



# Effects of water pilates on urinary loss, genital self-image and sexual function of elderly women

Deise Iop Tavares<sup>1</sup>, Géssica Bordin Viera Schlemmer<sup>1</sup>, Amanda Figueiró dos Santos<sup>2</sup>, Milena Ramila Pivetta<sup>2</sup>, Guilherme Tavares de Arruda<sup>3</sup>, Tamires Daros dos Santos<sup>4</sup>, Alecsandra Pinheiro Vendrusculo<sup>2</sup> and Melissa Medeiros Braz<sup>1\*</sup>

<sup>1</sup>Programa de Pós-graduação em Gerontologia, Departamento de Fisioterapia e Reabilitação, Universidade Federal de Santa Maria, Av. Roraima, 1000, 97105-900, Santa Maria, Rio Grande do Sul, Brazil. <sup>2</sup>Departamento de Fisioterapia, Universidade Franciscana, Santa Maria, Rio Grande do Sul, Brazil. <sup>3</sup>Programa de Pós-graduação em Ciências da Reabilitação, Universidade Federal de Santa Catarina, Araranguá, Santa Catarina, Brazil. <sup>4</sup>Programa de Pós-graduação em Distúrbios da Comunicação Humana, Universidade Federal de Santa Maria, Santa Maria, Rio Grande do Sul, Brazil. \*Author for correspondence. E-mail: melissabraz@hotmail.com

**ABSTRACT.** Descriptive, quasi experimental study with pre and post-test, which aimed to investigate the effects of Water Pilates (PA) on urinary incontinence, genital self-image and sexual function of elderly women. The sample consisted of seventeen elderly women aged 60 years or over, from a city in the interior of Rio Grande do Sul. The International Consultation on Incontinence Questionnaire - Short Form (ICIQ-SF) was used as instruments to assess the impact of UI in quality of life and qualify urinary loss, the Female Sexual Function Index (FSFI) to assess sexual function and Female Genital Self-Image Scale (FGSIS) to assess women's perception of their own genitalia. The PA protocol was performed twice a week for 50 minutes performed for eight weeks, totaling 16 sessions. The protocol was divided into warm-up, strengthening exercises and stretching. It was observed that the sample was composed of young elderly women ( $69.5 \pm 5.9$  years), overweight and with low FSFI and FGSIS scores. There was no significant change in the mean values before and after the intervention of the ICIQ-SF, FGSIS and FSFI scores. It was concluded that the PA method had no effect on urinary loss, sexual function and genital self-image.

**Keywords:** exercise movement techniques; urinary incontinence; sexuality; body image.

Received on January 23, 2020.

Accepted on October 14, 2020

## Introduction

Sexual health is a key element of health and quality of life. A satisfactory sex life can provide physical benefits, including improved cardiovascular health and performance during exercise and reduced pain sensitivity. A satisfactory sex life also provides psychological benefits, such as improvement in depressive symptoms, general well-being and quality of life, in addition to increased longevity (Santos, Santos, & Cendoroglo, 2015).

Female sexual function can be represented by the dynamic combination of emotional, cognitive and physiological processes. In addition, female sexual function is influenced by the feeling of well-being with life and is related to greater body satisfaction and regular physical activity (Cabral et al., 2014). The most used concept of sexual function is determined by the phases of desire, excitement, orgasm and resolution, in which each phase has its specific physiological and emotional characteristics, which can be compromised separately (Zielinski, Miller, Baixo, Sampsel, & DeLancey, 2012; Ferreira et al., 2013).

Poor sexual function can be associated with negative genital self-image (Handelzalts et al., 2017). This is because the genital self-image influences the desire, satisfaction and frequency of sexual activity. In general, women with negative genital self-image consider their genitals unattractive to their partner (Zielinski et al., 2012), without this necessarily being related to anatomical changes, but rather to the way they perceive their genitalia (Lowenstein et al., 2009).

Pelvic floor dysfunctions, such as urinary leakage, can also negatively affect genital self-image. The etiology is multifactorial, with emphasis on aging, genetic aspects, obesity, pregnancy, the number and type of delivery and hysterectomy. Urinary losses affect millions of individuals at all ages, although its greatest frequency occurs with women in perimenopause, which causes limitations in social, emotional and sexual life (Saboia et al., 2017).

