A Causal Model of Condom Use among People Living with HIV/AIDS in Myanmar

Nyi Nyi Htay, Wantana Maneesriwongul, Rutja Phuphaibul, Pisamai Orathai

Abstract: Using a correlational study design, a causal model of condom use was proposed and tested with 506 people living with HIV/AIDS in Mandalay, Myanmar. The constructs and conceptual relationships of this model were based on the Information-Motivation-Behavioral Skills model of changing AIDS-risk behavior. Self-reported structured questionnaires were used to collect the data. The hypothesized model was tested with the robust maximum likelihood method using the asymptotic covariance matrix employed by LISREL programme.

Findings revealed that 48.22% of participants reported always using condoms but 15.81% never used condoms when having sex with their partners in the past three months. The results showed that the last modified model adequately fitted the empirical data, and accounted for 74.70% of the variance for condom use among people living with HIV/AIDS. Moreover, accessibility/availability of condoms and condom-use skills had strong direct effects on condom use. Knowledge about transmission and prevention of HIV; attitudes towards condom use; condom norms; and perceived vulnerability had significant indirect effects on condom use through condom self-efficacy and condom-use skills. Condom self-efficacy had a powerful direct effect on condom-use skills as well as a significant indirect effect on condom use through condom-use skills. The nursing implications arising from this study include raising awareness of HIV reinfection among people living with HIV/AIDS and providing peer-based education and condom-use skills training sessions at the HIV treatment and care settings to promote condom self-efficacy together with condom-use skills.

Pacific Rim Int J Nurs Res 2013 ; 17(3) 234-248

Keywords: HIV/AIDS; Information-Motivation-Behavioral Skills model; Condom-use skills; Condom self-efficacy

Introduction

Myanmar is experiencing one of Asia's most serious HIV epidemics. The first HIV infected person was detected in1988 and the first AIDS patient was reported in 1991 in Myanmar.[1] By the end of 2011, an estimated 216,000 adults and children were living with HIV and approximately 18,000 people died of AIDS related illness in the country. The incidence was estimated at above 8,000 new infections per year.[2]

Nyi Nyi Htay, *PhD. (Candidate), RN, School of Nursing, Faculty of Medicine Ramathibodi Hospital &Faculty of Nursing, Mahidol University, Bangkok, 10400 Thailand* ***E-mail:*** *nyinyiuonmdy@gmail.com*
Correspondence to: Wantana Maneesriwongul, *DNSc., MPH., RN, Assistant Professor, School of Nursing, Faculty of Medicine Ramathibodi Hospital Mahidol University, Bangkok, 10400 Thailand*
E-mail: *wantana.lim@mahidol.ac.th*
Rutja Phuphaibul, *DNS., RN, Professor, School of Nursing, Faculty of Medicine Ramathibodi Hospital Mahidol University, Bangkok, 10400 Thailand*
Pisamai Orathai, *PhD., RN, Assistant Professor, School of Nursing, Faculty of Medicine Ramathibodi Hospital Mahidol University, Bangkok, Thailand*

Sexual transmission accounts for more than 80% of new HIV infection worldwide[3] and 72.8% of the reported AIDS cases in Myanmar.[4]

Preventing HIV infection by changing individual risk behavior is the key to arresting the AIDS epidemic.[5] Reducing sexual transmission of HIV is considered the first strategy in HIV prevention, and condom use becomes the core component of safer sex behavior.[3] However, HIV infected people engage in unprotected sex, just as those who are HIV negative or have unknown serostatus.[6] Studies have reported that the proportion of consistent condom use among people living with HIV/AIDS (PLHA) range from 32% to 58% during anal sex[7,8] and 51% to 85% when having vaginal sex, depending on gender and type of partners.[9,10]

In Myanmar, the proportion of men who reported using condoms consistently with sex workers was 60% among young men and 50% among older men.[11] An analysis of HIV/AIDS situation in Myanmar[12] revealed that in the general population, consistent condom use with female sex workers (FSWs) was 80.7%, whereas that with a casual partner was only 17.2%. Among FSWs, over 95% of them reported condom use at last sex with their clients, but only half of them used condoms at last sex with their regular partners. In contrast, injecting drug users (IDUs) reported condom use with FSWs ranging from 46% to 87%, and only 50% of men who have sex with men (MSM) reported consistent condom use in the past 6 months.[12]

The possibility of adopting safer sex behavior is highly individualized and depends on a person's level of knowledge, motivation and commitment to execute the desired behavior. The Information-Motivation-Behavioral skills (IMB) model is a useful framework for explaining condom use behavior because it constitutes considering a person's cognitive, affective and psychomotor capabilities to adopt the desired behavior; moreover, its constructs are operationally defined and clarify the causal relationships between its theoretical determinants as well as their relation to the expected behavior.[13]

Knowing the significant predictors of condom use among PLHA in specific social contexts may facilitate decision-making in development of comprehensive strategies for prevention and control of HIV/AIDS. Research shows that the predictors of condom use in HIV-infected individuals are similar to those found in HIV-negative individuals[14] and most of them can be explained by the IMB model. A number of studies supported that IMB model is useful in predicting condom use behavior.[9,15,16] This study aimed to validate the recursive model displaying the relationships among knowledge on transmission and prevention of HIV, attitude towards condom use, condom norms, perceived vulnerability, condom self-efficacy, condom-use skills, HIV disclosure, HIV/AIDS related stigma, accessibility/availability of condoms, and condom use among PLHA in Myanmar.

Conceptual framework

The IMB model of AIDS-risk reduction developed by Fisher and Fisher (1992) was applied as a theoretical framework in this study.[13] The conceptualization of the IMB model holds that an individual's level of risk-reduction information, motivation, and behavioral skills are the three fundamental determinants of AIDS-risk reduction behavior. The model assumes that information and motivation affect AIDS-risk reduction behavior largely through behavioral skills. Information and motivation may also have direct effects on AIDS-risk reduction behavior. There may be a correlation between AIDS-risk-reduction information and AIDS-risk-reduction motivation.[13]

Like the IMB model of changing AIDS-risk behavior, the proposed causal model of condom use is a three-factor conceptualization of the self-directed behavior change model. The three fundamental constructs are information about transmission and prevention of HIV (that is, knowledge about transmission and prevention of HIV); motivation to

use condoms (that is, attitudes towards condom use, condom norms and perceived vulnerability); and behavioral skills necessary to use condoms (that is, condom self-efficacy and condom-use skills). In addition, based on research evidence, three other predictors of condom use were added into the hypothesized model: HIV disclosure[17], HIV/AIDS related stigma[18], and accessibility/availability of condoms.[19]

In the hypothesized model, knowledge regarding transmission and prevention of HIV, attitude towards condom use, condom norms, perceived vulnerability, condom self-efficacy and condom-use skills were conceptualized to have positive direct effects on condom use. The effects of knowledge on transmission and prevention of HIV, attitude towards condom use, condom norms and perceived vulnerability are mediated by condom self-efficacy and condom-use skills. HIV disclosure and accessibility/availability of condoms have positive direct effects on condom use. However, HIV/AIDS-related stigma is considered to have a negative direct effect on condom use (see **Figure 1**).

