

Urinary incontinence and female sexual dysfunction in physically active older women

Correlação entre incontinência urinária, disfunção sexual e avaliação subjetiva da contração muscular perineal em idosas fisicamente ativas

Correlación entre incontinencia urinaria, disfunción sexual y evaluación subjetiva de la contracción del músculo perineal en mujeres ancianas físicamente activas

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ABSTRACT | Urinary incontinence (UI) and female sexual dysfunction (FSD) are disorders that affect quality of life. With the change in the Brazilian age pyramid, the prevalence of such disorders tends to increase. The aim of the present study was to correlate the relationship between UI, FSD and the functionality of the pelvic floor muscles (PFM) in physically active older women. This is a cross-sectional study, in which 35 older women ≥ 60 years old participated. Initially, the diagnostic form, the International Consultation on Incontinence Questionnaire – Short form (ICIQ-UI-SF) and Female Sexual Function Index (FSFI) were applied. Then, the PFM were evaluated by vaginal touch, following what is proposed in the perfect scheme. Among older women, 20% had both PFM dysfunctions. In total, 17 (48.6%) had UI and 16 (45.7%) FSD. There was a significant difference in the number of vaginal deliveries ($p=0.028$) and in the perfect schedule ($p=0.033$) between older women with and without FSD. There was no statistical difference between the groups with and without UI. The analysis showed an inversely proportional correlation between UI severity and sexual function in incontinent older women. ($p=0.008$; $r=-0.622$). Since, for each increase in UI severity by the ICIQ-SF, 0.577 of sexual function assessed by the FSFI is decreased ($p=0.034$; $r=0.516$). There is an association between UI and FSD in physically active older women. Some older women have both PFM dysfunctions despite

being physically active. Thus, it is important to reinforce the importance of thorough evaluations, oriented physical activity and multiprofessional action in health.

Keywords | Physical Activity; Pelvic Floor; Older Population; Sexual Health; Urinary Incontinence.

RESUMO | Incontinência urinária (IU) e disfunção sexual feminina (DSF) são disfunções que afetam a qualidade de vida. Com a mudança na pirâmide etária brasileira, a prevalência de tais disfunções tende a aumentar. O objetivo deste estudo foi estabelecer a relação entre a IU, a DSF e a contração muscular perineal em idosas ativas fisicamente. Trata-se de estudo transversal, do qual participaram 35 idosas ≥ 60 anos. Inicialmente foram aplicados a ficha diagnóstica e os questionários *International Consultation on Incontinence Questionnaire – Short Form* (ICIQ-UI-SF) e *Female Sexual Function Index* (FSFI). Em seguida foram avaliados os músculos do assoalho pélvico (MAP) por meio do toque vaginal, de acordo com o que propõe o esquema *perfect*. Entre as idosas, 20% apresentaram ambas as disfunções dos MAP. No total, 17 (48,6%) apresentavam IU e 16 (45,7%) DSF. Observou-se diferença significativa no número de partos vaginais ($p=0,028$) e no item rapidez do esquema *perfect* ($p=0,033$) entre as idosas com e sem DSF. Não houve diferença estatística entre os grupos com e sem IU. A análise apontou uma correlação inversamente

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proporcional entre a gravidade da IU e a função sexual nas idosas incontinentes ($p=0,008$; $r=-0,622$), de forma que, para cada aumento na gravidade da IU pelo ICIQ-SF, diminuiu-se 0,507 de função sexual avaliada pelo FSFI ($p=0,034$; $r=0,516$). Há uma associação entre IU e DSF em idosas fisicamente ativas. Algumas idosas apresentam ambas as disfunções dos MAP, apesar de serem ativas fisicamente. Dessa forma, é necessário reforçar a importância de avaliações minuciosas, da atividade física orientada e da atuação multiprofissional em saúde.

Descritores | Atividade Física; Assoalho Pélvico; Pessoa Idosa; Saúde Sexual; Incontinência Urinária.

