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Quality of Sex Life and Perceived Sexual Pleasure of PrEP Users in the Netherlands

Mart Van Dijk ^a, John B. F. De Wit ^b, Thomas E. Guadamuz ^c, Joel E. Martinez ^d, and Kai J. Jonas ^a

^aDepartment of Work & Social Psychology, Maastricht University; ^bDepartment of Interdisciplinary Social Science, Utrecht University; ^cDepartment of Society and Health, Mahidol University; ^dDepartment of Psychology, Princeton University

ABSTRACT

Next to its benefits for HIV prevention, PrEP may have psychosocial benefits relating to improved quality of sex life. The aim of the current study was to investigate the onset of changes in the quality of sex life and sexual pleasure of PrEP users in the first months of commencing PrEP use. Moreover, we investigated what factors were related to the quality of sex life of PrEP users. We recruited 145 participants via the Dutch PrEP-advocacy website PrEPnu.nl, and they received follow-up questionnaires after three and six months. We found that PrEP users reported an increase in the quality of their sex life, which was related to reduced fear of HIV since they started using PrEP but not to decreased condom use. PrEP users were more interested in experimenting with sex practices, but they did not always feel more desirable as a sex partner because of PrEP use. Health-care providers and health promotion campaigns could emphasize the positive effects of PrEP on the quality of sex life, in addition to the HIV-preventive effects of PrEP, to decrease PrEP stigma and increase PrEP uptake.

Introduction

Men who have sex with men (MSM) are disproportionately affected by HIV. In the Netherlands, about two-thirds of HIV infections are among MSM, and in the European Union (EU)/European Economic Area (EEA) sex between men is the predominant mode of HIV transmission (European Centre for Disease Prevention and Control, 2019). While the overall number of new HIV diagnoses is steadily declining over the past years in the EU/EEA region to a yearly rate of 5.6 per 100,000, the number of new HIV infections among MSM is increasing in some countries in this region (European Centre for Disease Prevention and Control, 2019). The implementation of pre-exposure prophylaxis (PrEP) can accelerate a decline in new HIV infections as was, for example, shown in the Impact Trial in England (Public Health England, 2019). PrEP uptake is increasing in contexts where PrEP became more easily available and affordable, such as in Germany and Belgium (Mysior et al., 2020; Vuylsteke et al., 2019). PrEP uptake and continuous use may further increase if psychosocial benefits of PrEP are better understood and promoted.

While it has been suggested that PrEP may have benefits for the quality of sex life in addition to its benefits for HIV prevention (Calabrese & Underhill, 2015; Grant & Koester, 2016; Race, 2016), there are only a limited number of studies that investigated the quality of sex life of PrEP users and what factors are related to their quality of sex life. One of these factors could be reduced fear of HIV as it has been found that PrEP reduces HIV-related fear (Collins et al., 2017; Hojilla et al., 2016; Keen et al., 2020; Koester et al., 2017; Moeller et al., 2020; Whitfield et al., 2019). The reduced fear

of HIV could lead to less consistent condom use, which in turn has been related to improvements in quality of sex life as well (Carballo-Diéguez et al., 2011). Furthermore, perceived improvements in quality of sex life may be related to increased sexual pleasure. PrEP users reported improvements in sexual pleasure since they started using PrEP, and they related these improvements to increased sexual desire (Da Silva-Brandao & Ianni, 2020) and greater feelings of sexual freedom (Mabire et al., 2019). Another possible factor related to quality of sex life is chemsex (the use of drugs while having sex) as MSM engaged in chemsex to enhance sexual pleasure (Weatherburn et al., 2017).

In sum, there is initial evidence that PrEP use also has (positive) psychosocial effects due to reduced fear of HIV, increased sexual pleasure (due to less frequent condom use), and perceived sexual freedom. To date, PrEP use has mostly been studied in the context of formal PrEP use, in which PrEP users received counseling and medical supervision. In the current study, we assessed the experiences of PrEP users in the Netherlands outside of clinical trials. At the time of our study, many PrEP users obtained PrEP via informal channels (e.g., pharmacies abroad) because formal PrEP services were not implemented yet (Van Dijk et al., 2021).