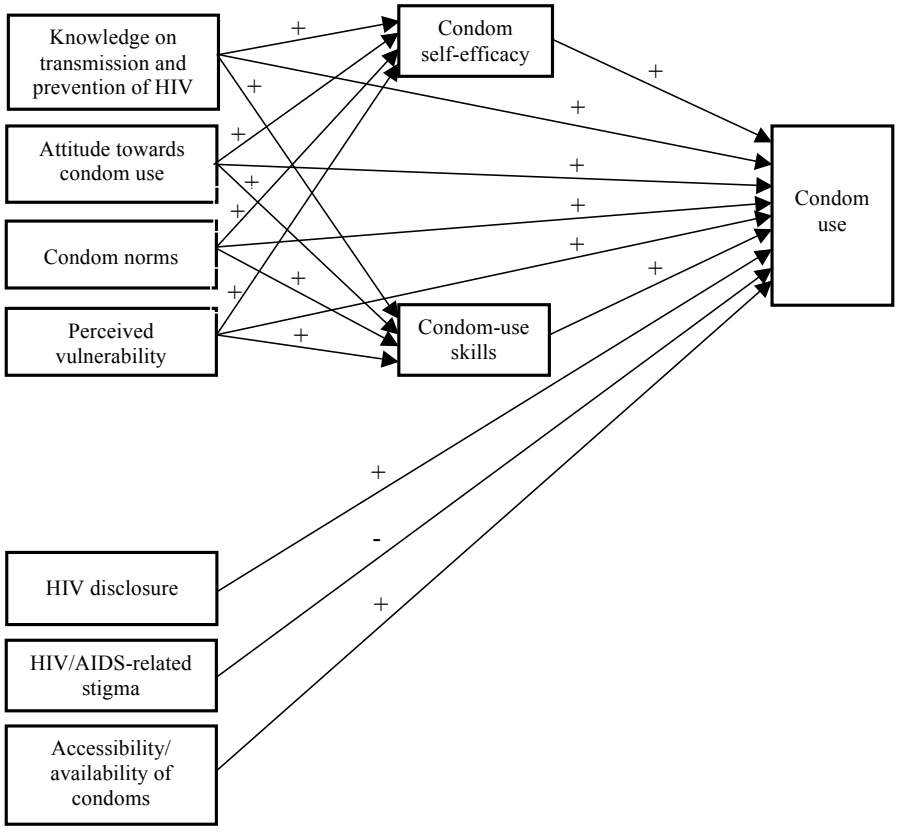


Figure 1 The Causal Model of Condom Use, modified from the Fisher and Fisher (1992) IMB model of changing AIDS-risk behavior

Method

Design: A correlational study design was used to test the causal model of condom use among PLHA in Myanmar.

Study area and settings: The research was conducted in seven townships in Mandalay district, Myanmar. The settings for the pilot study were Community and Home Based Care (CHBC) clinics and those for the main study included the AIDS/STD Prevention and Control Team (Mandalay), Medical Social Department of Mandalay General Hospital, Integrated HIV Care (IHC) clinics of Township Health Centers, and the Light Community Based Organization (Light-CBO) where the PLHA come to take counseling, blood testing, antiretroviral therapy (ART), and care for opportunistic infections.

Sample: The desired level of the ratio of sample size to an estimated parameter in the structural equation modeling (SEM) is 10:1.[20] In this study, the total number of estimated parameters was 23 and a total of 255 participants including 10% for missing data were needed to ensure the statistical power. However, the SEM using the robust maximum likelihood (RML) method with the asymptotic covariance matrix typically requires almost a double of sample size estimated for usual maximum likelihood based approximation techniques. Therefore, 506 participants were recruited to increase the robustness of the parameter estimates and produce trustworthy results.

Convenience and snowball sampling methods were used to find potential subjects and the inclusion criteria were: a) registered as a PLHA at a HIV/AIDS care clinic or had a medical record of positive HIV antibody testing; b) age ≥ 18 years; c) had an experience of sexual intercourse at least one time in the past 3 months; d) willing to participate voluntarily in the study; and e) did not have any complicated physical and/or mental health problem.

Instrumentation: The research instrument used in this study comprised a section on the background characteristics of the participants; HIV Status Disclosure Scale; Vulnerability Beliefs Scale; Condom-use Skills Checklist; HIV Stigma Scale; Condom Accessibility/Availability Scale; HIV Transmission and Prevention Knowledge Scale; Attitude Towards Condom Use Scale; Condom Norms Scale; and Condom Self-Efficacy Scale. The first three scales were published for public use while the rest were used with the authors' permission. They were modified for appropriately use with the PLHA and translated from English to Myanmar using a forward-backward translation method.[21] The translated versions were examined for content validity indices by eight experts: three physicians (a specialist in HIV/AIDS, a specialist in public health, and a university teacher); two nursing faculty members; two counselors; and one medical social worker. The revised instruments were further tested for clarity and comprehension of the use of wordings with 7 PLHA, and pilot-tested for internal consistency reliabilities with 41 PLHA.

The HIV Status Disclosure Scale was modified from the Brief HIV Disclosure and Safer Sex Self-Efficacy Scale developed by Kalichman and colleagues.[22] It is composed of 5 items using a "yes or no" dichotomous response (1 = yes and 0 = no), for example: "I told my sexual partner about my HIV status before having sex". The possible total-item scores range from 0-5 and a higher score represents that the individual has a greater desire to disclose his/her HIV status to sexual partners. The content validity index (CVI) for the Scale was .98 and the Kuder-Richardson's reliability coefficient was .72 for both the pilot and main studies.

