Research Article

The impact of socio-demographic factors on adherence and persistence to the treatment of female urinary incontinence aided by an app: a randomized longitudinal study

Abstract

Introduction and hypothesis: One of the factors that weaken physical therapy assistance in pelvic floor disorders is its interruption.

Objective: to analyze the adherence of incontinent women to the treatment of pelvic floor disorders associated with the mobile device (application), compared to traditional approaches.

Methodology: In this longitudinal, randomized and controlled study, 128 patients were selected to participate in the program through synchronous and asynchronous approaches, with Group 1 (G1) face-toface physiotherapy and application, Group 2 (G2) face-to-face physiotherapy and sheet with guidance on exercises printed, Group 3 (G3) only the application, and Group 4 (G4) only the sheet with guidance on the printed exercises. Twelve face-to-face physiotherapy sessions were held, in groups, once a week, for 3 months.

Results: In the sample, 77 participants (60.2%) adhered to the treatment and 51 (39.8%) did not. A significant difference was found between mean age and adherence to treatment. Adherent patients had an average of 48.3 years, while non-adherent 44.5, indicating a statistical significance of p = 0.015. There is less adherence in synchronous

Methodologies: G1, 19 (50%), G2, 21 (28.8%), when compared to asynchronous ones: G3, 3 (13.6%), and in G4, 8 (32%) showing p = 0.025 of statistical significance. Regarding the types of urinary incontinence (UI), 50 women had stress UI, 67 mixed UI and 11 urge UI. No significant difference was found between women who did not adhere, with p = 0.06. With regard to adherence according to wage income, according to the Brazilian Institute of Geography and Statistics (IBGE), it is determined by the number of minimum wages (SM) No None of the women who did not adhere to the treatment had an income greater than six MW.

Conclusion: Adherence to pelvic floor muscle training is greater when associated with face-to-face physiotherapy with a mobile application.

Keywords: adherence, pelvic floor, therapeutic exercises, education, behavioral strategies, motivation, self-efficacy

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Abbreviations: UI, urinary incontinence; SUI, stress urinary incontinence; MUI, mixed urinary incontinence; PFMT, pelvic floor muscle training; IUD, intrauterine device; TKA, total knee arthroplasty; IBGE, the Brazilian institute of geography and statistics

Introduction

Urinary incontinence (UI) is a prevalent dysfunction that can affect 13 to 70% of individuals in different populations regardless of gender and age group, causing a negative impact on the quality of life.[1–3] Classically UI is classified as stress urinary incontinence (SUI) related to the involuntary loss of urine under any stress situation such as coughing, sneezing, and physical activities; urge incontinence (UI) characterized by the presence of an unavoidable desire to urinate in a short period, associated with polaciuria, nocturia, and involuntary voiding dysfunction; finally, mixed urinary incontinence (MUI), which has symptoms that mix the two types of UI described above.[1] Among the causes of urinary incontinence, performance failure in the different structures that compose the pelvic floor is observed, especially the muscle portion.[4] Since the repercussions can

be minimized with conservative and non-conservative treatments, physiotherapy with emphasis on urogynecology has promoted level 1 assistance and Grade A evidence and recommendation.[5–7] Therefore, pelvic floor muscle training (PFMT) exercises based on motor learning are believed to be the gold standard for urination control.

PFMT applicability in the healing or management of different types of urinary incontinence symptoms has different outcomes, the most significant being SUI, that is, when compared to no assistance or placebo, there are up to six times more chances of evolution, and in a global perspective, when applied to any UI is up to two times more likely than when compared to no assistance (Dumoulin et al., 2018).