Participation in physical activities can have a positive effect on body and genital self-image (Meurer, Benedetti & Mazo, 2009). Among the physical activities, the Pilates Method stands out, which can be performed on the ground or in the water. Water Pilates (WP) is a recent method that adapts Pilates exercises on the ground to water (Melo, 2010). This method combines the principles of Pilates such as concentration, control, precision, center of force (Power House), flow and breathing (Sarmento, Pinto, Silva, Cabral, & Chiavegato, 2017) with the benefits of aquatic exercises (Macêdo et al., 2017).

In addition, the WP encompasses specific exercises for the pelvic floor muscles (PFM), causing a positive effect on the sexual life of women due to the improvement of the function of the muscles that are inserted in the clitoral corpora. There is also a better response of the sensory motor reflex that controls the involuntary contraction of PFM during orgasm and assists in arousal and orgasm (Piassarolli, Hardy, Andrade, Ferreira, & Osis, 2010).

The method can also contribute to changes in the way practitioners perceive their body image and this includes the genital image. The search for a positive body image is a motivating factor for the practice, and is often more important than self-care with health (Castro, Liberalli, Cruz, & Artaxo Netto, 2012). Body image concerns extend to the genital image and dissatisfaction with the body image can cause a decrease in sexual function and, consequently, a worsening of the genital image (Jawed-Wessel, Herbenick, & Schick, 2016).

Although female sexuality is a topic discussed today, there are still few studies that address the relationship between sexual function, genital self-image and physical exercises. Therefore, this study aims to investigate the effects of WP on urinary losses, genital self-image and sexual function of elderly women.

## Material and methods

This is a quasi experimental study with pre and post test. The sample was randomized for convenience, consisting of 26 elderly women aged 60 years or over from a city in southern Brazil.

Data collection was conducted between March and June 2019, after approval by the Research Ethics Committee of the responsible institution (CAAE 03467718.5.0000.5346) and obtaining the free and informed consent form, which was signed by all participants, guaranteeing their rights and privacy, provided for in Resolution nº 466/2012 of the Brazilian National Health Council.

Sedentary elderly women, with preserved cognitive, functional independents and who presented a medical certificate with permission to exercise water exercise program were included in the study. All elderly women who had diagnosed neurological pathologies, with two consecutive absences or a total of three alternate absences during the WP program were excluded.

The elderly women were invited to participate in the study by the researchers, receiving information, in written and verbal form, about the research objectives, procedures, risks, benefits and ethical aspects. After signing the free and informed consent form, the participants underwent an evaluation on urinary incontinence (UI) by the International Consultation on Incontinence Questionnaire - Short Form (ICIQ-SF), which assesses the impact of UI on quality of life and qualifies urinary loss. The ICIQ-SF is composed of five questions that assess the frequency, severity and impact of UI, as well as a set of eight items of self-diagnosis, which relate UI situations experienced by individuals. The maximum sum is 21 points, referring to a high impact of UI on quality of life (Rosa et al., 2014).

The evaluation of the genital self-image was made using the Female Genital Self-Image Scale (FGSIS), a questionnaire that evaluates the perception of women about their own genitalia. FGSIS consists of seven items on a four-point response scale ranging from strongly agree to strongly disagree. The scores for each question are added together to reach a total value that can vary between 7 to 28 points and the higher scores indicate more positive genital self-image (Herbenick et al., 2011).

To evaluate sexual function, the Female Sexual Function Index (FSFI) was used, which consists of 19 questions divided into six domains of sexual response: desire, arousal, lubrication, orgasm, satisfaction and pain or discomfort. The score for each question is individual and ranges from 0 to 5 points. The domain score is obtained by adding the corresponding questions and multiplying by the correction factor. To calculate the total FSFI score, the scores of the domains that have values from 2 to 36 points are added, with the highest values associated with better sexual function. The cutoff point is 26.55 and for the analysis of each domain the following cutoff points were used: Desire 4.28; Excitation 5.08; Lubrication 5.45; Orgasm 5.05; Satisfaction 5.04; and Pain 5.10 (Pechorro, Diniz, & Vieira, 2009; Ferreira et al., 2013).