The Berger's HIV Stigma Scale is an instrument to measure the existence and magnitude of stigma perceived by PLHA cross-sectionally without a recall period. The original Scale is composed of 40 items.[23] Because of overlapping items, Kaai and colleagues

reduced similar items and proposed a four-point Likert type (1=strongly disagree to 4=strongly agree), and developed a briefer 16-item, Berger's HIV Stigma Scale.[24] This latter Scale was used in this study, and "People with HIV are treated like social outcasts" is an example of one of its items. The possible summed scores ranged from 16 to 64. A greater score indicates an individual has experienced a higher level of HIV/AIDS-related stigma. The CVI of the Scale was .99 and the Cronbach's alpha coefficient was .73 in pilot study and .82 in main study.

The Condom Accessibility/Availability Scale was modified from a subscale of the Condom Barriers Scale developed by St. Lawrence *et al.*[25] It encompasses seven items measured by a dichotomous "yes" or "no" response (1 = yes and 0 = no), for example: "Condoms are rather expensive." The possible summed scores range from 0 to 7. The higher score means the respondent is more likely to access or get a condom. The CVI for this Scale was .95, and the Kuder-Richardson's reliability coefficient was .73 for the pilot study and .68 for the main study.

The HIV Transmission and Prevention Knowledge Scale was modified from the HIV Transmission Knowledge Scale developed by Fawzi and coworkers.[26] It is composed of 19 items. The scoring was given based on "true", "false" or "don't know responses" (1 = true and 0 = false or don't know). A sample item of this Scale is: "HIV cannot be transmitted by having sexual intercourse once without using a condom". The possible summed scores range from 0 to 19. The higher score stands for greater level of knowledge regarding transmission and prevention of HIV. The CVI of this Scale was .98. The Kuder-Richardson's reliability coefficient was .77 for the pilot study and .75 for the main study.

The Attitude Towards Condom Use Scale was modified from the Attitudes Toward Condoms Scale developed by Martinez-Donate *et al.*[27] It is a 14-item, five-point Likert type scale (1 = strongly agree to 5 = strongly disagree), and one item is: "Using condoms is not necessary when I have sex with only one person". The possible summed scores range from 14 to 70. A higher score demonstrates better attitudes towards using a condom. The CVI for this Scale was .97. The Cronbach's alpha coefficient was .83 in the pilot study and .86 in the main study.

The eight item Condom Norms Scale was proposed by Pratte and co-researchers.[28] It is composed of two subscales: Partner Norms and Peer Norms. In this study, the items were measured by a three-point rating scale. The rating scale for Partner Norms Subscale was 3 = not at all true to 1 = very true, and those for the Peer Norms Subscale was 1 = not at all important, to 3 = very important. Examples of an item in each subscale respectively were: "If you love someone, you don't have to use a condom" and "Your peers use condoms every time they have sex". The possible summed scores range from 8 to 24. A higher score implies greater social approval for using a condom. The CVI for this Scale was .97. The Cronbach's alpha coefficient was .82 in the pilot study and .88 in the main study.

The Vulnerability Beliefs Scale was modified from the HIV Transmission Risk and Vulnerability Beliefs Scale developed by Joseph and colleagues.[29] It is a 7-item, five-point Likert type scale (1= absolutely false to 5=absolutely true), and one item as an example is: "Getting infected with additional HIV would cause little extra harm to my health". The possible total-item scores range from 7 to 35 and the higher score represents greater vulnerability beliefs relating to HIV, STIs and OIs. The CVI of the Scale was .97 and the Cronbach's alpha coefficient was .70 in pilot study and .73 in main study.

The Condom Self-Efficacy Scale was developed by Hanna.[30] It is a 5-point Likert type scale (1 = very unsure, to 5 = very sure) and consists of 14 items, for instance, "I could talk about using condoms with any sexual partner". The possible

total-item scores range from 14 to 70. The higher score means greater self-efficacy to use a condom. The CVI for this Scale was .94. The Cronbach's alpha coefficient was .93 in pilot study and .94 in main study.

The Condom-use Skills Checklist was modified from the Condom Use Skills Measure developed by Zhang *et al.*[16] It is an 8-item, five-point Likert type scale (0 = never to 4 = always) based on a person's self-reported retrospective recall of how to apply a condom during intercourse. "Putting the condom on the male genital organ before intercourse" is the sample item of the checklist. The possible summed scores range from 0 to 32 and the higher score indicates better condom-use skills. The CVI of the scale was 1 and the Cronbach's alpha coefficient was .94 in pilot study and .92 in main study.

Condom use in terms of percentage was considered as an outcome variable in this study. The participants were asked how often they had: (a) vaginal sex with a condom; (b) vaginal sex without a condom; (c) anal sex with a condom; and (d) anal sex without a condom, all within the past three months. Then, the percentage of condom use was computed by dividing the total frequency of vaginal and anal sex that occurred with a condom by the total number of vaginal and anal sexual events, and multiplied by 100.[31]

Data collection: The data were collected using self-reported structured questionnaires from 506 participants who were PLHA at the selected research sites. Collection occurred during the days of HIV-antibody and viral load testing and follow-up and treatment (ART) from the first week of June to the last week of October, 2012. On one clinic day, only three of 20 PLHA met the eligibility criteria. Mostly, the data were collected individually by the first author in a private room arranged by the person in charge of the clinics. In some clinics, five to ten participants were gathered in a room and they were requested to respond the questionnaires on the spot without talking or showing the answers to others. The duration of responding to the questionnaires ranged from 25 to 45 minutes.

Ethical considerations: Approval to conduct the study was granted by the Institutional Review Board of the Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, Thailand and the Department of Medical Science, Ministry of Health, Nay-Pyi-Taw, Myanmar. Participation in this study was on voluntary basis. Participants signed the written informed consent form after they were provided with an explanation about the research objectives and procedure for data collection. Code numbers instead of participants' names were used to maintain anonymity, and confidentiality of the participants' information was strictly maintained throughout the study.

Data analysis: The Statistical Package for the Social Sciences (SPSS) version 18.0 and the student edition of Linear Structural Relationship Programme (LISREL) for Windows Version 8.8 were used to analyze the data. The data were coded, entered, checked and rechecked based on the data scanning and screening system. The characteristics of the samples and distributions of the key variables were analyzed by descriptive statistics, in terms of frequency, percentage, mean, median, mode, range, standard deviation, skewness and kurtosis. The assumptions underlying structural equation modeling (SEM) were tested, and which included normality, linearity, homoscedasticity and multicollinearity.