The aim of the current study was to document the onset of changes in behaviors and attitudes of PrEP users in a longitudinal study and to investigate factors that are related to the quality of sex life and sexual pleasure of PrEP users. As prior qualitative studies have found, we expected that less fear of HIV and a decrease in condom use would be related to an improved quality of sex life among PrEP users. We also expected that greater feelings of sexual freedom, as reflected

by experimenting with sex practices or recreational substance use, would be related to an improved quality of sex life. We first analyzed whether these behaviors and attitudes change in the first months of commencing PrEP use. Next, we analyzed how the behaviors and attitudes were related to the quality of sex life.

Method

Participants and Procedure

Between February 2017 and March 2019, participants were recruited via an online advert at the Dutch PrEP-advocacy website PrEPnu.nl. This website provides information about using and obtaining PrEP aimed at potential PrEP users in the Netherlands. Participants received a follow-up questionnaire via e-mail after three (T1) and six months (T2). All the participants who completed at least two questionnaires (Baseline T0 + T1/T2) were entered into a raffle to win a €100 gift card. This study was approved by the Ethics Review Committee Psychology and Neuroscience of Maastricht University (ERCPN-174_10_12_2016). The full details of the methods of this study have been described elsewhere (Van Dijk et al., 2021).

Participants younger than 18 years old or living with HIV were excluded from participation. In total, 767 participants completed the baseline (T0) questionnaire. For the current analysis, we included participants who reported using PrEP at T1 and T2 and who completed the items for the variables that were included in the analysis ($N = 145$). Six participants stopped using PrEP between T1 and T2. We did not include data from T0 because not all relevant items for the current analysis were assessed at T0.

Measures

The questionnaires were administered online using Qualtrics. The questionnaires were offered in Dutch and English. The full questionnaires can be found on <https://osf.io/dm79v/>. Below we describe the relevant variables for the current analyses.

Sociodemographic Characteristics

In the baseline questionnaire (T0) participants were asked to indicate their gender (gender assigned at birth and current gender), age, relationship status, educational level, financial situation, country of birth, and country of residence. We assessed the perceived financial situation with a 6-point scale; (1) “you can’t make ends meet without borrowing,” (2) “you are having problems making ends meet,” (3) “you are getting by but have to be careful,” (4) “things are all right,” (5) “you are doing rather well,” and (6) “you are doing really well”.

Quality of Sex Life and Quality of Life

At T1 and T2, we asked participants about their quality of sex life with the following single item: “Since you started taking PrEP, would you say that the quality of your sex life is:” with responses indicated on a 5-point scale ranging from (1) “a lot worse” to (5) “a lot better.” Similarly, we asked participants about their quality of life in general since they started taking PrEP to investigate whether quality of sex life explained additional variance.

PrEP Use and Consequences of PrEP Use

We asked participants when they started using PrEP (month and year). We transformed this variable into the number of months that they were using PrEP. We asked current PrEP users whether they used PrEP daily or on demand. At T1 and T2, we also asked them to indicate their agreement, using a 5-point scale ranging from (1) strongly disagree to (5) strongly agree, with the following five items that were phrased for the period since they started using PrEP: “I feel less anxious when having sex,” “I feel more safe when having sex,” “I feel I am a more desirable sex partner because of PrEP,” “I feel more interested in experimenting with novel sex practices,” and “I am interested in using (novel) recreational drugs while having sex.” Due to the conceptual overlap of the first two items, (less) anxious and (more) safe, ($r = .72$ at T1 and $r = .57$ at T2), we computed a new variable based on the mean of these two items.

Condom Use

To assess condom use, we asked participants whether their condom use changed since they started taking PrEP on a scale from (1) “a lot lower than before” to (5) “a lot higher than before”.

