

EFFECTS OF STEP DRILLS USING THE JAPANESE MAT ON SOME FUNCTIONAL, PHYSICAL AND MOTOR VARIABLES OF ELDERLY LADIES 50-55 YEARS

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ABSTRACT

The current research aims to prepare a training course using step drills on the Japanese mat to improve some physical, functional and motor variables of elderly women and identify the effects of this training course on some physical, functional and motor variables of elderly women (50-55 years). The researcher used the experimental approach (two-group design) with pre- and post-measurements. Participants (n=20) were all women (50-55 years) without previous participation in sport and were all free of chronic diseases. Participants were randomly divided into two equivalent groups (control=experimental=10). Both groups practice the same warm-up and fitness exercises but only the experimental group practiced the square steps drills on the Japanese mat. Results indicated that :

- 1.The recommended program improved speed strength as a physical factor in favor of the experimental group
- 2.The recommended program improved coordination and agility as motor factors in favor of the experimental group
- 3.The functional factors did not show any significant improvements
- 4.Performing step drills on Japanese mat led to accurate results in the experimental group

Keywords: functional ability , elderly women , Japanese mat

Introduction and Research Significance

Physical education is no longer limited to high achievements or younger age groups (children – adolescents) for improving physical, psychological, functional and motor abilities. Instead, it is now more related to elderly population as this age group represents the majority of the society and in the past, it provided the whole society with major deeds. Nevertheless, this age group suffers from the lack of movability due to physical, psychological or functional reasons, especially females.

Therefore, many physical educators tried to develop special programs to suite the abilities of those individuals and many devices and tools were developed to be used in such drills. One of these drills is the squares of the Japanese mat, a very recent training technique that appeared after 2007 and used by elderly as it considers their physical, functional and motor abilities and decreases risks of injury as most of those individuals suffer from various diseases. In addition, it does not cost much and can be easily used at homes, gardens, squares ...etc. the significance of this research is clear in trying to apply easy drills (mere stepping) for elderly women (50-55 years) to identify its effects on some physical, motor and functional abilities, especially that this age group is very near to old age as most references indicate that old age begins in (60) years.

Research Problem

According to review of literature concerning international experiences in using physical education and recreation to support health aspects, including functional and psychological abilities of elderly, it is important to remove stress, anxiety and fears and support good will and cooperation and other psychological variables that can be managed through physical, sports and recreational work.

The researcher discovered weaknesses in elderly age groups in Jordan and other Arab countries concerning the physical and recreational aspects of life. It is noteworthy that other countries like Egypt and UAE started to care for this age group through academic programs of faculties of physical education. Compared with the mean age of (60-75) years in Jordan, we can indicate a significant difference among mean ages of Japanese and British elderly. All over the world, there is a major interest in this age group to improve all its physical, psychological and health aspects. This is not the case in Jordan. Considering that old age starts at (60), most previous studies indicate the importance of paying more attention to this age group, especially women, in Jordan and other Arab countries.

This research problem is clear in that old age has serious effects on health and physical aspects of elderly women. This research is trying to use step drills on small squares of the Japanese mat as an easy method for improving psychological, physical and functional aspects of women in this age group.

Aims:

The current research aims to:

- 1.Prepare a training course using step drills on the Japanese mat to improve some physical, functional and motor variables of elderly women
- 2.Identify the effects of this training course on some physical, functional and motor variables of elderly women (50-55 years).

Hypothesis:

There are statistically significant differences between the pre- and post-measurements of both the experimental and control groups and the post-measurements of the experimental and control groups on some physical, functional and motor variables of participants.

Review of Literature:

Elderly population:

The concept of elderly population depends on the state's philosophy towards growth stages of the individual. Most Arab states think that this term is applicable for those who turned (60) or more as this stage manifests clear functional changes that affect the human body negatively in daily life activities especially for those who did not participate previously in sports or physical activities in addition to its adverse psychological effects (1)

Tarek Rabea indicated that there four stages for old age: 50-60, 60-70, 70-80 and above 80. The first stage is characterized by functional stability with low decrease in physical, health and psychological aspects. On the contrary, the fourth stage is characterized by severe decrease in these aspects (2)

The researcher chose participants from the first stage so that drill can help them face the following deteriorations in other stages.