The assumptions of linearity and absence of multicollinearity were met in this study. However, violation of the assumptions of normality and homoscedasticity was found in some variables. The non-normal data can be transformed but this may change the interpretation of the variables.[32] In addition, multivariate analysis is rather robust to mild to moderate violation of normality, especially as the sample size increases.[33] A very large sample is needed to test the asymptotic properties of parameter, standard error and

model-fit estimators in maximum likelihood estimation of SEM, and if sample size becomes more than 400, the possibility of the occurrence of nonconvergence will be reduced to less than one percent.[34] Therefore, the robust maximum likelihood (RML) method with the asymptotic covariance matrix was applied to test the hypothesized model using the original data set without executing any rectification in this study. The goodness-of-fit indices were used to evaluate the degree of model fit in SEM testing for the causal model of condom use.[32]

Results

Characteristics of the participants: Approximately two-thirds (n = 328, 64.82%) were males. Their ages ranged from 20 to 67 years, with a mean of 36.46 (SD = 7.35). More than half (n = 270, 53.35%) were in the age range of 30-39 years. The majority (n = 358, 70.75%) were married and only 23.12% (n = 117) were single. Almost one-third (n = 163, 32.21%) of the participants had middle school level education and only 16.79% (n = 85) were attending a university or had graduated. The duration of living with HIV ranged from 3-204 months, with a mean of 48.32 (SD = 35.15). Most participants (n = 304, 60.07%) had 12-60 months duration of living with HIV. About 80.83% (n = 409) of the participants were undergoing ART. Approximately one-fifth (n = 101, 19.96%) of the participants reported a desire to have the first child or more children. The number of sexual partners ranged from 1 to 25, with a mean of 2.17 (SD = 3.24). Almost 80% (n = 400) of participants had only one sexual partner and the rest had multiple partners in the past three months. Nearly 60% (n = 296) of the participants reported their steady partners were HIV-positive and those of the others were HIV-negative (n = 100, 19.76%) or unknown serostatus (n = 110, 21.73%). About 86.16% (n = 436) of the participants were heterosexual, 12.05% (n = 61) were homosexual and 1.77% (n = 9) were bisexual. Almost 30% (n = 145) of the participants reported consumption of beverages containing alcohol (for example, whisky, rum, beer or wine) and a very few number of them (n = 12, 2.37%) reported the use of illicit drugs during sex in the past three months. The characteristics of the participants are summarized in **Table 1**.

Table 1 Characteristics of the participants (n = 506)

Demographic characteristics	Values	Number	Percent
Gender	Male	328	64.82
	Female	178	35.17
Age (year)	20 – 29	79	15.61
	30 – 39	270	53.35
	40 – 49	131	25.88
	50 and above	26	5.13
Marital status	Single	117	23.12
	Married	358	70.75
	Divorce	13	2.56
	Widow/Widower	18	3.55
Education	Primary school level	120	23.71
	Middle school level	163	32.21
	High school level	138	27.27
	University level/ Graduated	85	16.79

Table 1 Characteristics of the participants (n = 506) (Continued)

Demographic characteristics	Values	Number	Percent
Duration of living with HIV (months)	Under 12	52	10.27
	12 – 60	304	60.07
	61 – 120	134	26.48
	121 and above	16	3.16
ART	Yes	409	80.83
	No	97	19.16
Desire to have (more) children	No desire	257	50.79
	Desire	101	19.96
	Not related (single/widow/widower)	148	29.24
Number of sexual partner in the past three months	Only 1	400	79.05
	2 – 5	61	12.05
	6 – 9	16	3.16
	10 and above	29	5.73
HIV status of steady partner	HIV-positive	296	58.49
	HIV-negative	100	19.76
	Unknown serostatus	110	21.73
Type of sexual intercourse	Homosexual	61	12.05
	Heterosexual	436	86.16
	Bisexual	9	1.77
Use of alcohol during sex in the past three months	Yes	145	28.66
	No	361	71.34
Use of drugs during sex in the past three months	Yes	12	2.37
	No	494	97.63

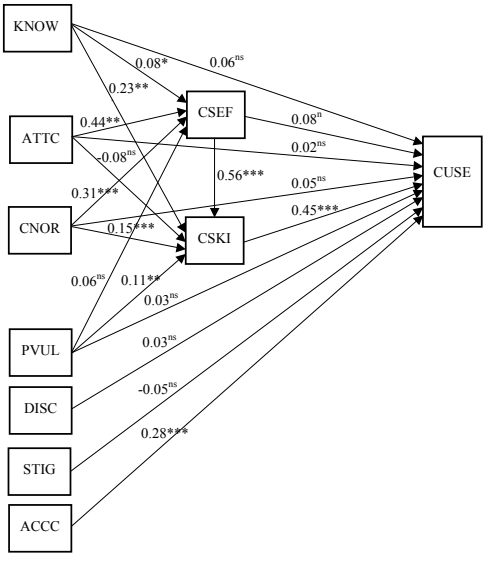
Descriptive characteristics of the key variables: As shown in **Table 2**, the average scores of the key variables were: 14.85 (range = 6 to 19) for knowledge on transmission and prevention of HIV; 52.59 (range = 21 to 70) for attitude towards condom use; 18.27 (range = 8 to 24) for condom norms; 29.56 (ranged = 16 to 35) for perceived vulnerability; 2.88 (range = 0 to 5) for HIV disclosure; 41.22 (range = 24 to 58) for HIV/AIDS related stigma; 5.04 (range = 0 to 7) for condom accessibility/availability; 49.71 (range = 14 to 70) for condom self-efficacy; 23.66 (range = 0 to 32) for condom-use skills; and 70.01 (range = 0 to 100) for condom use reported in terms of percentage. Only 48.22% (n = 244) of participants reported they always used a condom whereas 15.81% (n = 80) stated they never used a condom when having sex in the past three months.

Testing the hypothesized model: Results indicated that the proposed model would explain 70.10% of the variance for condom use ($R^2 = 0.701$). However, the goodness of fit statistics showed $\chi^2 = 257.99$ ($df = 28$, $p = 0.000$), $\chi^2/df = 9.21$, GFI = 0.90, AGFI = 0.80, RMSEA = 0.13. The largest standardized residual was 3.88 and the smallest standardized residual was -1.44. Overall, the hypothesized model did not fit the empirical data because of poor goodness of fit statistics.

