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A structural model of HIV risk-taking intentions in Barbados

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Abstract

Introduction: The purpose of the study was to provide a comprehensive explanation of human immunodeficiency virus (HIV) (sexual) risk-taking intentions in Barbados using an extended model derived from the theory of planned behaviour (TPB) using structural equation modelling (SEM). The study extends this model by including two other factors essential for the prediction of an individual's intention to engage in unsafe sexual behaviours: knowledge about HIV/acquired immunodeficiency syndrome (AIDS) and perceived risk of or susceptibility to HIV infection.

Material and methods: A structured questionnaire was used as the main data collection tool. The main constructs were: HIV Risk-taking Intentions, Attitudes, Subjective Norms, Perceived Behavioural Control, Knowledge of HIV/AIDS, and Perceived Risk. Three models were tested: SEM; a direct effects model; and the traditional TPB model.

Results: The traditional TPB model performed best. Attitudes and perceived behavioural control were significant predictors of HIV risk-taking intentions; knowledge of HIV/AIDS and perceived risk of HIV infection had no influence.

Conclusions: Behavioural change interventions should focus on changing attitudes towards sex and sexual behaviours among individuals since attitudes are important determinants of intentions. In terms of perceived behavioural control, efforts should be made to identify those persons who find it difficult to control their sexual behaviours. Enhancing these individuals' self-efficacy beliefs and confidence about condom use and other safe sex practices would curb intentions to engage in risky sexual practices as well as actual behaviours.

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Key words: structural equation modelling, HIV/AIDS, theory of planned behaviour, Barbados.

Introduction

Undoubtedly, the issue of human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) has been one of the most thought-provoking health subjects in recent times. In the Caribbean, it has been noted that increased access to antiretroviral treatments in certain territories such as Barbados and The Bahamas has led to a reduction in HIV/AIDS-related deaths in these territories [1]. Notwithstanding these improvements in health care services, recent empirical evidence has shown that the Caribbean is still among the most affected regions in the world [1]. In particular, by the end of 2016, an estimate of 310,000 people living with HIV in the Caribbean was reported, with an estimated 18,000 new HIV infections in the region [1].

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Given the situation, empirical research on sexual risk-taking behaviours has been undertaken in order to identify the major factors responsible for the development of these behaviours, especially among the younger sections of the population. These empirical attempts sought to provide scientific and logical explanations for the prevalence of HIV risk-taking behaviours among young people as a means of contributing to practical solutions for curbing the increasing rates of HIV/AIDS within this vibrant section of the population. However, few studies have adopted or tested rigorous explanatory frameworks or models capable of explaining sexual risk-taking behaviours in the Caribbean. The current research is particularly important as it provides a stronger contribution to the study of these behaviours among university students in the Caribbean, using the principles of social cognitive theory.

As noted before, there has been a marked increase in the number of empirical studies focusing on HIV risk-taking attitudes, intentions and behaviours in the HIV/AIDS and sexual behaviour literature [2-7]. For example, Ganczak *et al.* [3] investigated the beliefs and attitudes towards HIV infection and sexual relationships among Polish adolescents. These authors found that Polish adolescents believed that AIDS was the most serious disease facing the country and that people should be afraid of contracting HIV/AIDS. Approximately a third of the sample indicated that for the rest of their life they intended to have only one partner [3]. The authors, however, concluded that "… [c]ool sex with multiple partners is contributing to the rapid transmission of HIV/AIDS, so… developing behavioural interventions for adolescents to change such sexual behaviours is particularly challenging" [3].

Notwithstanding these challenges, other studies have still highlighted the need and the relevance for developing such interventions. For example, Heeren *et al.* [4] stressed the importance of developing and testing HIV risk-reduction interventions for university students. These authors indicated that university students are likely to engage in risky sexual behaviours, including sexual intercourse with multiple partners and inconsistent condom use. The authors also asserted that:

…few studies have developed and tested HIV risk reduction interventions for university students in… other developing countries… [and] one of the first steps in developing an efficacious intervention is the identification of a theory that is appropriate to the behaviour and the population [4].

