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Using the Theory of Planned Behavior incorporated with perceived barriers to explore sexual counseling services delivered by healthcare professionals in individuals suffering from epilepsy

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ABSTRACT

People with epilepsy (PWE) are highly likely to suffer from sexual dysfunction, and dealing with this issue is a challenge for healthcare providers. Unfortunately, there is no theory-driven study that has investigated the counseling practice of healthcare providers for sexual problems in PWE. Therefore, we decided to apply the well-established Theory of Planned Behavior (TPB) to examine factors associated with healthcare providers' sexual counseling in PWE. Apart from TPB, perceived barriers toward providing counseling could be a possible factor that needs to be investigated as well. Therefore, two models explaining sexual counseling practice were proposed. Model 1 included only TPB and Model 2 included TPB incorporated with perceived barriers. Five hundred fifty-nine Iranian healthcare professionals responsible for PWE were recruited across several neurology clinics and asked to complete TPB-specific questionnaires. The same healthcare professionals were asked to complete an additional questionnaire on their attitudes toward sexual counseling 18 months later. Structural equation modeling suggested Model 2 to be more useful in explaining sexual counseling practice compared with Model 1. Moreover, attitude and perceived behavioral control showed stronger associations with behavioral intention, whereas subjective norm showed weaker associations. The associations were similar across different healthcare professionals (i.e., medical doctors vs. nurses). In conclusion, TPB incorporated with perceived barriers might be a useful theory for different types of healthcare providers to improve and enhance sexual counseling practice.
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1. Introduction

Sexuality is an integral part of people's lives and is significantly related to quality of life [1]. Individuals suffering from chronic diseases or conditions such as epilepsy tend to show impaired sexual functioning and consequently diminished quality of life. According to previous epidemiologic studies, 20–30% of women with epilepsy report some sort of sexual problem, such as decreased libido, reduced sexual arousal, and/or infrequent orgasms [2]. Similarly, around 30% of men with epilepsy report erectile dysfunction [3,4]. Although the exact mechanisms by which epilepsy can cause sexual problems remain unknown, sexual impairment is most likely caused by a multitude of factors, such as anxiety, stigmatization, epileptic activity in the cortex, general impact of the disease on health, and side effects of certain antiepileptic drugs [2,5–11]. In terms of side effects, for example, the negative effects of the novel antiepileptic drug lamotrigine (LTG) on sexual functioning have recently been demonstrated [12]. A pharmacological review suggested that LTG has the ability to inhibit voltage-gated sodium channels, consequently suppressing glutamate release and enhancing the action of gamma-aminobutyric acid [13]. Secondary to these actions, LTG may induce persistent genital arousal disorder through altering brain excitatory transmission and finally result in an unbalance of the dopamine/serotonin ratio [14]. Because of the detrimental effects on quality of life, healthcare providers should be aware of the potentially impairing effects of epilepsy on sexuality and should address this in people with epilepsy (PWE) from a very early stage in the treatment process.

Abbreviations: Comparative fit index, CFI; Lamotrigine, LTG; People with epilepsy, PWE; Root mean square of error approximation, RMSEA; Sexual Attitudes and Beliefs Survey, SABS; Structural equation modeling, SEM; Standardized root mean square residual, SRMR; Tucker–Lewis index, TLI; Theory of Planned Behavior, TPB.

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This, however, proves to be a challenging endeavor for many healthcare providers [15,16], and different types of barriers have been identified providing possible explanations on why sexuality is not routinely considered and addressed in the treatment process [17–19]. To the best of our knowledge, however, no studies have explored specific theories underlying counseling practice of healthcare providers and how these could influence sexual counseling in PWE. Therefore, the aim of the present study was to use the Theory of Planned Behavior (TPB) to investigate and examine factors associated with healthcare providers' sexual counseling in PWE. The reasons for using TPB include the following: (1) other studies on PWE showed that TPB is an appropriate theory to explain patients' drug compliance [20] and help-seeking behaviors [21] and (2) TPB can explain healthcare providers' intention to provide health service [22].

