from a staff at the unit who was also blinded to the

group allocation. The respondents were only informed about the date, time and venue of the program in order to maintain the single blinding process.

Development of the peer-led education module on HIV prevention

The peer education program module on HIV prevention was developed through a process of consultations with a group of experts in public health promotion, behaviour intervention and modification amongst youth. The panel of experts consisted of a public health and epidemiology consultant with special interest in HIV, two clinical psychologists, four psychiatrists and a sexual and reproductive health specialist from the faculty. The module was developed based on Information Motivation Behaviour model (Fisher, et al., 1996). The content of the module consisted of facts on HIV/AIDS, stigma, empathy and discrimination against people with HIV. Knowledge on life skills such as wise decision making and assertiveness was also included.

The implementation of the peer-led education module on HIV prevention

The peer-led education program was delivered by trained peer educators who have received training prior one month prior to the introduction of the intervention program to the respondents. The trainers were members of the panel who developed the module and they also included the first author. To ensure the consistency of the training, peer educators observed the trainers in the first training session. Following that, the peer educators conducted the program twice under the observation of trainers on different days. Mistakes were identified and corrective measures were taken during the training sessions. Once trained, five peer educators ran each program which was facilitated by two trainers. The peer-led education program was delivered in English language.

Data collection

Data were collected using a set of validated and pretested questionnaire at three different time frames. The first data collection occurred at baseline before the introduction of the peer-led education Program in HIV/AIDS and HRD to the intervention and control group respectively. The second data collection took place immediately after the program ended and the third one occurred after three months of program completion. The endpoint measures were knowledge, attitude and risk behaviour practices related to HIV. The total summated scores were calculated for each domain. For HIV knowledge, a high summated score indicates good level of knowledge. As for the attitude scale, a high score indicates low level of stigmatized attitude which was favourable in the study. Meanwhile, higher total risk behaviour scores indicate greater frequency of occurrence for the risk behaviour.

Data analysis

Data were collected and entered manually into statistical computer software of SPSS version 18 (PASW Statistics 18, 2009). Data were analyzed using descriptive and inferential statistics.

Measures of central tendency and dispersion such as mean and standard deviation (SD) respectively were used to describe the continuous data while percentage was

used to describe the categorical data. Median and interquartile range (IQR) were used to describe the data when there was no assumption of normality.

Chi square test was used to determine the homogeneity of respondents' socio-demographic variables between the treatment and control group. The usage of Fisher's exact test (FET) was called for when the number of expected count for a particular category was less than five in a 2 x 2 table. Independent t test was used for comparison of mean differences of scores on HIV knowledge, attitude and risk behaviour related to HIV between the treatment and control group. However, if normality assumption was violated its non parametric equivalent was used.

Two-way repeated measures ANOVA test was employed to look at the main and interaction effects within and between groups for mean scores of HIV knowledge, attitude and risk behaviour related to HIV. It used partial eta squared (η^2) as a measure of effect size which represents the variance proportion in the dependent variable that can be explained by the independent variable. The interpretation of the strength of eta squared values used the following guidelines by Cohen, 1988: small effect (0.01), moderate effect (0.06), and large effect (0.14). Confidence interval was set at 95% for the estimation of odds ratio and mean. All significant levels were set at a standard p value of less than 0.05 ($p < 0.05$).

Results:

Response rate

Out of 282 respondents, 276 completed the questionnaire at baseline, immediate post test and three months follow up giving a response rate 97.9%.

Baseline comparison between the treatment and control groups

The intervention and control groups were compared on socio-demographic characteristics, baseline sound HIV knowledge, attitude related to HIV and risk behaviour practices. The comparison was done to ensure that the randomization process in the study was able to generate two groups with no difference. The comparisons are summarized in Tables 4.1 and 4.2.

Baseline comparison on socio-demographic characteristics

Table 1 shows the distribution of socio-demographic characteristics the respondents in the intervention and control groups. The overall mean age of the 276 respondents was 20.36 years (SD = 3.00, 95% CI = 19.99 - 20.71) and ranged from 18 to 39 years. Majority of the respondents were female (78.6%). Majority were Malay (71.4%), followed by Chinese (21.0%), Indian (4.3%) and 3.3% "Others" who were among natives of East Malaysia such as Iban, Kadazan and Dusun. Majority of the respondents were not married (97.5%) and stayed in campus (97.8%).