Hence, the development of effective risk reduction programmes or interventions is heavily dependent on sound and logical theoretical frameworks. One such framework which has been deemed useful in the study of human behaviour (and specifically, sexual behaviour) is the theory of planned behaviour (TPB). The TPB stipulates that behavioural intentions are a function of attitudes, subjective norms and perceived behavioural control regarding the behaviour [8]. Behavioural intentions, as a result, directly affect actual behaviour. Attitudes are defined as behavioural beliefs about the consequences of engaging in a specific behaviour. Subjective norms are based on the normative expectations or beliefs about whether a specific referent other (for example, a friend or family member) or group would support or approve of the performance of a particular act or behaviour. Perceived behavioural control concerns the individual's perceptions of the ease (or difficulty) associated with performing a specific behaviour. This latter factor is the defining aspect of the TPB, because this construct was added to the theory of reasoned action (an earlier theory; [9]) to form the TPB. Within the context of HIV risk-taking intentions, attitudes towards HIV risk-taking behaviours are an individual's beliefs about whether engaging in risk-taking behaviours is harmful or dangerous (i.e. beliefs about the consequences associated with the behaviour). Subjective norms regarding HIV risk-taking behaviours are the individual's beliefs about whether his or her referent groups are supportive of his or her performance of HIV risk-taking behaviours (for example, not using condoms, multiple sex partners, etc.). Perceived behavioural control, within this context, is an individual's perceived ability (control) to avoid HIV risk-taking behaviours. In particular, individuals with high perceived behavioural control regarding HIV risk-taking behaviours find it easier to refrain from engaging in these behaviours.

The TPB has been effectively tested and applied as a major theoretical model in previous HIV/AIDS and sexual behaviour research. Kok *et al.* [10], for example, tested the model of planned behaviour by examining the effects of attitudes, subjective norms and perceived behavioural control on HIV risk-taking intentions among men who have sex with men (MSM). This research revealed that the three social-cognitive variables explained more than 50% of variance in intentions to use condoms for anal sex with future e-dates, with perceived behavioural control as the strongest predictor. In another study, Heeren *et al.* [4], in their American sample, found that attitudes and subjective norms directly influenced university students' intentions to use condoms, whereas all three factors (attitudes, subjective norms and perceived behavioural control) directly affected intentions to use condoms in the South African sample. These authors also found that attitudes predicted intentions to use condoms more strongly in the American sample than in the South African sample, and that perceived behavioural control (measured by self-efficacy) predicted intentions more strongly in the South African sample, compared with the American sample. Another study, testing the TPB, revealed that attitudes and perceived behavioural control, but not subjective norms, were significant predictors of condom use among Xhosa adolescents in South Africa [5]. Overall, these studies which tested the TPB model came to similar conclusions regarding its usefulness and applicability to various settings in both developed and developing countries.

Two relevant factors (outside of the traditional TPB) which have gained considerable attention in the HIV/AIDS literature are knowledge of HIV/AIDS and risk

perception. These factors have been argued to be essential components in existing health-related models such as the Health Belief Model (HBM) [11], and the AIDS Risk Reduction Model (ARRM) [12]. Prior research has empirically addressed these variables within the context of HIV risk-taking behaviours. For example, Barden-O'Fallon *et al.* [2] investigated the relationship among various individual characteristics, perceived risk of HIV infection, sexual behaviours, and knowledge and awareness of HIV/AIDS in rural Malawi. The authors found that certain sexual behaviours such as having multiple sex partners were associated with risk perception for men and women in rural Malawi. Knowledge of HIV/AIDS was found to be associated with several cognitive and behavioural risk factors associated with HIV transmission (for example, having multiple sex partners). Other research has shown that an increased perceived risk and knowledge regarding HIV/AIDS were associated with effective behavioural and attitudinal change concerning sexual behaviours and practices [13, 14].

Given the arguments of Barden-O'Fallon *et al.* [2] that the causal link between knowledge and perceived risk is not yet established, it is thus important to explore this empirical concern. Intuitively, one can argue that persons who are more knowledgeable about HIV/AIDS and risky sexual behaviours are better able to assess their status in terms of their chances of contracting HIV/AIDS (i.e. risk perception). Hence, knowledge can be examined as an antecedent of perceived risk, following the approach of Barden-O'Fallon *et al.* [2]. It is logical to assume that knowledge of HIV/AIDS influences risk-taking intentions indirectly via perceived risk.

