Chapter 03

Impact of Clinical Pilates on Satisfaction With Life of Women With Urinary Incontinence

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Abstract

The high prevalence of urinary incontinence is a problem of public health due to its physical, psychological, social and economic effects. It affects predominantly all age female gender and may influence satisfaction with life. Clinical Pilates has been studied in healthy subjects and seems to have positive effects on the psychological and general well-being. However, this method lacks evidence upon its effect on women with urinary incontinence. This study aims to assess the impact of a Clinical Pilates exercise-based program on the perception of contraction of pelvic floor muscles and in satisfaction with life of women with urinary incontinence. A quasi-experimental investigation has been carried out with a 60 women sample distributed by an Experimental Group (EG; n=30) and a Control Group (CG; n=30). Participants were aged ≥ 50 years, diagnosed with stress and mixed urinary incontinence, grade ≥ 3 in the Modified Oxford Grading Scale. EG performed 60 minutes classes of Clinical Pilates based exercises twice a week for ten weeks. CG had no intervention. Pelvic floor efficacy was assessed through Broome's Self-Efficacy Scale and satisfaction with life through Satisfaction with Life Scale. Descriptive statistics and the Inferential Statistics were used. The T-Student test, the Wilcoxon and the Mann-Whitney tests were used in case of abnormality with $\alpha = 0.05$). The results showed that the Clinical Pilates exercise-based program had positive effects on the contraction of pelvic floor muscles, total score [79(10.48) vs 35.9(11.44); $p < 0.001$] in both Broome's sub-scales, A [80.71(9.29) vs 35.36(18.57); $p < 0.001$] and B [77.6(11.06) vs 35.36(18.57); $p = 0.02$] and in satisfaction with life [24.00(8.00) vs 16.00 (8.00); $p < 0.001$]. In conclusion, Clinical Pilates has positively influenced participants' perception of pelvic floor muscles contraction and satisfaction with life.

Introduction

The increasing of the average life expectancy of female gender to 84 years, in Portugal, requires new behaviors, lifestyles, expectations and principles, demanding questions on the stereotyped social repre-

sentations, leading to reflect on the difference between standard and healthy aging. It is not aging itself, but the different aging ways [1]. Paúl and Ribeiro [2] describe aging as a process or a set of processes experienced by every living creatures, expressing itself through both the loss of adapting ability and the decreasing of functionality, being associated to countless changings impacting on population's mobility, autonomy and health.

By 2050, the older people will rise as well as some disfunctions like urinary incontinence (UI), associated to this demografic changing, and there will be a 55% women raising with UI [3]. The UI prevalence is a public health issue, with severe physical, psychological, social and economic consequences. The International Continence Society defines UI as any complaint of involuntary urine loss [4]. The current female/male incidence ratio is 2:1 and 200 million people worldwide suffer from it. In Europe, the percentage of women is 18 to 42%. In Portugal, 33.3% of women over 40 suffer from UI [3,5,6].

This dysfunction prevails most in female gender in all age groups, with menopause presenting a mild to moderate peak [6]. UI has a multifactorial etiology with the most common cause being pelvic floor muscles (PFM) dysfunction [7].

Different UI types are divided according their characteristics: 1) Stress Incontinence occurs due to the increase of the abdominal pressure and to the transitory inability of the urethral sphincter mechanism, resulting in involuntary leakage of urine on coughing, sneezing, laughing or on physical effort or exertion, often occuring on women aged between 45 and 65 [8]. Pelvic floor traumatisms during pregancy and delivery are suggested to be its main risk factors [9]; 2) Urge Incontinence is described as a detrusor hyperactivity resulting from involuntary bladder contractions [10]; 3) Mixed Incontinence is the combination of Urge Incontinence and Stress Incontinence symptoms, whose predominance can prevail over each other. Its origin is unknown, but some connection can exist between the detrusor hyperactivity and the sphincter imcompetence, affecting social, psychological, occupational, domestic, physical and sexual life, triggering symptoms of depression, loneliness and anxiety [10-12].

To obtain a successful aging similar to Rowe and Kahn's model [13], people must have low risk of illness and inabilities, a healthy lifestyle, and keep an active social life. On the other hand, the WHO [1] defines active aging as a process to optimize opportunities to health, participation and security to potentiate well-being and quality of life (QoL) throughout aging.

Well-being has been developed into two distinct fields, one within the scope of adult's development and mental health – psychological well being– and another more connected to psychosocial aspects, to quality and satisfaction with life conditions and circumstances – subjective well being [14].