Physical and recreational drills for elderly population:

Elderly people can gain many benefits from moderate daily physical activity like walking (3), swimming or simple moves with or without ball as this may create a significant improvement in physical fitness especially when these activities are done as a group in recreational mode like dancing or hiking as it improves the psychological aspect and motivates individuals to participate (4) (5). In addition, these drills increase social cohesion (6) especially when done in recreational mode (7).

Pre-old age physical performance helps creating useful individual habits that help individuals to decrease risks of physiological changes in cardio-vascular system and blood pressure (8), obesity (9) diabetes, osteoporosis, erythrites and even cancer as several studies indicated a preventive effect of sports participation and physical drills in several cases of cancer, especially cervical and breast cancer in women.

Furthermore, it improves fat status as fat percentage in women between 46-55 years may reach 92% of normal healthy individuals and this may have negative effects on most vital organs in addition to muscle atrophy (10). Regular practice of physical activities helps maintaining balance in elderly people like standing on one leg or practicing yoga or tai chi as this type of drills increases agility, coordinative abilities and physical/motor aspects coherence in addition to regulating other body systems (11) (12).

Step squares on the Japanese mat:

Japan had a specialized center for these exercises since 2007 as this type of drill aims to increase the physical and motor abilities of elderly people, especially coordination and balance. It depends on movements that improve mental and muscular abilities. Japanese mat consists of (40) squares (25x25cm) fixed in columns (10 squares per column) and rows (4 squares per row). The individual moves from one side to the other according to three levels (primary – intermediate – complex). Each level has a set of movement that progress from easy to hard. The easy level requires individuals to move among squares using only two squares in each column or row. In the third level, individuals move to the sides, forward or backward on various rows and columns as numbers are changed till (8) numbers in each set.

Methods

Approach:

The researcher used the experimental approach (two-group design) with pre- and post-measurements.

Participants:

Participants (n=20) were all women (50-55 years) without previous participation in sport and were all free of chronic diseases. Participants were randomly divided into two equivalent groups (control=experimental=10). Both groups practice the same warm-up and fitness exercises but only the experimental group practiced the square steps drills on the Japanese mat.

Table (1): Participants

Total number	Experimental	Control
20	10	10

The researcher tested equivalence of groups on functional variables (pulse), physical variables (speed strength) and motor variables (agility, coordination and kinesthetic cognition with 60cm jump test).

Research Instruments:

- Related literature
- Japanese mats (n=4) – dummies (n=8) – markers – measuring tap – whistle – data recording form – stop-watch – medical balance – laptop

Research Tests and Pilot study:

The researcher chose validated tests suitable for participants including pulse and blood pressure (13), three hoops with right leg then with left leg for measuring speed strength (14) (15), zigzag run among dummies (figure 8) for three times in a rectangle (5x3m) for measuring agility (16), numbered circles for measuring coordination (17) (18) and (60cm) jump for measuring kinesthetic cognition (19). Pilot study was performed on a pilot sample (n=3) on 24-4-2016 then retest was taken on 29-4-2016 to measure validity and reliability of tests in addition to identify any difficulties that may arise during main application.

Main application:

Pre-measurements were taken for both groups on 2-5-2016. The training program included (24) units (3 units per week) for (2) months from 5-5-2016 to 27-6-2016. Exercises included warm-up (10-15 min) for both groups, physical exercises for both groups and step drills for the experimental group only. Post-measurements were taken on 29-6-2016 following the same protocol of pre-measurements.

Statistical treatment:

The researcher tabulated data and treated it statistically using SPSS software.