The mean age of respondents in the intervention group did not differ significantly from the control group ($t = 0.575$, $p = 0.566$). Similarly, gender distribution in the intervention group also did not differ significantly from the control group ($\chi 2 = 0.635$,

p = 0.425). However, the intervention and control group differed significantly in the ethnicity (χ^2 = 4.786, p = 0.025). The number of Malays in the intervention group (77.4%) was higher as compared to the control group (65.5%).

Table 1 Socio-demographic characteristics of respondents (n=276)

Characteristics	Frequency n and percentage, %		Total	Test	p value
	Treatment group	Control group			
1. Age					
≤19	61(44.5)	57(41.0)	118(42.8)	χ^2	0.555
≥20	76(55.5)	82(59.0)	158(57.2)		
Total	137(100.0)	139(100.0)	276(100.0)		
Mean, SD	20.46(3.12)	20.25(2.88)	20.36(3.00)	t	0.566
95%CI	(19.23 – 20.99)	(19.77- 20.74)	(19.99-20.71)		
2. Gender					
Male	32(23.4)	27(19.4)	59(21.4)	χ^2	0.425
Female	105(76.6)	112(80.6)	217(78.6)		
Total	137(100.0)	139(100.0)	276(100.0)		
3. Ethnicity					
Malay	106(77.4)	91(65.5)	197(71.4)	χ^2	0.025*
Non Malay	31(22.6)	48(34.5)	79(28.6)		
Total	137(100.0)	139(100.0)	276(100.0)		
4. Marital status					
Unmarried	134(97.8)	135(97.1)	269(97.5)	FET	1.000
Married	3(2.2)	4(2.9)	7(2.5)		
Total	137(100.0)	139(100.0)	276(100.0)		
5. Living arrangement					
In campus	134(97.8)	136(97.8)	270(97.8)	FET	1.000
Out campus	3(2.2)	3(2.2)	6(2.2)		
Total	137(100.0)	139(100.0)	276(100.0)		

Chi square test (χ^2), Fisher's exact test (FET), Independent t test (t)
*Significant at p < 0.05

Baseline comparison on knowledge, attitude and risk behaviour practices related to HIV

Table 2 shows that there was no significant difference in mean scores of HIV knowledge between the intervention and control group at baseline. The mean attitude scores in the intervention also did not differ significantly from the control group at baseline. The risk behaviour domains were divided into sexual and substance risk behaviour practices. The substance risk behaviour practices comprised illicit drugs use, alcohol consumption and smoking practices. The mean score of sexual risk behaviour in the intervention group did not significantly from the control group. However, the mean score of substance risk behaviour in the intervention group differed significantly from the control group. The control group (0.381) has higher score in substance risk behaviour as compared to the intervention group (0.124).

Table 2 Baseline comparison on mean scores of knowledge, attitude and risk behaviour practices related to HIV between the intervention and control group

Outcome measures	Mean scores (SD)			p value[a]
	All	Treatment	Control	
All (n = 276)				
HIV Knowledge	4.09(0.94)	4.04(0.95)	4.15(0.93)	0.343
Attitude related to HIV	5.33(1.84)	5.18(1.84)	5.47(1.83)	0.187
Substance risk behaviour	0.254(0.55)	0.124(0.35)	0.381(0.17)	0.0001*
Unmarried (n = 269)				
Sexual risk behaviour	0.007(0.12)	0.00(0.00)	0.015(0.17)	0.319

[a]p value was calculated using an Independent t test
*Significant at $p < 0.05$

Correlation between knowledge, attitude and risk behaviour practices related to HIV at baseline

Correlations between baseline substance risk behaviour mean score and mean scores of other measures (HIV knowledge, attitude related to HIV and sexual risk behaviour) were computed in order to determine whether the use of covariate was indicated in the subsequent analysis. The correlation analysis was performed because substance risk behaviour mean score differed significantly between the intervention and control group ($t = - 3.978$, $p = 0.0001$).

Table 3 shows the correlation matrix of the baseline knowledge, attitude and risk behaviour practices related to HIV. In the correlation analysis, a p value of less than 0.05 was indicative for the use of covariate in the subsequent analysis. There was a significant but weak correlation between baseline substance risk behaviour and HIV

knowledge (r = 0.190, p = 0.002) and attitude related to HIV (r = 0.196, p = 0.001). The correlation was also significant and moderate between substance risk behaviour and sexual risk behaviour (r = 0.409, p = 0.0001). Therefore, substance risk behaviour was identified as a covariate in the analysis of the variables with significant correlation.