Satisfaction with Life (SL) is considered a subjective well being dimension, of cognitive origin, representing each individual's psychological evaluation about life [15]. It has been defined as a person's assessment on its very own life, supposing that its global nature becomes into a stable assessment and not completely dependent on the current person's emotional condition [16,17]. These dimensions display each one's feelings of satisfaction and hapiness with itself, with its social and family attachements, with the past personal achievements and with the future expectations [18,19]. Therefore, it allows identifying how satisfied and happy an individual feels in different psychological domains and which are the psychological resources he manages: in the relationship with itself, with the others and the surrounding and its abilities to adapt [15].

Although UI is not considered a serious physical disease or directly affects people's lives, numerous psychological, social and economic problems are associated with it [20,21]. As mentioned, UI can be considered a public health problem due to its magnitude, the costs for the patient and society, and the consequences on QoL [22]. Although UI is not a life-threatening disease [23], the loss of urine implies a number of repercussions in adult women's QoL [24,25], emotional state, and sexual intercourse [26,27], wich configures it a health psychology field of study as well.

UI limits the individual's lifestyle as it alters the way it judges itself, as it sees and perpectives its body and how it interacts with it [28]. It is estimated that PFM exercises can reduce incontinence events in 95% [29]. They are recommended as a first-line treatment and considered as a non-invasive method without colateral effects [30]. Therefore, Clinical Pilates exercises could be used, consisting in a set of exercises adapted from those original of Pilates method, divided into several levels of difficulty to be applied into physical rehabilitation. It can be applied individually or in group, having in mind each person's problem [31]. Clinical Pilates exercises hold low intensity when compared to aerobic exercises. They include a breathing component, which has several advantages to aerobic capacity as well as to mental health, evidencing focus through the attention given to breathing [32].

Eight basic principles are essencial to this intervention: breathing, focus, core, posture, alignment, light movements, accuracy, and control [33-35]. Abdominal and back muscles, together with the diaphragm and the pelvic floor frame a cylinder of supporting muscles. Hence, PFM are trained during exercise and movement [36]. Contraction of PFM during Pilates exercises opposes to the increasing of the intra-abdominal pressure effect caused by the exercise practice, thus preventing urine leakage and strengthening PFM [36]. Group exercises increase social interaction among participants, especially among subjects with similar health status. In fact, group exercises provide participants life experience exchanges, new friendship bonds and an increasing on well being, thus influencing positively their maintenance in the program and their social role [37].

Several authors reveal the ability of physiotherapeutic intervention based on Clinical Pilates exercises in healthy women, reporting its positive effects to both physical and psychosocial levels. However, scarce researches have been assessing the effect of this method in women with UI. Therefore, this chapter aims to present a study that assesses Clinical Pilates effects on the UI, and the ability of contraction of PFM, as well as the SL in women aged over 50 with Stress or Mixed UI.

Methods

Participants

A quasi-experimental research has been conducted with a non-randomized sample of 60 women aged over 50 and diagnosed with stress or mixed UI. The inclusion criteria were: presenting a score ≥ 3 in the Modified Oxford Grading Scale [38], presented below; ability to read and write and meeting clinical criteria to perform exercise. Women presenting cognitive impairments were excluded. The sample was divided into two groups: Experimental Group (EG) (n=30) and Control Group (CG) (n=30). EG performed sessions of Clinical Pilates twice a week for ten weeks. The CG did not perform any session. However, they had the opportunity to perform them at the end of the study. The Flowchart sample is presented in Figure 1.

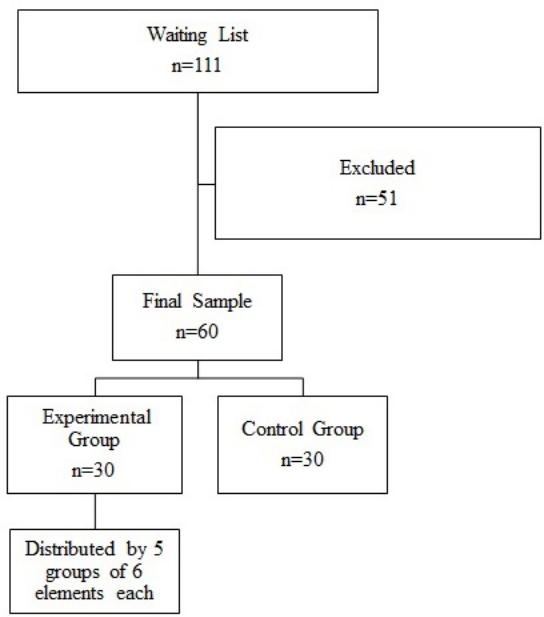

Figure 1: Flowchart sample.

