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Original Research

The impact of Peyronie's disease on Portuguese men's mental health and sexual functioning

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Abstract

Purpose: The purpose of this study was to assess the impact of Peyronie's disease (PD) on Portuguese men's mental health and sexual functioning.

Materials and Methods: Study participants included 103 men diagnosed with PD who had attended urology appointments at two hospitals in Portugal. The participants' average age was 34.38 years old (SD = 13.77). The study utilized a variety of measurement instruments, encompassing a sociodemographic questionnaire, the Portuguese version of the Brief Symptoms Inventory-18, the Portuguese version of the Massachusetts General Hospital-Sexual Functioning Questionnaire, and a Questionnaire measuring PD concerns.

Results: Overall results showed that the men surveyed presented higher levels of mental health symptoms (somatization, depression, and anxiety) and lower levels of sexual functioning than the community sample (the general Portuguese population without clinical disorders). Correlation coefficients showed a strong and positive correlation between mental health symptoms and a loss of sexual confidence and stress, while finding a strong and negative correlation between sexual functioning and stress. Most PD concerns exhibited strong and positive mutual correlations. The study also found strong and positive correlations between penile curvature and a perceived reduction in penis attractiveness and discrimination fears. Multiple regression analyses showed that PD concerns and penile curvature explained 34.3% of the overall mental health variance and 21% of the overall sexual functioning variance.

Conclusions: These results are consistent with those of previous studies that have shown that experiencing PD can increase mental health symptoms and diminish sexual functioning.

Keywords

Peyronie's disease; Mental health; Sexual functioning; Portuguese men

1. Introduction

Peyronie's disease (PD) is a chronic inflammatory disease affecting the *tunica albuginea* of the penis. PD possesses an estimated prevalence that ranges from 3.2% to 13% of men [1–3]. Although its etiology is not completely clear [4], current theories link PD to the occurrence of micro- and macro-traumas [5–10] that initially cause the growth of fibrous plaques. In turn, these plaques cause changes in penile morphology [11, 12], namely curvature, shortening, and hourglass-like deformities, with penile curvature being the most frequent symptom and affecting 75 to 95% of cases [13, 14]. Sexual problems, namely painful erections or erectile dysfunction [15–18] are also associated with PD, as are psychological problems. The most common psychological symptom in men with PD is associated with discontent and anxiety related to

the degree of penile curvature, with this symptom affecting between 70% and 80% of cases [19–21]. Other psychological symptoms related to PD include depression, which occurs in 48% of cases [22], as well as relationship and partner problems [23], isolation, stigmatization, and difficulties in seeking medical help for treatment [24]. Thus, given the lack of Portuguese studies concerning this topic, the researcher developed the current study with the primary objective of assessing PD's impacts on Portuguese men's mental health and sexual functioning.

2. Materials and methods

2.1 Measurement instruments

In order to meet its objectives, this study employed a sociodemographic questionnaire, which asked participants a set of questions regarding age, marital status, educational attainment, socioeconomic status, employment status, place of residence, sexual orientation, if they were circumcised or not, and a self-assessment of penis length (in centimeters).

The study assessed penile curvature using axial and coronal photographs of participants' penises taken while experiencing a full pharmacologically induced erection at their urologist's office. The participants' urologists used a ruler to draw a straight line starting at the base of the penis (proximal shaft) through the absolute center of the straight portion of the proximal and distal penile shafts and to the point of maximum curvature. The degree of curvature was objectively determined by measuring the angle between the two intersecting lines using a goniometer and was recorded in each patient's file.

The current research measured mental health using the Portuguese version of the Brief Symptom Inventory-18 (BSI-18) [25], which is comprised of 18 items and three subscales, encompassing somatization, depression, and anxiety. The depression subscale focuses on depressive disorders' core symptoms, which include dysphoric mood states and anhedonia, among others. In turn, the anxiety subscale encompasses symptoms indicative of panic states, such as nervousness, tension, and motor agitation. The global severity index is obtained by adding the scale's 18 items together, providing a measurement of individuals' general psychological distress levels, with higher scores revealing more intense psychosymptomatology. Furthermore, the scale demonstrated excellent internal consistency ($\alpha = 0.91$).

The Massachusetts General Hospital-Sexual Functioning Questionnaire (MGH-SFQ) [26] consists of a scale with five different items that assess sexual interest and arousal, the ability to achieve orgasm, the ability to get and maintain an erection, and general sex life satisfaction. Scale scores are calculated using a seven-point Likert scale, ranging from (1) totally absent, (2) markedly decreased, (3) almost average, (4) average, (5) somewhat above average, (6) markedly above average, and (7) extremely above average. Higher MGH-SFQ scores indicate better sexual functioning. The MGH-SFQ's limited number of items makes it an attractive instrument for detecting sexual dysfunctions in clinical practice, in addition to displaying excellent internal consistency ($\alpha = 0.95$).