Table 3 Correlation matrix of HIV knowledge, attitude related to HIV, sexual and substance risk behaviours

Outcome measures	**HIV Knowledge score**	**Attitude related to HIV score**	**Sexual Risk behaviour score**	**Substance Risk behaviour score**
HIV Knowledge score	1.000	0.183*	0.058	0.190*
Attitude related to HIV score		1.000	0.156*	0.196*
Sexual Risk behaviour score			1.000	0.409*
Substance Risk behaviour score				1.000

*Significant at $p < 0.05$

Evaluation of the effectiveness of the intervention on HIV knowledge

Two-way repeated measures ANOVA test was used to look at the main effect of group, time and group x time interaction on HIV knowledge. Table 4 shows the result of two way repeated measures ANOVA analysis for HIV knowledge on the group (intervention and control) and time (baseline, immediate post test and three months follow up) effects and interaction between group and time. The substance risk behaviour was the covariate in the analysis because of its significant correlation with HIV knowledge ($r = 0.190$, $p < 0.05$). The assumption of sphericity was violated (Mauchly's test (χ^2) = 10.338, p = 0.006) and Greenhouse-Geisser corrected estimates were used in the result interpretation. There were significant main effects for group ($F(1,273) = 11.555$, $p = 0.001$, partial $\eta^2 = 0.041$); time ($F(2,273) = 13.571$, $p = 0.0001$, partial $\eta^2 = 0.047$) and interaction between group and time ($F(2,273) = 16.301$, $p = 0.0001$, partial $\eta^2 = 0.056$). The interaction between group and time is plotted in the graph shown in Figure 1. The interaction occurred at baseline and immediate post test whereby HIV knowledge in the intervention group improved immediately after intervention and it reduced in the control group.

Table 4 Summary table of two way repeated measures ANOVA for HIV knowledge

Source	Type III Sum of Squares	df	Mean square	F	p value	Partial η^2
HIV Knowledge						
Group	14.749	1	14.749	11.555	0.001*	0.041
Error (between)	348.463	273	1.276			
Time	11.679	1.928	6.057	13.571	0.0001*	0.047
Group* Time	14.029	1.928	7.276	16.301	0.0001*	0.056
Error (within)	234.944	273	0.861			