Measures

Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, [39]). This is a 5-item scale designed to measure global cognitive judgments of one's life satisfaction. Participants indicate how much they agree or disagree with each of the 5 items using a 7-point scale that ranges from 7 ('strongly agree') to 1 ('strongly disagree'). A higher final score represents a greater Pearson's correlation with satisfaction with its own life. With a 30 to 35 score, the patient is 'extremely satisfied' with her life; between 25 and 29, 'very satisfied'; between 20 to 24, the patient is 'satisfied'; between 10 and 19, the patient is 'unsatisfied'; and from 5 to 9, 'extremely unsatisfied' with her life [40]. The SWLS is a valid and reliable measure of life satisfaction, suited for use with a wide range of age groups and applications [41]. Reliability showed good internal consistency with Cronbach's $\alpha = 0.78$ [42]. Data collection over the years has shown a 0.93 correlation for a 1-year interval, and a 0.91 correlation for a 4-year interval [43].

Broome Pelvic Muscle Exercise Self-Efficacy Scale (PMSES; Broome, [44]). This 23-item scale is divided into two subscales: efficacy expectations and outcome expectations. Part A is a 14-item subscale that examines efficacy expectations by asking subjects to respond to items illustrating a variety of situations. Participants are asked to indicate how confident they are in performing activities such as contracting pelvic muscles, performing pelvic muscle contractions while lying down, standing, and sitting. The Part B of the scale is a nine-item subscale that examines outcome expectations. In part B, subjects indicate their confidence that the activity (performance of PFM) will prevent unwanted urine loss. Some of the situations included in the scale are coughing, sneezing, laughing, and waiting in line for a restroom. Using a rating scale of 0 to 100, the subjects circle the number that best corresponds to their performance and belief that PFM will prevent unwanted urine loss in certain situations. Total scores for parts A and B are averaged for a total scale score. The higher

the score, the greater the person's perceived efficacy and outcome expectation. The range of scores are 0 to 32 (low self-efficacy), 33 to 66 (moderate self-efficacy), and above 66 (high self-efficacy). These ranges were based on the total possible score equally divided. The scores can then be used to assess a person's perceived efficacy expectation and outcome expectations. The PMSES has been adapted and validated for the Portuguese population by Branquinho, Marques, and Robalo [45], presenting high internal consistency ($\alpha = 0.92$) and good intraobserver reliability indices ($0.55 < r < 0.99$) [44,45].

Procedure

Data collection and the intervention have been conducted in Hospital of Braga, in Northern Portugal, Physiotherapy Department facilities, from, April to July 2016, within a controlled environment, provided by the administration to the head physiotherapist responsible for the class execution. After group distribution and before class EG attended a previous briefing for study introduction and objectives. Informed consent terms have been signed for participation and the initial assessment instruments filled in. Clinical Pilates and basic anatomy concepts have been explained taking into consideration all sessions' principles application. EG performed twice a week sessions with one hour duration for 10 weeks. The group was divided into five-element classes to strengthen the right supervision and exercise execution. Sessions were divided in accordance with women's skill improvement. Consequently, seven sessions have been performed with easy performance exercises, followed by seven sessions of moderate difficulty, and by five sessions of advanced difficulty. Sessions were also divided into three phases: warm-up, core, and stretching. Warm-up lasted seven minutes, core thirty minutes, and stretching eight minutes. CG was aware of study information and its participation in a first session. This group filled in the same assessment instruments, thus allowing future group characterization and comparison. CG had the opportunity to perform the exercises after the end of the investigation. Both groups have been reassessed after the 10 weeks.

Ethics

The study was submitted and approved by the Ethics Committee from Hospital of Braga (CESHB 006/2016). All participants participated voluntarily in the study and provided written informed consent according to the Helsinki's Declaration.