To assess PD concerns, the study asked participants a set of questions involving their penis curvature perceptions, particularly in relation to aesthetic concerns, virility, a loss of sexual performance confidence, sexual problems (pain, erectile dysfunction, etc.), the inability to satisfy their partners, the anticipation of rejection or discrimination, and becoming depressed, anxious, or stressed. PD concerns were scored according to a five-point Likert scale ranging from (1) not at all concerned, (2) moderately concerned, (3) neutral, (4) concerned, and (5) very concerned. In addition, the PD Concerns questionnaire demonstrated very good internal consistency ($\alpha = 0.88$).

2.2 Procedures

The researcher began by evaluating the clinical history of patients with a PD diagnosis who had attended urology appointments at two hospitals in Portugal. The researcher initially contacted 673 male urology patients from the two hospitals, of whom 148 agreed to participate in the study, yielding a response rate of 21.9%. Study inclusion criteria encompassed being 18 years of age or older, having a penile curvature of 30 degrees or greater, a lack of comorbidities, such as diabetes or alcohol, tobacco, or drug abuse, and not reporting any sexual problems prior to PD occurrence. 103 patients met these inclusion criteria, while 45 were excluded from the study. Subsequently, the men who met the inclusion criteria responded to multiple psychosexual assessment measures. Furthermore, this study respected all ethical and deontological principles, ensuring compliance with all existing norms, including informed consent, confidentiality, and the anonymity of participants' identities and the study results. Participants received no financial compensation in exchange for participating in the study, and the data collected were used exclusively for statistical purposes. The researcher collected data concerning patients' diagnoses and information regarding the degree of penis curvature from their clinical files and medical assessments. Subsequently, the researcher divided participants into three different groups, encompassing participants with penis curvatures of 30° or less, those with penis curvatures ranging from 31° to 60°, and those with penis curvatures of over 61°.

2.3 Statistical methods

This study utilized the Statistical Package for the Social Sciences (SPSS) software to analyze variable data. In addition to basic descriptive measures (mean, standard deviation, and frequency), the researcher calculated the Pearson's correlation coefficients (following the verification of assumptions of normality and homogeneity). Furthermore, the study also conducted multiple regression analyses to assess predictive relationships among mental health and sexual functioning risk factors.

2.4 Ethics statement

The present study protocol adhered to the Declaration of Helsinki—Ethical Principles for Medical Research Involving Human Subjects. The study informed all participants that their responses would be anonymous and confidential, and participants gave their informed consent to be included prior to participating in the study. Finally, the University of Beira Interior research ethics board approved this study.

3. Results

The study participants included 103 men who had been diagnosed with PD and who had urology appointments at two hospitals in Portugal. The study excluded 45 men who claimed to have a history of sexual problems prior to PD occurrence, diabetes, or alcohol, tobacco, or drug abuse. Participants ranged from 18 to 61 years old, with an average age was 34.38 years (SD = 13.77). Regarding marital status, 53 participants (51.6%) were single, 30 (29%) were married or in de facto civil unions, 17 (16.1%) were dating or in a committed relationship, and three (3.3%) claimed to be separated or divorced. Participants predominantly lived in urban areas, with 63 men (61.3%) living in large cities. In general, sample participants also possessed elevated educational attainment levels, with 43 (41.9%) having a university education. Furthermore, the vast majority of participants stated that they were currently employed (n = 70, 67.7%). Concerning socioeconomic status, 53 men (51.6%) claimed to possess middle socioeconomic status, 23 men (22.6%) asserted that they held lower middle socioeconomic status, and 20 men (19.4%) claimed to have low socioeconomic status. When asked about their sexual orientation, the vast majority of participants self-identified as heterosexual (n = 76, 74.2%), while 17 (16.1%) self-identified as homosexual and 10 (9.7%) as bisexual. 79.3% of all participants said that they were not circumcised and reported an average self-assessed erect penis length of 15.09 cm (SD = 2.54 cm). Regarding penile curvature, 66 men (64.3%) reported a curvature of 30° or less, 30 men (28.6%) claimed to have a curvature of 31° to 60°, and seven men (7.1%) declared that they had penile curvature surpassing 60°.