Drug Use

To explore drug use, we asked participants whether they had ever used drugs in a sexual context. If yes, we asked them to select which drugs they had used: 3-MMC, 4-MEC, 4-FA, Cocaine, Crystal Meth, GHB/GHL, Ketamine, Methoxetamine (MXE), or XTC (ecstasy/MDMA).

Data Analysis

We analyzed the data using IBM SPSS Statistics version 26. To assess changes in the quality of sex life, condom use, and the PrEP-related items over a period of three months, we conducted repeated ANOVA measurements to compare the two measurements (T1 and T2) of each variable, in a longitudinal within-participant online design. To assess if quality of life, condom use and the PrEP-related items were related to quality of sex life, we conducted a linear regression analysis with quality of sex life at T2 as dependent variable. The repeated measures ANOVA and the linear regression analysis were performed twice: Once with only the participants who were using PrEP for 6 months or less ($N = 100$, findings described in the Results section), and once with all participants who were using PrEP ($N = 145$; results described in the online supplementary material). In addition, we conducted a mediation analysis to assess if reduced fear of HIV was associated with improved quality of sex life as mediated by decreased condom use, using 5000 bootstrapped standard errors in PROCESS version 3 for SPSS (Hayes, 2017).

Results

Participant Characteristics and PrEP Use

Table 1 shows the participant characteristics. All 145 participants were cisgender males. Their mean age was 43 years (range: 20–71). Most participants were single (70; 48.3%) or in an open relationship (66; 45.5%). Overall, the sample was

Table 1. Frequencies of participant characteristics ($N = 145$).

Age (years; mean, range)	43 (20–71)
Born in the Netherlands	119 (82.1%)
Living in the Netherlands	140 (96.6%)
Perceived financial situation	
You can't make ends meet without borrowing	1 (0.7%)
You are having problems making ends meet	2 (1.4%)
You are getting by but have to be careful	14 (9.7%)
Things are all right	43 (29.7%)
You are doing rather well	52 (35.9%)
You are doing really well	33 (22.8%)
Education level	
No tertiary education	21 (14.5%)
Professional/vocational qualification	29 (20.0%)
Bachelor degree	43 (29.7%)
Master degree	43 (29.7%)
PhD degree	9 (6.2%)
Relationship status	
Single	70 (48.3%)
In a relationship	9 (6.2%)
In an open relationship	66 (45.5%)
Used this drug in a sexual context since PrEP initiation:	
3-MMC	14 (9.7%)
4-MEC	2 (1.4%)
4-FA	3 (2.1%)
Cocaine	19 (13.1%)
Crystal meth	9 (6.2%)
GHB/GHL	61 (42.1%)
Ketamine	34 (23.4%)
Methoxetamine (MXE)	6 (4.1%)
XTC (ecstasy/MDMA)	66 (45.5%)
PrEP use duration	
0–3 months	85 (58.6%)
4–6 months	15 (10.3%)
7–12 months	16 (11.0%)
More than 12 months	29 (20%)

relatively high educated (95 participants (65.6%) had a Bachelor's degree or higher) and in a comfortable perceived financial situation (128 participants (88.4%) evaluated their financial situation as “all right” or higher).

The median duration of PrEP use was 3 months ($Mean = 7.28$, $SD = 9.83$, range: 0–56 months). More than half of the participants used PrEP daily (T1: 109 participants (75.2%), T2: 101 participants (69.7%)), and the remainder used PrEP on demand (T1: 36 (24.8%), T2: 44 (30.3%)). Recreational drug use in a sexual context was common: 66 participants (45.5%) indicated they had used XTC (ecstasy/MDMA) while on PrEP, and 61 participants (42.1%) indicated to have used GHB/GHL. Use of other drugs is reported in Table 1.