However, there are two weak points in the physiotherapeutic assistance in the dysfunctions described above: adherence and the lack of accessibility for all people, especially in countries like Brazil.[8,9] Adherence can be defined as the extent to which the individual follows the guidelines or suggestions of the professional responsible for the treatment's success in the short or long term.[10,11] In addition, it is also applicable in chronic treatments, in terms of a person's behavior, whether through drug intake, lifestyle change, and the correspondence

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and agreement with what has been prescribed.[12] There are different types of instruments in daily clinical life currently available, capable of pointing out whether or not a specific tool interferes with the adherence of a particular therapy.[10,12]

In 2015, the UN General Assembly called for universal health coverage, with the premise of ensuring the quality of life for all individuals of different age groups. This has fostered the evolution of research and practices conducted since the beginning of the 21st century, implementing technology applied in health care. In this way, providing communication at different extremes and assistance to more restricted populations in the different socio-demographic aspects (WHO 2016, UN General Assembly, September 2015). Also, with the aim of engaging patients, the tools in Tele-Health emerged. It is defined as the practice performed by a mobile device between the health professional and the client/patient/user when they are far away, as a facilitating instrument. Its taxonomy has two types of strategies: asynchronous, which stands out in the planned interaction, assistance in real-time, which can be via video or call (WHO, 2016; WHO 2018). However, the results are still debatable (Kjos et al.), highlighting that younger female individuals who believed therapy effectiveness was low showed lower adherence.

Objective

This study's objective was to analyze the impact of socio-demographic factors on patients with urinary incontinence and relate them to adherence and persistence in each proposed treatment.

Subjects and methods

Study and randomization

It is a randomized longitudinal controlled trial, in which women aged 18 and 59 were recruited and diagnosed with stress urinary incontinence (SUI), urge incontinence (UI), and mixed urinary incontinence (MUI), between January 2017 and April 2018, from the waiting lists at Urogynecology Outpatient Clinics of the Federal University of Paraná (CHC-UFPR). The research project was approved by the Research Ethics Committee of the Faculdade Inspirar and registered at ClinicalTrials.gov (protocol ID # 66541417.5.0000.5221). The study exclusion criteria were: Pregnant women, puerperal women up to six months postpartum, women with prolapse superior to grade III by Pelvic Organ Prolapse - Quantification (POP-Q) (PERSU et al., 2011), lower tract urinary infection, intra-pelvic tumor, pelvic region pain that would prevent the therapies offered or who had a history of previous surgery in a pelvic region less than six months prior, of a pacemaker or intrauterine device (IUD) users and occurrence of two consecutive absences from face-toface physical therapy.

Six hundred eighty-five women eligible to participate in the study were contacted via telephone and invited to conduct the initial evaluation and treatment. Of this number, 177 were scheduled. However, only 128 attended. The randomization was performed according to four groups, Group 1 (G1) face-to-face physiotherapy and cell phone application for adherence to exercises (N:38), Group 2 (G2) face-to-face physiotherapy and sheet with orientation on the printed exercises (N:43), Group 3 (G3) only the cell phone application (N: 22) and Group 4 (G4) only the sheet with orientation on printed exercises (N:25). All participants answered a socio-demographic evaluation form elaborated by the researchers, and soon after, randomization was sent to the other team to receive the orientation regarding the respective methodology. Groups G1 and G2 carried out face-to-face physiotherapy once a week for three months and they were reevaluated afterward. The survey lasted three months. Of the 128 volunteers who attended the first evaluation, all entered the statistical analysis where adherence was the study object.

Study Variables

The evaluation to characterize the sample consisted of the following criteria: socio-demographic aspects: age, marital status, ethnicity, schooling, monthly income, living habits: smoking, alcoholism, pathology: stress urinary incontinence, urgency, mixed and urinary tract infection. After three months, all 128 volunteers from G1, G2, G3, and G4 were contacted for adherence evaluation.

Interventions

After initial evaluations, the volunteers were randomized and directed to their groups: G1 (Physiotherapy + application): 12 physical therapy sessions were carried out per group, once a week for three months, and the application was installed on their phones. Group G2 (Physical Therapy + application): 12 face-to-face physical therapy sessions were performed in groups, once a week for three months, and a sheet was delivered to encourage adherence to home exercises, this sheet being the written version of life hygiene tips and exercises contained in the application. Group G3 received the application (an online version of the sheet) installed on their cell phones, where dynamic exercises with sound and images show how many times each exercise is performed, the strength level, and how many seconds to contract and relax the pelvic floor. The iPelvis ® application contains progressive exercise programs for training the pelvic floor muscles, based on previously validated protocols for UI treatment,[5] respecting the local exercise physiology and the principles of increasing motor learning.[13] Visual and sound feedback is provided to the patient, guiding the exact moment to perform the contractions, maintaining each contraction and the respective relaxation times, organized in progressive phases as the patient advances in the protocols. With 6 phases lasting 15 days each, totaling three months, group G4 received a printed sheet with guidance on the exercises composed of explanations and graphs. It was the written version of the application.