Table 1 describes the mental health symptom results, which indicated that study participants presented higher levels of somatization, depression, and anxiety symptoms than the general population, but lower levels of symptomatology than the clinical population. The study obtained the validation scores for the general population, encompassing people without mental health disorders, from the relevant literature [25], while acquiring the validation scores for people with mental health disorders from clinical/psychiatric samples. Regarding sexual functioning, Table 1 shows that participants also demonstrated lower levels of sexual functioning in comparison with the general population, using validation scores for healthy men from the general population. Finally, the study observed moderate levels of PD concerns among participants, recording higher levels of PD concerns in regard to a loss of penis attractiveness, a loss of sexual confidence, greater sexual problems, and an inability to satisfy one's partner.

As shown in Table 2, the study conducted a correlation analysis to determine the levels of association among mental health symptoms, sexual functioning, PD concerns, and the degree of penile curvature. Correlation coefficients showed that mental health symptoms were strongly and positively correlated with a loss of sexual confidence (r = 0.318; $P < 0.05$) and stress (r = 0.370; $P < 0.05$). Additionally, sexual functioning was strongly and negatively correlated with stress (r = -0.327; $P < 0.05$). Furthermore, most PD concerns demonstrated mutual strong and positive correlations. Finally, curvature was positively and strongly correlated with a loss of penis attractiveness (r = 0.528; $P < 0.001$) and discrimination fears (r = 0.387; $P < 0.05$).

Finally, the study performed two multiple regression analyses to assess the effects of PD concerns and penile curvature on mental health symptoms and sexual functioning. In the first model (mental health), PD concerns, and curvature explained 34.3% of the overall variance. In the second model (sexual functioning), PD concerns, and penile curvature explained 21% of the overall variance. Therefore, as shown in Table 3, a loss of virility, a loss of sexual confidence, the inability to satisfy one's partner, stress, and the degree of penile curvature were significant predictors of mental health symptoms. Additionally, a loss of penis attractiveness, a loss of sexual confidence, greater sexual problems, and penile curvature were significant predictors of lower sexual functioning.

4. Discussion

The literature describes Peyronie's disease (PD) as an accumulation of scar tissue in the *tunica albuginea* of the penis, which causes penile curvature and deformities and may result in psychological distress and sexual dysfunction. PD often leads to psychological and psychosocial consequences, such as depression, low self-esteem, and emotional distress, problems that are capable of diminishing affected individuals' quality of life [27].

As in other studies, our results suggest that most men report mental health difficulties, including somatization, depression, and anxiety symptoms, as the samples' observed mental health scores were higher than expected for a non-clinical population. Moreover, the study results also reinforce the relevance and importance of PD concerns. Similar to the findings of other studies [19], study participants with PD highlighted their concerns regarding their physical appearance, sexual functioning, discomfort, and social stigmatization. Furthermore, the study findings clearly showed that penile curvature and PD concerns were predictive of lower levels of mental health and sexual functioning, confirming PD's negative impacts on psychological functioning.

PD can interfere with men's emotional functioning, leading to depression, anxiety, low self-esteem, and sexual problems, reinforcing the disease's potential complications [28]. Thus, as our findings suggest, early psychological assessment

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TABLE 1. General results (n = 103 men with a PD diagnosis).

		Study sample (SD)	General population	Clinical population
Mental Health Symptoms (0–4)	Somatization	0.88 (0.94)	0.57 (0.91)	1.35 (1.00)
	Depression	1.31 (1.25)	0.89 (0.72)	1.82 (1.05)
	Anxiety	1.21 (0.99)	0.94 (0.76)	1.74 (0.99)
Sexual Functioning (1–7)	Sexual interest	3.65 (1.33)	3.98 (1.19)	-
	Sexual arousal	3.55 (1.26)	3.89 (1.06)	-
	Orgasm	3.35 (1.22)	3.90 (1.06)	-
	Erection	3.35 (1.22)	3.93 (1.16)	-
	Sexual satisfaction	3.19 (1.45)	3.99 (1.45)	-
PD Concerns (1–5)	Loss of penis attractiveness	3.21 (1.59)	-	-
	Loss of virility	2.93 (1.66)	-	-
	Loss of sexual confidence	3.46 (1.45)	-	-
	Greater sexual problems	3.20 (1.47)	-	-
	Inability to satisfy one's partner	3.50 (1.40)	-	-
	Discrimination fears	2.79 (1.59)	-	-
	Stress	2.53 (1.43)	-	-

TABLE 2. Mental health symptoms, sexual functioning, PD concerns, and degree of curvature correlation matrix (n = 103).