The application of the data collection instrument was carried out individually in the laboratory of practical teaching of the university by the researchers in a single day. The WP protocol was performed twice a week,

lasting approximately 50 minutes, for 8 weeks, totaling 16 sessions, with a pre-program session and a post-program session for evaluation and reevaluation. The WP was divided into warm-up, the main part of which involves strengthening exercises in general and stretching, based on exercises proposed by Steinman and Chiumento (2009), as shown in Table 1. It is important to note that all exercises were associated with breathing according to the principle of the method. For CORE activation, when exhaling, the participant made the chest retraction, decreasing the space between the costal arches and, simultaneously, performed a contraction of the abdominal muscles and the perineal musculature.

**Table 1.** Program of exercises performed.

Warm-up	1) Front march; 2) Coast March; 3) Side Walk; 4) Walking with trunk rotation.	1 minute and 30 seconds each exercise.
	In bipedal: 1) with dumbbell bilaterally, shoulder at 90°, the participant will perform abduction and horizontal adduction; Abduction and horizontal adduction of the shoulder with extended elbow, with dumbbell. 2) Boxing - shoulder and elbow flexion - bilateral with dumbbell. 3) Fencing - shoulder at 90° and elbow extension, perform circular movements. 4) Leaning on the wall, hip at 90° and knee extension, perform hip circumference. 5) Leaning on the handrail with trunk tilt, perform hip flexion and extension with knee extended.	
Main part	Sit-ups: 1) With the aid of spaghetti, for stabilization, maintain the sitting position, with hip flexion and knee extension and plantiflexion; 2) With the help of spaghetti for stabilization, alternate hip flexion with knee extension will be performed; 3) With the help of spaghetti for stabilization, will perform abduction and adduction of the hip; 4) With the help of spaghetti for stabilization, you will perform hip and knee flexion bilaterally; 5) With the help of spaghetti for stabilization, external hip rotation with hip flexion and knee associated with the plantar union of the feet (frog position) will be performed.	3 sets of 15 repetitions from the 1st to the 4th week.  3 sets of 20 repetitions from the 5th to the 8th week.
	1) Global posterior chain: With hands holding the handrail bilaterally, feet resting on the wall bilaterally, the participant will perform trunk flexion; 2) Global for anterior chain: Participant with his back to the wall, with both hands on the handrail, feet together, will perform trunk extension; 3) Cervical Region: Participant in bipedation will perform active stretching of the cervical musculature.	
Stretching		Approximately 5 minutes

Source: Adapted from Steinman and Chiumento (2009).

### Statistical analysis

Data were analyzed using the GraphPad Prism 5 statistical software (GraphPad Software Inc., San Diego, CA, EUA). The normality of the variables was assessed by the Shapiro-Wilk test. Continuous variables are presented as mean, standard deviation and categorical variables as absolute frequencies and percentages.

The intra-group comparison (pre x post WP moments) was performed using the Mann-Whitney U Test. The level of significance adopted was 5% ( $p \leq 0.05$ ).

### Results and discussion

Initially, 26 elderly women were selected to participate in the present study, however, 9 were excluded for not completing all evaluations or due to consecutive absences to the proposed intervention. Thus, the sample of this study was composed of 17 elderly women. The general characteristics of the sample are shown in Table 2.