Variable analysis

Descriptive statistics were used to describe the sample's socio-demographic and gynecological characteristics. Collected data description was made through summary measures, absolute and relative frequencies for qualitative variables, and mean and standard deviation for quantitative variables. For the quantitative variables between the two groups, the Student's T-test was used. Between more than two groups, the Snedecor F test was used. When comparing qualitative variables between two or more groups, Fisher's exact test was used. All analyses were conducted using the statistical computing software R, always considering the 5% significance level.

Results

Of the 38 G1 volunteers, 19 joined and 19 did not: 12 volunteers did not start attending, 5 volunteers had 2 consecutive absences, and 2 volunteers gave up due to work. Of the 43 G2 volunteers, 22 joined and 21 did not join, 16 volunteers did not even start the attendance, 3 volunteers gave up because of work, 01 volunteer gave up because of traveling, and 1 volunteer gave up because of distance, claiming the research site was far away. Of the 22 G3 volunteers, 19 signed up, and 3 did not sign up due to application issues. Of the 25 G4 volunteers, 17 joined and 8 did not: 1 volunteer reported demotivation, 2 volunteers lost the sheet, 01 volunteer did not understand the exercises on the sheet, and 6 volunteers did not want to report the reason for not joining the proposed treatment.

In this study, 349 women were selected for the study eligibility; however, only 128 agreed to participate, and they were randomly allocated into 4 groups. Regarding the general comparison of the groups, a significant difference was found between the mean age of

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the patients concerning treatment compliance, with patients who did not adhere being 3.8 years younger on average compared to those who adhered to the treatment. Among the proportions of patients who had adherence in the different groups, a significant difference was also found, with 50% of the volunteers in group G1 not completing the treatment, whereas in group G3, this percentage was only 13.6%.

Regarding the income of patients who did or did not adhere to the treatment, a significant difference was identified; moreover, the volunteers who did not have an income above 6 minimum salaries did not adhere. A significant difference was also detected between smokers and alcoholics volunteers who did and did not adhere, being that 71.4% of smokers and 53.8% of alcoholics who did not conclude the treatment Table 1.

Table 1 Sample characteristics

Variable		Complete Sample	Adhered to treatment	Did not adhere to treatment	P value
Number of volunteers		128	77 (60.2%)	51 (39.8%)	
Age		46.8 (8.5)	48.3 (8.0)	44.5 (8.9)	0.015
Group	**G1**	38	19 (50%)	19 (50%)	0.025
	G2	43	22 (51.2%)	21 (48.8%)	
	G3	22	19 (86.4%)	3 (13.6%)	
	G4	25	17 (68%)	8 (32%)	
UI Type	**SUI**	50	33 (66%)	17 (34%)	0.06
	MUI	67	41 (61.2%)	26 (38.8%)	
	UI	11	3 (27.3%)	8 (72.7%)	
Marital Status	**Married**	80	48 (60%)	32 (40%)	0.456
	Separated	61	46 (75.4%)	15 (24.6%)	
	Single	12	9 (75%)	3 (25%)	
	Widow	5	4 (80%)	1 (20%)	
Ethnicity	**Caucasian**	115	73 (63.5%)	42 (36.5%)	0.063
	Asian	8	3 (37.5%)	5 (62.5%)	
	Black	5	1 (20%)	4 (80%)	
Education	**1 to 5 years**	12	6 (50%)	6 (50%)	0.358
	6 to 10 years	59	33 (55.9%)	26 (44.1%)	
	More than 10 years	57	38 (66.7%)	19 (33.3%)	
Income/ Salary	**Up to 2 salaries**	38	28 (73.7%)	10 (26.3%)	0.024
	3 to 4 salaries	37	18 (48.6%)	19 (51.4%)	
	5 to 6 salaries	44	25 (56.8%)	19 (43.2%)	
	More than 6 salaries	6	6 (100%)	0	
UTI		40	27 (67.5%)	13 (32.5%)	0.33
Smoking		21	6 (28.6%)	15 (71.4%)	0.002
Etil		52	24 (46.2%)	28 (53.8%)	0.016
Sendetary		74	48 (64.9%)	26 (35.1%)	0.273