Particularly, the purpose of the study is to provide a comprehensive explanation of HIV (sexual) risk-taking intentions using an extended model derived from the TPB. TPB posits that attitudes, subjective norms, and perceived behavioural control influence a person's intentions to perform a specific behaviour [8]. The TPB has been used extensively in previous research as a means of explaining various health-related intentions and behaviours, including intentions to use a condom during sexual intercourse. This study on HIV/AIDS and sexual risk-taking behaviour extends this model by including two other factors essential to the prediction of an individual's intention to engage in unsafe sexual behaviours: knowledge about HIV/AIDS and perceived risk or susceptibility of HIV infection (i.e. an individual's belief of the likelihood of contracting HIV/AIDS). In particular, the model for this study posits that attitudes towards HIV risk-taking behaviours, subjective norms and perceived behavioural control regarding these same behaviours directly influence HIV risk-taking intentions. Knowledge of HIV/AIDS (and of related sexual behaviours) will indirectly influence intentions to engage in risky sexual behaviours via perceived risk.

Figure 1 shows the proposed model of the study. Figure 2 shows a direct effects model indicating that attitudes, subjective norms, perceived behavioural control, knowledge of HIV/AIDS, and perceived risk have a direct effect on HIV risk-taking intentions. Figure 3 shows the traditional model derived from the TPB. These models will be tested using latent structural equation modelling (SEM). SEM procedures, unlike traditional forms of statistical data analyses (for example, multiple regression), can account for measurement error by modelling relationships among several multi-indicator latent variables, thereby leading to more valid and reliable research conclusions. Using χ^2 difference tests, the fits of these models will be compared against each other to determine the most plausible model of HIV risk-taking intentions for the Caribbean.

It is worth mentioning here that the study will seek to explain intentions and not behaviour. It is also important to note that previous studies examined HIV risk-taking intentions indirectly by asking respondents to indicate their intentions to use a condom during sexual intercourse (for example, [5]). The present study measures HIV risk-taking intentions directly by asking respondents to highlight their intentions to engage in various risky sexual behaviours, rather than examining an individual's intention to engage in a single health-related behaviour (for example, using a condom during intercourse). This approach may serve to provide a better understanding of how certain factors directly translate into an individual's intentions to engage in specific sexual risk-taking behaviours.

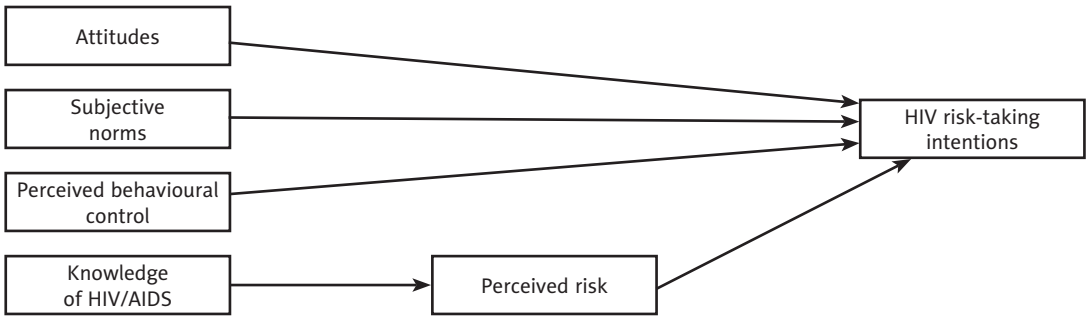

Figure 1. Proposed model

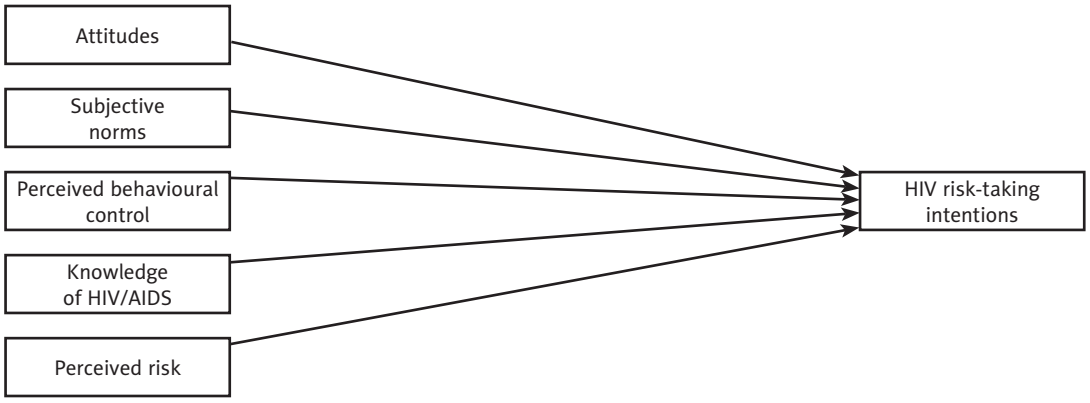

Figure 2. Direct Effects Model showing direct effects of all variables on intentions

