Prevalence and factors associated with pelvic floor dysfunction in university women: a cross-sectional study

Prevalência e fatores associados à disfunção do assoalho pélvico em mulheres universitárias: um estudo transversal

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Abstract

Introduction: Urinary incontinence (UI), fecal incontinence (FI), and genito-pelvic pain or penetration disorder (GPPPD) are considered pelvic floor dysfunction (PFD), and are mainly characterized by poor functionality of the pelvic floor muscles. Despite the relevance of these dysfunctions in women's lives, the demand for care is low. **Objective:** To analyze the prevalence of PFD, in university women, and factors associated with PFD. **Methods:** This is a cross-sectional study conducted at São Paulo State University, Marília, SP, Brazil, with undergraduate and/or postgraduate women aged over 18 years. An online questionnaire containing 40 open and multiple-choice questions about PFD was developed by the authors and a Google form was disclosed via social media (Facebook, Instagram) to the participants. The questionnaire was applied between April and July 2020. **Results:** A sample of 707 participants was included. The average age was 22.5 ± 21.0 years old. The most prevalent PFD was GPPPD, reported by 30.7% of women, followed by UI (16.8%) and FI (3.2%). PFD was significant less reported in the Midwest region compared to other regions ($p = 0.015$) and significantly more prevalent in women who attended public university ($p = 0.038$), in women with UI, FI, and GPPPD. The association-test showed that attending public university showed association to UI ($p < 0.001$), FI ($p = 0.008$) and GPPPD ($p = 0.006$). In addition, parity showed association with GPPD ($p = 0.032$) and to attend health courses with UI ($p = 0.002$). **Conclusion:** PFD is prevalent among university women and GPPPD was the most recurrent, followed by UI and FI. GPPPD was associated with parity and attending a public university. UI was associated with attending public university and health courses. FI was associated with attending a public university.

Keywords: Pelvic floor disorders. Physiological sexual dysfunction. Urinary incontinence. University.

Resumo

Introdução: *A incontinência urinária (IU), a incontinência fecal (IF) e a dor genitopélvica ou distúrbio de penetração (DGDP) são considerados disfunções do assoalho pélvico (DAP) e caracterizam-se principalmente pela má funcionalidade dos músculos do assoalho pélvico. Apesar da relevância dessas disfunções na vida das mulheres, a demanda por atendimento é baixa.* ***Objetivo:*** *Analisar a prevalência das DAP em mulheres universitárias e fatores associados à DAP.* ***Métodos:*** *Trata-se de um estudo transversal realizado na Universidade Estadual Paulista, Marília, SP, Brasil, com graduandas e/ou pós-graduandas maiores de 18 anos. Um questionário online contendo 40 questões abertas e de múltipla escolha sobre DAP foi desenvolvido pelos autores e um formulário do Google foi divulgado via mídia social (Facebook, Instagram) às participantes. O questionário foi aplicado entre abril e julho de 2020.* ***Resultados:*** *Uma amostra de 707 participantes foi incluída. A média de idade foi de 22,5 ± 21 anos. A disfunção mais prevalente foi a DGDP, relatada por 30,7% das mulheres, seguida por IU (16,8%) e IF (3,2%). As características gerais não diferiram entre os grupos, mas no geral as disfunções foram significativamente menos relatadas na região Centro-Oeste em comparação com outras regiões (p = 0,015) e significativamente mais prevalente em mulheres que frequentaram universidade pública (p = 0,038) e em mulheres com IU, IF e DGDP. O teste de associação não demonstrou associação entre as disfunções e etnia, índice de massa corporal ou tipo de assistência à saúde. Além disso, frequentar universidade pública apresentou associação com IU (p < 0,001), IF (p= 0,008) e DGDP (p = 0,006). Além disso, a paridade mostrou-se associada à DGDP (p = 0,032) e frequentar cursos de saúde com IU (p = 0,002).* **Conclusão:** *A disfunção do assoalho pélvico é prevalente entre as universitárias e a DGDP foi a mais recorrente, seguida de IU e IF. DGDP foi associado à paridade e a frequentar universidade pública. IU foi associada a frequentar universidade pública e a cursos da área da saúde. IF foi associada a frequentar universidade pública.*

