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Dual Motivational Model of Pre-Exposure Prophylaxis (PrEP) Use Intention: Model Testing among Men Who Have Sex Men (MSM) in Ukraine

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Abstract

The Dual Motivational Model of PrEP use intention (DMM) is a new theoretical model that was recently tested among a population of men who have sex with men (MSM) in the United States. The model posits that there are two main pathways of motivation for MSM to use PrEP: the Protection Motivation Pathway and the Expectancy Motivation Pathway. The Protection Motivation Pathway suggests that the intention to use PrEP is triggered by the desire to protect oneself from acquiring HIV, while the Expectancy Motivation Pathway suggests that PrEP use intention is triggered by the expectation to have better sexual experiences by using PrEP. Although both motivators have been tested separately, only the DMM of PrEP use intention suggests that both pathways simultaneously influence an individual's intention to use PrEP. Using online data from 1,078 MSM in Ukraine, we aimed to test the DMM previously tested among MSM in the U.S. Results show that the relationship of the pathways is similar among Ukrainian and American MSM, though not identical. Potential explanations for minor differences may be related to cultural and contextual differences and the different trajectories for PrEP roll-out. Successful validation of the DMM for PrEP use intention as a theoretical model suggests that it may be applied to other

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cultures that are contemplating PrEP use delivery to target health promotion among MSM at risk for HIV.

Introduction

Ukraine has Europe's second largest HIV epidemic in the region (adult prevalence=1.2%), with evidence of an emerging epidemic among MSM (UCDC, 2016). HIV prevalence among the estimated 181,000 MSM in Ukraine was 7.5% in 2017 and is rising (UNAIDS, 2018). Although Ukrainian law does not prohibit homosexual relationships, MSM experience inordinate levels of social discrimination and stigma (Spindler, Salyuk, Vitek, & Rutherford, 2014). Nearly 50% of Ukrainian healthcare providers reported being against extending similar rights to homosexuals relative to heterosexuals (Maymulakhin, Zinchenkov, & Kravchuk, 2007). Similar to the U.S. three decades ago, 66.5% of Ukrainians surveyed considered homosexuality a perversion or mental illness (Martsenyuk, 2012). HIV-infected MSM living in similar hostile environments experience poor outcomes across the HIV continuum of care (Beyrer et al., 2011). HIV diagnosis and reporting rates are low among MSM and evidence-based interventions are limited (Bolshov, Kasianchuk, Leshchynskyi, Trofymenko, & Shvab, 2012; Dubov, Fraenkel, Yorick, Ogunbajo, & Altice, 2018). A triangulation data synthesis of people with HIV (PWH) in Ukraine showed that out of all PWH reported acquiring HIV heterosexually, 40% were actually either MSM or people who inject drugs (PWID), attesting to extraordinary levels of stigma and discrimination (Cakalo et al., 2015; Vitek et al., 2014).

Pre-exposure prophylaxis (PrEP), a once-daily medication is highly effective (92%) in preventing MSM from acquiring HIV (Spinner et al., 2016). Despite its potential, PrEP is not readily available in Ukraine (Dubov et al., 2018; Spinner et al., 2016). Ukrainian MSM report interest in taking PrEP, but data suggest that uptake is influenced by how PrEP is dispensed (Dubov et al., 2018). As PrEP roll-out starts, understanding PrEP use motivation and decision-making among MSM is of paramount importance in designing and modifying campaigns that promote PrEP use. This is especially important in Ukraine where HIV incidence and mortality continue to rise (UNAIDS, 2017).

This study aims to understand the decision-making processes underlying PrEP intention among MSM in Ukraine by testing the Dual Motivational Model (DMM) of PrEP use intention, which was originally proposed and tested among MSM in the U.S.

Dual Motivational Model of PrEP Use Intention

The DMM is a psychological model (Figure 1) to understand MSM's intention to use PrEP. The model posits that the decision to use PrEP is driven by two important pathways: the motivation to protect oneself (*Protection Motivation Pathway*), and the motivation to increase sexual pleasure (*Expectancy Motivation Pathway*). The first pathway is influenced by the need to protect oneself from acquiring HIV, while the second one is driven by the expectation to have better sexual experiences by eliminating condoms while using PrEP (Ranjit et al., 2018). The number of sexual partners is a driving factor in both pathways. Within the *Protection Motivation Pathway*, greater number of partners is directly associated

with perceived risk. Within the *Expectancy Motivation Pathway*, the relationship between number of partners and sexual expectancy is indirect and is mediated by safe sex fatigue and negative attitudes toward condoms.