RESUMEN | La incontinencia urinaria (IU) y la disfunción sexual femenina (DSF) son trastornos que afectan la calidad de vida de las personas. Con el cambio en la pirámide de edad brasileña se aumentará la prevalencia de tales disfunciones. El objetivo de este estudio fue establecer la relación entre la IU, la DSF y la contracción del músculo perineal en mujeres mayores físicamente activas. Este es un estudio transversal, en el que participaron 35 mujeres ≥ 60 años. Inicialmente se aplicó el formulario de diagnóstico y los cuestionarios *International Consultation on*

Incontinence Questionnaire – Short Form (ICIQ-UI-SF) e Índice de Función Sexual Femenina (FSFI). Luego, se evaluó la musculatura del piso pélvico (MAP) mediante toque vaginal siguiendo lo que propone el esquema *perfect*. Entre las ancianas, el 20% tenía ambas disfunciones de MAP. En total, 17 (48,6%) tenía IU, y 16 (45,7%) DSF. Hubo una diferencia significativa en el número de partos vaginales ($p=0,028$) y en el ítem rapidez del esquema *perfect* ($p=0,033$) entre mujeres ancianas con y sin DSF. No hubo diferencia estadística entre los grupos con y sin IU. El análisis mostró una correlación inversamente proporcional entre la gravedad de la IU y la función sexual en mujeres ancianas con incontinencia ($p=0,008$; $r=-0,622$), de modo que por cada aumento en la gravedad de la IU por el ICIQ-SF se disminuyó 0,507 de función sexual evaluada por el FSFI ($p=0,034$; $r=0,516$). Existe una asociación entre la IU y la DSF en mujeres ancianas físicamente activas. Algunas ancianas tuvieron ambas disfunciones del MAP a pesar de ser físicamente activas. Por lo tanto, es necesario reforzar la importancia de las evaluaciones detalladas, la actividad física orientada y la acción multiprofesional en salud.

Palabras clave | Actividad Física; Suelo Pélvico; Anciano; Salud Sexual; Incontinencia Urinaria.

INTRODUCTION

In recent years, Brazil has faced important changes in the age pyramid, leading to an increase in the number of older adults in the country. Thus, it is essential to pay more attention to chronic and functional dysfunctions of the pelvic floor muscles (PFM), related to advancing age¹.

Regarding the older population, the PFM dysfunctions are motives of great concern²⁻⁴. Among the functions, urinary incontinence (UI) and female sexual dysfunction (FSD) stand out, because of a great prevalence and negative impact on quality of life⁵. The UI is characterized by the *International Continence Society* (ICS) like any involuntary loss of urine⁶, being prevalent among Brazilian older women over 60 years (26.2%)⁷. The FSD is characterized by a deficit in one of the phases of female sexual response cycle, which consists of: excitement, plateau, orgasm, and resolution⁴. New models characterize the female sexual response as non-linear, suggesting that for women there would be a subjective component, contradicting traditional theories of linearity. The research of Wolpe et al.⁴ found that the prevalence of FSD in Brazil is approximately 67.7%, being higher in middle-aged women, due the symptoms of the climacteric period.

It is known that aging causes a series of physiological changes in a female organism⁸. Muscle atrophy and the replacement of skeletal muscles by adipose tissue⁸. Such changes also affect the PFM, leading to a decreased muscle contraction strength and also to dysfunctions such as FSD and UI⁹.

On the other hand, studies indicate that physical activity generates several benefits for the older population, including improving the functionality of the PFM. In the study of Virtuoso, Mazo and Menezes⁹, 39 women over the age of 60 were evaluated, divided into two groups – practitioners group (PG), in which women were practitioners of physical activities, and a group of non-practitioners (NPG), in which women were not engaged in physical activities. The authors found that the older women in PG had a higher number of repetitions ($p=0.008$) and greater speed ($p=0.022$) of contractions of PFM, in addition to greater muscle strength in perineometry (slow fibers ($p=0.050$) and fast ones ($p=0.008$)).