In the volunteer group that performed face-to-face physiotherapy and used the mobile application (G1), in the analysis of patient compliance, a significant difference was found concerning smoking since all the volunteers in this group did not complete the proposed treatment. In the analysis of the group of patients who underwent face-to-face physiotherapy and received the home-based exercise guidelines sheet (G2), a significant difference was identified between the ages of the patients who did and did not adhere to the treatment. Volunteers who did not adhere to the treatment were, on average, 4.8 years younger than those who did. A significant difference was found between the volunteers who smoked and those who adhered to the treatment, with 85.7% of smokers and 80% alcoholics who did not finish the treatment.

No significant differences were found between adherence and non-treatment adherence in the volunteer group that only used the mobile application (G3), which may be due to the small number of volunteers in this group. Regarding the volunteers allocated to the group (G4), a significant difference was found between the percentage of alcoholism among the volunteers who did and did not adhere, and 60% of the alcoholics did not finish the treatment. There was also a significant difference between ethnic groups, with 71.4% of those classified as Asian not finishing the treatment, while the number for Caucasians was 16.7%. According to the analysis made in the comparison between the groups, no significant differences were found Figure 1.
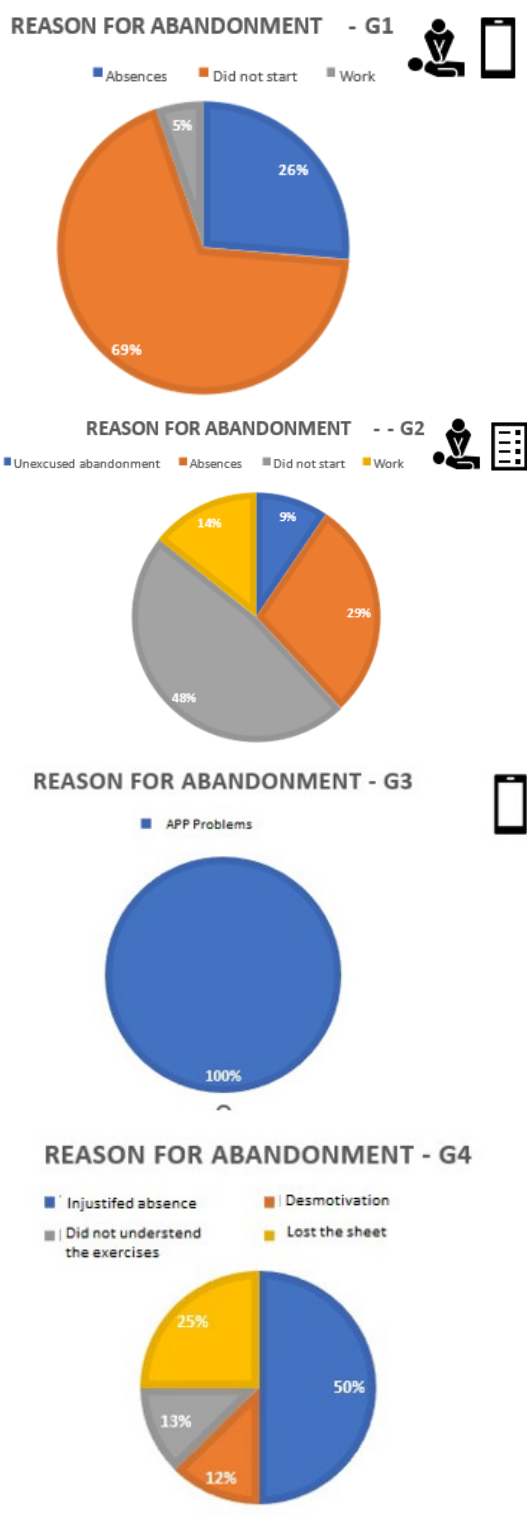
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Figure 1 Abandonment factors in groups G1, G2, G3 and G4.