Changes in Behavior and Attitudes

Table 2 shows the descriptive statistics of quality of sex life, condom use, and the PrEP-related items, including the results of the repeated measures ANOVA. PrEP users reported

improvements in their perceived quality of sex life with an average score of 4.15 ($SD = 0.70$) at T1. The improvements in quality of sex life maintained over time; the score at T2 did not differ from the score at T1 ($M = 4.14$, $SD = 0.70$; $F < 1$). PrEP had less impact on quality of life in general compared to its impact on quality of sex life. The scores on quality of life in general were closer to the middle value (3), indicating that the perceived quality of life was “the same” as before using PrEP.

PrEP users reported high agreement with feeling less anxious when having sex since they started PrEP use, both at T1 and T2. PrEP use, however, did not make them feel more desirable as a sex partner at T1 or T2. PrEP use did make them somewhat more interested in experimenting with sex practices, and this increased over time ($F(1, 99) = 4.56$, $p = .04$, $\eta_p^2 = .04$). In contrast, PrEP users indicated that they were not interested in using new types of drugs while having sex. Furthermore, PrEP users reported a decrease in self-reported condom use at T1 since they started using PrEP, and condom use further decreased at T2 ($F(1, 99) = 7.48$, $p = .007$, $\eta_p^2 = .07$).

Factors Related to Quality of Sex Life

Significant factors related to the quality of sex life at T2 were the quality of sex life at T1 ($B = 0.28$, $t = 2.69$, $p = .009$) and the quality of life in general at T2 ($B = 0.36$, $t = 3.40$, $p < .001$) (Table 3). Feeling less fear of HIV at T2 was close to the level of significance ($B = 0.15$, $t = 1.87$, $p = .07$) and this variable was significant in the analysis with the full sample ($B = 0.17$, $t = 2.52$, $p = .01$) (Table S1 in Online Supplementary Material).

In order to better understand the relationship between reduced fear of HIV and increased quality of sex life, we assessed if this relationship was mediated by condom use (Figure 1). These analyses showed no indirect effect of condom use ($b = 0.02$, 95% CI = -0.01 – 0.06), but did show a direct effect of fear of HIV on the quality of sex life ($b = 0.23$, $t(142) = 2.98$, $p = .003$) that was not mediated by condom use.

Discussion

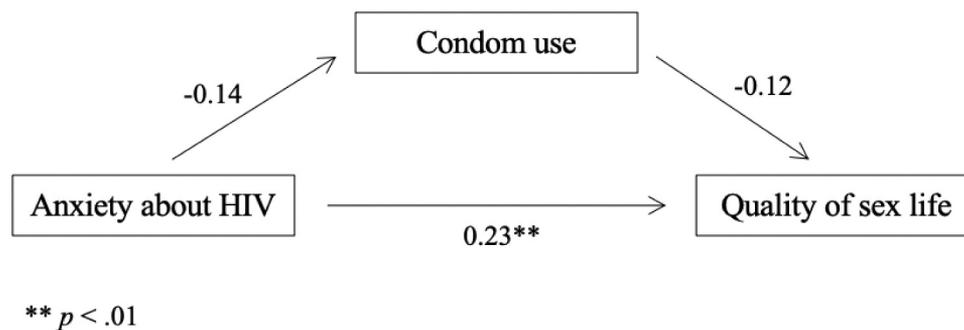
The aim of the current study was to assess the onset of changes in perceived quality of sex life and sexual pleasure of PrEP users in their first six months of PrEP use. We also assessed factors that were related to the quality of sex life of PrEP users. PrEP users reported an increase in quality of their sex lives, and, to a lesser extent, an increase in quality of life in general. Similar to earlier studies (Collins et al., 2017; Hojilla et al., 2016; Keen et al., 2020; Koester et al., 2017; Moeller et al., 2020; Whitfield et al., 2019), PrEP users also reported less fear of HIV

Table 2. Descriptive statistics and repeated measures ANOVA to compare the scores on the variables of interest between the two time points. This analysis only includes the participants who were using PrEP 6 months or less ($N = 100$).