Given the need to understand the dysfunctions of PFM that affect physically active older women, this study provides data that may influence the clinical point of view, leading a professional to investigate the presence of dysfunctions related to PFM. In addition, from a scientific

point of view, this study raises questions for future research and, from a social point of view, helps the treatment of older women.

This study aimed to establish the link between UI, FSD and perineal muscle contraction in physically active older women. As secondary objectives, this study verifies whether there is a difference in the contraction of PFM and UI among physically active older women with and without FSD and identify if there is a difference in perineal muscle contraction and sexual function among physically active older women with and without UI.

METHODOLOGY

This is a cross-sectional study that aimed to establish the link between UI, a FSD and a contraction of PFM in physically active older women. The population was composed of older women over 60 years old who participate in the Núcleo Integrado de Estudos e Apoio à Terceira Idade (Nieati) held by the Centro de Educação Física e Desportos (CEFD) of Universidade de Santa Maria (UFSM), in Santa Maria, Rio Grande do Sul. A sample of 34 women was estimated to obtain a significance level of 5% and p-value of 95%, based on Virtuoso, Mazo and Menezes⁹. The sample calculation was performed using the Gpower software, version 3.1. For the correlations between variables, an *a priori* analysis was used considering an effect size of 0.5, and p-value of 0.95. For comparisons between variables, a sensitivity analysis was used, considering the current sample number with a p-value of 0.80, and significance level of 0.05. The size of the effect was 0.97.

To carry out the study, the following inclusion criteria were adopted: women at the age of 60 or more, participants of Nieati-CEFD-UFSM; with preserved cognitive ability; functionally independent; sexually active; who agreed to use the accelerometer for at least five days a week, with the minimum use of 10 hours per day. The following exclusion criteria were adopted: older women who were undergoing hormone replacement therapy; chronic cough referred; physical disability or sequels of neurological pathologies; medical treatment of UI; sexually inactive; and women who performed physical activity in the water (swimming, water aerobics, hydrotherapy), as this would make the use of the accelerometer impracticable.

To check cognitive function, the Mini Mental State Examination (MMSE) was used. Older women who did not have cognitive impairment were included in the

study (>25 points). The Katz scale was used to analyze activities of daily living (ADLs) and dependency level.

To define the level of physical activity (PA), the older women used an accelerometer for at least five days, with a minimum use of 10 hours per day, prior to the data collection. The cutoff point was used based on the reference values of intensity of a moderate daily PA, equal to or greater than 1.041 *counts* per minute. After applying the inclusion/exclusion criteria, 35 older women were recruited (Figure 1). Participants signed a Free and Informed Consent Form (FICF).

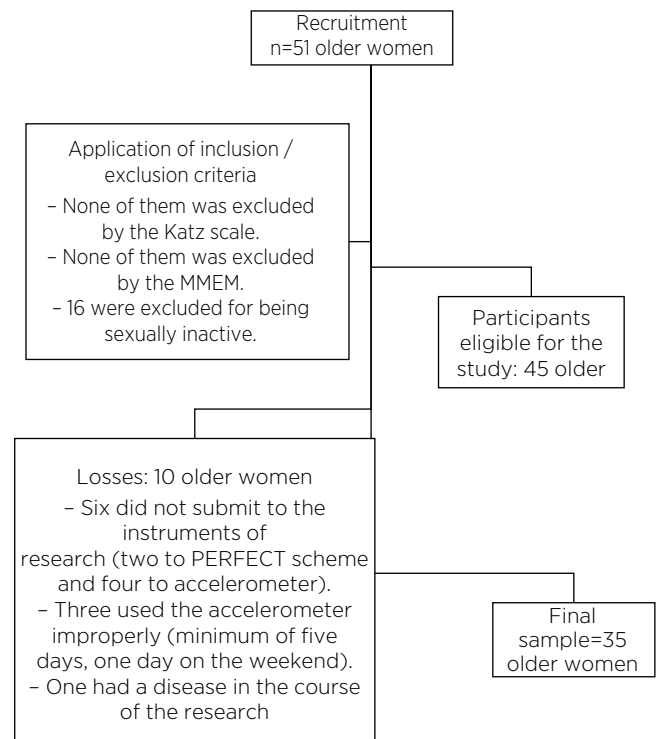


Figure 1. Flowchart referring to the recruitment of the study

Data collection was carried out in a physiotherapy clinic heated at 24°C. Researchers were trained and made the evaluations through blindness: one of them made interviews and the other evaluated the PFM.