The Theory of Planned Behavior is based on the Theory of Reasoned Action [23] and is frequently applied to predict behaviors or behavioral change using four key elements: attitude, subjective norm, perceived behavioral control, and behavioral intention [24]. *Attitude* describes a person's positive or negative judgment toward their behaviors. *Subjective norm* refers to the approval or disapproval of these behaviors in the person's environment as perceived by the person. *Perceived behavioral control* represents the level of control toward the behaviors that a person feels he or she has [24,25]. In terms of the clinical practice in epilepsy care and especially in view of sexual counseling, attitude refers to how healthcare providers judge their services of sexual counseling. Subjective norm refers to how healthcare providers perceive the opinions of their environment on providing sexual counseling. Finally, perceived behavioral control refers to how healthcare providers have control over providing sexual counseling to PWE. Overall, the three aforementioned elements are postulated to influence and shape the final behavior and/or cause behavioral change, a process that is mediated by behavioral intention (e.g., whether the healthcare providers intend or do not intend to provide sexual counseling). In other words, attitude, subjective norm, and perceived behavioral control may influence a person's intention to perform a specific behavior, and engagement in such a behavior is mainly influenced by levels of intention.

In addition to TPB, we propose the examination of an alternative model that includes TPB and a factor called "perceived barriers". Two key arguments justify the inclusion of this additional factor. First, although TPB has been found to be useful in explaining health behaviors among different populations [20,22,26–31], one of its major limitations is its parsimony, especially because TPB relies only on three key elements to explain behavioral intention [32]. Second, perceived barriers have been identified as possible factors hindering the delivery of sexual counseling [15,17]. Consequently, we decided to incorporate perceived barriers as an underlying factor into the original TPB theory. More specifically, we hypothesized that perceived barriers would be associated with behavioral intention and with sexual counseling practice.

The general aim of the present study was to examine the usefulness of TPB (Fig. 1) and TPB with perceived barriers (Fig. 2) in explaining attitudes toward sexual counseling in an Iranian sample of healthcare providers (including neurosurgeons, neurologists, and nurses) dealing with PWE. Additionally, we were interested in whether different healthcare professionals (i.e., medical doctors vs. nurses) interpret the TPB model or the TPB model incorporated with perceived barriers similarly.

2. Materials and methods

The study was conducted in ten neurology clinics across seven university hospitals in Tehran, Qazvin, Isfahan, Mahshad, Kashan, Tabriz, and Yazd. The procedure was approved by the research ethical committee of Qazvin University of Medical Sciences. All participants provided written consent prior to participating in the study.

2.1. Participants and procedures

Study participants were healthcare professionals (including neurosurgeons, neurologists, and nurses) responsible for PWE care in neurology clinics. Individuals were included in the study if they had been involved in providing services and care to PWE, including prevention, diagnosis, treatment, and rehabilitation. Seven hundred fifty questionnaires were distributed, and 74.5% of the participants responded to the questionnaires (N = 559; detailed information of questionnaires can be found in Sections 2.2.1–2.2.5). Eighteen months later, the same participants completed another questionnaire asking about sexual counseling practice (more details can be found in Section 2.2.6).

2.2. Main outcome measures

2.2.1. Attitudes toward providing sexual counseling

The 12-item Sexual Attitudes and Beliefs Survey (SABS) was developed by Reynolds and Magnan [33] to capture attitudes related to clinical practice. Response options are on a five-point Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The SABS has demonstrated satisfactory internal consistency ($\alpha = 0.75$–0.82) and excellent test–retest reliability ($r = 0.85$) [34]. A higher SABS score indicates stronger beliefs about providing sexual counseling.