**Table 2.** Characterization of the sample.

Variable	N=17
Age (years)	69.5 ± 5.9
BMI (Kg/m <sup>2</sup> )	27.5 ± 4.6
Marital status, n (%)	
Married	9 (52.9)
Widow	8 (47.1)
Occupation, n (%)	
Retired	9 (52.9)
Housekeeper	5 (29.4)
Autonomous	2 (11.8)
Pensioner	1 (5.9)
Personal background, n (%)	
Smoking	3 (17.6)
Diabetes	2 (11.8)
Urinary incontinence	9 (52.9)
SAH	11 (64.7)
Comorbidities, n (%)	
Gynecological disorders	5 (29.4)
Pulmonary dysfunctions	3 (17.6)
Rheumatological disorders	8 (47.1)
Cardiac dysfunction	3 (17.6)
Renal dysfunctions	2 (11.8)
Age of menarche (years)	12.9 ± 1.5
Age of menopause (years)	48.3 ± 5.2
Number of pregnancies, n (%)	
None	3 (17.6)
Two	5 (29.4)
Three	6 (35.4)
Four or more	3 (17.6)
Number of normal deliveries, n (%)	
None	6 (35.3)
One	1 (5.9)
Two	6 (35.3)
Three	4 (23.5)
Number of cesarean deliveries	
None	8 (47.0)
One	5 (29.4)
Two	2 (11.8)
Three	2 (11.8)
Number of abortions	4 (23.5)
Medications, n (%)	
Diuretics	1 (5.9)
Corticosteroids	1 (5.9)
Tranquilizers	3 (17.6)
Antidepressant	1 (5.9)
Statin	1 (5.9)
Antihypertensive	1 (5.9)

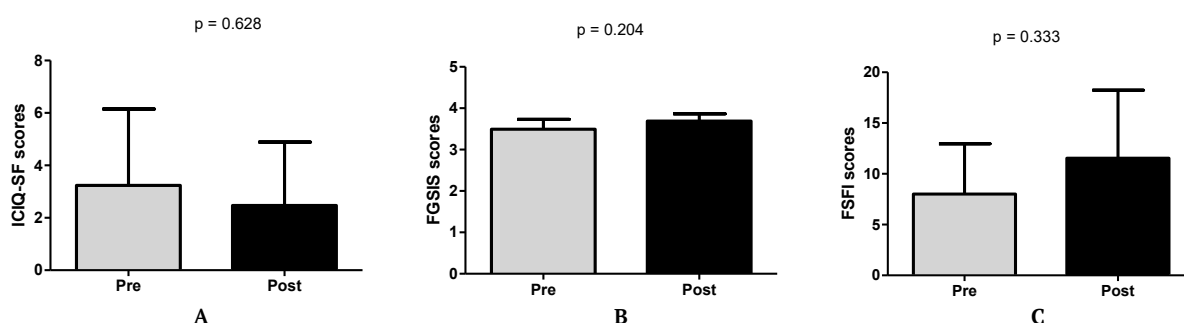
Values expressed as mean ± SD, frequency and percentage. BMI: Body mass index; SAH: Systemic Arterial Hypertension.

Considering the pre and post-intervention moments, there was no significant reduction in the mean values of the ICIQ-SF scores (pre 3.23 ± 5.67 vs post 2.47 ± 4.70;  $p = 0.628$ ), FGSIS (pre 24.47 ± 3.20 vs post 25.88 ± 2.37;  $p = 0.185$ ) and FSFI (pre 8 ± 9.63 vs post 11.55 ± 13.03;  $p = 0.333$ ) as shown in Figure 1.

The average values obtained in each domain of the ICIQ-SF, FGSIS and FSFI instruments before and after the proposed intervention are shown in Table 3.

Regarding the ICIQ-SF, in the pre-intervention, 5 (29.41%) elderly women reported never losing urine; 4 (23.53%) elderly women reported losing urine when coughing or sneezing; 3 (17.65%) elderly women lose urine before reaching the bathroom; 3 (17.65%) elderly women lose urine when they are sleeping; 1 (5.88%) elderly woman loses urine during physical activity; and 1 (5.88%) elderly woman reported losing urine when she finished urinating and is dressing. After the WP, 8 (47.05%) elderly women reported loss before reaching the bathroom, 4 (23.53%) elderly women lost when they are sleeping, 3 (17.65%) elderly women lose when coughing or sneezing, 1 (5, 88%) elderly woman loses when she finished urinating and is getting dressed and

1 (5.88%) elderly woman reported urinary loss for no obvious reason. It is important to note that elderly women could inform more than one option.