*Significant at $p < 0.05$

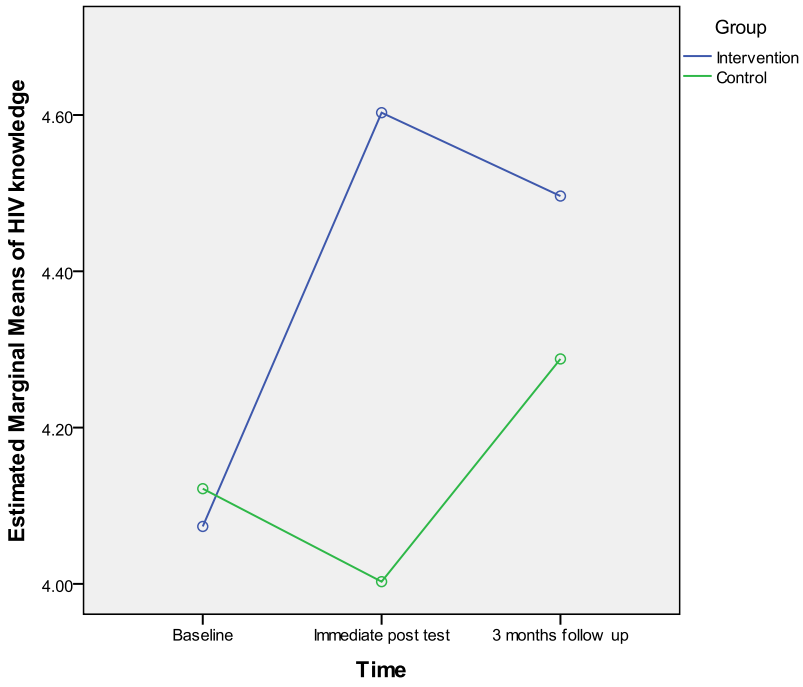

Figure 1 The interaction plot between group and time for means of HIV knowledge

Evaluation of the effectiveness of the intervention on attitude related to HIV

Table 5 shows the result of two way repeated measures ANOVA analysis for attitude related to HIV on the group (intervention and control) and time (baseline, immediate post test and three months follow up) effects and interaction between group and time. The covariate in the analysis was the substance risk behaviour. The assumption of sphericity was violated (Mauchly's test (χ^2) = 7.755, p = 0.021) and Greenhouse-Geisser corrected estimates were used in the result interpretation. There were significant main effects for group (F(1,273) = 24.971, p = 0.0001, partial η^2 = 0.084); time (F(2,273) = 99.419, p = 0.0001, partial η^2 = 0.267) and interaction between group and time (F(2,273) = 68.991, p = 0.0001, partial η^2 = 0.202). The interaction between group and time is plotted in the graph shown in Figure 4.5. The interaction occurred at baseline and immediate post test whereby attitude related to HIV in the treatment group increased greatly after intervention and a small increment on attitude related to HIV was also found in the control group.

Table 5 Summary table of two way repeated measures ANOVA for attitude related to HIV

Source	Type III Sum of Squares	df	Mean square	F	p value	Partial η^2
Attitude related to HIV						
Group	162.784	1	162.784	24.971	0.0001*	0.084
Error (between)	1779.677	273	6.519			
Time	305.898	1.945	157.248	99.419	0.0001*	0.267
Group* Time	212.275	1.945	109.121	68.991	0.0001*	0.202
Error (within)	839.983	273	3.077			

*Significant at p < 0.05

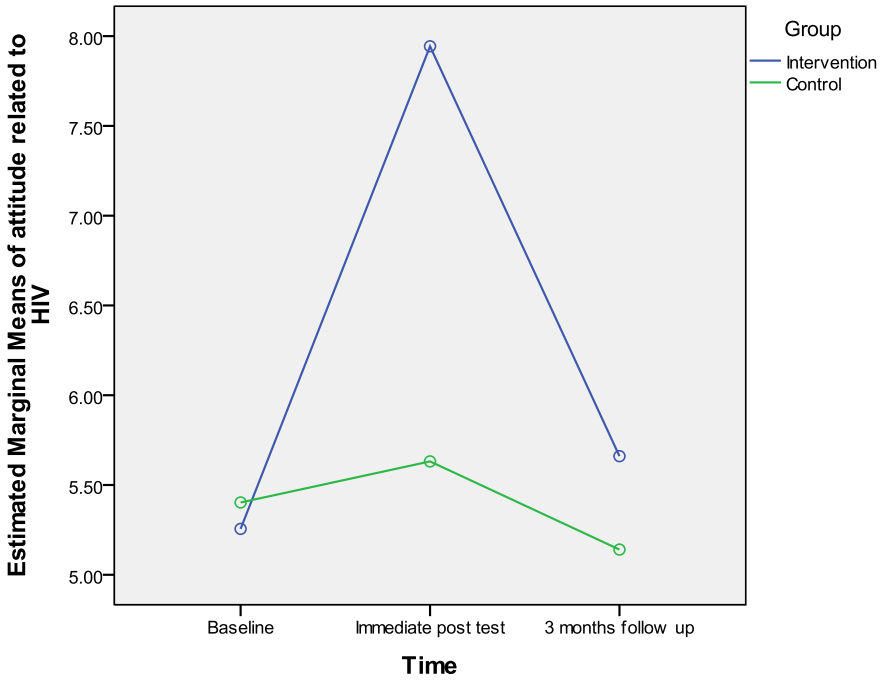

Figure 2 The interaction plot between group and time for means of attitude related to HIV

Evaluation of the effectiveness of the intervention on risk behaviour practices

i. Sexual risk behaviour practice

Table 6 shows the result of two way repeated measures ANOVA analysis for sexual risk behaviour on the group (intervention and control) and time (baseline, immediate post test and three months follow up) effects and interaction between group and time. The covariate in the analysis was the substance risk behaviour. The assumption of sphericity was reported as Mauchly's test (χ^2) = 0.00, p = NA and Greenhouse-Geisser corrected estimates were used in the results interpretation. There were significant main effects for time (F(1,266) = 8.545, p = 0.004, partial η^2 = 0.031). The main effects for group (F(1,266) = 0.523, p = 0.470, partial η^2 = 0.002) and interaction between group and time (F(1,266) = 0.523, p = 0.470, partial η^2 = 0.002) were not significant. The interaction between group and time is plotted in the graph shown in Figure 4.6.