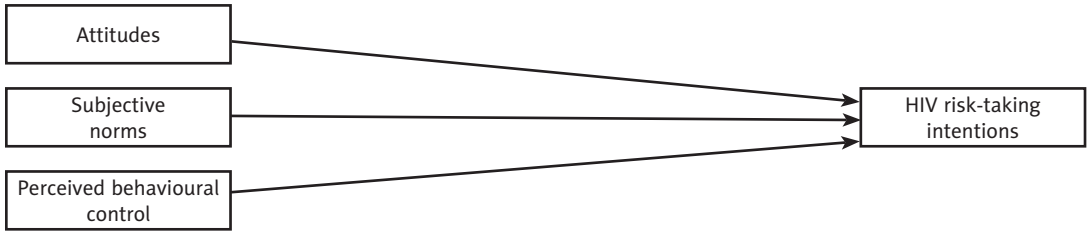

Figure 3. The Theory of Planned Behaviour Model

Material and methods

Sample and data collection procedures

The Institutional Review Board and the Research Ethics Committee at a tertiary institution in Barbados approved the study. Three hundred students enrolled at the institution were targeted as the main participants for the study. Questionnaires were distributed to students to fill out during periods before and after teaching sessions at the institution. Students were informed about the nature and purpose of the study, and confidentiality and anonymity were assured. The data collection process spanned over two weeks.

Measures

A structured questionnaire was used as the main data collection tool in the current study. The questionnaire measured the main study variables that constructed the models tested here. These variables are discussed below.

HIV risk-taking intentions were measured using three items which were scored on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). On this measure, respondents indicated the extent to which they would engage in various HIV risk-taking sexual behaviours such as having sex without a condom, and having sex with multiple partners. Higher scores on this measure indicated higher intentions to engage in HIV risk-taking behaviours. Cronbach's α for this scale was 0.62.

Attitudes were measured using three items which were scored on a seven-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Respondents indicated how they felt about whether various HIV risk-taking behaviours such as having sex without a condom and having sex with more than one partner were wrong or harmful. Higher scores on this measure indicated more favourable attitudes towards HIV risk-taking behaviours. Cronbach's α was 0.65.

Subjective Norms were measured using three items which asked respondents to indicate the extent to which their friends would approve of their engaging in various HIV risk-taking behaviours. The items were scored on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Higher scores on this measure indicated greater perceived normative support from friends to engage in HIV risk-taking behaviours. Cronbach's α for this scale was 0.71.

Perceived Behavioural Control was measured using two items which were scored on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). This scale measured the extent of control that respondents possessed regarding their ability to refrain from engaging in various HIV risk-taking behaviours. Higher scores on this measure indicated greater perceived behavioural control to avoid HIV risk-taking behaviours. Cronbach's α for this scale was 0.65.

Knowledge of HIV/AIDS was measured using 18 items derived from the HIV/AIDS Knowledge Questionnaire (HIV-KQ-18) [15]. The HIV-KQ-18 consists of categorically scored items which measure general awareness and knowledge of various sexual practices and behaviours that place individuals at risk of contracting HIV/AIDS. For example, a sample item was "Coughing and sneezing do not spread HIV/AIDS". The response options were True, False and Don't know. A correct response was given a score of one and an incorrect one was given a score of zero. 'Don't know' responses were scored as incorrect and were given a score of zero, consistent with Carey and Schroder [15]. Hence, the scale was essentially dichotomous: Correct Response (1) and Incorrect Response (0). Higher scores on this measure indicated higher levels of knowledge regarding HIV/AIDS and related sexual behaviours. Cronbach's α for the scale was 0.80.

Perceived Risk, which was measured using a single item, asked respondents to indicate their chances of contracting HIV/AIDS on a scale of 1 to 5, where 1 was *very unlikely* and 5 was *very likely*. Higher scores indicated a higher perceived risk of HIV infection. This item was similar to that used by Barden-O'Fallon *et al.* [2].