Palavras-chave: *Distúrbios do assoalho pélvico. Disfunções sexuais fisiológicas. Incontinência urinária. Universidade.*

Introduction

Pelvic floor dysfunction (PFD) is characterized by poor functionality of the pelvic floor muscles and altered function in pelvic organs. The risk factors are structural changes, diseases, physical trauma, pregnancy, obesity, and high-performance sports. PFD is a public health problem and generates increasing expenditures in the health area, which influence the quality of life and social life.[1,2] According to the American Society of Urogynecology, one in four women aging 20 years or older will have PFD in their lifetime.[3,4]

According to the World Health Organization, urinary incontinence (UI) is the most common PFD, affecting more than 200 million people worldwide.[3] The most common types are stress urinary incontinence (SUI), urgency urinary incontinence (UUI), and mixed urinary incontinence (MUI), which could be treated by conservative or surgical approaches.[4] In Brazil, surgical treatment predominates. An epidemiological study consulting the Brazilian Public Health Data Center System (DATASUS) from 2008 to 2019 found a total number of 84,378 surgical procedures and about 6,89 procedures per 100,000 women.[5]

Whereas UI is widely reported in the literature about prevalence, pathophysiology, and treatment, fecal incontinence (FI) and genito-pelvic pain/penetration disorders (GPPPD), that includes dyspareunia and vaginismus symptoms, are restricted in global literature. This also reflects the low seek for assistance as the main complaint in health consultations is UI, while FI and GPPPD are less reported and explored by patients and health care professionals.[6] Despite the relevance of these signs and symptoms in women's lives, the demand for care is low,[6] possibly because women consider PFD as a natural process of the human body, due to embarrassment, or because they are not aware of the treatment.[6]

Considering the gap in the literature about the prevalence of different types of PFD and that generally young population are not included and represent an important group for preventive interventions, this study aimed to analyze the prevalence of PFD (UI, FI, and DPPPD) in university women and factors associated with PFD.

Methods

This cross-sectional study was approved by the Research Ethics Committee of the Faculty of Philosophy and Sciences, Universidade Estadual Paulista, Marília, São Paulo, Brazil (protocol No. 1918/2009). Undergraduate and graduate students were recruited from public and private universities distributed over different Brazilian geographic regions from April 2020 to July 2020. All participants, prior to the application of the questionnaire, signed an informed consent form.

Participants

We performed the sample size calculation on G*Power software using a priori power analysis. Considering that any other previous research performed the measurement proposed by this study, we considered the calculations a goodness-of-fit test: contingency tables, effect size w of 0.1, probability of error α 0.05, power of 0.95, and Df of 2; a total of 687 participants was required. Our analysis included a sample of 707 participants. The inclusion criteria were female adults over 18 years old, studying in public or private universities distributed over different Brazilian geographic regions. An online questionnaire containing 40 open and multiple-choice questions about PFD was developed by the authors and a Google form was disclosed via social media (Facebook, Instagram) to the participants.

Questionnaire variables

The first section was composed of a free and informed consent form, with information about research aims, procedures of data collection results in dissemination, the privacy of the participant's identity, the importance of their participation to future treatment/preventive approaches for UI. After consenting to participate in the study, they were able to move forward to the next sections. The second section requested personal data such as name, age, university, Brazilian geographic region, education level (undergraduate or postgraduate), course field, ethnicity, weight, height, medical care system assistance, and the number of deliveries (vaginal or caesarean). The third section was composed of questions about IU, FI, and GPPPD knowledge, occurrence, and type.

Statistical analysis

The quantitative results related to the characterization are presented as mean ± standard deviation, and qualitative results were expressed as relative and absolute frequency [n (%)]. When the relative sample was not related to the entire sample (n = 707), we described the sample size under analysis used as a reference to calculation, for example, the relative frequency of a variable from participants who reported UI. To compare the characteristics of the different PFD (UI, FI, and GPPPD), the chi-square test was applied. Analysis of the individual association between UI, FI, and GPPPD with qualitative variables separately was performed by chi-square test followed by Bonferroni. The software IBM SPSS Statistics for Windows, version 20.0 (IBM Corp., Armonk, N.Y., USA) was used for statistical analysis, and differences were considered statistically significant at $p < 0.05$.