Statistics

Measures of central tendency have been used in the description and sample characterization, mean and median, as well as dispersion measures, such as standard deviation and interquartile range. For normality verification, the Shapiro-Wilk test was applied to age, body mass index (BMI), menopause, marital status, household, PMSES and SWLS. The parametric T-Student test was used for paired data, and applied to variables showing normal distribution, both to comparison before and after Clinical Pilates intervention, to CG and to independent variables (between groups). Nonparametric tests have been applied to variables showing a not normal distribution. Wilcoxon test for paired samples, as a comparison before and after Clinical Pilates or with no intervention. Mann-Whitney test was applied to independent samples between the two groups. All data have been collected and analysed through Statistical Package for the Social Sciences (version 23.0). Significance level was $p = 0.05$ (confidence interval 95%) [46].

Results

Sample Characterization of Socio Demographic Factors

Table 1 shows homogeneity between groups without statistically meaningful differences for age, BMI, menopause, marital status, and living with whom. Women in EG and CG are aged over 56 and in average are overweight (BMI> 25). Two thirds are in menopause and the majority live with the family.

Table 1: Characterization and analysis of socio-demographic factors.

	EG (n=30)	CG (n=30)	p value
Age (years)[c]	57 (7,0)	56 (12)	0,830
BMI (Kg/m²)[a]	28 (5,26)	26,7 (3,70)	0,273
Menopause[b]	24 (80%)	22(73,3%)	0,761
Marital status[b]			
Married	25(83,3%)	22(73,3%)	0.771
Single	1(3,3%)	3(10%)	
Widow	2(6,6%)	2(6,6%)	
Divorced	2(6,6%)	3(10%)	
Household[b]			
Family	28 (93,3%)	24 (80%)	0,254
Alone	2 (6,7%)	6 (20,0%)	

Note. [a]Mean and standard deviation; [b]number of participants presenting a determined and percentage; [c]Median value and interquartile deviation.

Effect of Clinical Pilates on Women's Belief with UI about Satisfaction with Life

At baseline (M0) no significant statistical differences have been found between groups in relation to SL perception ($p > 0.05$). After the 10-week intervention (M1) significant differences, $p < 0.001$, could be seen (cf. Table 2). After Clinical Pilates intervention, the EG has improved its belief in SL (20, 0 vs 24,0; $p > 0.01$). Nevertheless, the CG exhibited a tendency to a SL worsening, although no statistical meaningful differences have been found between the two assessment moments.

Table 2: Clinical Pilates effect on the subject's belief on Satisfaction with Life.

		EG (n=30)	CG (n=30)	Intergroup intervention value (p)
Satisfaction with Life (SL)[a]	M0	20,0 ± 11,0	17,0 ± 10,0	0.085
	M1	24,0 ± 8,0	16,0 ± 8,0	< 0.001*
Intragroup intervention value (p)		< 0.001	0.020	

Note. [a]Median value and interquartile deviation; M0 = baseline; M1 = 10 weeks after starting investigation. *highly significant p <.001.

Clinical Pilates Effect on Pelvic Floor Functionality

M0 (Table3) shows that groups are homogeneous in relation to PFM contraction self-efficacy ($p > 0.05$). Regarding the perception of pelvic floor functionality, both groups presented initial values (M0) between 33 and 66, which indicate moderate self-efficacy. At the end of the intervention, values obtained in the EG had been higher, above 66, indicating a high self-efficacy. Although values have been maintained between 33 and 66, the CG has shown a significant decreasing. Women in the CG worsened their condition, both in scale subdivision and in total score. The EG has shown a positive effect either in part A, which refers to the perception of PFM contraction without urine leakage during an activity, and in part B, referring the same perception in an activity preventing urine leakage.

Table 3: Clinical Pilates effect on the subject's belief on the PMSES.

PMSES		EG	CG	Intervention value (p)
Part A[b] (PFM contraction without urine leakage)	M0	43,9 ± 42,7	35,7 ± 20,2	0.329
	M1	80,7 ± 10,4	35,4 ± 19,1	< 0.001*
Intragroup Intervention value (p)		< 0.001	< 0.001	
Part B[a] (PFM contraction as urine leakage prevention)	M0	45,0 ± 22,1	35,9 ± 13,9	0.063
	M1	77,6 ± 11,1	33,9 ± 13,6	< 0.001*
Intragroup Intervention value (p)		< 0.001	0.002	
Final Score (Part A +Part B)	M0	46,7 ± 21,8	37,7 ± 11,6	0.051
	M1	79,0 ± 10,5	35,9 ± 11,4	< 0.001*
Intragroup Intervention value (p)		< 0.001	< 0.001	

Note. [a]Mean value and standard deviation; [b]Median value and interquartile deviation. *highly significant $p < .001$.