Data analysis

The theoretical models in the study were examined using LISREL VIII, with maximum likelihood estimation. Latent structural equation modelling involves a two-step approach to model testing, which was proposed by Anderson and Gerbing [16]. The first step involves conducting a confirmatory factor analysis on the overall measurement model. The measurement model represents the inter-correlations among all latent factors in the model as well as the relationships between these latent factors and their respective indicators (actual items or parcels). Significant and strong factor loadings provide partial evidence of adequate (or poor) fit of the measurement model. The use of fit statistics such as the comparative fit index (CFI) and the root mean square error of approximation (RMSEA) would provide sufficient evidence of adequate (or poor) model fit. A CFI above 0.90 and an RMSEA statistic below 0.1 indicate adequate model fit [17].

Attitudes (using three indicators), subjective norms (using three indicators), perceived behavioural control (using two indicators), and HIV risk-taking intentions (using three indicators) were specified as latent variables in the model. Perceived risk was measured by a single item or indicator and was specified as a single latent in the model. Knowledge of HIV/AIDS was measured using 18 dichotomous (True or False) items or indicators. As a result, parcelling was used to combine these dichotomous indicators into three parcels (comprising 6 items each) to serve as indicators for knowledge of HIV/AIDS, another latent variable in the model. Coffman and MacCallum [18] argue that parcelling is appropriate for dichotomous variables because parcels, more than individual items, are likely to approximate a normal distribution:

If items are not normally distributed and they are combined to form parcels, the parcels may be more normally distributed than the original items… Parcel[l]ing could also be used with dichotomous items, which obviously cannot be normally distributed. Parcels created from such items may approximate a normal distribution… If it is assumed that the dichotomous items measure a continuous underlying construct, then combining the items into parcels creates parcels with a more differentiated scale and the parcels would tend to have higher communalities than the items.

The second step of the two-step approach involves an assessment of the three structural models in the study. Model 1 represents the proposed model which depicts direct effects of attitudes, subjective norms and perceived behavioural control on HIV risk-taking intentions. Knowledge of HIV/AIDS was hypothesized to have an indirect effect on intentions via perceived risk (see Figure 1 above). Model 2 represents a direct effects model where all variables were specified to have a direct effect on intentions. This model differs from Model 1 in that knowledge of HIV/AIDS was specified as having a direct effect on intentions rather than having an indirect effect via perceived risk (see Figure 2). Model 3 represents the traditional TPB model where attitudes, subjective norms and perceived behavioural control were hypothesized to influence intentions. The direct paths from knowledge to intentions and perceived risk to intentions were set (fixed) to zero in Model 2 to arrive at Model 3, which is nested under Model 2. The χ^2 difference test was used to compare these models to determine the most plausible model for the study.

Stevens [19] recommended that there should be at least 15 cases per indicator in SEM research. A minimum sample size of 180 is required given that there are 12 indicators measured in the current study. The sample size for the current study was 203. Hence the ratio between the number of participants and the number of indicators was acceptable.

Results

Sample demographics

A total of 203 useable questionnaires were obtained, indicating a response rate of 68%. Of these 203, 70% were female and 30% were male. The ages for the respondents ranged from 18 to 58 years, with a mean age of 27.79 (SD = 9.08). This indicates that sample was a relatively young one. The gender and age breakdown in this sample is more or less representative of the characteristics in the student population of the university in which the survey was conducted.

Confirmatory factor analysis of the measurement model

Before testing the fits of the proposed model and the two alternative models of the study, it was important to examine the overall measurement model, consistent with the two-step

Table 1. Standardised factor loadings in measurement model

Factors/Indicators	Factor loadings
Attitudes	
ATT1	0.69
ATT2	0.53
ATT3	0.49
Subjective norms	
SNORMS1	0.49
SNORMS2	0.62
SNORMS3	0.75
Perceived behavioural control	
PCONTROL1	0.81
PCONTROL2	0.57
Knowledge of HIV/AIDS	
KNOWAIDS1	0.77
KNOWAIDS2	0.69
KNOWAIDS3	0.78

All factor loadings were statistically significant.
Perceived Risk was specified as a single latent variable.

approach outlined by Anderson and Gerbin [16]. The confirmatory factor analysis revealed that the measurement model adequately fits the data ([χ^2 (76) = 194.99, $p < 0.001$, CFI = 0.91, RMSEA = 0.08]). Factor loadings depicted in the measurement model were statistically significant, reinforcing good convergent validity. Table 1 shows the factor loadings in the measurement model.