Results

A sample of 707 Brazilian university women was obtained by online form. The women's media age was 22.5 ± 2.1 years. Table 1 shows that most of the women were Caucasian (50.1%), eutrophic (36.1%), nulliparous (66.1%), from southeast Brazil (89.1%), attended public university (65.6%) and health courses (70.4%), and had health care delivered by private medical assistance (52.2%).

Table 1 - Demographic, anthropometric, and obstetric characteristics of the population (n = 707)

Variables		n (%)
Ethnicity	Caucasian	355 (50.1)
	Other	97 (13.8)
	Did not answer	255 (36.1)
Body mass index	Low weight	31 (4.5)
	Adequare weight	255 (36.1)
	Overweight	161 (22.8)
	Obesity	39 (5.5)
	Did not answer	221 (31.1)
Parity	Nulliparous	467 (66.1)
	Primiparous	21 (3.0)
	Multiparas	15 (2.1)
	Did not answer	204 (28.9)
Geographic region	Southeast	630 (89.1)
	South	33 (4.7)
	Midwest	7 (1.0)
	Northeast	32 (4.5)
	North	1 (0.1)
	Brazilians living abroad	4 (0.6)
University	Private	243 (34.4)
	Public	464 (65.6)
Course area	Health course	498 (70.4)
	Others	209 (29.6)
Health care	Private	369 (52.2)
	Public	134 (18.9)
	Did not answer	204 (28.9)

Table 2 shows the relative frequency of each type of PFD. Regarding the distribution of PFD complaints, UI was reported by 119 (16.8%) women. Among them, the most frequent type was SUI, followed by MUI and UUI. Additionally, FI was reported by 23 (3.3%) women. According to the most recent terminology which merged two disorders (dyspareunia and vaginismus), 218 (30.8%) women reported GPPPD. Considering the previous classification, from a total of 707 women, the most frequent reporting was "pain during intercourse" (dyspareunia) (n = 178; 25.2%), followed by 40 (5.6%) women who answered they "could not allow penetration during sex" (vaginismus).

Table 2 - Pelvic floor dysfunction (urinary and fecal incontinence and genito-pelvic pain/penetration disorders) in university women (n = 707)

Type of pelvic dysfunction	Relative sample (n)	n (%)
Urinary incontinence	707	119 (16.8)
Stress urinary incontinence	119	70 (58.8)
Urgency urinary incontinence	119	21 (17.6)
Mixed urinary incontinence	119	28 (23.5)
Fecal Incontinence	707	23 (3.2)
Genito-pelvic pain/penetration disorder	707	218 (30.8)
Could not allow penetration during sex (vaginismus)	707	40 (5.6)
Pain during penetration (dyspareunia)	707	178 (25.2)

Table 3 shows the characterization of the participants according to the reported PFD complaints. It showed similar group composition characteristics among different PFD: in all groups, the majority was composed of Caucasian nulliparous women with adequate BMI, from the southeast region, who attended health courses area at public universities and had private medical care access. The differences found regarding geographic region (p = 0.015) and university (p = 0.038) were demonstrated by the z-test (Bonferroni method). These differences, however, were not between groups, but regarding intragroup differences in all groups (UI, FI, and GPPPD), which means that all PFD were significant less reported in the Midwest compared to other regions in all groups and significantly more prevalent in women who attended a public university, also in all groups.

