



Original Article

Effect of belly dancing on urinary incontinence-related muscles and vaginal pressure in middle-aged women

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Abstract. [Purpose] This study examined the effect of belly dancing on the urinary incontinence-related muscles and vaginal pressure in middle-aged women to provide fundamental data for establishing an effective training program focusing on mitigating and preventing urinary incontinence. [Subjects and Methods] The subjects included 24 middle-aged women, who have been diagnosed with urinary incontinence. The subjects were randomly divided into two groups, viz. the experimental group (N=12) and control group (N=12). The experimental group underwent a belly dancing program focusing on pelvis moves. [Results] In the experimental group, the urinary incontinence-related muscle strength and vaginal pressure were increased, while the control group showed no significant change. [Conclusion] Belly dancing focusing on pelvis moves had a positive effect on the urinary incontinence-related muscle strength and vaginal pressure, suggesting that a recreational dance program focusing on pelvic exercise can be used to prevent and relieve the symptoms of urinary incontinence as a non-surgical treatment.

Key words: Urinary incontinence, Pelvis, Vaginal pressure

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INTRODUCTION

Today, many middle-aged women suffer from urinary incontinence, because of the decrease in the strength of their pelvic floor and urethral sphincter muscles due to pregnancy, delivery and aging¹⁻⁴⁾. Urologic diseases, particularly urinary incontinence, tend to decrease people's self-esteem and cause them to feel anxiety and humiliation^{1, 2)}. The number of urinary incontinence patients has gradually increased every year and a medical industry has grown up around this problem^{1, 2)}. In other words, more and more people are likely to be diagnosed with urinary incontinence and incur a heavy financial burden attempting to treat it^{1, 2)}. Urinary incontinence can be mitigated by several types of treatment, including surgery, medication, and behavior therapy^{3, 4)}. Particularly, behavior therapy, such as pelvic muscle strength training, is actively applied as a primary treatment, since it tends to have a lower incidence of side effects compared to surgical treatment or medication^{3, 4)}. Although physical exercise is recommended for patients, muscle strength training through dumbbells or weight machines would increase the possibility of injury among middle-aged females with diminished physical ability²⁾. In addition, physical exercise programs need to be more interesting and recreational if they are to succeed in engaging the continuous participation of the patients. Thus, this study investigated the effect of pelvic muscle strength training through belly dancing, one of well-known recreational dances, on the urinary incontinence-related muscles and vaginal pressure in middle-aged women, in order to provide practical data for establishing an effective training program focusing on mitigating and preventing urinary incontinence.

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SUBJECTS AND METHODS

A total of 24 middle-aged women, who were diagnosed with urinary incontinence by doctor, from D city, South Korea participated in this study. The subjects were randomly divided into two groups: the experimental group (N=12; age=52.3 ± 4.1 yrs; height=157.3 ± 2.2 cm; weight 59.2 ± 3.4 kg) and the control group (N=12; age=51.4 ± 5.1 yrs; height=158.4 ± 3.2 cm; weight 59.8 ± 2.9 kg). The experimental group was requested to participate in a belly dancing program (90 min, 2 times a week, for 12 weeks), while the control group did not participate in such a program. The belly dancing program, focusing on pelvic muscle strength training (Table 1), was established with two sports training and conditioning experts and three current belly dancing instructors. The intensity of the training was decided by rating the perceived exertion (Rating of Perceive Exertion: RPE)⁵. The RPE was gradually increased from 8 to 14 (week 1 to 2: RPE 8–10, week 3 to 8: RPE 11–12, week 9 to 12: RPE 13–14). All of the subjects underwent the measurement of their vaginal pressure and urinary incontinence-related muscles pre- and post-experiment. Their vaginal pressure was measured by vaginal pressure measurement equipment (HMT-2000, HMT, Korea). Particularly, the maximum pressure and duration of their pelvic floor muscle contraction were recorded by one well-trained and experienced nurse. The strength of their urinary incontinence-related muscles, specifically their adductor muscle, was measured by a one repetition maximum strength test (80% of 1 Repetition Maximum) by using a hip adductor weight machine (T-8003, TechnoGym, Italy) after sufficient warm-up exercises. The data obtained were processed using SPSS 18.0. and standard deviations of the two groups were calculated and the paired t-test was conducted to examine the difference between the pre- and post-experimental values. Values of p<0.05 were considered statistically significant. All of the subjects were educated about the content and purpose of the experiment and provided written informed consent before beginning the study, in accordance with the ethical principles of the Declaration of Helsinki.