Correlations between PMSES and SWLS

Table 4 shows the associations between SL and PFM self-efficacy (M1). They are closely connected therefore both scale gains are similar. These results can be seen both in the final score and in the different subscales.

Table 4: Pearson's correlation between SWLS and PFM self-efficacy, after Clinical Pilates.

		Part A Broome scale	Part B Broome scale	Total Broome scale
Total Satisfaction with Life	r	0.469	0.414	0.454
	p	< 0.001	0.001	< 0.001*

*highly significant p <.001

Discussion

At the end of the Clinical Pilates ten-week program the women improved their perception of SL, compared to those who have not participated. Therefore, this method contributed to their psychological and social well-being [47,48]. The women in the CG presented a worsening in the perception of SL during this period, which might be explained by the aggravating factors caused by this health condition. Cardoso and colleagues [49] sustain that there is a growing negative impact in the life of women with UI, and an increasing number of health problems associated to this condition, and also the escalating financial problems, either to the patients as well as to the health care services [49,50].

Self-efficacy on contracting PFM has shown that the exercise program based on Clinical Pilates in classes has been effective, raising self-efficacy levels on PFM contraction. These results are similar to the ones from Soares [51], who has shown that PFM voluntary contraction exercises, associated to Clinical Pilates, are key principles holding a lot of benefits, such as the improvement of perception and body awareness of pelvic floor, an increasing in vascularization, tonicity and PFM strength [51].

Clinical Pilates exercises have impacted effectively to raise women's self-efficacy on the perception of exercise, thus improving the confidence to contract PFM and diminishing the symptomatology associated to UI and SI. A better muscle performance is associated to Clinical Pilates exercises, by decreasing the probability of occurring

several physical problems, which appear with aging. Hay-Smith and colleagues [52] referred that patients with a good training would be able to maintain the habit of contracting these muscles during months [52,53]. The women who have not performed the exercise program worsened slightly their condition after the 10 weeks, which might be connected with UI natural progression, as physical inactivity harms negatively pelvic floor, diminishing muscle activation and with a consequent atrophy, thus decreasing its function [54].

The results of this research are similar to those of Boyle and colleagues [55], whose sample comprised 403 women, aiming to determine the training effects of PFM in women with UI, when compared to no training or treatment. It was concluded that PFM training exercises should be included in the UI treatment, due to the their positive effects [55].

UI might lead to a discomfort in the social life through fear, shame and humiliation when leaking urine, which can drive these women to isolation [56], affecting their interpersonal relationship, emotions and well-being [57]. Clinical Pilates has influenced positively the way women perceive life, and Dumoulin and colleagues [58] sustain that PFM training is a golden-pattern for UI treatment, thus evidencing an "A" level. Conservative treatment, connected to pelvic floor re-education, and using educative measures, is an effective option [28].

Comparing the results obtained between the correlations between SL and the PMSES, it can be seen that they associate with each other. Anatomic-physiological and psychosocial gains also correlate. Clinical Pilates can lead to positive changes in lifestyle, having short and long-term health benefits. Evidence has been showing that a low physical activity level is a risk factor for non-transmissible chronic diseases and consequently poor QoL. A healthy lifestyle implies the habit of physical activity practice [59].

A study conducted by Joia, Ruiz, and Donalisio, [60] concluded that health and independence have been the main determinants of

happiness, which reinforce the perception of social and family relations. The authors also sustain that SL has been connected to the report of good family conditions and social relationships, and to the balance between objectives and fulfilments. Participants have shown themselves highly motivated during the intervention, showing interest in the method and availability to continue their participation. Patients also kept a visible interest in sharing information among them, thus creating a good atmosphere in all sessions. This is quite positive, once they concluded that the main determinant factor of perception of high SL is a steady social relationship, which is conditioned by UI [60].

Health professionals should pay attention to this condition at a prime and at a secondary phase, having in mind all the UI factors, so that transdisciplinary health teams can provide women with UI a friendly and warm care in physical, emotional and psychosocial aspects [61].

The current investigation presents as a main limitation a small sample size. Further studies are required to evaluate other psychosocial aspects connected with this health condition, as the current health model does not focus on health as the absence of illness, rather on a daily resource.

We have concluded that the exercises based on Clinical Pilates, performed in classes, improved the health condition of women with mixed incontinence or stress incontinence, influencing positively both their self-efficacy and SL. These exercises strengthen their daily routine and UI management by decreasing urine leakage. They also potentiate family and social lifestyle promoting SL in women with UI.

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