Table 6 Summary table of two way repeated measures ANOVA for sexual risk behaviour

Source	Type III Sum of Squares	df	Mean square	F	p value	Partial η^2
Sexual risk behaviour						
Group	0.032	1	0.032	0.523	0.470	0.002
Error (between)	16.362	266	0.062			
Time	0.263	1	0.263	8.545	0.004*	0.031
Group* Time	0.016	1	0.016	0.523	0.470	0.002
Error (within)	8.181	266	0.031			

*Significant at $p < 0.05$

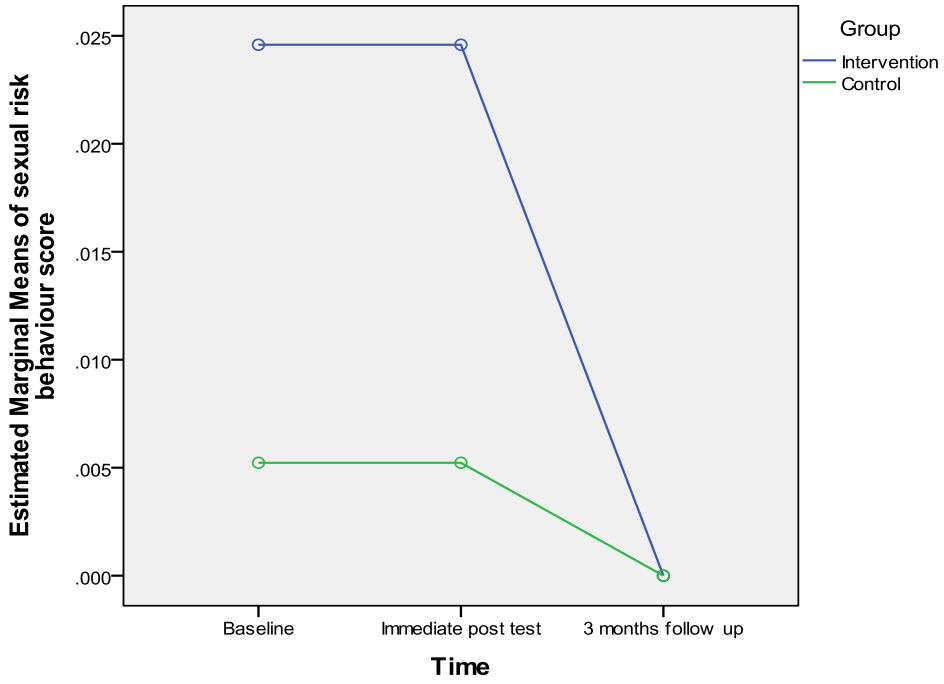

Figure 3 The interaction plot between group and time for means of sexual risk behaviour

ii Substance risk behaviour practice

Table 7 shows the result of two way repeated measures ANOVA analysis for substance risk behaviour on the group (intervention and control) and time (baseline, immediate post test and three months follow up) effects and interaction between group and time. The assumption of sphericity was reported as Mauchly's test (χ^2) = 0.00, p = NA and Greenhouse-Geisser corrected estimates were used in the results interpretation. There were significant main effects for group (F(1,274) = 11.703, p = 0.001, partial η^2 = 0.041), time (F(1,274) = 56.626, p = 0.0001, partial η^2 = 0.161) and interaction between group and time (F(1,274) = 7.663, p = 0.006, partial η^2 = 0.027). The interaction between group and time is plotted in the graph shown in Figure 4.7. The reduction in substance risk behaviour scores was smaller at three months follow up in the intervention group as compared to the control group.