RESULTS

The results of the paired t-test by group are presented in Table 2. After 12 weeks of the belly dancing intervention, the experimental group showed a significant difference between their pre- and post-experiment values, while the control group did not demonstrate any significant change. Firstly, the maximum pressure of the pelvic floor muscle contraction was significantly increased from 18.7 ± 1.5 mmHg to 32.5 ± 3.6 mmHg in the experimental group (p<0.05). Secondly, the experimental group showed a significant increase in the duration of their maximum pelvic floor muscle contraction from 3.9 ± 0.5 sec to 6.6 ± 0.4 sec. Thirdly, the one repetition maximum of the adductor muscle was significantly increased from 8.4 ± 0.7 to 12.5 ± 0.7.

Table 1. Belly dance exercise program

Type	Exercise	Time (min)
Warm-up	Leg shimmy, body shimmy, pelvic tilt, hip drop/lift, hip slide, hip thrust, hip circle, hip bump	20
Belly dance moves	Leg shimmy, body shimmy, pelvic tilt, hip drop/lift, hip slide, hip thrust hip circle, hip bump, hip twist, belly roll, undulation, figure eight rib cage, hip shimmy, choo choo-shimmy	60
Cool-down	Same as warm-up	10

Intensity=RPE 8–10 (Week 1 to 2), RPE 11–12 (Week 3 to 8), RPE 13–14 (week 9 to 12)

Table 2. Result of pared t-test

Type		Baseline	12 weeks
Exercise group (N=12)	Adductor muscle (repeat)	8.35 ± 0.65	12.54 ± 0.70**
	Maximum vaginal contraction pressure (mmHg)	18.70 ± 1.50	32.50 ± 3.59**
	Maximum vaginal contraction duration (sec)	3.88 ± 0.50	6.55 ± 0.35**
Control group (N=12)	Adductor muscle (repeat)	8.55 ± 0.50	8.53 ± 0.65
	Maximum vaginal contraction pressure (mmHg)	19.50 ± 1.75	19.35 ± 2.30
	Maximum vaginal contraction duration (sec)	3.95 ± 0.20	3.91 ± 0.27

Values are mean ± SD. Significantly different (**p<0.001) between pre and post in the experimental group.

DISCUSSION

About 55.7% of Korean middle-aged women experience symptoms of urinary incontinence, which is considered as one of the most important health issues around the world by the World Health Organization (WHO) and needs to be controlled consistently^{6, 7)}. For instance, over 30%, 50% and 53.7% of middle-aged women in the U.S., Canada and Taiwan, respectively, are considered as urinary incontinence patients^{8–10)}.

Thus, this study tried to examine the effect of a belly dancing program on the urinary incontinence-related muscles and vaginal pressure in middle-aged women. The result of this study indicated that 12 weeks of the belly dancing intervention significantly increased the maximum pressure of the pelvic floor muscle contraction and its duration and the adductor muscle strength. This result supports those of previous studies. According to Lee & Lee's study¹¹⁾, 10 weeks of pelvic exercise increased the maximum pressure of the pelvic floor muscle contraction among middle-aged women. Mun et al.¹²⁾ also found that the degree of urinary incontinence was improved by a pelvic muscle exercise intervention, due to the resulting increased maximum pressure of the pelvic floor muscle contraction and its duration. Shin & Park¹³⁾ indicated that 12 weeks of pelvic exercise significantly improved many symptoms of urinary incontinence, such as urinary frequency and nocturia. Na et al.²⁾ found that the weakened muscles around the pelvis caused by aging and delivery could be strengthened through regular physical activity, thereby, in turn, relieving or preventing urinary incontinence. Ko et al.¹⁴⁾ suggested that belly dancing, in particular, increases the bone density in middle-aged women. Yoon et al.¹⁵⁾ found that 6 weeks of adductor exercise increased the adductor muscle strength and pressure of the pelvic floor muscle contraction, showing similar effects to the Kegel and other sphincter exercises.

In conclusion, a regular pelvic exercise program could be actively applied as an effective non-surgical treatment for urinary incontinence. This study included a pelvic exercise program, in the form of recreational dancing, that females could follow more easily and participate in for longer by engaging their interest. Although the results of this study indicated the effectiveness of pelvic exercise in reducing urinary incontinence, more specific and diverse research is necessary to identify how such exercises can be tuned to the patient's individual characteristics (e.g., age, gender, previous exercise experience, degree of urinary incontinence, etc.). In addition, future study would identify the effect of exercise on urinary incontinence by types such as stress, urge, overflow, and functional incontinence.

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