**Figure 1.** Comparison of the mean values of the pre vs post WP scores of the ICIQ-SF, FGSIS and FSFI questionnaires. Values expressed in average. Comparison of pre vs post moments: Mann-Whitney U test. A) ICIQ-SF = International Consultation on Incontinence Questionnaire - Short Form; B) FGSIS = Female Genital Self Image Scale; C) FSFI = Female Sexual Function Index.

**Table 3.** Comparison of pre and post WP values.

Instrument	Pre WP			Post WP			p value <sup>a</sup>
	Mean ± SD	Minimum	Maximum	Mean ± SD	Minimum	Maximum	
ICIQ-SF							
Frequency of losing urine	0.76 ± 1.09	0	4	0.59 ± 1.06	0	4	0.507
Amount of urinary loss	1.41 ± 1.97	0	6	0.82 ± 1.24	0	4	0.442
Interference of urinary loss in daily activities	1.23 ± 2.88	0	10	1.06 ± 2.59	0	10	1.000
FGSIS							
Safety	3.65 ± 0.60	2	4	3.88 ± 0.33	3	4	0.203
Appearance	3.71 ± 0.47	3	4	3.88 ± 0.08	3	4	0.219
Comfort	2.82 ± 1.07	1	4	3.06 ± 1.09	1	4	0.503
Smell	3.53 ± 0.62	2	4	3.76 ± 0.75	1	4	0.081
Function	3.41 ± 0.71	2	4	3.65 ± 0.61	2	4	0.297
Medical exam	3.59 ± 0.71	2	4	3.82 ± 0.53	2	4	0.231
Shame	3.76 ± 0.44	3	4	3.82 ± 0.53	2	4	0.451
FSFI							
Desire	2.22 ± 1.14	1.2	4.8	2.86 ± 1.32	1.2	4.8	0.115
Excitation	0.65 ± 1.39	0	4.2	1.29 ± 1.91	0	4.5	0.329
Lubrication	0.79 ± 1.86	0	6	1.94 ± 1.97	0	5.7	0.329
Orgasm	0.87 ± 1.97	0	6	1.48 ± 2.18	0	6	0.340
Satisfaction	2.35 ± 1.83	0.4	6	2.45 ± 1.81	0	5.6	0.791
Pain	1.11 ± 2.25	0	6	2.38 ± 6.29	0	25.6	0.981

Values expressed as mean  $\pm$  SD, minimum and maximum. <sup>a</sup> Pre-post-intragroup comparison: Mann-Whitney U test. \*Statistically significant  $p \leq 0.05$ . WP: Water Pilates. ICIQ-SF=International Consultation on Incontinence Questionnaire - Short Form; FGSIS=Female Genital Self Image Scale; FSFI=Female Sexual Function Index.

In characterizing the sample of this study, it was observed that the group was made up of young elderly women. Age is one of the main determinants of urinary losses, which result from the anatomical and physiological changes on the urinary tract that are inherent to aging (Dziekaniak, Meucci, & Cesar, 2019; Gibson & Wagg, 2014). Added to this is the difficulty in walking, falls, worsening cognition and the effects of drugs used to treat other comorbidities (Dziekaniak et al., 2019).

In addition, it is clear that the elderly women in this study were overweight. Overweight can cause an increase in intra-abdominal pressure, due to the weight caused in the waist-hip, which will impact on the function of PFM. This causes a change in the effective closing mechanism, leading to UI (Tavares, Bolina, Dias, Ferreira, & Santos, 2018).

In this study it was observed that WP had no significant relationship with the improvement of urinary losses. For Correa, Moreira and Garcez (2015), Pilates provides strength gains in PFM, increased flexibility and considerable improvement in UI, which provides better quality of life by reducing the volume of urine lost to effort. Although it does not specifically train PFM, the Pilates method indirectly activates these muscles, allowing pelvic floor resistance during the increase in abdominal pressure that occurs during physical activity. Thus, urinary loss is prevented and PFM function improves (Schrader et al., 2017; Bo & Herbert, 2013).

Culligan et al. (2010) compared the changes in muscle strength and pelvic floor symptoms in 62 women who practiced Pilates or PFM training. The study showed that the average strength gains caused by the two types of exercises were similar, with a slight predominance of strength in those who performed PFM training. Another study verified the effects of the Pilates method on the activity of these muscles, observing an increase in the strength of the two types of muscle fibers, thus suggesting that Pilates can promote an improvement in the function of these muscles (Marques, Chedid, & Eizerik, 2008).