First, a diagnostic form consisting of 20 questions distributed in four blocks was applied (Block 1: identification data; Block 2: sociodemographic characteristics; Block 3: health conditions; Block 4: physical activity). The form was adapted containing urogynecological data of the patients.

After that it was applied the *International Consultation on Incontinence Questionnaire – Short Form (ICIQ-UI-SF)*, which can evaluate the frequency, severity and impact of UI in the quality of life. The score ranges from 0 to 21; the higher the score the greater the severity of UI¹⁰.

To evaluate the sexual function the questionnaire *Female Sexual Function Index* (FSFI) was applied, composed of 19 questions divided into six domains: sexual desire, sexual arousal, vaginal lubrication, orgasm, sexual satisfaction and pain¹¹. Each question could be scored from 0 to 5. The final score was the sum of the weighted scores, with a maximum of 36. Values equal to or below 26.55 are suggestive of FSD¹¹.

After applying the questionnaires, the volunteers were invited to do a physical evaluation of PFM through the *perfect* scheme¹². This evaluation, performed by a trained physiotherapist, occurred with the patient undergoing lithotomy, in which the intravaginal palpation was performed, introducing the 2nd and 3rd 3-4cm fingers into the vaginal cavity, with a properly gloved hand and greased with water-based lubricating gel to reduce discomfort during the procedure.

In the *perfect* scheme, muscle strength is symbolized by letter “P”, representing *power*, and is graded according to the Oxford scale, from zero to five, in addition to assessing the presence and intensity of voluntary muscle contraction (IMC). Muscle endurance is represented by “E” (*endurance*) and corresponds to the time of sustained voluntary contraction. As a result, sustaining muscle contraction is recorded (maximum 10 seconds). The repetition of sustained contractions (slow fibers) is also registered, being represented by “R” (*repetition*). The contractions considered to be satisfactory (of five seconds) are the recorded ones women are able to perform after a four-second rest period between them (maximum of 10 repetitions). The contractions of the fast fibers are represented by “F” (*fast*). The number of fast contractions of one second is verified without compromising the intensity (maximum 10 times). The evaluation sought to isolate the contraction of PFM through guidance, verbal command (“hold your urine with movements from inside and up”; “relax your legs, glutes and abdomen”) and proprioceptive stimulation. The research of Laycock and Jerwood¹³ points that the *perfect* scheme demonstrated reliability and validity as an assessment tool.

The statistic analysis was developed through the Statistical Package for Social Sciences (SPSS), version 20.0. The normality evaluation of the data was performed through the Shapiro Wilk test. The Mann-Whitney test was used to compare those who had and did not have UI, as well as the groups with or without FSD, in obstetric, urinary, sexual function and *perfect* scheme variables. To verify the link between the severity of UI and sexual function, Spearman’s correlation test was used.

In addition, simple linear regression was analyzed to verify the influence of UI in the sexual function, adopting a level of significance of 5% ($p < 0.05$). The correlation of Bonferroni was used to reduce the chances of Type 1 error, using $p < 0.025$. Older women who had UI and FSD simultaneously were not excluded from clinical analysis.

RESULTS

Regarding the 35 older women who were evaluated, it was observed that 17 (48.6%) had UI, while 16 (45.7%) presented FSD. Furthermore, the results show that 20% of the older women ($n=7$) had both PFM dysfunctions, simultaneously.