Discussion

This study explored the adherence of incontinent women using four categories regarding urinary incontinence treatment. It was observed that when comparing face-to-face/synchronous methodologies and (G1 and G2) and non-face-to-face/asynchronous methodologies (G3, G4), asynchronous provided greater adherence to treatment in the group where the application was present, which corroborates with the study of,[14] which aimed to evaluate the telerehabilitation effectiveness for patients after total knee arthroplasty (TKA) when compared to face-to-face rehabilitation. Thus, this reveals that with technology, remote supervision for home telerehabilitation, health professionals and patients are expected to achieve results similar to those from face-to-face rehabilitation, telerehabilitation should be applied to improve access to rehabilitation services for communities, and there is also benefit in terms of time and cost of services.

We found that volunteer smokers did not adhere as much. This observation corroborates the study of,[15] which aimed to evaluate the prevalence of drug withdrawal and identify predictors of low adherence to the drug in patients, revealing a significant difference that smoking was among the predictors that led to low treatment adherence. We believe that self-esteem is closely linked to a lack of adherence to various treatments, including induced self-sabotage. Unfortunately, there is not much research on this theme and it is associated with socio-economic and health consequences. Therefore, it would be valuable to explore the underlying psychological factors of this behavior. We affirm that positive beliefs about smoking influence self-esteem (Hale et al., 2015). The authors evaluated 445 participants who reported being regular or occasional smokers and applied a series of questionnaires evaluating their beliefs and behaviors regarding smoking. As in our study, it was observed that smoking mainly occurs among individuals with low self-esteem, thus justifying the low adherence in our study.

Smoking is higher among individuals with lower socio-economic status in most developed countries. Concerning early pharmacotherapy treatment, patients with low socio-economic status are more likely to interrupt than those who adhere to the treatment.[16] Individuals with more purchasing power have more chances to stop smoking, whereas those who do not have as much purchasing power have increased smoking. This may occur due to limited access to information, education, and health.[17]

In a study that linked smoking prevalence and high school students' socio-economic profile in a city in Minas Gerais, Brazil, it was pointed out that 70.69% of the students that already smoked belonged to a family group in which family income was 1 to 3 minimum salaries. In comparison, the students that had an income between 7 to 9 salaries was only 5.17%. This suggests that poorer individuals smoke more.[18] In addition, purchasing power, low schooling, and poor self-care are related to this issue.[19] According to the 2011 State-of-the-Science Consensus (Dumoulin et al., 2015), there are different strategies for successful treatment adherence, highlighting the therapeutic approach that provides shortterm behavior change to achieve the same behavior in a long-term maintenance perspective. It is also suggested that three aspects are crucial to change this course of action, such as motivation, capacity, and opportunity. It is highlighted that the professionals who provide health education, body awareness training, self-applicable problem solving, feedback, performance analysis, pre-recorded audios, and strategies based on the individuality of their socio-demographic characteristics have promising results.

Within the context of treatment adherence, this research showed a significant difference among sample volunteers concerning income. This research noted that there was not as much adhesion by patients of social classes who make less than 6 minimum salaries. The concept used here for the social class is based on the governmental view of social classes, used by IBGE (The Brazilian Institute of Geography and Statistics) in the population census, every 10 years, based on the number of minimum salaries. It is an easy and objective calculation,

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but it considers the person's current salary, ignoring occasional gifts and property. Sudden salary increases or decreases can end up changing the rationale, making some objectives inadequate. In an analogy of social class X wage income, Carneiro (2020) describes that a group's social class is perceived or demonstrated by a similar social status, which despite presenting several aspects, the economic aspect, sticks out the most. For the author, it is common for people to confuse social class with income (SHEEP, 2020).