Table 2 Descriptive statistics of key variables (n = 506)

Variables	Possible range	Actual range	Mean	Median	Mode	SD
Knowledge on transmission and prevention of HIV	0-19	6-19	14.85	15.00	16.00	2.87
Attitude towards condom use	14-70	21-70	52.59	52.00	52.00	8.74
Condom norms	8-24	8-24	18.27	19.00	24.00	4.63
Perceived vulnerability	7-35	16-35	29.56	31.00	35.00	4.95
HIV disclosure	0-5	0-5	2.88	3.00	4.00	1.60
HIV/AIDS related stigma	16-64	24-58	41.22	41.00	42.00	6.53
Accessibility/availability of condom	0-7	0-7	5.04	5.00	7.00	1.73
Condom self-efficacy	14-70	14-70	49.71	52.00	56.00	11.23
Condom-use skills	0-32	0-32	23.66	26.00	32.00	7.66
Condom use (%)	0-100	0-100	70.01	86.18	100.00	37.36

Model modification: Model modification was employed until it was best fitted and parsimonious guided by the modification indices (MI) as well as theoretical supports and empirical evidences.[35,36] The final respecification model demonstrated better fitting and becoming a more parsimonious model with $\chi^2 = 22.59$ ($df = 25$, $p = 0.602$), $\chi^2/df = 0.90$, GFI = 0.99, AGFI = 0.98, RMSEA = 0.00. The largest standardized residual was 2.32 and the smallest standardized residual was -1.43. This model would explain 74.70% of the variance for condom use among PLHA (see **figure 2**).



$\chi^2 = 22.59$ ($df = 25$, p=0.602), $\chi^2/df = 0.90$, GFI = 0.99, AGFI = 0.98, RMSEA = 0.00

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, ns = Non-significant
KNOW = Knowledge on transmission and prevention of HIV, ATTC = Attitude towards condom use, CNOR = Condom norms, PVUL = Perceived vulnerability, DISC = HIV disclosure, STIG = HIV/AIDS related stigma, ACCC = Accessibility/availability of condoms, CSEF = Condom self-efficacy, CSKI = Condom-use skills, CUSE = Condom use

Figure 2 The causal model of condom use (last modified model)

The path coefficients in the last modified model illustrated only nine out of 18 proposed paths were significant at p value of 0.05 to 0.001 levels. Although some of the predictive variables demonstrated no significant direct effects on condom use, they had significant indirect effects mediated by condom self-efficacy and condom-use skills. The direct, indirect and total effects of the exogenous on the endogenous observed variables are shown in Table 3.

Table 3 Direct, indirect and total effects of the exogenous on the endogenous observed variables in the last modified model

Causal variables	Affected variables								
	Condom self-efficacy			Condom-use skills			Condom use		
	TE	DE	IE	TE	DE	IE	TE	DE	IE
Knowledge on transmission and prevention of HIV	0.08*	0.08*	-	0.28***	0.23***	0.05*	0.19***	0.06^{ns}	0.13***
Attitude toward condom use	0.44***	0.44***	-	0.17***	-0.08^{ns}	0.25***	0.13**	0.02^{ns}	0.11***
Condom norms	0.31***	0.31***	-	0.32***	0.15***	0.17***	0.22***	0.05^{ns}	0.17***
Perceived vulnerability	0.06^{ns}	0.06^{ns}	-	0.14***	0.11**	0.03^{ns}	0.10*	0.03^{ns}	0.07***
HIV disclosure	-	-	-	-	-	-	0.03^{ns}	0.03^{ns}	-
HIV/AIDS related stigma	-	-	-	-	-	-	-0.05^{ns}	-0.05^{ns}	-
Accessibility/ availability of condoms	-	-	-	-	-	-	0.28***	0.28***	-
Condom self-efficacy	-	-	-	0.56***	0.56***	-	0.33***	0.08^{ns}	0.25***
Condom-use skills	-	-	-	-	-	-	0.45***	0.45***	-

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, ns = Non-significant
TE = Standardized total effect
DE = Standardized direct effect
IE = Standardized indirect effect

Hypotheses testing: The last modified model illustrates that accessibility/availability of condoms and condom-use skills had positive direct effects on condom use at a parameter coefficient of $\Upsilon = 0.28$ ($p < 0.001$) and $\beta = 0.45$ ($p < 0.001$). There was no significant direct effect on condom use by knowledge on transmission and prevention of HIV ($\Upsilon = 0.06$, $p > 0.05$), attitude towards condom use ($\Upsilon = 0.02$, $p > 0.05$), condom norms ($\Upsilon = 0.05$, $p > 0.05$), perceived vulnerability ($\Upsilon = 0.03$, $p > 0.05$), HIV disclosure ($\Upsilon = 0.03$, $p > 0.05$), and condom self-efficacy ($\beta = 0.08$, $p > 0.05$). HIV/AIDS-related stigma had a negative direct effect on condom use but not significant ($\Upsilon = -0.05$, $p > 0.05$).

Knowledge regarding the transmission and prevention of HIV, attitude towards condom use, and condom norms, had positive direct effects on condom self-efficacy; $\Upsilon = 0.08$, $p < 0.05$, $\Upsilon = 0.44$, $p < 0.001$, $\Upsilon = 0.31$, $p < 0.001$, respectively. However, perceived vulnerability had no significant direct

effect on condom self-efficacy ($\Upsilon = 0.06$, $p > 0.05$).

Knowledge about the transmission and prevention of HIV ($\Upsilon = 0.23$, $p < 0.001$), condom norms ($\Upsilon = 0.15$, $p < 0.001$) and perceived vulnerability ($\Upsilon = 0.11$, $p < 0.01$) had significant positive direct effects on condom-use skills. Attitude towards condom use had a negative direct effect on condom-use skills, but was not significant ($\Upsilon = -0.08$, $p > 0.05$).

There were strong positive indirect effects on condom use by knowledge of the transmission and prevention of HIV (IE = 0.13, $p < 0.001$), attitude towards condom use (IE = 0.11, $p < 0.001$), condom norms (IE = 0.17, $p < 0.001$) and perceived vulnerability (IE = 0.07, $p < 0.001$) through condom self-efficacy and condom-use skills. Condom self-efficacy was a powerful predictor of condom-use skills ($\Upsilon = 0.56$, $p < 0.001$). It also had a significant indirect effect on condom use through condom-use skills (IE = 0.25, $p < 0.001$).

Discussion

The participants who were PLHA, demonstrated a number of sexual risk behaviors. For example, about 20.95% had multiple partners in the past three months, and almost 48% and 5% of the participants reported vaginal and anal sex without using condoms, respectively, for at least one time in the past three months. As documented, unsafe sex increases likelihood of HIV transmission, especially anal sex without using condoms.[37] The reported condom use in this study was rather low in comparison with the findings of recent survey among HIV-positive heterosexual men and women (n = 200) in Bangkok, Thailand and where almost all men reported consistent condom use and 95% of women reported using male condoms.[38] A pooled analysis of studies suggested that condoms are 90-95% effective in preventing HIV and its new strains if used consistently, and that using a condom provides a 20-fold decrease in the risk of acquiring HIV infection, per sexual act.[39] Although the 100% TCP (targeted condom promotion) programme has been implemented in five of seven townships in Mandalay district, 74.70% of the participants reported they had a condom at present and only 58.89% stated they have enough condoms.