	T1		T2		F	p	η_p^2
	M	(SD)	M	(SD)			
Quality of life ¹	3.69	(0.72)	3.56	(0.67)	1.31	.25	.01
Quality of sex life ¹	4.15	(0.70)	4.14	(0.70)	0.13	.72	.001
I feel less anxious/more safe when having sex ²	4.46	(0.97)	4.61	(0.74)	2.68	.11	.03
I feel I am a more desirable sex partner because of PrEP ²	2.93	(1.26)	3.02	(1.29)	0.14	.71	.001
I feel more interested in experimenting with novel sex practices ²	3.41	(1.25)	3.62	(1.17)	4.56	.04	.04
I am interested in using (novel) recreational drugs while having sex ²	1.99	(1.24)	1.96	(1.22)	0.48	.49	.01
Condom use ³	2.29	(0.74)	2.07	(0.77)	7.48	.007	.07

Table 3. Multivariable regression analysis with quality of sex life at T2 as outcome variable. This analysis only included the participants who were using PrEP 6 months or less (N = 100).

	B	S.E.	Standardized Beta	t	p
(Constant)	0.97	0.65		1.48	.14
Quality of sex life (T1)	0.28	0.10	0.28	2.69	.009
Condom use (T1)	-0.05	0.10	-0.05	-0.48	.64
Condom use (T2)	-0.03	0.10	-0.03	-0.24	.81
I feel less anxious/more safe when having sex (T1)	-0.03	0.07	-0.03	-0.36	.72
I feel less anxious/more safe when having sex (T2)	0.15	0.08	0.16	1.87	.07
I feel more interested in experimenting with novel sex practices (T1)	0.03	0.06	0.05	0.53	.60
I feel more interested in experimenting with novel sex practices (T2)	0.05	0.06	0.09	0.83	.41
I feel I am a more desirable sex partner because of PrEP (T1)	-0.004	0.06	-0.008	-0.07	.94
I feel I am a more desirable sex partner because of PrEP (T2)	0.09	0.06	0.16	1.61	.11
Quality of life (T1)	0.01	0.11	0.01	0.09	.93
Quality of life (T2)	0.36	0.10	0.34	3.40	.001
I am interested in using (novel) recreational drugs while having sex (T1)	-0.10	0.06	-0.18	-1.55	.13
I am interested in using (novel) recreational drugs while having sex (T2)	-0.03	0.07	-0.04	-0.38	.71

**Figure 1.** Mediation analysis investigating the relationship between fear of HIV and quality of sex life mediated by condom use, all at T2.

when having sex since they started using PrEP. This reduced fear was positively related to improvements in quality of sex life. The relationship between fear of HIV and quality of sex life was not found to be mediated by changes in condom use.

We found that PrEP users became somewhat more interested in experimenting with sex practices after they started using PrEP, and this interest increased over time. Although we did not ask our participants for any specification of these sex practices, earlier qualitative studies found that PrEP users indicated that they felt more comfortable to switch their sexual position from top to bottom, which they associated with higher HIV risk before (Mabire et al., 2019; Quinn et al., 2019), and PrEP users were more likely to have attended sex parties (Meunier & Siegel, 2019). Also, a quantitative study among 1,500 MSM in Australia found that PrEP users had a more “adventurous” sex life as they were more likely to have engaged in group sex and had a higher number of sex partners (Prestage et al., 2019). Overall, we found that drug use in the context of sex was high, similar to other studies that reported high levels of recreational drug use or chemsex among PrEP users (Closson et al., 2018; Gafos et al., 2019; Nöstlinger et al., 2020; Roux et al., 2018). However, PrEP users in our study did not have an increased interest in using (novel) recreational drugs while having sex since they started using PrEP. Notably, a study among PrEP users in a demonstration trial in the Netherlands found that (problematic) drug use actually decreased after PrEP initiation (Achterbergh et al., 2020). The authors proposed the possible explanation that PrEP users in the demonstration trial received counseling and motivational interviewing. In our study, no decrease in drug use was found.