Table 4.20 Summary table of two way repeated measures ANOVA for substance risk behaviour

Source	Type III Sum of Squares	df	Mean square	F	p value	Partial η^2
Substance risk behaviour						
Group	4.492	1	4.492	11.703	0.001*	0.041
Error (between)	105.170	274	0.384			
Time	4.325	1	4.325	52.626	0.0001*	0.161
Group* Time	0.630	1	0.630	7.663	0.006*	0.027
Error (within)	22.521	274	0.082			

*Significant at p < 0.05

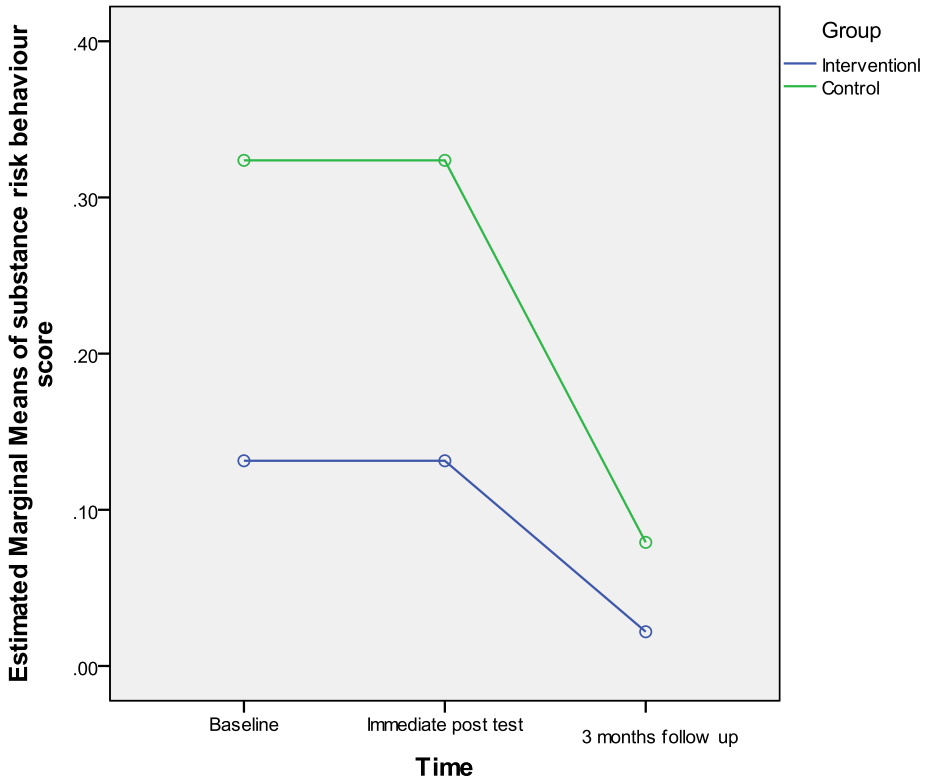

Figure 4.7 The interaction plot between group and time for means of substance risk behaviour

Discussion

The effect of intervention on HIV knowledge

The present study was able to show the effectiveness of the peer-led education program in HIV prevention in improving HIV knowledge among university students. It was shown that the program has enabled the respondents to improve their HIV knowledge immediately after intervention. The difference in pre-post test in the intervention group has shown significant increase in mean scores of knowledge about HIV. This finding echoed the result of a previous study (Jahanfar, Lye & Rampal, 2009). However, unlike the present study, the previous study did not observe the sustainability of the program at long term measure.

The result of the present study was also consistent with the finding of a meta analysis by Medley, et al., (2009). In their review, thirty studies that were conducted in developing countries were included and respondents were identified across different populations. They concluded from the review that the intervention has the strongest effect on changing HIV knowledge in all populations except for transport workers (Medley, et al., 2009). They also emphasized that the evidence of the impact of peer

education on HIV prevention is prominent in behaviour change strategy if implemented in developing countries.

The review also focused on a few issues of implementation of peer education such as recruitment, training and supervising of peer educators which may have implications on the findings (Medley, et al., 2009). These issues were also discussed prior to the conduct of the present study. However, unlike the present study, the meta analysis did not discuss about the theoretical basis of the development of the peer education program which may also have important implication on the results of each selected study in the review.

Based on the previous study on the effectiveness of IMB module-based HIV program which was implemented by peer educators on college students, it was reported that it improved respondents' knowledge of HIV prevention significantly relative to control (Fisher, et al., 1996). Although the measure on HIV knowledge may differ from the present study, both have shown a significant impact on changing HIV knowledge amongst similar group of respondents. The effect of the module on improving HIV knowledge in the previous study was greater in those who were sexually active than those who were not. With regard to its sustainability, the previous study did not report whether the improvement of HIV knowledge was sustained throughout three months study period. It just emphasized that the program enabled the respondents to have sustainable change in behavioural skills such as condom use amongst respondents.