	1	2	3	4	5	6	7	8	9	10
1 - Total mental health symptoms	-									
2 - Total sexual functioning	0.163	-								
3 - Loss of penis attractiveness	0.056	-0.109	-							
4 - Loss of virility	0.047	-0.327*	0.497**	-						
5 - Loss of sexual confidence	0.318*	-0.270	0.707**	0.554**	-					
6 - Greater sexual problems	0.122	-0.264	0.457*	0.641**	0.708**	-				
7 - Inability to satisfy one's partner	0.127	-0.147	0.563**	0.368*	0.810**	0.693**	-			
8 - Discrimination fears	0.273	-0.127	0.397*	0.443*	0.444*	0.230	0.249	-		
9 - Stress	0.370*	-0.164	0.380*	0.375*	0.604**	0.528**	0.528**	0.703**	-	
10 - Curvature	-0.115	-0.105	0.528**	0.242	0.218	-0.056	0.042	0.387*	0.122	-

* < 0.05; ** < 0.001.

TABLE 3. Multiple regression analyses of PD and PD concerns' impacts on mental health symptoms and sexual functioning (n = 103).

	Mental Health Symptoms			Sexual Functioning		
	B	*SEB*	β	*B*	*SEB*	β
Loss of penis attractiveness	-0.074	0.195	-.0121	0.213	0.242	0.310*
Loss of virility	-0.144	0.173	-0.246*	-0.089	0.215	-0.134
Loss of sexual confidence	0.519	0.282	0.776**	-0.252	0.349	-0.333*
Greater sexual problems	0.024	0.238	0.036	-0.262	0.295	-0.354*
Inability to satisfy one's partner	-0.384	0.249	-0.554**	0.208	0.309	0.265
Discrimination	0.031	0.198	0.050	0.080	0.246	0.116
Stress	0.222	0.218	0.343*	-0.057	0.270	-0.078
Curvature	-0.302	0.390	-0.197*	-0.398	0.484	-0.230*
R^2	0.343			0.210		
F	1.237**			0.673**		

* < 0.05; ** < 0.001. Note: *B* = unstandardized beta, *SEB* = standard error for the unstandardized beta, and β = standardized beta.

and interventions are of the utmost importance in order to improve PD patients' mental health symptoms, sexual performance, stress and anxiety levels, and overall quality of life.

Assessing PD's effects on mental health and sexual functioning is pertinent to achieving preventive treatment goals, thus enhancing patients' well-being. As in much of the previous research [29], this study's findings showed that PD's impacts on mental health and sexual functioning are multi-dimensional and are not necessarily associated with penile curvature. In fact, most study participants had less severe penile curvature, and it is possible that other factors may interfere with PD's potential influence on sexual functioning and mental health, namely relationship issues, sexual performance anxiety, stigmatization, and isolation [19], which could lead to changes in perceptions concerning the true impacts of PD [21].

The study findings regarding PD and PD concerns' nega-

tive mental health impacts are consistent with earlier studies, particularly in regard to depression, anxiety, reduced self-esteem [22, 30, 31], loneliness, hopelessness or negative reactions (such as shame), feelings of inadequacy, and low body image [19]. Aesthetic concerns seemed to be more associated with sexual functioning difficulties, probably due to stress's impacts on male sexual response and concerns associated with penile morphology. Concerns about penile morphology appear to be more aggravated for men with PD [32] than for their partners, creating increased concerns regarding their partners' sexual satisfaction, even though the majority of PD patients are able to have penetrative sex without any major difficulties [19]. Furthermore, future studies should attempt to assess PD's effects on relationship conflicts, as relationship problems encompass several determinants.

PD and PD concerns' influence on mental health and sexual functioning may be linked to the fact that some men may have created an obsession with penis shape and emotional variables, which are manifesting themselves in the form of relevant sexual dysfunctions that require therapeutic interventions [33, 34], highlighting PD's psychological burden. PD's effects are often underestimated by doctors who do not consider it to be a significant problem. However, if we consider its impacts on health and sexual functioning, negative PD-related effects become much more evident. In this regard, the study results draw attention to the need to assess the mental health and sexual functioning of men diagnosed with PD.

5. Conclusions

This study clearly demonstrates the negative impacts of PD and PD concerns on the mental health and sexual functioning of men who have been diagnosed with PD. Nevertheless, the mediating effects underlying this relationship are complex, and more studies are needed in order to accurately understand this phenomenon. Furthermore, these results are consistent with those from prior research that have indicated that PD can negatively influence somatization, depression, anxiety, and sexual functioning. As a result, andrology and urology health professionals working with PD patients should be particularly aware of their patients' psychological needs during clinical decision-making processes.

Author contributions

HP is the sole contributor to this article.

Ethics approval and consent to participate

University of Beira Interior research ethics board approved this study.

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Conflict of interest

The author declares no conflict of interest.

Informed consent statement

All subjects gave their informed consent for inclusion before they participated in the study.

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