Table 3 - Demographic, anthropometric and obstetric characteristics according to pelvic dysfunction (n = 707)

Variable	UI (n = 119)	FI (n = 23)	GPPPD (n = 178)	p
Age	23.1 ± 0.6	21.7 ± 2.2	22.7 ± 0.5	0.754
Ethnicity				
Caucasian	55 (46.2)	5 (21.7)	103 (57.9)	
Other	17 (14.3)	1 (4.4)	21 (11.8)	0.514
NA	47 (39.5)	17 (73.9)	54 (30.3)	
BMI				
Low weight	2 (1.7)	-	7 (3.9)	
Proper weight	40 (33.6)	5 (21.7)	75 (42.1)	
Overweight	25 (21.0)	1 (4.4)	40 (22.5)	0.596
Obesity	7 (5.9)	-	6 (3.4)	
NA	45 (37.8)	17 (73.9)	50 (28.1)	
Parity				
Nulliparous	69 (58.0)	6 (26.1)	128 (71.9)	
Primiparous	4 (3.4)	-	4 (2.3)	
Multiparas	3 (2.5)	-	-	0.163
NA	43 (36.1)	17 (73.9)	46 (25.8)	
Region				
Southeast	104 87.4)	21 (91.3)	164 (92.1)	
South	11 (9.2)	1 (4.4)	6 (3.4)	
Midwest	-	1(4.3)	-	**0.015**
Northeast	3 (2.5)	-	7 (3.9)	
North	-	-	-	
Living abroad	1 (0.9)	-	1 (0.6)	
University				
Private	23 (19.3)	2 (8.7)	51 (28.7)	**0.038**
Public	96 (80.7)	21 (91.3)	127 (71.3)	
Course				
Health course	70 (58.8)	19 (82.6)	118 (66.3)	0.073
Others	49 (41.2)	4 (17.4)	60 (33.7)	
Health care				
Private	55 (46.2)	5 (21.7)	105 (59.0)	
Public	21 (17.6)	1 (4.4)	27 (15.2)	0.462
NA	43 (36.2)	17 (73.9)	46 (25.8)	

Note: UI = urinary incontinence; FI = fecal incontinence; GPPPD = genito-pelvic pain/penetration disorder; NA = not answered; BMI = body mass index. Except the variable age, values are expressed as relative and absolute frequency = n (%). Chi-square test. Bold font indicates statistical significance (p < 0.05).

Table 4 summarizes the associations and shows that there was no association between PFD and ethnicity, BMI, and type of health care access. Besides, attending public university showed associated to UI ($p > 0.001$), FI ($p = 0.008$) and GPPPD ($p = 0.006$). In addition, parity showed association with GPPD ($p = 0.032$), and course health area with UI ($p = 0.002$) (Table 4).

Table 4 - Association (p-value) between incontinence/genito-pelvic disorders and qualitative variables

Variable	UI (n = 119)	FI (n = 23)	GPPPD (n = 178)
Ethnicity	0.649	0.768	0.200
Body mass index stratified	0.519	0.477	0.252
Parity	0.750	0.791	**0.032**
Health course	**0.002**	0.193	0.198
Attend public university	**< 0.001**	**0.008**	**0.006**
Type of health care	0.832	0.578	0.080

Note: UI = urinary incontinence; FI = fecal incontinence; GPPPD = genito-pelvic pain/penetration disorder. Chi-square test. Bold font indicates statistical significance ($p < 0.05$).

Discussion

Contradicting our hypotheses that the most prevalent PFD would be UI, our results showed that GPPPD was the mainly complain reported by university women, followed by UI and FI. The characteristics of the women who had different PFD were similar and the associated factors, in general, were parity (GPPPD), attending public university (UI, FI, and GPPPD), and health courses (UI).

The construction of our hypotheses could be influenced by the wide literature on UI, whereas FI and GPPPD are less investigated. The range of UI prevalence is heterogeneous (5-70%) and this variability can be attributed to factors such as the methodology used in the research, definitions, and diagnoses, level of knowledge, socioeconomic level, age, and parity.[7]

A Turkish cross-sectional study[7] conducted with female university students of similar age to our sample showed a prevalence of 18.4% of UI, matching the prevalence in our study. Concerning the fourth item from the International Consultation on Incontinence Questionnaire - Short Form questionnaire used by them, which categorizes the reason for leakage in SUI, UUI, and MUI, the authors[7] did not address the findings in their results/discussion section but we can observe that the main UI type in their sample was regarding UUI (leaks before you can get to the toilet), which diverges from our findings and also from an Italian survey[8] that demonstrated SUI as the major type in this population.