Another previous study has also supported the findings of the present study. The previous study confirmed IMB model's proposition that HIV information was one of the main factors in affecting HIV preventive behaviours (Bazargan, et al., 2000). HIV information was indicated to have a reliable effect on HIV behavioural skills. It was reported that male college students who have more knowledge about HIV sexual transmission were more likely to adopt safer and protected sexual intercourse than others. However, this finding was inconsistent with other previous studies (Fisher, et al., 1994; McGuire, et al., 1992; Fisher & Misovich, 1990).

The three previous studies have not found any significant associations between knowledge and HIV prevention behaviour. The reasons behind it were that HIV knowledge was measured differently in each study and although some improved their correct HIV knowledge after intervention, some misconceptions about HIV still existed amongst respondents. However, the association between knowledge and sexual behaviour in the present study was not observed because of the rare occurrence of that particular behaviour amongst respondents.

The effect of intervention on attitude related to HIV

The attitude of respondents towards HIV changed significantly to a more favourable one after intervention relative to control. The positive improvement in attitude was significantly maintained throughout the study period although the attitude mean score reduced at three months follow up in comparison to mean scores obtained immediately

after intervention. However, the mean scores at three months follow up were still higher than scores obtained prior to intervention. Although significant positive change in attitude was also found in the control group, it showed that the attitude of the respondents in the control group became less favourable at the end of the study period. This was reflected by the mean attitude scores at three months follow up (5.21) as compared to baseline (5.47) in the control group.

The finding of the present study was similar with one local study and another controlled study examining the effect of peer education among university students in Turkey (Jahanfar, Lye & Rampal, 2009; Ergene, et al., 2005). Both studies have reported significant positive changes in university students' attitude towards HIV after they got involved in the peer education program. These results were also supported by a review by Medley, et al., (2003). They reported that HIV peer education program implemented on respondents from different groups of populations has also shown positive impact on their attitude towards HIV. They also concluded that peer education has a significant impact on improving HIV related attitude and a few studies in the review also showed a positive change in HIV risk perception amongst respondents (Medley, et al., 2003).

Earlier studies on the effect of IMB model-based HIV program has shown similar changes on attitude but they were focusing more on motivational attitude towards adopting HIV preventive behavioural skills rather than an accepting attitude towards HIV. In the motivational construct of the actual IMB model, the attitude measured was related to attitude of respondents to increase their efficacy to avoid unsafe sexual intercourse such as by using condom every time they engaged in sex (Bazargan, et al., 2000; Fisher, et al., 1996). However, the IMB based model in the present study was modified in such a way that an accepting attitude towards HIV was also included in the motivation construct as it would also have an effect in HIV preventive behavioural change amongst respondents.

In the present study, respondents' knowledge and attitude towards HIV seemed to be correlated following intervention. However, a small proportion of the respondents with sound HIV knowledge were still guarded in certain responses towards some attitude domains. The finding from the present study indicated that the respondents still have a tendency to discriminate HIV infected people as they responded negatively to the question on whether or not they would want to share or buy meals from HIV infected person. This was however not supported by Jahanfar, Lye & Rampal, (2009) as they reported that knowledge and attitude have positive correlation following intervention and thus may influence respondents' behaviour (Jahanfar, Lye & Rampal, 2009).

However, another local study on university students reported differently. Although their knowledge was moderate, it did not have much impact on their attitude and practices related to HIV specifically in their sexual practice (Rozina, et al., 2009). The reasons for the different findings were possibly due to various outcome measures used which sometimes may not indicate the actual attitude of the respondents towards HIV.

Furthermore, attitudes change may require longer observational time compared to HIV knowledge. In the present study three months observation may not be sufficient to elicit such a sustainable change in attitude related to HIV.

The effect of intervention on risk behaviour practices

Following intervention, it was reported that the program intervention was not effective in reducing sexual risk behaviour. However, its impact on substance risk behaviour was shown otherwise. The findings of the study did not in fact nullify the effectiveness of the program intervention on sexual practice but rather the occurrence of such practices amongst respondents in the present study was rare. Therefore any changes over time would not give a marked difference before and after intervention. The impact on sexual practice was not supported by the results of the previous study. A meta analysis by Medley, et al., (2009) revealed a few important findings (Medley, et al., 2009). It was shown that there were more favourable findings on the impact of peer education on behavioural changes, gathered from more than a single study. There was a moderate effect on improving behavioural outcomes such as increased condom use among at risk populations such as IDU but only one study showed similar result in youths. However, positive effects of intervention on condom use were observed when all target populations in the review were combined. Therefore, it can be concluded that peer education effectiveness on HIV preventive behavioural change is only marginal on youth population in comparison to at risk populations.