This study showed that people from lower social classes did not adhere to the treatment. Also on this subject,[20] evidenced that the financial issue can be one of the main barriers encountered by patients during chronic disease treatment, since, with a better income, it would be easier for the patient to face related expenses, even when dealing with free treatment such as transportation and availability among other things.[20] This perception is also corroborated by,[21] who affirms in their study that there is an "endogenous quality" between individuals' health and monthly income. For the authors, low income leads to more compromised health, and poor health leads to low income. Individuals who need treatment are the ones who consume fewer resources and techniques for better health and maintenance.[21] Still, following this issue, and with this work's findings,[22] also recalls that other factors may be related to non-adherence treatment; among them, the authors state that other aspects are merely added to the financial aspect such as patient inability to have a good relationship with the health professional, committed perception of the treatment itself, religious beliefs, repressive education, cultural beliefs, and beliefs in various myths that make up each individual's psychosocial scenario.[22]

For,[23]socio-economic factors are the most cited in publications regarding patients' non-adherence with a treatment recommendation and coincide with the research findings. The author also states that the lower the patient's social class, the lower his ability to adhere to a proposed treatment. Our study identified a significant difference in the lack of patient adherence by those with an income below 6 minimum salaries. The governmental idea of social classes, used by IBGE in the population census every ten years, is based on minimum salaries. It is an easy and objective calculation criterion, but it only considers the person's current salary and ignores occasional gifts and property. Sudden salary increases and decreases can make the result biased and inappropriate for some purposes Table 2.

Table 2 Social classes X minimum salary

Social classes by minimum wage range (IBGE)		
Class	Minimum wage number (MW)	Family income (US$) in 2020
A	Above 20 MW	US$ 4.050,39 or more
B	From 10 to 20 MW	US$ 2.025,20 to US$ 4.050,38
C	From 4 to 10 MW	US$ 810,08 to US$ 2.025,19
D	From 2 to 4 MW	US$ 405,04 to US$ 810,07
E	Until to 2 MW	Until to US$ 405,03

Some patients live far away, their logistics and time spent to get to the care center generates cost, interrupts their work activities, and may be associated with abandonment. Thus, in the face-to-face groups, a greater adherence in the group with an associated App was noted, possibly because it stimulated the patient to self-care, increasing understanding and engagement with the face-to-face care itself. The same effect was observed in the Group that was managed with a complete application because with the possibility of exercising at home, commuting costs with displacement and diminishing profits for this activity were mitigated. The Group managed only with the printed exercise sheet may have had the worst adherence because there was

no interactivity. Thus, we infer that App's presence in therapy brought a motivational factor that impacted patient adherence. Application use can help develop self-care awareness and change your perception of Quality of Life.

Conclusion

Adherence to pelvic floor exercises for low-income women with urinary incontinence is different for patients treated synchronously, where adherence was lower than those treated asynchronously. The patient group assisted by mobile application showed a higher adherence than the group assisted by a protocol sheet of paper. The factors that most represented a break in adherence to pelvic floor exercises were smoking and alcoholism, so new strategies should be proposed for these risk groups. In addition, women from lower social strata and lower income are a risk group for worse adherence. Factors such as logistics, remote housing to the outpatient clinic for therapy, and the need to leave work, especially during work hours, should be considered in future studies on the adherence of physical therapy since these factors may have impacted the outcome. The possibility of exercising at home and at a time that does not jeopardize work or domestic tasks may represent increased adherence since some patients may not be adhering not because of lack of interest but because of logistical and scheduling difficulties. However, the triad of smoking, alcoholism, and low income is commonly associated in such a way that the correlation of each of these items in isolation must be interpreted with caution. It might not be the smoking or alcoholism itself associated with low clinical adherence, but the social set composed of low income, smoking, and alcoholism, the creators of this complex represent a risk group for this low adherence.

In countries like Brazil, a large part of the population is outside physical therapy services for the pelvic floor, but the four billion people who make up class D form an important market that represents new business opportunities. In this aspect, the integration of information technology to facilitate access to these services for the low-income population may be a horizon to be explored.

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Conflicts of interest

The authors declares that there is no conflict of interest.

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