Methods

As previously published (Dubov et al., 2018), 1,184 participants were recruited over 3 days in February 2016 to complete a Qualtrics™ survey using convenience sampling throughout all regions of Ukraine; 1,078 had complete data for analysis. Participants accessed survey links through social media outlets (Grindr, Hornet, Scruff, [Qguys.com](https://www.qguys.com)), mailing lists and advertisements by community-based organizations. Participants were paid ~\$4 USD in phone credits. This study was approved by [blinded for peer review] Institutional Review Boards.

Variables

The definitions of variables have been previously described (Ranjit et al., 2018). The *Number of sexual partners* was measured using a single item: “*How many sexual partners did you have in the past 6 months*” on a scale of 1 (1 partner) to 5 (10+ partners). *Negative attitudes toward condoms* was measured using six items like: “*I believe using condoms interferes with sexual pleasure*”. Agreement on items were measured on a 4-point Likert scale, with Cronbach alpha being $\alpha=0.86$ (Helweg-Larsen & Collins, 1994). *Safe sex fatigue* was measured using three items like: “*It takes a lot of effort to keep my sexual behavior safe.*” Agreement on items was measured with a 4-point Likert scale, with Cronbach alpha of $\alpha=0.86$. *Sexual expectancy on PrEP*, an 8-item scale included items like: “*I may be less likely to inquire about my partner’s HIV status before having sex*”. Agreement was measured on a 4-point Likert scale with Cronbach alpha of $\alpha=0.88$ (Dermen & Cooper, 1994). *Perceived risk* was measured using one item “*It is unlikely that I will get HIV in the next year*” reverse coded and measured on a 4-point Likert scale. Last, *PrEP use intention* was measured using a 6-point Likert scale for: “*If PrEP were available, how likely are you to use it to prevent HIV*”.

Results

The sample characteristics and risk behaviors ($n=1,078$) are presented in Tables 1 and 2, respectively. Mean age of participants was 30 years ($SD=7.5$).

Model Testing

Results from the Structural Equation Modeling (SEM) analysis are presented in Figure 2, which demonstrates that the original model of the DMM had a satisfactory fit of $\chi^2=43.93$, $df=9$, $p=.00$ with root mean square error of approximation (RMSEA) of 0.06. After adding links that were suggested from the U.S. model such as from safe sex fatigue to perceived risk and sexual expectancy on PrEP, the fit was improved $\chi^2=10.24$, $df=7$, $p=.17$ with RMSEA of 0.02 (Figure 3). Correlations between the variables in the proposed model are provided in Table 3.

Protection Motivation Pathway

The SEM results shows that the number sexual partners had a small but significant effect on perceived risk ($\rho=.06$, $p<.05$). Perceived risk had a direct positive link to PrEP use intention ($\rho=.10$, $p<.01$). Additionally, perceived risk was influenced by safe sex fatigue ($\rho=.16$, $p<.01$).

Expectation Motivation Pathway

The number of sexual partners also had a small effect on safe sex fatigue ($\rho=.07$, $p=.05$). Safe sex fatigue was directly associated with negative attitude towards condoms ($\rho=.49$, $p<.01$) and sexual expectancy on PrEP ($\rho=.08$, $p<.05$). Negative attitudes toward condoms directly influenced sexual expectancy about PrEP ($\rho=.25$, $p<.05$). Sexual expectancy, in turn, had a direct effect on PrEP use intention ($\rho=.29$, $p<.01$). The number of sexual partners, hence, indirectly influenced negative attitude about condoms ($\rho=.04$, $p<.05$), sexual expectancy on PrEP ($\rho=.02$, $p<.05$), and PrEP use intention ($\rho=.01$, $p<.01$). All the direct and indirect effects are presented in Table 4.

Discussion

In this study, we found that unlike in the U.S., the number of sex partners had a weak, yet significant influence on safe sex fatigue and perceived risk. The differences observed in the associations between the Ukrainian and U.S. models may be multi-fold, including contextual reasons such as the lower number of sexual partners reported in Ukraine (Ranjit et al., 2018) and the potentially the higher levels of stigma observed among Ukrainian MSM (Cakalo et al., 2015; Vitek et al., 2014).