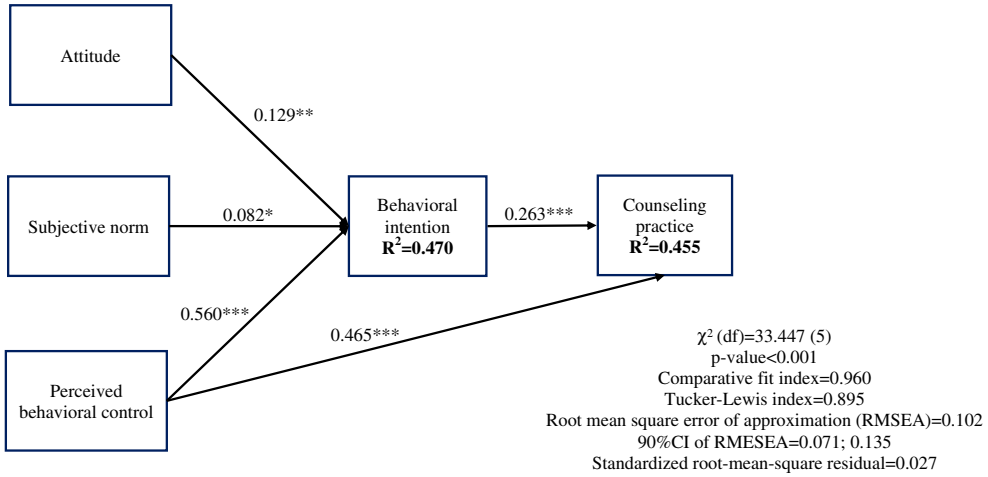

Fig. 1. The Theory of Planned Behavior Model on counseling practice. Note: *p < 0.05; **p < 0.01; ***p < 0.001; age, sex, and year of practice were controlled.

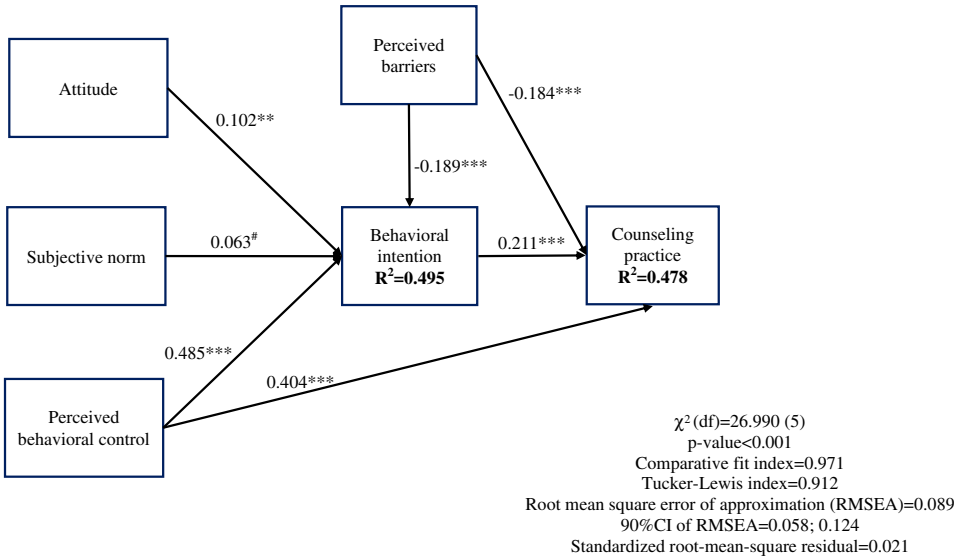

Fig. 2. The Theory of Planned Behavior Model incorporated with perceived barriers on counseling practice. Note: *p < 0.05; **p < 0.01; ***p < 0.001; #p = 0.067; age, sex, and year of practice were controlled.

Internal consistency of the Persian version of the SABS has been found to be satisfactory (α = 0.82).

2.2.2. Subjective norm toward providing sexual counseling

Three items were used to measure subjective norms (e.g., "Professional colleagues think that I should talk with patients about their sexuality"). Each item was rated on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree), with a higher score indicating a higher subjective norm perception. Internal consistency for this scale in the present study was acceptable with a Cronbach's α of 0.80.

2.2.3. Perceived behavioral control toward providing sexual counseling

Three items were used to measure perceived behavioral control (e.g., "I am confident that I can talk with patients about their sexuality"). Each item was rated on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree), with a higher score indicating more perceived behavioral control. Internal consistency was α = 0.83 in this study.

2.2.4. Behavioral intention of providing sexual counseling

Behavioral intention was measured using two items (e.g., "I intend to talk with patients about their sexuality"). Each item was rated on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree), with a higher score indicating more behavioral intention. Internal consistency was α = 0.79 in this study.

2.2.5. Perceived barriers toward providing sexual counseling

Seventeen items (e.g., "I do not have enough time to discuss sexual problems") were used to assess perceived barriers providing sexual counseling for patients. All items were rated on a five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree), with a higher score indicating greater levels of perceived barriers to provide sexual counseling. Internal consistency was α = 0.83 in this study.