Table 1 contains obstetric, UI and PFM contractions data, in relation to older women who have or have not FSD. There was a significant difference between the groups in the number of vaginal deliveries, as the group that did not have FSD the one which got the highest average ($p=0.028$). In the component speed of the *perfect* scheme, which represents the contraction of fast-twitch muscle fibers of PFM, the group which had FSD presented the highest average ($p=0.033$) (Table 1).

Table 1. Comparison of groups with FSD and without FSD in relation to obstetric data, urinary loss and perineal muscle contraction

	With FSD	Without FSD	Value of p
	Average±DP	Average±DP	
Age	64.12±4.5	66.89±5.1	0.103
Weight	72.19±10.9	72.95±13.8	0.947
Obstetric Data			
Pregnancies	2.44±1.3	3.11±2.0	0.253
Deliveries	2.19±1.2	2.26±1.6	0.697
Miscarriages	0.25±0.7	0.53±0.7	0.130
Cesarean sections	1.00±1.2	0.32±0.5	0.121
Vaginal deliveries	1.19±1.2	2.42±1.7	0.028**
Weight of the largest newborn	3.31±1.1	2.89±1.6	0.659
ICIQ-SF			
Urinary loss frequency	1.38±1.8	1.16±1.5	0.914
Urinary loss amount	1.37±1.8	1.32±1.4	0.813
Impact of UI on LQ	3.00±3.8	1.26±1.6	0.330
UI severity	5.69±7.1	3.68±3.9	0.533
<i>Perfect</i> scheme			
Strength	3.13±1.5	2.47±1.4	0.165
Maintenance	2.50±1.2	2.42±2.0	0.685
Repetition	3.88±2.2	2.58±1.9	0.111
Speed	6.13±3.4	3.63±2.6	0.033*

*Statistically significant difference considering $p < 0.05$. **Statistically significant difference considering Bonferroni correction ($p < 0.025$).

Table 2 presents the obstetric, sexual function and contraction data of PFM in relation to older women who have UI or do not have UI. It is noted that there was no difference between the groups.

Table 2. Comparison of groups with and without UI in relation to obstetric data, sexual function and perineal muscle contraction

	With IU	Without IU	p-value
	Mean±SD n=17	Mean±SD	
Age	65.88±5.3	65.38±4.8	0.921
Weight	76.18±13.8	69.22±10.1	0.135
Obstetric Data			
Pregnancies	3.35±1.6	2.28±1.7	0.065
Deliveries	2.24±1.4	2.22±1.4	0.946
Miscarriages	0.53±1.0	0.28±0.4	0.880
Cesarean sections	0.71±0.9	0.56±1.0	0.494
Vaginal deliveries	2.12±1.5	1.61±1.7	0.339
Weight of the largest newborn	3.47±1.1	2.72±1.5	0.135
FSFI			
Desire	4.06±1.1	4.33±0.8	0.365
Sexual arousal	5.00±1.4	4.78±0.9	0.631
Lubrication	4.94±0.6	4.94±0.6	0.985
Orgasm	4.59±0.7	4.56±0.7	0.869
Satisfaction	3.12±1.4	2.39±0.5	0.190
Pain	6.35±1.1	6.44±0.9	0.952
Total	28.29±4.2	27.56±2.5	0.739
Perfect scheme			
Strength	2.65±1.5	2.89±1.4	0.557
Maintenance	2.35±2.0	2.56±1.3	0.479
Repetition	2.47±1.8	3.83±2.3	0.082
Speed	4.65±3.3	4.89±3.1	0.855

Although there are no significant results, when observing the Table 2 it is possible to notice that women who have UI showed a tendency of lower results in relation to the *perfect* scheme, lowest total score of the FSFI questionnaire sexual function and a higher number of pregnancies than the older women in the group without UI.