Unlike other studies, studies using IMB model-based intervention reported results that were more favourable towards youth populations such as college and university students (Bazargan, et al., 2000; Fisher, et al., 1996; Fisher, et al., 1994; McGuire, et al., 1992). All studies revealed similar findings in relation to respondents' increased self efficacy in adopting much safer behaviour in engaging in sexual intercourse. They were reported to show significant increase in condom use during sex either at individual or group level, negotiate safer sex and to have increased accessibility to condom. However, there was still concern whether this practice would sustain over a period of time as it was reported that adopting safer preventive behaviour skills was only implemented by a certain group of young population such as those who are involved in a non monogamous relationship (Bazargan, et al., 2000). For those who had a short lived sexual relationship with only one partner, they were likely to avoid condom use because they perceived it as being safe. Therefore, this issue would be important to ensure the sustainability of the preventive behaviour following intervention.

Strengths and Limitations

The results of the present study should be viewed in the light of the study's strengths and limitations. The major strength of the study was the use of randomized controlled study design to evaluate the effectiveness of the HIV peer education module on HIV knowledge, attitude and risk behaviour practices. The study design was considered as a gold standard method to measure the efficacy of an intervention on the outcome

measures. Adequate sample size with low attrition rate and appropriate statistical tests used has enabled it to provide a considerable estimate of the effects of the intervention on the intended outcome measures.

The development of the intervention module was considered unique as it combined the consensus of expertise from diverse groups such as public health specialist with special interest in HIV, sexual and reproductive health specialist, clinical psychologists and psychiatrists who were well versed in dealing with human behaviours. The module was also framed on specific Information Motivation Behaviour (IMB) theoretical model and integrated with other psychological theories which were proven earlier to benefit youths and university students in enhancing their HIV preventive behaviours. The inclusion of components which focus on life skills such as assertiveness and decision making skills in a more structured fashion has further strengthened the uniqueness of the intervention.

The use of peers in delivering HIV information and skills to the respondents in the intervention helped in minimizing the desirability effect of self report by the respondents to give more favourable answers which may not reflect their true response in the study. This is in addition to the use of anonymous data collection tools which further assisted in controlling this set of response bias. The training of the peer educators was consistent through out the study period and thus enhanced the reliability of the educational materials delivered during intervention.

Although the effectiveness of HIV peer education program in the present study was evidenced in the intervention group, the effect of cross contamination in the control group was observed in the study despite efforts to control it. There was a slight positive change in HIV knowledge and attitude among respondents after three months follow up in the control group. The reason for the change was possibly due to opportunities for interchange of information amongst the respondents from the separate groups within three months after intervention. The interactions may have occurred because they were recruited from the same geographical location. Furthermore, the relationship amongst respondents may have existed prior to the conduct of the study and this friendship networks continued even after intervention. Therefore, it provides opportunities for interaction and cross talk post intervention.

The present study was also limited by the inadequacy in the study follow up duration to assess the sustainability of the intervention effect. It was reflected specifically on risk behaviour practices. The modification of behaviour may require longer observational time as compared to knowledge and attitude. This has been a challenge in the study in view of several logistic issues. In conducting the present study, the university authority provided a few guidelines that have to be followed such as the study could not interfere with the students learning time and compulsory extracurricular activities. Therefore, the study was only allowed to be conducted on weekends when the students were free from other activities that were not in the university's schedule.

Conclusion:

The trend of HIV spread among youth is increasingly worrying. The risk factors for HIV transmission among youth include poor HIV knowledge, attitude and inadequate life based skills to prevent them from HIV infection. Majority of university students still lack knowledge of HIV and they also show unfavourable attitude related to HIV. They are more likely to involve in risk behaviour activities. Preventive intervention strategies that are unique to this population group would help to reduce their susceptibility to HIV infection. The intervention should also have a lasting effect on young people HIV preventive behaviour which includes sustained sound HIV knowledge, favourable attitude and behavioural skills to prevent them from HIV infection.

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