The effect sizes of relationships among all variables were larger in the U.S. sample (Ranjit et al., 2018). One possible explanation for the weaker relationships observed among Ukraine MSM is the lack of variability observed in the number of sexual partners. Though not assessed in this survey, factors that may contribute to lower reported number of sexual partners in Ukraine may reflect limited MSM sexual networks, anticipated stigma or self-imposed strategies to reduce sexual risk. Alternatively, social desirability bias may have influenced Ukrainian MSM to underreport their number of sexual partners. Stigma-related constructs were not, however, measured, and their impact on the DMM should be considered in future research.

Though the magnitude differed, the relationships between variables in both settings were similar. Increasing numbers of sex partners was associated with high levels of safe sex fatigue and higher perceived risk; and safe sex fatigue was related to dissatisfaction with condoms. Aligning PrEP use with “safe sex” is emerging in the U.S. PrEP community, which may similarly have emerged with the expectation to have better sexual experiences without condoms (i.e., on PrEP). This stemmed from dislike of condoms. Unlike the U.S. where the number of new HIV infections is decreasing, the HIV epidemic in Ukraine is volatile. The coverage of treatment as prevention programs is low (UNAIDS, 2018) and condom use remains low among MSM (Kasianczuk, Johnston, Dovbakh, & Leszczynski, 2009). Stigma-reducing campaigns like U=U (Undetectable=Untransmissible) have yet to

evolve in Ukraine, which increasingly places responsibility on the individual who must make decisions about prevention, including PrEP. The DMM model tested in Ukraine suggests that the discussions around prevention should include conversations that acknowledge the challenges posed by safe sex fatigue, while encouraging condom use until primary (i.e., PrEP) or treatment as prevention strategies are more readily available. As PrEP enters the Ukrainian landscape, these findings suggest that dual health marketing strategies will be crucial to optimize PrEP uptake. In addition to health marketing, recent findings from the parent study suggest that PrEP delivery strategies will need to be tailored to the at-risk population of MSM (Dubov et al., 2018).

Despite its important findings, some limitations remain. The data were collected at a single point in time; therefore, the relationships among the variables can be interpreted only as correlational. Additionally, the answers are self-reported and subject to social desirability bias.

Key among the findings is that the original DMM of PrEP use intention (Ranjit et al., 2018) is confirmed with testing MSM in a different context. Although the magnitude of some of the relationships differs, the directionality of the relationships remains the same. Findings suggest that this model may help guide PrEP scale-up in other settings where both self-protection and pleasure expectations may guide decision-making by MSM.

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Figure 1.

The DMM model proposes dual pathways to PrEP use intention. The Expectancy Motivation Pathway, driven by the expectation of better sexual experience on PrEP and the Protection Motivation Pathway, driven by perceived risk to self of acquiring HIV.

Figure 2.

The Dual Motivational Model of PrEP use intention among MSM (N = 1,078) resulted in a good fit. The final model explained 10% of the variance in the outcome variable PrEP Use Intention. Overall model fit: $\chi^2 = 43.93.24$, $df = 9$, $p = .00$; CFI = .94; RMSEA = .06; PCLOSE = .157.

Figure 3.

The revised Dual Motivational Model of PrEP use intention among MSM (N= 1,078) resulted in a good fit. The final model explained 10% of the variance in the outcome variable PrEP Use Intention. Overall model fit: $\chi^2 = 10.24$, $df = 7$, $p = .17$; CFI = .99; RMSEA = .02; PCLOSE = .97.

Table 1.

Characteristics of Men Who Have Sex with Men in Ukraine

N = 1078 (%), M (SD)	
Mean age	30 (7.5)
Heard of PrEP	
Yes	537 (49.8)
No	541 (50.2)
Source of PrEP use information	
Friends	500 (46.6)
Website	275 (25.5)
Social worker	227 (21.1)
Family member	53 (4.9)
Health care provider	75 (7.0)
Colleague	57 (5.3)
Community meeting	69 (6.4)
Journal article	79 (7.3)
Education	
High school and below	243 (22.5)
Above high school	790 (73.3)
Sexuality	
Homosexual	672 (62.3)
Bisexual	262 (24.3)
Heterosexual	23 (2.1)
Transsexual	12 (1.1)
Other	101 (9.4)
Living situation	
With parents, stable	362 (33.6)
Independently, stable	303 (28.1)
Temporary and unstable	221 (20.5)
With friends, stable	105 (9.7)
No permanent housing	42 (3.9)
Regular partner	
Yes	642 (59.6)
No	436 (40.4)
Regular partner's HIV Status (n = 642)	
Positive	42 (3.9)
Negative	502 (46.6)
Don't know	98 (9.1)
Relationship type	
Monogamous	335 (31.1)
Non-monogamous regular partner	297 (27.6)
No regular partner	10 (0.9)

N = 1078 (%), M (SD)	
No. of partners in the last 6 months	
1 Partner	378 (35.1)
2 partners	279 (25.9)
3–5 partners	251 (23.3)
6–10 partners	86 (8.0)
10+ partners	84 (7.8)

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Table 2.