Regarding older women with UI, it is possible to see Figure 2 that, as the score on the FSFI questionnaire increases, the severity of UI decreases. This result suggests a correlation between dysfunctions: the greater the severity of UI, the worse the sexual function of the older women. The correlation test reinforces this result ($p=0.008$; $r=-0.622$). According to the linear regression analysis, for each increase in UI severity by ICIQ-SF, decreases 0.507 of sexual function evaluated by FSFI ($p=0.034$; $r=0.516$).

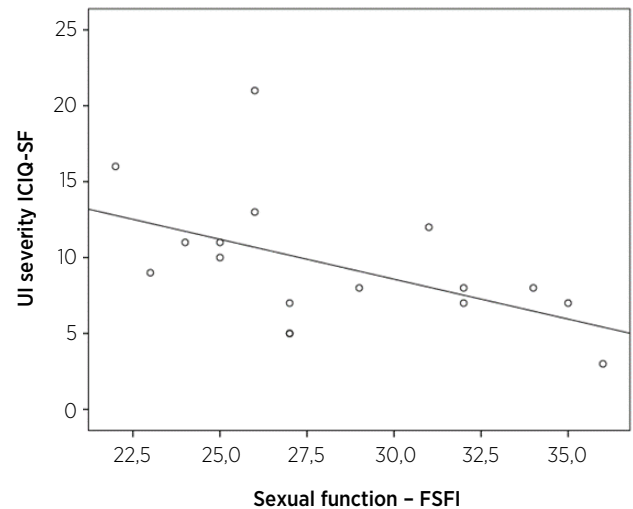


Figure 2. Inverse proportional correlation between UI severity and sexual function in incontinent older women

DISCUSSION

This study aimed to establish the relationship between UI, FSD and PFM contraction in physically active older women. The results show a high frequency of dysfunctions of PFM, so that some older women presented them simultaneously (20%). There was a difference among older women who had and did not have FSD in the number of vaginal deliveries and in the item called speed of the *perfect* scheme. There was no statistical difference between older women with and without UI. However, older woman who have UI presented a lower result in the *perfect* scheme in sexual function, in addition to a higher number of pregnancies than older women who do not have UI. An inversely proportional correlation was found in the scatterplot between sexual function and severity of UI, reinforced by the correlation test and the linear regression analysis.

Advancing age is one of the most cited risk factors for PFM. This fact is associated with a decrease in estrogen levels, a decreased bladder capacity, which changes from 500-600ml to 250-300ml in older women, the increase of chronic diseases in old age groups and the increase of body mass index. In addition to the age factor, multiparity is also considered an important risk factor. According to Zeleke et al.¹⁴, the proportion of women suffering from one or more PFM disorders increases with parity. In other words, multiparous women are more likely to develop PFM dysfunction. The proportion found was 34.6% (95% CI, 7.8-11.7%) for nulliparous women, 45.3% (95% CI, 40.3-59.1%) for women who had one to two deliveries

and 52.1% (95% CI, 48.3 -55.8%) for women who had more than three deliveries. However, the high frequency of dysfunctions was not an expected result in this study, as the older participants were physically active.

According to Virtuoso, Menezes e Mazo¹⁵, the use of diuretics and a positive family history are the main risk factors for the development of UI in older women who practice physical activity. Studies also point out that some factors established in the literature, such as childbirth and overweight, do not increase the chances of UI in the case of an active older population¹⁶, and that parity, delivery or episiotomy are not risk factors for UI among the older population⁷. However, as older women who have UI in this study had a higher number of pregnancies than older women who had not UI, in addition to worse perineal muscle contraction and lower sexual function score.

In this study, women who did not have FSD had a higher number of normal deliveries compared to women who had FSD. This result highlights that vaginal delivery, in addition to having numerous benefits for the mother and the newborn, does not seem to predispose older women to PFM dysfunction. However, this result is in agreement with literature findings. According to the studies of Zizzi et al.¹⁷, the muscle strength of the PF is directly linked to the type of the delivery. In the study, women who had a vaginal delivery had lower values of perineal muscle contraction than those who had a cesarean delivery.