Our study also found no improvement in sexual function after the intervention. It is important to highlight that FSFI scores were considered below ideal both pre- and post-program and this can be justified by the fact that many elderly women are not sexually active. A study by Marques and Braz (2017), which evaluated the effects of the Pilates method on the soil on the female sexual function of eight women aged 18 to 35 years, showed that this eight-week intervention was effective in significantly improving function sexual ( $p = 0.002$ ).

The strength of PFM is closely linked to sexual function, so when there is weakness of this musculature there may be sexual dysfunction (Marques & Braz, 2017). Pilates has a positive effect on female sexual life, as it is a method that exercises and strengthens PFM (Piassarolli et al., 2010; Halis, Yildirim, Kocaaslan, Cecen, & Gokce, 2015). However, it is important that the PFM activation commands are clear, constantly reinforced and well understood by the participants. A recent systematic review of women's knowledge of pelvic floor dysfunction showed that most patients had never received information about PFM (Fante, Silva, Mateus-Vasconcelos, Ferreira, & Brito, 2019). Freitas et al. (2019) analyzed the knowledge of Brazilian women about pelvic floor dysfunctions, as well as the ability to contract PFM, in which most women (55%) had little knowledge and 79.7% did not know the functions of PFM.

The practice of WP did not affect genital self-image. Again, it is noteworthy that the elderly women in this study already had a low genital self-image in the pre-intervention and showed a slight improvement in the post-intervention. For Souto et al. (2016) performing any type of physical activity can favor positive changes in the perception of body image that extends to women's genital self-image. Condello et al. (2016) suggests that elderly women adopt the practice of physical activity to improve health promotion and maintenance, in addition to favoring a more satisfactory body image.

The pilates method did not show effects on urinary loss, sexual function and genital self-image, however the gross values of these items increased. This increase can be justified by the time used in this program, the specificity of the training and the use of water. It is important to note that this study is the first to be carried out in water and this could make it difficult for patients to understand PFM contraction, as well as muscle palpation to see if the participants were contracting them correctly.

## Conclusion

It was concluded in this study that there were no statistically significant effects on urinary losses, genital self-image and sexual function of elderly women. However, it is important to note that there was an increase in the gross values of these items after the intervention of the WP.

This study suggests that the method can be used as an adjunctive treatment for urinary loss, sexual dysfunction, in addition to changes in perception of genital self-image, although further studies are needed.

## References

- Bo, K., & Herbert, R. D. (2013). There is not yet strong evidence that exercise regimens other than pelvic floor muscle training can reduce stress urinary incontinence in women: a systematic review. *Journal of Physiotherapy*, 59(3), 159-168. doi: 10.1016/S1836-9553(13)70180-2
- Cabral, P. U. L., Canário, A. C. G., Spyrides, M. H. C., Uchôa, S. A. C., Eleutério, J. J., Giraldo, P. C. & Gonçalves, A. K. (2014). Physical activity and sexual function in middle-aged women. *Revista da Associação Médica Brasileira*, 60(1), 47-52. doi: 10.1590/1806-9282.60.01.011
- Castro, J., Liberali, R., Cruz, T. M. F., & Artaxo Netto, M. I. (2012). Os benefícios do pilates na imagem corporal de seus praticantes. *Encontro Revista de Psicologia*, 15(23), 83-92.
- Condello, G., Capranica, L., Stager, J., Forte, R., Falbo, S., Di Baldassarre, A., ... & Pesce, C. (2016). Physical activity and health perception in aging: do body mass and satisfaction matter? A three-path mediated link. *Plos One*, 11(9), e0160805. doi: 10.1371/journal.pone.0160805