Results:

Table (2): pre- and post-measurements of the experimental group on all research variables (n=10)

Test	Pre-		Post-		(t)	significance
	Mean	SD	Mean	SD		
Rest Pulse (PBM)	76.51	2.9	76.32	1.62	1.644	NS
Diastolic blood pressure	12.8	1.54	12.5	1.28	1.193	NS
Systolic blood pressure	8.92	1.99	8.73	1.97	1.65	NS
3 hoops right (m)	1.45	3.51	1.87	2.01	4.19	S
3 hoops left (m)	1.37	2.48	1.61	1.95	3.32	S
Zigzag run (sec)	38.36	4.01	33.25	2.76	4.97	S
Number circles (sec)	28.54	1.99	20.23	2.66	7.9	S
(60cm) long jump (sec)	17.64	2.38	9.92	1.72	3.14	S

(t) table value on $P \leq 0.05 = 1.833$

Table (3): pre- and post-measurements of the control group on all research variables
(n=10)

Test	Pre-		Post-		(t)	significance
	Mean	SD	Mean	SD		
Rest Pulse (PBM)	76.13	1.74	76.05	2.02	1.801	NS
Diastolic blood pressure	12.39	1.61	12.33	1.98	1.61	NS
Systolic blood pressure	8.71	2.05	8.69	1.87	1.43	NS
3 hoops right (m)	1.61	1.9	1.75	2.1	2.21	S
3 hoops left (m)	1.85	1.76	1.93	1.45	1.91	S
Zigzag run (sec)	37.65	3.17	35.29	2.84	5.52	S
Number circles (sec)	25.82	2.41	22.12	2.89	4.15	S
(60cm) long jump (sec)	18.08	3.59	12.47	2.25	2.88	S

(t) table value on $P \leq 0.05 = 1.833$

Table (4): difference significance among post-measurements of the experimental and control groups on all research variables (n1=n2=10)

Test	Control		Experimental		(t)	significance
	Mean	SD	Mean	SD		
Rest Pulse (PBM)	76.05	2.02	76.32	1.62	0.947	NS
Diastolic blood pressure	12.33	1.98	12.5	1.28	1.42	NS
Systolic blood pressure	8.69	1.87	8.73	1.97	1.089	NS
3 hoops right (m)	1.75	2.1	1.87	2.01	5.26	S
3 hoops left (m)	1.93	1.45	1.61	1.95	2.69	S
Zigzag run (sec)	35.29	2.84	33.25	2.76	9.83	S
Number circles (sec)	22.12	2.89	20.23	2.66	8.41	S
(60cm) long jump (sec)	12.47	2.25	9.92	1.72	13.03	S

(t) table value on $P \leq 0.05$ and freedom degree of (18) = 1.734

Discussion:

Through results shown in tables (2, 3 and 4) the researcher noticed that there were no statistically significant differences between the pre- and post-measurements of the

experimental and control groups or between the post-measurements of both groups on pulse or blood pressure according to (t) values.

The researcher thinks that this is due to the fact that step drills and regular exercises did not improve the oxygenic work. Therefore, depended on anaerobic system for initiating drills in both groups. This is consistent with Abd El-Fattah, A. & Hassanain M. (20), Scot & Edward (21), Hagar, S. (22), Hassan, M. (23) and Ghonaim, M. (24).

Concerning other physical and motor tests, results indicated statistically significant differences between the pre- and post-measurements of the experimental and control groups or between the post-measurements of both groups in favor of the experimental group.

The researcher thinks that this is due to the fact that the experimental program improved speed strength. This is consistent with Ghonaim, M. (24) and Ismail, S. (26). In addition, the program improved agility and coordination. This is consistent with Mohamed, N. (27). Furthermore, the program improves kinesthetic cognition, balance and psychological status due to recreational atmosphere. This is consistent with Al-Amry, Z. (28). Hamza, A. indicated that variety in exercises leads to verity in experience and this facilitates response to stimuli considering the progression principle (29). All this was facilitated by step drills on Japanese Mat.

Conclusions:

According to this research aim, methods and results, the researcher concluded the following:

- 1.The recommended program improved speed strength as a physical factor in favor of the experimental group
- 2.The recommended program improved coordination and agility as motor factors in favor of the experimental group
- 3.The functional factors did not show any significant improvements
- 4.Performing step drills on Japanese mat led to accurate results in the experimental group
- 5.Research aim and hypothesis were achieved

Recommendations:

The researcher recommends the following:

- Using step drills on the Japanese mat for elderly populations, especially females
- Performing similar studies to identify the psychological effects of these drills on women
- Using these drills with children to improve their physical and motor abilities
- Including these drills in physical education curricula of various age groups due to its easiness and usefulness