The results of this study revealed that the causal model of condom use among PLHA fitted adequately to the empirical data, but partially supported the premises of the IMB model, that is, not all model predictors could be determined as hypothesized. Further, accessibility/availability of condoms had a significant direct effect on condom use. This finding confirms prior research showing that increasing the condom accessibility/availability was more likely to lead to use of condom(s) among HIV at-risk groups such as low-income women[15], men drug users[40] and gay men.[41] Also, condom-use skills had a positive direct effect on condom use, and is consistent with previous research that used the IMB model with truck drivers[42] and female sex workers[16]. Knowledge about the transmission and prevention of HIV, attitudes towards condom use, condom norms and perceived vulnerability only had indirect effects on condom use through condom self-efficacy and condom-use skills. However, in this study, the condom-use skills construct was more influential than condom self-efficacy when mediating the effects of other key variables on condom use. These findings add to the growing body of evidence on the theoretical validation of the IMB model and specify its relevance for explaining condom use behavior among PLHA.

In accordance with other studies showing a direct causal effect of self-efficacy on mathematical skills among children[35,36], condom self-efficacy had a strong direct effect on condom-use skills in this study. Self-efficacy exercises a substantial independent effect on performance and influences all aspects of human behaviors including acquisition of new behavior

or mastery of a skill.[43] However, further research is needed to validate whether the effect of condom self-efficacy on condom-use skills does significantly exist or not.

The literature supports that active interventions such as behavioral-skills training (preparatory actions, behavioral skills arguments, carrying condoms, discussing condom use with potential partners, condom-use skills training, role play condom application or negotiation) were more effective than passive interventions that only presented information without engaging participants in specific activities.[44] The findings of this study suggested that HIV prevention and control programs may not be successful unless they manage to increase behavioral skills together with condom self-efficacy and condom-use skills as well as accessibility and availability of condoms. Additionally, our findings identified the possible causal factors that could be applicable in refining the existing programs specifically appropriate for PLHA in Myanmar. Active and culturally acceptable interventions based on the IMB model, along with adequate provision of high quality and affordable cost condoms should be implemented to enhance condom use among PLHA in Myanmar.

Limitations

Sampling bias might exist in this study because samples were recruited by using non-probability sampling methods. The data relied on self-report of the PLHA and their responses might have resulted in over- or under-reporting of the use of condoms. The construct validity of the research instruments in Myanmar context was not tested although content validity and reliability were tested. The generalization of the findings to all PLHA is limited. The findings may be generalizable to the adult PLHA especially those who have accessed the integrated HIV care clinics in Mandalay district.

Conclusion

This study highlighted that the condom use among PLHA was significantly high when they had condom-use skills and accessed to condoms. Even though participants had high levels of knowledge regarding transmission and prevention of HIV, attitude towards condom use, condom norms and perceived vulnerability, the percentage of condom use may not be increased without having condom self-efficacy and condom-use skills. Evaluation of actual condom use and condom-use skills among PLHA in Myanmar is urgently needed while increasing the distribution of condoms. Our findings have several nursing implications. Nurses must be concerned about importance of positive prevention to prevent HIV reinfection and raise awareness of HIV reinfection among PLHA. Nursing interventions should address the integration of multiple, evidence-based approaches to increase condom self-efficacy and condom-use skills as well as availability, accessibility, acceptability, and use of condoms among PLHA and other high-risk population. Peer-based education and condom-use skills training sessions need to be carried out at all HIV treatment and care settings to assist in the reduction of HIV infection rates.

Recommendations for further research

In this study, the PLHA demonstrated a number of sexual risk behaviors for acquiring additional STIs and new strains of HIV. However, more studies are needed that focus on secondary prevention aspects for the health of PLHA. Further IMB model intervention research is recommended, for example in promoting condom self-efficacy together with condom-use skills among PLHA and other high-risk populations. Also, further studies using qualitative method or mixed methods research design should be carried out among PLHA to illicit the barriers and facilitating factors of safer sex practices.

Acknowledgements

The authors acknowledge the contributions of the experts, health care providers and volunteers who were involved in instrument translation and validation, recruitment of participants and data collection. Special thanks go to the participants in this study.