Testing the structural path models

The second step was to examine the fits of the three structural models: Model 1 (the proposed model), Model 2 (the direct effects model), and Model 3 (the TPB model). The analyses revealed that the models had reasonable fit. Both Model 2 ([$\chi^2_{difference}(4) = 18.42$, $p < 0.05$]) and Model 3 ([$X^2_{difference}(2) = 16.20$, $p < 0.05$]) showed a significant improvement in fit over that of Model 1 (the proposed model). However, the chi-square difference between Model 2 and Model 3 was not significant ([$\chi^2_{difference}(2) = 2.22$, $p > 0.05$), suggesting that the two additional paths in Model 2 (knowledge to intentions, and perceived risk to intentions) did not add significantly to the prediction of HIV risk-taking intentions above and beyond that provided by Model 3 (TPB). Model 3 also had an acceptable model fit ([χ^2 (78) = 196.81, $p < 0.001$, CFI = 0.92, RMSEA = 0.08]). Hence, Model 3, which represents the TPB, was chosen as the most plausible model for explaining HIV risk-taking intentions in the study. Table 2 shows the model fit statistics for the models tested here.

Table 2. Model fit statistics for the measurement and structural models

Measurement model	χ^2 (df)	RMSEA	CFI	NNFI
M.M.	194.99 (76)	0.08	0.91	0.88
Structural model	**χ^2 (df)**	**RMSEA**	**CFI**	**NNFI**
Model 1	213.01 (80)	0.09	0.89	0.85
Model 2	194.59 (76)	0.08	0.90	0.87
Model 3	196.81 (78)	0.08	0.92	0.90

Model 1 = Proposed Model, Model 2 = Direct Effects Model, Model 3 = TPB Model.
NNFI – Non-normed fit index. An NNFI above 0.90 indicates adequate model fit.

Figure 4 shows the chosen model with the standardized path coefficients. Analysis of individual paths revealed that attitudes towards HIV risk-taking behaviours had a significant and positive effect on HIV risk-taking intentions ($t = 2.68$), whereas perceived behavioural control had a significant and negative effect on HIV risk-taking intentions ($t = -3.60$). These results suggest that persons with more positive attitudes towards HIV risk-taking behaviours showed higher intentions to engage in these types of behaviours, whereas persons with higher perceived behavioural control (to avoid risk-taking behaviours) showed lower intentions to engage in HIV risk-taking behaviours. The effect of perceived behavioural control on intentions was stronger than that of attitudes. Subjective norms did not emerge as a significant determinant of HIV risk-taking intentions.

Discussion

The study examined three models of HIV risk-taking behaviours among 203 university students in Barbados. The SEM analyses revealed that the TPB model was the best

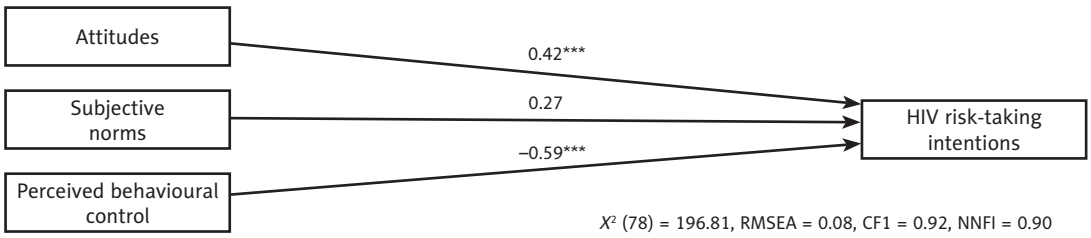

Figure 4. The Chosen Model: Theory of Planned Behaviour (Model 3). Paths from knowledge to intentions, and from perceived risk to intentions are set to zero, these paths were omitted in the above diagram

model for the study. These results demonstrate the usefulness and relevance of the TPB model (for HIV risk-taking intentions) in the study and, by extension, in Barbados. The strong predictive value of this model for HIV risk-taking intentions is consistent with previous studies on HIV/AIDS and sexual behaviour [4, 5, 10]. These studies found that the TPB model explained one third or more of the variance in sexual behavioural intentions.