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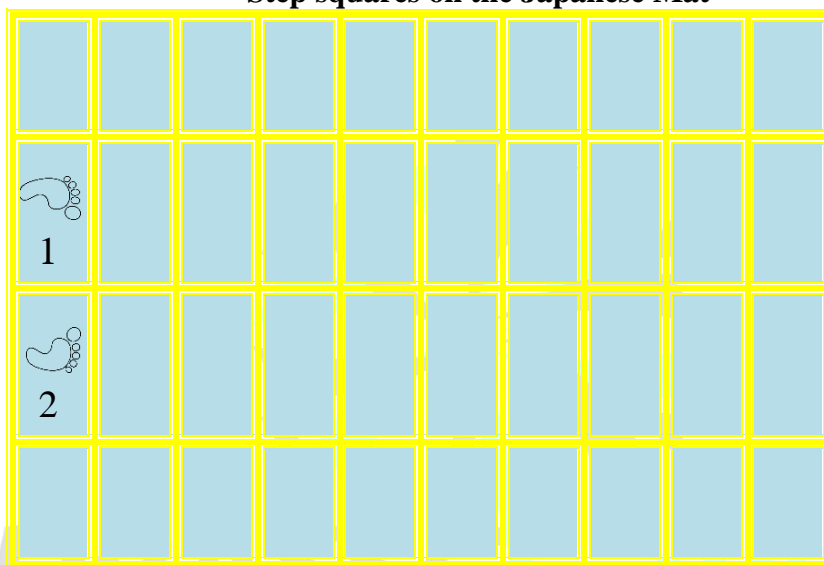
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Annex (1)

Step squares on the Japanese Mat



Start

Annex (2): Sample Units (7, 8 and 9) for Week (3) of the training program

Week	Units	No.	drills	Distance	Intensity	Volume	Rest between reps	Rest between sets	Rest between drills	Notes
Three	7, 8, 9	1	Standing with hands down then jumping with hand aside	-	60%	5x3	-	60 sec	210 sec	a)Correct position is required from beginning to end b)Drill (1) for coordination, (2) for speed strength, (3) for coordination and speed strength, (4) for agility, (5) & (6) for agility and coordination, (7), (8) (9) & (10) for coordination, agility and kinesthetic c)Exercises (1-6) done by both groups d)Exercises (7-8) done by control in addition
		2	Hoop left, three steps, hoop right then three steps	15 m	60%	3X2	90 sec	150 sc	210 sec	
		3	Up and down a 10cm box. Each (2) participants face and alternate legs (left / right)	-	60%	10x3	-	150 sec	210 sec	
		4	Zigzag run among 10 dummies (50 cm apart)	5m	60%	10x3	30 sec	150 sec	210 sec	
		5	10 balls (3m apart and first ball 3m from start). Participant passes the first ball and turns right around the second ball then pass the third	33m	60%	2x3	90 sec	150 sec	210 sec	

Week	Units	No.	drills	Distance	Intensity	Volume	Rest between reps	Rest between sets	Rest between drills	Notes
			and turns left around the fourth							<p>to (1-6) e) Exercises (9-10) done by experimental in addition to (1-6) f) Experimental group at primary level till week (5) then passes to intermediate g) Three introductory units were administered</p>
		6	The same as previous drill but turning right at around the first ball and then left around the second ball. Balls are 2.5m apart	28m	60%	4x3	90 sec	150 sec	210 sec	
		7	Putting (10) markers on floor (50 cm apart) and passing them while placing foot in the middle of two markers	5m	60%	4x3	30 sec	90 sec	210 sec	
		8	Same as previous with right foot placed and left foot beside it	5m	60%	4x3	30 sec	90 sec	210 sec	
		9	Feet placed in front of middle squares and one row is numerated as follows (3, 1, 2, 4). The same numbers	Full mat	60%	10x3	30 sec	90 sec	210 sec	

Week	Units	No.	drills	Distance	Intensity	Volume	Rest between reps	Rest between sets	Rest between drills	Notes
			are used with the upper row till the 10 th row. Participant puts right instep on square (1) then left on square (2), right on square (3) then left on square (4). Move to next row till finishing 10 rows							
		10	Same as previous but putting right instep on square (3) then left on square (2) then right on square (1) then left on square (2)	Full mat	60%	10x3	30 sec	90 sec	C210	

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