References

1. Ministry of Health. National Health Plan (2006-2011). Nay-Pyi-Taw: Department of Health Planning; 2006.
2. National AIDS Programme. Myanmar – Global AIDS Response Progress Report 2012. Nay-Pyi-Taw: Department of Health, Ministry of Health; 2012.
3. UNAIDS. Reducing sexual transmission of HIV. Geneva; 2010.
4. National AIDS Programme. UNGASS Country Progress Report of Myanmar (January 2008 – December 2009). Nay-Pyi-Taw: Department of Health, Ministry of Health; 2010.
5. Ainsworth M. Setting Government Priorities in Preventing HIV/AIDS. Finance and Development. 1998; 35(1): 18-21.
6. Schiltz MA, Sandfort ThGM. HIV-positive people, risk and sexual behavior. Social Science and Medicine. 2000; 50:1571-1588.
7. Camoni L, Regine V, Colucci A, Conte ID, Chiriotto M, Vullo V, Sebastiani M, Cordier L, Beretta R, Fiore JR, Tateo M, Affronti M, Cassara G, Suligoi B. Changes in at-risk behavior for HIV infection among HIV-positive persons in Italy. AIDS Patient Care and STDs. 2009; 23(10):853-858.
8. Cooperman NA, Arnsten JH, Klein R. Current sexual activity and risky sexual behavior in older men with or at risk for HIV infection. AIDS Education and Prevention. 2007; 19(4):321-333.
9. Nostlinger C, Niderost S, Gredig D, Platteau T, Gordillo V, Roulin C, Rickenbach M, Dias SF, Rojas DR. Condom use with steady partners among heterosexual people living with HIV in Europe: testing the information-motivation-behavioral skills model. AIDS Patient Care and STDs. 2010; 24(12):771-780.
10. Chakrapani V, Newman PA, Shunmugam M, Dubrow R. Prevalence and contexts of inconsistent condom use among heterosexual men and women living with HIV in India: implications for prevention. AIDS Patient Care and STDs. 2010; 24(1):49-58.
11. UNAIDS/WHO. AIDS Epidemic Update. Geneva; 2006.
12. UNFPA/Myanmar. Report on Situation Analysis of Population and Development, Reproductive Health and Gender in Myanmar. New York; 2010.
13. Fisher JD, Fisher WA. Changing AIDS-risk behavior. Psychological Bulletin. 1992; 111(3):455-474.
14. Kline A, van-Landingham M. HIV-infected women and sexual risk reduction: The relevance of existing models of behavior change. AIDS Education and Prevention. 1994; 6:390-402.
15. Anderson ES, Wagstaff DA, Heckman TG, Winett RA, Roffman RA, Solomon L, Cargill V, Kelly JA, Sikkema KJ. Information-motivation-behavioral skills (IMB) model: testing direct and mediated treatment effects on condom use among women in low-income housing. Annual Behavioral Medicine. 2006; 31(1):70-79.
16. Zhang H, Liao M, Nie X, Pan R, Wang C, Ruan S, Zhang C, Tao X, Kang D, Jiang B. Predictors of consistent condom use based on the information-motivation-behavioral skills (IMB) model among female sex workers in Jinan, China. BMC Public Health. 2011; 11:113.
17. Latka MH, Metsch LR, Mizuno Y, Tobin K, Mackenzie S, Arnsten JH, Gourevitch MN. Unprotected sex among HIV-positive injection drug-using women and their serodiscordant male partners: role of personal and partnership influences. Journal of Acquired Immune Deficiency Syndrome. 2006; 42:222-228.
18. Preston DB, D'Augelli AR, Kassab CD, Cain RE, Schulze FW, Starks MT. The influence of stigma on the sexual risk behavior of rural men who have sex with men. AIDS Education and Prevention. 2004; 16(4):291-303.
19. Song YS, Calsyn DA, Doyle SR, Dierst-Davies R, Sorensen JL. Predictors of condom use among men enrolled in drug treatment programs. AIDS Education and Prevention. 2009; 21(5):460-473.
20. Hair JF, Black WC, Babin BJ, Anderson RE, Tatham RL. Multivariate Data Analysis. 6th rev. ed. Boston: Pearson Prentice Hall; 2006.
21. Maneesriwongul W, Dixon JK. Instrument translation process: a methods review. Journal of Advanced Nursing. 2004; 48(2):175-186.

22. Kalichman SC, Rompa D, DiFonzo K, Simpson D, Kyomugisha F, Austin J, Luke, W. Initial development of scales to assess self-efficacy for disclosing HIV status and negotiating safer sex in HIV-positive persons. AIDS & Behavior. 2001; 5:291-296.
23. Berger B, Ferrans CE, Lashley FR. Measuring stigma in people with HIV: psychometric assessment of the HIV stigma scale. Research in Nursing and Research. 2001; 24:518-529.
24. Kaai S, Bullock S, Srna A, Chersich M, Luchters S, Geibel S, Munyao P, Mandaliya K, Temmerman M, Rutenberg N. Perceived stigma among patients receiving antiretroviral treatment: a prospective randomized trial comparing an m-DOT strategy with standard-of-care in Kenya. Journal of Social Aspects of HIV/AIDS. 2010; 7(2):62-70.
25. St. Lawrence JS, Chapdelaine AP, Devieux JG, O'Bannon RE, Brasfield TL, Eldridge, GD. Measuring perceived barriers to condom use: psychometric evaluation of the condom barriers scale. Assessment. 1999; 6(4):391-404.
26. Fawzi MCS, Jagannathan P, Cabral J, Banares R, Salazar J, Farmer P, Behforouz H. Limitations in knowledge of HIV transmission among HIV-positive patients accessing case management services in a resource-poor setting. AIDS Care. 2006; 18(7):764-771.
27. Martinez-Donate AP, Hovell MF, Blumberg EJ, Zellner JA, Sipan CL, Shillington AM, Carrizosa C. Gender differences in condom-related behaviors and attitudes among Mexican adolescents living on the U.S-Mexico border, AIDS Education and Prevention. 2004; 16(2):172-186.
28. Pratte K, Whitesell N, McFarlane M, Bull S. Factor analyses of condom attitudes, norms, and self-efficacy measures in diverse samples. Journal of Nursing Measurement. 2010; 18(3):153-175.
29. Joseph HA, Flores SA, Parsons JT, Purcell DW. Beliefs about transmission risk and vulnerability, treatment adherence, and sexual risk behavior among a sample of HIV-positive men who have sex with men. AIDS Care. 2010; 22(1):29-39.
30. Hanna KM. An adolescent and young adult condom self-efficacy scale. Journal of Pediatric Nursing. 1999; 14(1):59-66.
31. Scott-Sheldon LA, Carey MP, Vanable PA, Senn TE, Coury-Doniger P, Urban MA. Predicting condom use among STD clinic patients using the information-motivation-behavioral skills (IMB) model. Journal of Health Psychology. 2010; 15(7):1093-1102.
32. Hair JF, Black WC, Babin BJ, Anderson RE. Multivariate data analysis: a global perspective. 7th rev. ed. Boston: Pearson Prentice Hall; 2010.
33. Munro BH. Statistical methods for health care research. 4th rev. ed. Philadelphia: Lippincott Williams & Wilkins; 2001.
34. Boomsma A, Hoogland JJ. The robustness of LISREL modeling revisited. Netherlands: Springer Science and Business Media; 2001.
35. Schunk DH. Self-efficacy and achievement behaviors. Educational Psychology Review. 1989; 1:173-208.
36. Schunk DH, Gunn TP. Self-efficacy and skill development: Influence of task strategies and attributions. Journal of Educational Research. 1986; 79:238-244.
37. Pebody R. HIV transmission risk during anal sex 18 times higher than during vaginal sex. International Journal of Epidemiology. 2010; Avaliable from: http://www.aidsmap.com/.
38. Nadia KL, Nittaya P, Suteeraporn P, Sudrak L, Chuleeporn K, Surasith C, Jintanat A. Sexual life, options for contraception and intention for conception in HIV-positive on successful antiretroviral therapy in Thailand. AIDS Care. 2012; 24(7):897-904.
39. Varghese B, Maher JE, Peterman TA, Branson BM, Steketee RW. Reducing the risk of sexual HIV transmission. Sexually Transmitted Diseases. 2002; 29(1):38-43.
40. Song YS, Calsyn DA, Doyle SR, Dierst-Davies R, Sorensen JL. Predictors of condom use among men enrolled in drug treatment programs. AIDS Education and Prevention. 2009; 21(5):460-473.
41. Ko N, Lee H, Hung C, Chang J, Lee N, Chang C, Lee M, Chang H, Ko W. Effects of structural intervention on increasing condom availability and reducing risky sexual behaviors in gay bathhouse attendees. AIDS Care. 2009; 21(12):1499-1507.
42. Cornman DH, Schmiege SJ, Bryan A, Benziger TJ, Fisher JD. An information-motivation-behavioral skills (IMB) model-based HIV prevention intervention for truck drivers in India. Social Science and Medicine. 2007; 64:1572-1584.
43. Bandura A. Social Foundations of Thought and Action: a social cognitive theory. Eaglewood Cliffs, New Jersey: Prentice-Hall; 1986.
44. Albarracin D, Durantini MR, Earl A. Empirical and theoretical conclusions of an analysis of outcomes of HIV-prevention interventions. Current Directions in Psychological Science. 2006; 15(2):73-78.