A possible explanation is that since we recruited participants in a context where formal PrEP services were not fully implemented yet, PrEP users may not have received counseling, and therefore did not change their drug use behavior. Studies in other contexts have also emphasized the importance of behavioral counseling in mitigating sexual risk behavior of PrEP users (Golub et al., 2013; Hojilla et al., 2016; Oldenburg et al., 2018).

PrEP users reported a decrease in condom use, and this seemed to continue over time. PrEP users overall did not report a change in feeling a more desirable sex partner since they started using PrEP, while in the literature changes have been found in both directions. Some PrEP users felt that they were a less desirable sex partner as they had encountered stigmatizing reactions from potential sex partners (Brooks et al., 2019; Grace et al., 2018). Other PrEP users felt that they were a more desirable sex partner as they were seen as having a lower risk of having HIV (Martinez & Jonas, 2019).

The findings of our study contribute to the discourse of psychosocial benefits and sex-positive effects of PrEP. Initially, PrEP users were stigmatized as reflected by the use of such terms as “Truvada whores” (Calabrese & Underhill, 2015). However, a recent study in Australia, where PrEP is widely available, found that positive views of PrEP were twice as common as negative views of PrEP (Philpot et al., 2020). Researchers have advocated a focus on the empowerment regarding sexual health and how PrEP fits in the complete array of HIV and sexually transmitted infection (STI) prevention strategies (Rojas Castro et al., 2019). To increase PrEP uptake and continuous use, health promotion campaigns

should include the positive effects of PrEP, such as the improved quality about sex life and reduced anxiety for HIV. For example, a PrEP campaign in Chicago that underlined sexual pleasure was found to increase PrEP awareness and engagement (Dehlin et al., 2019; Keene et al., 2020). While promoting PrEP, it is important to take into account that factors that may improve sexual pleasure (such as less frequent condom use and increased chemsex) are also associated with increased incidence of STIs (Bourne et al., 2015; Quinn et al., 2019). Nevertheless, concerns about sexual risk behavior should not impede the prescription of PrEP as it may delay the progress in reducing new HIV infections (Gandhi et al., 2019; Marcus et al., 2019).

This study had several strengths and limitations. We recruited participants by convenience sampling through the PrEP advocacy website PrEPnu.nl. Especially at the start of our recruitment, in early 2017, the use of PrEP was still limited in the Netherlands. Hence, it was practical to recruit participants, that is (potential) PrEP users, through channels for this population group. By using this platform, we may have recruited motivated and well-informed (potential) PrEP users. As PrEP use is becoming more common in many countries, future researchers may want to recruit a wider range of PrEP users. A limitation of this study was that we could not use a multi-item measure for quality of sex life. A consolidation of concepts is needed, and subsequently instrument development, as terms for quality of sex life, sexual pleasure, and sexual well-being are used interchangeably in the literature. A final limitation was that we did not ask the questions to MSM who were not using PrEP, so we cannot compare quality of sex life of PrEP users with non-users. We asked PrEP users to indicate changes in quality of sex life since they started taking PrEP, so we can only make inferences about the effect of PrEP based on these self-reported changes.

In conclusion, we found that early PrEP users in the Netherlands reported an increase in the quality of their sex lives, which was associated with reduced fear of HIV while having sex since they started using PrEP. PrEP users also were more interested in experimenting with novel sex practices, but they did not always feel more desirable as a sex partner because of PrEP use. Health-care providers and health promotion campaigns could highlight the positive effects of PrEP on the quality of sex life, in addition to the HIV-preventive effects of PrEP, to decrease PrEP stigma and increase PrEP uptake and continuous use.

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Disclosure Statement

No potential competing interest was reported by the author(s).

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Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author, MvD.

ORCID

Mart Van Dijk  <http://orcid.org/0000-0001-6722-3979>
 John B. F. De Wit  <http://orcid.org/0000-0002-5895-7935>
 Thomas E. Guadamuz  <http://orcid.org/0000-0001-6803-1127>
 Joel E. Martinez  <http://orcid.org/0000-0003-4949-303X>
 Kai J. Jonas  <http://orcid.org/0000-0001-6607-1993>

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