- Correa, J. N., Moreira, B. P., & Garcez, V. F. (2015). Ganho de força muscular do diafragma pélvico após utilização dos métodos Pilates ou Kegel em pacientes com incontinência urinária de esforço. *Revista Uningá*, 23(2), 11-17.
- Culligan, P. J., Scherer, J., Dyer, K., Priestley, J. L., Guignon-White, L., Delvecchio, D., & Vangeli, M. (2010). A randomized controlled trial comparing pelvic floor muscle training to a Pilates exercise program for improving pelvic muscle strength. *International Urogynecology Journal*, 21(4), 401-408. doi: 10.1007/s00192-009-1046-z
- Dziekaniak, A. C., Meucci, R. D., & Cesar, J. A. (2019). Incontinência urinária entre idosos residentes na área rural do município do sul do Brasil. *Geriatrics Gerontology Aging*, 13(1), 4-10. doi: 10.5327/Z2447-211520191900021
- Fante, J. F., Silva, T. D., Mateus-Vasconcelos, E. C. L., Ferreira, C. H. J., & Brito, L. G. O. (2019). Do women have adequate knowledge about pelvic floor dysfunctions? a systematic review. *Revista Brasileira de Ginecologia e Obstetrícia*, 41(8), 508-519. doi: 10.1055/s-0039-1695002
- Ferreira, C. C., Mota, L. M. H., Oliveira, A. C. V., Carvalho, J. F., Lima, R. A. C., Simaan, C. K., ... & Santos Neto, L. L. (2013). Frequency of sexual dysfunction in women with rheumatic diseases. *Revista Brasileira de Reumatologia*, 53(1), 41-46. doi: 10.1590/s0482-50042013000100004
- Freitas, L. M., Bø, K., Fernandes, A. C. N. L., Uechi, N., Duarte, T. B., & Ferreira, C. H. J. (2019). Pelvic floor muscle knowledge and relationship with muscle strength in Brazilian women: a cross-sectional study. *International Urogynecology Journal*, 30(11), 1903-1909. doi: 10.1007/s00192-018-3824-y
- Gibson, W., & Wagg, A. (2014). New horizons: urinary incontinence in older people. *Age and Ageing*, 43(2), 157-163. doi: 10.1093/ageing/aft214
- Halis, F., Yildirim, P., Kocaaslan, R., Cecen, K., & Gokce, A. (2015). Pilates for better sex: changes in sexual functioning in healthy Turkish women after Pilates exercise. *Journal of Sex & Marital therapy*, 42(4), 302-308. doi: 10.1080/0092623X.2015.1033576
- Handelzalts, J. E., Yaakobi, T., Levy, S., Peled, Y., Wiznitzer, A., Krissi, H. (2017). The impact of genital self-image on sexual function in women with pelvic floor disorders. *European Journal Obstetrics & Gynecology and Reproductive Biology*, 211, 164-168. doi: 10.1016/j.ejogrb.2017.02.028
- Herbenick, D., Schick, V., Reece, M., Sanders, S., Dodge, B., & Fortenberry, J. D. (2011). The Female Genital Self-Image Scale (FGSIS): results from a nationally representative probability sample of women in the United States. *The Journal of Sexual Medicine*, 8(1), 158-166. doi: 10.1111 / j.1743-6109.2010.02071.x
- Jawed-Wessel, S., Herbenick, D., & Schick, V. (2016). The relationship between body image, female genital self-image and sexual function among first time mothers. *Journal of Sex and Marital Therapy*, 43(7), 618-632. doi: 10.1080 / 0092623X.2016.1212443
- Lowenstein, L., Gamble, T., Sanses, T. V., Raalte, H. van, Carberry, C., Jakus, S. ... & Kenton, K. (2009). Sexual function is related to body image perception in women with pelvic organ prolapse. *The Journal of Sexual Medicine*, 6(8), 2286-2291. doi: 10.1111/j.1743-6109.2009.01329.x
- Macêdo, É. M. P., Neves, S. F., Palma, M. A., Motta-Santos, D., Rauber, S. B., Brandão, P. S. ... & Campbell, C. S. G. (2017). Efeito de sessão aguda de Pilates no solo e na água sobre a glicemia de mulheres portadoras de diabetes tipo 2. *Fisioterapia Brasil*, 18(1), 47-55. doi: 10.33233/fb.v18i1
- Marques, F. Z. C., Chedid, S. B., & Eizerik, G. C. (2008). Resposta sexual humana. *Revista de Ciências Médicas*, 17(3), 175-183.
- Marques, M. G., & Braz, M. M. (2017). Efeito do método Pilates sobre a função sexual feminina. *Fisioterapia Brasil*, 18(1), 63-68. doi: 10.33233/fb.v18i1
- Melo, A. (2010). *Método pilates na água*. São Paulo, SP: Phorte.
- Meurer, S. T., Benedetti, T. R. B., & Mazo, G. Z. (2009). Aspectos da autoimagem e autoestima de idosos ativos. *Motriz*, 15(4), 788-796.
- Pechorro, P., Diniz, A., & Vieira, R. (2009). Satisfação sexual feminina: relação com funcionamento sexual e comportamentos sexuais. *Análise Psicológica*, 27(1), 99-108.
- Piassarolli, V. P., Hardy, E., Andrade, N. F., Ferreira, N. O. & Osis, M. J. D. (2010). Treinamento dos músculos do assoalho pélvico nas disfunções sexuais femininas. *Revista Brasileira de Ginecologia e Obstetrícia*, 32(5), 234-240. doi: 10.1590/s0100-72032010000500006
- Rosa, L. H. T., Souza, C. M., Lima, C. H. L., Boggio, E. S. B., Santos, F. C., Carboni, C. ... & Rosa, P. V. (2014). Prevalência de incontinência urinária em idosos de Porto Alegre-RS. *Geriatrics, Gerontology and Aging*, 8(2), 104-109.