Risk behaviors of MSM in Ukraine (N = 1,078)

		N (%)
In the last 6 months, how often were you drinking alcohol before or during the time of sex?	Never	193 (17.9)
	Rarely	279 (25.9)
	Sometimes	342 (31.7)
	Often	189 (17.5)
	Every time	75 (7.0)
	Never	851 (78.9)
In the last 6 months, did you use drugs either immediately before or during the time of sex?	Rarely	104 (9.6)
	Sometimes	69 (6.4)
	Often	29 (2.7)
	Every time	25 (2.3)
In the last 6 months, how often have you used condoms when having sex with your regular partner? (n = 642)	No regular partner	18 (1.7)
	Never	148 (13.7)
	Rarely	63 (5.8)
	Sometimes	94 (8.7)
	Often	111 (10.3)
	Every time	208 (19.3)
In the last 6 months, how often have you used condoms when having sex with a casual partner?	No regular partner	335 (31.1)
	Never	57 (5.3)
	Rarely	40 (3.7)
	Sometimes	89 (8.3)
	Often	151 (14.0)
	Every time	406 (37.7)
When was your last HIV test?	Never	69 (6.4)
	Within past 6 months	719 (66.7)
	6 months to 2 years ago	201 (18.6)
	More than 2 year ago	89 (8.3)

Table 3.

Correlation matrix among variables in the model

	1	2	3	4	5	6	Mean (SD)
1 Number of partners	1.00						2.27 (1.24)
2 Safe sex fatigue	0.05	1.00					2.31 (0.62)
3 Negative attitude towards condoms	0.03	0.49**	1.00				2.27 (0.61)
4 Sexual Expectancy	0.03	0.21**	0.29**	1.00			2.49 (0.66)
5 Perceived risk	0.06	0.16**	0.12**	0.05	1.00		1.98 (0.84)
6 PrEP use intention	0.11**	0.06*	0.07*	0.29**	0.12**	1.00	4.33 (1.24)

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

Table 4.
Direct, indirect and total effects among the variables in the model assessing PrEP Use Intention

Variables Predictor	Criterion	Direct effects		Indirect effects		Total effects	
		B(SE)	Beta	B(SE)	Beta	B(SE)	Beta
1 Number of partners	Safe sex fatigue	.035 (.017)	0.07*	-	-	0.035(.017)	0.07*
	Negative attitude towards condoms	-	-	0.017 (.008)	0.04*	0.017 (.017)	0.04*
	Sexual expectancy on PrEP	-	-	0.008 (.004)	0.02*	0.008 (.004)	0.02*
	Perceived Risk	.04 (.022)	0.06*	0.008 (.006)	0.01*	0.050 (.005)	0.07*
	PrEP Use Intention	-	-	0.004 (.005)	0.01**	0.168(.041)	0.01**
2 Safe sex fatigue	Negative attitude towards condoms	0.47 (.02)	0.49**	-	-	0.477 (.029)	0.49**
	Sexual expectancy on PrEP	.09 (.036)	0.08*	0.134 (.020)	0.13**	0.224 (.037)	0.21**
	Perceived Risk	.22 (.041)	0.16**	-	-	0.218 (.037)	0.16**
	PrEP Use Intention	-	-	0.156 (.029)	0.08**	0.156 (.029)	0.08**
3 Negative attitude towards condoms	Sexual expectancy on PrEP	.28 (.037)	0.25	-	-	0.282 (.041)	0.25*
	PrEP Use Intention	-	-	0.154(.029)	0.07**	0.154 (.029)	0.07**
4 Sexual expectancy on PrEP	PrEP Use Intention	.55 (.05)	0.29**	-	-	0.546 (.062)	0.29*
5 Perceived Risk	PrEP Use Intention	.153 (.045)	0.10**	-	-	0.153 (.045)	0.10**

* Significant at $p < .01$

** Significant at $p < .05$