Many studies addressed topics regarding risk factors to UI, and all are incisive about recommending massive actions to mitigate these factors and prevent them or to later offer a better treatment.[7-10] Although our study aimed to investigate IU, FI, and GPPPD prevalence, we were also interested in knowing more about which women were more susceptible to having PFD in the Brazilian university context, to target actions for this population. We found that university students from public universities were more likely to present PFD regardless of the type of complaint. Our findings are not sufficient to explain it, but further studies should help to develop the possible explanations for this behavior and might orientate actions to this population.

UI complaint was associated with attending health area courses. A Spanish study based on an online survey with a similar population showed that health science students had better knowledge of PFD than other students.[11] Following the findings from this Spanish study, and considering that health students have specific knowledge of human anatomy and function, and therefore should be able to identify urine leakage as a health problem, it would be expected that women from our study who attended health courses should complain less about having PFD. So, these are other points that should be addressed in future studies on the Brazilian population.

Discussions about UI are extensive, but FI can be more distressing and silent. FI is a PFD defined as a "complaint of involuntary loss of feces - when feces is solid and/or when feces is liquid".[12] Individuals, in general, are rarely willing to report loss of feces because they feel embarrassed; for this reason, the literature may point out a different prevalence for this dysfunction.[13] Usually, FI is investigated in postpartum and in the older population.[14-17] Considering that our sample was composed of young nulliparous women, the prevalence of 3.2% and the lack of association with parity surprised us, which demonstrated that this population should be also screened.

GPPPD, previously classified as dyspareunia and vaginismus, is characterized by pain in the genital region associated with sexual intercourse, which may occur before, during, and after sexual intercourse and/or involuntary contraction of the muscles of this region in moments of attempted vaginal penetration.[18] The surprisingly high prevalence of GPPPD (30.8%) in university women with a median age of 22 years old called our attention. The report of sexual dysfunction is heterogenous, and we consider that merging two different disorders with different levels of complexity, prevalence and burdens is problematic,[19] so we decided to present the complaints separately. Vaginismus was related by 5.6% and dyspareunia by 25.2% of women. These findings agree with other population surveys.[20,21]

Considering that in Brazil the majority of women initiate their sexual life after the age of 14 years old,[22] it implies that almost one in four women experience sexually distressing symptoms since the first decade of their sexual life. The comparison of prevalence with populations of the same age was impaired by the gap in the literature, but studies, in general, showed lower prevalence.[19,21] The etiology of GPPPD is multifactorial, which includes biomedical explanations mainly based on vaginal infections/inflammation or anatomical disorders, and/or psychosocial explanation as trait anxiety, hypervigilance, and fear of physical and sexual abuse.[23] Our methodology of a self-report questionnaire, without objective measures, didn't allow us to classify GPPPD into primary or secondary and to know if the pain/intercourse symptoms are acute or chronic, which means that our prevalence should be overestimated for other reasons than GPPPD itself, as transitory vaginoses, for example.[23]

PFD is often a hidden disorder, especially in young women, with low demand for treatment for reasons such as low level of knowledge or even embarrassment. Determining the prevalence of PFD is important to establish preventive measures, enable treatment, reduce symptoms, and guide the population about health education with a focus on autonomy and quality of life. Universities are an ideal place to impact the young population and implement it.

The experience of this study should be a precedent for other surveys which reach a large population. Applying an online questionnaire by Google Forms platform makes it possible to reach more people, and thus better understand the studied subject. In addition, as it is impersonal, it allows participants to be honest about the answers.

Conclusion

The prevalence of PFD is high in university women. GPPPD was the most prevalent disorder, followed by UI and FI. The associated factors in general were parity (GPPPD), attending public university (UI, FI and GPPPD) and health courses (UI).

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Authors' contribution

LFI, GTAN, PRRJ, CBP and AMPB: conceptualization, data curation, methodology, writing-original draft, writing-review and editing. LFI, CBP and AMPB: Investigation. LFI, PRRJ, CBP and AMPB: project administration. GTAN, PRRJ, CBP and AMPB: formal analysis. GTAN, CBP and AMPB: visualization. AMPB: supervision.

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