2.2.6. Sexual counseling practice

The practice on sexual counseling for PWE was assessed using eight items. A sample item was "In the past year, with what percentage of your clients have you assessed their sexual health?" Four items were scored on a 0–3 scale and four items on a 0–5 scale, resulting in a final score ranging from 0 to 32, with a higher score indicating a better performance of a healthcare practitioner in terms of sexual counseling [35].

2.3. Statistical analysis

Descriptive statistics were used to explore participants' characteristics and study variable distributions. Pearson correlations were further computed to investigate the associations between the various instrument scores. Structural equation modeling (SEM) was conducted to examine the fit of two proposed models: the TPB-only model (Model 1, Fig. 1) and the TPB-incorporated with perceived barriers model (Model 2, Fig. 2). Next, Model 1 was compared with Model 2 to identify the best performing model in explaining the data. The better performing model was then used to test the path invariance across healthcare professionals (medical doctors vs. nurses). Finally, the Sobel test [36] was used to examine the mediating effects of behavioral intention in the associations between the three or four independent variables (i.e., attitude, perceived norm, and perceived behavioral control if Model 1 performed better and additionally perceived barriers if Model 2 performed better) and the counseling practice. In addition, Sobel tests were conducted for all participants if the path invariance was supported and separately for medical doctors and nurses in case the path invariance was not supported.

Maximum likelihood estimator was applied to all the models. Four fit indices were used to compare Model 1 with Model 2, including comparative fit index (CFI) and Tucker–Lewis index (TLI) >0.9; root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) <0.08 [37,38]. In cases where RMSEA was over 0.08, we viewed RMSEA <0.10 as an alternative [39]. Moreover, the four mentioned indices and a χ^2 difference test were used to check for path invariance with a nonsignificant χ^2 difference test suggesting path invariance.

3. Results

The mean age of the healthcare professionals was 42.94 ± 7.43 years, with a greater proportion being males (n = 401; 71.1%). More than half of the participants were nurses (n = 287; 51.3%), followed by neurologists (n = 169; 30.2%) and neurosurgeons (n = 103; 18.4%). Average years of practice experience were 6.44 ± 3.74 years. The correlation matrix for the TPB elements (including attitude, subjective norm, perceived behavioral control, behavioral intention, and counseling practice) and perceived barriers can be found in Table 1. The strongest correlation was found between perceived behavioral

Table 1
Pearson correlations between the key factors of the Theory of Planned Behavior and perceived barriers.

Variables	Mean (SD)	r (N = 559)				
		2.	3.	4.	5.	6.
1. Attitude	3.97 (0.60)	0.399	0.600	0.497	−0.415	0.521
2. Subjective norm	3.25 (0.80)		0.426	0.371	−0.323	0.392
3. Perceived behavioral control	3.41 (1.05)			0.672	−0.518	0.642
4. Behavioral intention	3.54 (1.08)				−0.505	0.574
5. Perceived barriers	3.32 (0.91)					−0.497
6. Counseling practice	19.77 (9.02)					

Note. p-values for all correlations were <0.001.

control and counseling practice (r = 64) and the weakest between subjective norm and perceived barriers (r = −0.32).

Results of Model 1 (TPB only) are illustrated in Fig. 1. Although two of the fit indices were excellent (CFI = 0.960 and SRMR = 0.027), the other two indices were below the recommended values (TLI = 0.896 and RMSEA = 0.102). Therefore, Model 1 could not be regarded a satisfactory model. Examination of the coefficient of each TPB path in Model 1 showed that all coefficients were significant. Attitude, subjective norm, and perceived behavioral control together explained 47% of the variance in behavioral intention, and behavioral intention and perceived behavioral control together explained 45.5% of the variance in final counseling practice. All the control variables included in the model (i.e., age, sex, and year of practice) were not significantly associated with counseling practice.