In particular, attitudes and perceived behavioural control were the only significant predictors of HIV risk-taking intentions. Persons with more favourable attitudes towards HIV risk-taking behaviours had higher intentions to engage in these types of behaviours, and persons with higher perceived behavioural control (to avoid risk-taking behaviours) had lower intentions to engage in HIV risk-taking behaviours. Subjective norms had no significant effect on intentions. This finding was not surprising given the results of previous studies which showed that attitudes and perceived behavioural control tend to be the best predictors of intentions to use condoms, whereas subjective norms played a marginal (or insignificant) role. For example, Jemmott *et al.* [5] revealed that subjective norms were not a significant determinant of condom use intentions, whereas attitudes and perceived behavioural control had significant effects. It has been shown that subjective norms have weaker effects on intentions than do attitudes or perceived behavioural control (for example [20]). It is important to note that perceived behavioural control had a stronger effect on risk-taking intentions than did attitudes, suggesting that this factor is the most salient determinant in the TPB model for HIV risk-taking intentions. This finding was consistent with that of Kok *et al.* [10], who also found that perceived behavioural control had the strongest effect on intentions to use a condom.

Knowledge of HIV/AIDS and perceived risk of HIV infection did not significantly add to the explained variance in HIV risk-taking intentions above and beyond that provided by the TPB model. This is surprising given the arguments that knowledge and perceived risk are important factors in the prediction of risky sexual behaviours [2]. Other research has confirmed that knowledge does not necessarily translate into safe sex behaviours [6]. Merakou *et al.* [6], for example, argued that "…although there is a relatively high level of objective knowledge regarding the principal routes of HIV transmission, this knowledge is insufficient on its own to ensure that young people practice safe sex". In a previous study, perceived risk, too, was found to have a non-significant effect on sexual behaviour, where there was no significant difference (in sexual risk-taking practices) between men who considered themselves at risk for HIV and those who did not. Although the findings imply that knowledge and perceived risk regarding HIV/AIDS play a marginal role in predicting HIV risk-taking intentions, the authors still acknowledge the need to include them in developing effective behavioural interventions to change risky sexual practices.

The implications of the study are important to consider for practice (interventions) and future research. With respect to the practical implications, the TPB seems to be a worthwhile starting point (i.e. theoretical foundation) in the development of HIV-related behavioural change interventions. Firstly, behavioural change interventions should focus on changing attitudes towards sex and sexual behaviours among individuals since it is recognized, in this study, that attitudes are important determinants of intentions. Hence, overly liberal attitudes towards sex and sexual behaviours should be identified, and efforts should be directed at educating individuals about the serious (and deadly) consequences of engaging in risky sexual behaviours. In terms of perceived behavioural control, efforts should be made to identify those persons who find it difficult to control their sexual behaviours (i.e. those who find it harder to refrain from engaging in unsafe sexual practices such as having multiple sex partners and inconsistent use of condoms during sexual intercourse). Enhancing these individuals' self-efficacy beliefs and confidence about condom use and other safe sex practices would curb intentions to engage in risky sexual practices as well as actual behaviours.

The present study has a number of limitations. Firstly, the study is both correlational and cross-sectional in its design, and hence, inferences regarding causality are difficult to form. The use of SEM as a technique to determine 'causality' is insufficient, since establishing causal links among variables is more a matter of study design than of statistical analysis. Longitudinal and experimental studies are needed to examine these links much more rigorously. Secondly, the study sought to explain intentions and not behaviour; hence, the results are restricted to predicting individuals' motivations to engage in HIV risk-taking behaviours rather than their actual sexual behaviours. The use of a self-report methodology presents problems including social desirability bias, common method variance and other related biases. Finally, the findings of this study cannot be generalized to the larger student population in the Caribbean, given that it was conducted in only one Caribbean country. Future research should seek to examine the usefulness of the TPB and related sexual behavioural models in different Caribbean countries in order to compare the findings with those of other developing countries.

It is clear that the TPB is indeed an important contribution to the HIV/AIDS and sexual behaviour literature. This model seems to have wide application across various settings with different cultural, social, economic and political dimensions. However, future research should continue to contribute to and modify the TPB model in an effort to further our theoretical understanding of human behaviour.

Conflict of interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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