- Saboia, D. M., Firmiano, M. L. V., Bezerra, K. C., Vasconcelos Neto, J. A., Oriá, M. O. B. & Vasconcelos, C. T. M. (2017). Impact of urinary incontinence types on women's quality of life. *Revista da Escola de Enfermagem da USP*, 51, e03266. doi: 10.1590/s1980-220x2016032603266
- Santos, A. M., Santos, F. N., & Cendoroglo, M. S. (2015). Sexualidade e dor crônica em idosas longevas: descrição de fatores interferenciais. *Revista Dor*, 16(1), 48-52. doi: 10.5935/1806-0013.20150010
- Sarmiento, L. A., Pinto, J. S., Silva, A. P., Cabral, C. M., & Chiavegato, L. D. (2017). Effect of conventional physical therapy and Pilates in functionality, respiratory muscle strength and ability to exercise in hospitalized chronic renal patients: a randomized controlled trial. *Clinical Rehabilitation*, 31(4), 508-520. doi: 10.1177 / 0269215516648752
- Schrader, E. P., Frare, J. C., Comparin, K. A., Diamante, C., Araújo, B. G., Danielli, C., & Murbach, L. D. (2017). Eficácia do método pilates e do *biofeedback* manométrico em mulheres na menopausa com incontinência urinária. *Semina: Ciências Biológicas e da Saúde*, 38(1), 61-78. doi: 10.5433/1679-0367.2017v38n1p61
- Souto, S. V. D., Novaes, J. S., Monteiro, M. D., Rodrigues Neto, G., Carvalhal, M. I. M., & Coelho, E. (2016). Imagem corporal em mulheres adultas vs. meia-idade e idosas praticantes e não praticantes de hidroginástica. *Motricidade*, 12(1), 53-59. doi: 10.6063/motricidade.5000
- Steinman, J., & Chiumento, L. F. (2009). *Apostila de formação do curso de pilates na água*. Florianópolis, SC: Instituto TAO.
- Tavares, D. M. S., Bolina, A. F., Dias, F. A., Ferreira, P. C. S. & Santos, N. M. F. (2018). Excesso de peso em idosos rurais: associação com as condições de saúde e qualidade de vida. *Ciência & Saúde Coletiva*, 23(3), 913-922. doi: 10.1590/1413-81232018233.25492015
- Zielinski, R., Miller, J., Baixo, L. K., Sampselle, C. & DeLancey, J. O. (2012). The relationship between pelvic organ prolapse, genital body image and sexual health. *Neurourology and Urodynamics*, 31(7), 1145-1148. doi: 10.1002/nau.22205