According to the fit indices, Model 2 was regarded a nearly satisfactory model (CFI = 0.971, TLI = 0.912, and SRMR = 0.021) except for the slightly high RMSEA (0.089) (Fig. 2). However, the RMSEA was below the alternative suggested cutoff of 0.10, therefore somewhat supporting the better fit of Model 2 compared with Model 1. Further examination of the coefficient of each TPB path in Model 2 found all coefficients to be significant, except for the path coefficient of subjective norm to behavioral intention (standardized coefficient = 0.063; p = 0.07). Moreover, attitude, subjective norm, and perceived behavioral control together explained 49.5% of the variance in behavioral intention; behavioral intention and perceived behavioral control together explained 47.8% of the variance in counseling practice. All of the included control variables (i.e., age, sex, and year of practice) were not significantly associated with counseling practice.

Because Model 2 showed a better fit than Model 1, it was used as the baseline model to test path invariance between medical doctors (including neurosurgeons and neurologists) and nurses. Results indicated that one fit index in the constrained model (CFI = 0.960) was slightly worse than that of the configural model (CFI = 0.964), and that the other fit indices of the constrained model (TLI = 0.940, SRMR = 0.028, and RMSEA = 0.074) were even better compared with those of the configural model (TLI = 0.893, SRMR = 0.022, and RMSEA = 0.099) (Table 2). In addition, χ^2 difference test resulted in no significant difference between the configural and the constrained model ($\Delta\chi^2 = 13.448$, $df = 10$; p = 0.20), indicating path invariance between medical doctors and nurses.

After ensuring path invariance between healthcare professionals, the mediating effects of behavioral intention were explored next. According to the Sobel tests (Table 3), attitude (standardized coefficient = 0.022; p = 0.02), perceived behavioral control (standardized coefficient = 0.102; p < 0.001), and perceived barriers (standardized coefficient = −0.040; p < 0.001) showed indirect associations with counseling practice through behavioral intention. However, no indirect association between subjective norm and counseling practice (standardized coefficient = 0.013; p = 0.086) could be detected.

4. Discussion

To the best of our knowledge, this is the first study using TPB to explore sexual counseling practice of healthcare providers for their patients with epilepsy. Results indicated that TPB is not sufficient in explaining the sexual counseling practice as evidenced by the poor model fit. The alternative model with inclusion of perceived barriers to the basic TPB model provided a better explanation of the data, resulting in a more adequate model fit (CFI = 0.971, TLI = 0.912, SRMR = 0.021, and RMSEA = 0.089). In addition, the alternative model showed that nearly half of the variance in behavioral intention (i.e., the intention on providing sexual counseling) and nearly half of the variance in providing sexual counseling could be explained by the factors (attitude, subjective norm, perceived behavioral control, behavioral intention perceived barriers). It therefore seems that the key TPB elements as well as perceived barriers are critical factors for healthcare providers in conducting and including sexual counseling into their practice. Another important finding of our study is that this model was invariant across medical doctors (including neurosurgeons and neurologists) and nurses. In other words, the model has the potential to be applied to different healthcare providers.

Generally speaking, our main findings are in accordance with previous studies on PWE showing strong links between attitude and behavioral intention [20,21] and between perceived behavioral control and behavioral intention. Overall, study findings on the association between subjective norm and behavioral intention in PWE tend to be contradictory. Our results correspond to the findings of Lin et al. [20] reporting no association between subjective norm and behavioral intention, but not another study reporting significant correlation between the two elements [21]. Despite the often contradictory results, the studies

Table 2
Path invariance across healthcare professionals (medical doctors vs. nurses).

Fit index	Model 2a	Model 2b
χ^2 (*df*)	37.161 (10)*	50.609 (20)*
Comparative fit index	0.964	0.960
Tucker–Lewis index	0.893	0.940
Root mean square error of approximation (RMSEA)	0.099	0.074
90% CI of RMSEA	0.066; 0.134	0.049; 0.100
Standardized root-mean-square residual	0.022	0.028

Model 2a = Configural model of Model 2 (see Fig. 2); that is, freely estimated path coefficients across healthcare professionals.
Model 2b = Model 2 with all path coefficients constrained to be equal across healthcare professionals.
* p < 0.001.

Table 3
Sobel tests for mediated effects through behavioral intention in Model 2 (N = 559).