โมเดลความสัมพันธ์เชิงสาเหตุของการใช้ถุงยางอนามัยของผู้ติดเชื้อเอชไอวี/ผู้ป่วยเอดส์ในประเทศเมียนมาร์

Nyi Nyi Htay, วันทนา มณีศรีวงศ์กูล, รุจา ภู่ไพบูลย์, พิศสมัย อรทัย

บทคัดย่อ: งานวิจัยนี้เป็นการศึกษาเชิงสหสัมพันธ์ เพื่อทดสอบความตรงของโมเดลความสัมพันธ์เชิงสาเหตุของการใช้ถุงยางอนามัยของผู้ติดเชื้อเอชไอวี/ผู้ป่วยเอดส์ในประเทศเมียนมาร์ ตามกรอบของโมเดลการให้ข้อมูลและการจูงใจเพื่อปฏิบัติพฤติกรรมลดความเสี่ยงต่อการติดเชื้อเอชไอวี กลุ่มตัวอย่างคือผู้ติดเชื้อเอชไอวี/ผู้ป่วยเอดส์ที่มาใช้บริการที่คลินิกชุมชนในเมืองมันดาเลย์ จำนวน 506 คน เลือกกลุ่มตัวอย่างตามสะดวกและแบบลูกโซ่ เก็บรวบรวมข้อมูลโดยใช้แบบสอบถามตามการรายงานตนเอง วิเคราะห์ข้อมูลพื้นฐานด้วยสถิติบรรยาย ตรวจสอบความตรงของโมเดลสมมติฐานวิจัยด้วยโปรแกรมลิสเรล ผลการศึกษาพบว่ากลุ่มตัวอย่างร้อยละ 48.22 ใช้ถุงยางอนามัยเป็นประจำ และร้อยละ 15.81 ไม่เคยใช้ถุงยางอนามัยเมื่อมีเพศสัมพันธ์ใน 3 เดือนที่ผ่านมา โมเดลความสัมพันธ์เชิงสาเหตุของการใช้ถุงยางอนามัยที่พัฒนาขึ้นมามีความสอดคล้องกับข้อมูลเชิงประจักษ์ ตัวแปรอิสระทั้งหมดในโมเดลร่วมกันอธิบายความแปรปรวนของตัวแปรการใช้ถุงยางอนามัยได้ร้อยละ 74.70 โดยการเข้าถึงแหล่งบริการถุงยางอนามัยและทักษะในการใช้ถุงยางอนามัยมีอิทธิพลทางตรงต่อการใช้ถุงยางอนามัย ในขณะที่ความรู้เกี่ยวกับการป้องกันการติดเชื้อเอชไอวี ทัศนคติกับเกี่ยวกับการใช้ถุงยางอนามัย บรรทัดฐานทางสังคมเกี่ยวกับการใช้ถุงยางอนามัย และการรับรู้ความเสี่ยงต่อการติดเชื้อเอชไอวีมีอิทธิพลทางอ้อมต่อการใช้ถุงยางอนามัยโดยส่งอิทธิพลผ่านความเชื่อมั่นในการใช้ถุงยางอนามัย และทักษะการใช้ถุงยางอนามัย นอกจากนี้ ความเชื่อมั่นในการใช้ถุงยางอนามัยยังมีอิทธิพลทางตรงต่อทักษะการใช้ถุงยางอนามัย และมีอิทธิพลทางอ้อมต่อการใช้ถุงยางอนามัยโดยส่งอิทธิพลผ่านทักษะการใช้ถุงยางอนามัยอย่างมีนัยสำคัญทางสถิติ ในอนาคตควรมีงานวิจัยที่ใช้โมเดลการให้ข้อมูลและการจูงใจเพื่อปฏิบัติพฤติกรรมลดความเสี่ยงต่อการติดเชื้อเอชไอวี อาทิเช่น การส่งเสริมความเชื่อมั่นในการใช้ถุงยางอนามัยควบคู่ไปกับฝึกทักษะการใช้ถุงยางอนามัยในกลุ่มผู้ติดเชื้อเอชไอวี/ผู้ป่วยเอดส์ตลอดจนกลุ่มเสี่ยงอื่นๆ

Pacific Rim Int J Nurs Res 2013 ; 17(3) 234-248

คำสำคัญ: ผู้ติดเชื้อเอชไอวี/ผู้ป่วยเอดส์ รูปแบบการให้ข้อมูลและการจูงใจเพื่อปฏิบัติพฤติกรรมลดความเสี่ยง โมเดลความสัมพันธ์เชิงสาเหตุของการใช้ถุงยางอนามัย ทักษะการใช้ถุงยางอนามัย ความเชื่อมั่นในการใช้ถุงยางอนามัย

Nyi Nyi Htay, *PhD. (Candidate), RN โรงเรียนพยาบาลรามาธิบดี, คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี กรุงเทพฯ 10400 ประเทศไทย*
E-mail: *nyinyiuonmdy@gmail.com*
ติดต่อที่: วันทนา มณีศรีวงศ์กูล, *DNSc., MPH., RN, ผู้ช่วยศาสตราจารย์, โรงเรียนพยาบาลรามาธิบดี, คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี กรุงเทพฯ 10400 ประเทศไทย*
E-mail: *wantana.lim@mahidol.ac.th*
รุจา ภู่ไพบูลย์, *DNS., RN, ศาสตราจารย์, โรงเรียนพยาบาลรามาธิบดี, คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี กรุงเทพฯ 10400 ประเทศไทย*
พิศสมัย อรทัย, *PhD., RN, ผู้ช่วยศาสตราจารย์, โรงเรียนพยาบาลรามาธิบดี, คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี กรุงเทพฯ 10400 ประเทศไทย*