Furthermore, older women who had FSD showed a greater number of fast contractions (fast) in the *perfect* scheme. However, it is known that the PFM are made up 70% of fibers type I (slow twitch fibers) and only 30% of fibers type II (fast twitch fibers)¹⁸. Thus, it can be inferred that a decrease in the fibers of rapid contraction, in the case of older people in this study, would not be harmful to sexual function, since they exist in a smaller number in the muscles of the PFM. Likewise, the best score in fast contractions was not a protective factor from FSD.

Regarding UI, it is known that it is a dysfunction that generates an important social and hygienic problem, being considered a public health problem¹⁹. The result of this study points out to an inversely proportional correlation between UI severity and sexual function, indicating that the more severe the UI, the greater the chance of older woman developing sexual dysfunctions. The severity of UI it is evaluated by the frequency of urinary loss, amount of losses and the impact of UI on their quality of life. In turn, sexual dysfunction is defined as a recurrent deficit in any of the phases of female sexual response cycle⁴.

Other studies have found this association in other populations^{20,21}. In the study of Su, Sun and Jiann²¹ 1.450 women aged 34.6 ± 8.4 years were interviewed. As its result, FSD association with the three main types of UI was verified: the effort UI (OR: 1.6; CI: 1.1-2.3; $p < 0.05$), urgency (OR: 1.8; CI: 1.0-3.3; $p < 0.05$) and mixed UI (OR: 1.6; CI: 1.0-2.4; $p < 0.05$). The most common dysfunction, seen in all types of UI, was in the domain of sexual desire.

It can be considered that, in addition to anatomical, embryological, functional and endocrine similarities, the psychological impact of UI, such as shame, discomfort, fear of losing urine during intercourse, anxiety and loss of self-confidence may explain the association with FSD. According to a few authors, UI can trigger problems such as urine loss during intercourse (intercourse incontinence), nighttime urine losses associated with urgency and fear of bed wetting²². Fear of stinking and UI during intercourse are associated with altered image and self-esteem, responsible for the low frequency of sexual activity among incontinent women²³.

The study of Visser et al.²⁴ points out that in the older population the occurrence of urinary incontinence also has a negative impact on sexuality. A cross-sectional survey was conducted with 350 women above the age of 55. Of all participants with a partner, 68% (95% CI: 61-74) were sexually active. Of all of them, 25% (95% CI: 17-35) felt they were being avoided in sexual activity because of UI. The loss of urine during sexual intercourse was present in 26% (95% CI: 19-34) 24 of the cases. Such results demonstrate that the impact on sexual function must be considered when approaching UI in older women.

Regarding the treatment of UI, studies have demonstrated the benefits of training the pelvic floor muscles (PFMT) reducing urine loss and improving sexual function²⁵. However, it is known that the loss of urine is still a taboo, generating feelings of shame, frustration and discomfort that prevent many women from starting treatment or even talking to health professionals about the problem in matter.

As limitations of this study, it is pointed out that, in case of subjects such as sexual activity and UI, there is always some insecurity that must be taken into account in relation to the acquired data, as it is possible that socially desirable answers are given by the older. However, when questions were asked about sexuality through reliable and validated questionnaires (and not through interviews), this study aimed reducing this risk as much as possible. This study presented a deep and reliable assessment, using

widely recognized instruments, which makes the results likely to be replicated.

CONCLUSION

The results of this study show that there is an inversely proportional correlation between UI severity and sexual function in incontinent older women. Some older women presented both dysfunctions, regardless of being physically active.

There was a difference in perineal muscle contraction between older women who had and did not have FSD. However, no significant differences were found between the groups with and without UI in perineal muscle contraction and sexual function. However, older women with UI showed a tendency to lower results in these variables, compared to older women without UI.

These results reinforce the importance of PFM assessment, individual exercise guidance and prescription, multiprofessional performance for older women who have UI and / or FSD, in addition to joint participation with physical educators, physiotherapists, doctors and other health professionals.

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