Independent variable	Std. coefficient	Coefficient	SE	p-value
Perceived barriers	−0.040	−0.395	0.110	<0.001
Attitude	0.022	0.324	0.140	0.020
Subjective norm	0.013	0.149	0.087	0.086
Perceived behavioral control	0.102	0.880	0.194	<0.001

Note. Std. coefficient = standardized coefficient.

reporting a significant association between subjective norm and behavioral intention consistently report weaker associations of behavioral intention compared with the other two factors attitude and behavioral control [20,21]. Similar findings have been supported by other TPB studies across different populations [26,27]. We suggest two possible reasons: first, in agreement with Lin et al. [20], healthcare providers in our study scored relatively high in attitude and perceived behavioral control, making them feel positive about their control over providing counseling practice. Given these positive beliefs, it is possible that the association between subjective norm and the intention to provide sexual counseling practice could consequently be reduced. Second, healthcare providers conduct different types of counseling (e.g., auxiliary service and core clinical service), and the levels of subjective norm vary depending on the different services (e.g., the environment may not expect a healthcare provider to provide auxiliary service but only core clinical service). Indeed, a nonsignificant correlation between subjective norm and the intention to provide auxiliary service and a significant correlation between subjective norm and the intention to provide core clinical service were previously found in a group of pharmacists [22]. As a result, the association between subjective norm and intention to provide sexual counseling might be weakened.

In addition to TPB, we found perceived barriers to be a relevant factor linked to behavioral intention and actual sexual counseling. Previous study findings suggest that perceived barriers can hinder PWE to actively seek help for their sexual problems [21,40], and these findings can be extended from patients to their healthcare providers: healthcare providers may encounter a set of difficulties (e.g., time constraint) to provide such services to PWE. Therefore, additional work on resolving these barriers for healthcare providers is needed.

Given that our results endorsed the alternative model (i.e., the TPB model incorporated with perceived barriers), the question arises as to the practical value of this model and how it can be used for healthcare professionals. For every discipline, professionals are trained in a specific way to achieve professionalism [41], and these different trainings may shape and produce different types of attitudes and beliefs. Therefore, empirical evidence is needed to ensure that the TPB model with perceived barriers is suitable for different healthcare providers, especially for the two main groups of medical doctors and nurses. Results from our path invariance analyses provide some answer by suggesting that the model applies to both groups equally. Therefore, training programs aimed at shaping the TPB elements (i.e., attitudes and perceived behavioral control) and reducing perceived barriers can potentially be useful to train healthcare providers across disciplines and help them change their attitudes toward sex counseling for PWE.

Tailored programs aiming at attitude shaping, enhancement of perceived behavioral control, and reduction of perceived barriers are needed for different healthcare providers so that they learn how to effectively provide PWE with sexual counseling in order to increase their sexual health and sexual quality of life. This can be achieved by means of various approaches. For example, psychoeducation for healthcare providers can help them shape their attitudes by sensitizing them toward the presence of sexual problems in PWE and helping them understand the importance of sexual health for overall quality of life [16]. Furthermore, brainstorming over action planning to set up strategies on how to efficiently provide sexual counseling might enhance their perceived behavioral control [28–30,32]. Finally, performing so-called coping planning (e.g., let them think about all the potential barriers and possible solutions in providing sexual counseling) could help decrease the burden of perceived barriers [28–30,32].

5. Limitations and conclusions

Some limitations to the present study need to be considered. First, we were unable to control for all possible confounders that could interfere with sexual counseling practice because of the unavailability of the data and the specific study design. For example, we were unable to control for any life events (e.g., an important relative passed away) and/or affective state of the healthcare provider (e.g., being in a happy or a sad mood). Second, given that the participants of this study were neurosurgeons, neurologists, and nurses, our results cannot be generalized to other healthcare professionals. Third, sexual counseling practice was measured using self-report. Therefore, social desirability may have introduced a reporting bias and led to overestimation of sexual counseling. Future work using more objective measures on sexual counseling practice (e.g., using medical records to retrieve service data on sexual counseling) may prevent such biases.

In conclusion, attitude, perceived behavioral control, and perceived barriers were associated with sexual counseling practice and mediated through behavioral intention in healthcare providers. Behavioral intention together with perceived behavioral control and perceived barriers might be linked directly to actual sexual counseling. The abovementioned paths were invariant across medical doctors and nurses. Based on these findings, specific training programs for medical doctors and nurses can be developed, which will help them understand the importance of dealing with sexual concerns in PWE and improve their services in providing sexual counseling.

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Conflict of interest

None.

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