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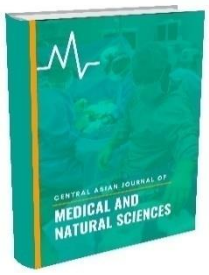

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Effectiveness of Instruction Program in Improving Balance Level among Seniors with Osteoporosis

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Abstract: A quasi-experimental design was used in the present study with the application of a pre-tests/ post-tests approach for the study group and control group after implementation of the instructional program. The period of the study was from the 16th of October 2022 to the 10th of June 2023.

Non-probability (purposive) sample of (100) osteoporotic patients were selected from senior homes. The study sample in this research was divided into two groups; (50) osteoporotic patients for the study, which were exposed to the health instructional program, and (50) osteoporotic patients for control group. The study group was exposed to an instructional program, while the control group was not exposed to the program. The groups were almost matched relative to their characteristics. The study instrument consisted of (3) major parts; the first part is concerned with the patient's socio-demographic characteristics of gender, age, level of education, marital status, and occupation. The second part is concerned with clinical features of body weight, height, body mass index, go on diet, C and D supplements, years of osteoporosis, chronic diseases, smoking, and drinking alcohol. The third part is concerned with a balance scale that includes 14 items.

The present study results refer to a highly significant difference among osteoporotic patients' balance levels between the pretest and posttest in the study group at p-value= 0.00 respectively, and there is a highly significant difference among osteoporotic patients' balance level between the pretest and posttest in the control group at p-value= 0.05 respectively.

More research with a larger sample size is necessary to estimate the prevalence of osteoporosis and osteoporotic fractures related to fall incidence as a result of balance disturbance in Iraq, as well as to encourage the implementation of the guidelines, safety precautions,

management techniques, and preventive measures, as well as to track the effects on the long-term quality of life of osteoporotic patients.

Key words: Effectiveness, Instruction Program, Balance Level, Seniors, Osteoporosis.

Introduction

The most common metabolic bone disorder is osteoporosis. Due to its lack of symptoms, it could not be recognized until a clinical occurrence, such a fracture, has taken place. Osteoporosis does not have a significant clinical or financial effect; osteoporotic fractures do. According to the World Health Organization (WHO), industrialized nations have a lifetime risk of 30 to 40% for hip, vertebral, or wrist osteoporotic fractures. In the 27 member states of the European Union, osteoporosis affects 15% of people over the age of 50 (22% of women and 6.6% of men); according to the European Prospective Osteoporosis Study (EPOS), the disease affects 15% of women between the ages of 50 and 60 and 45% of women over the age of 70. The estimated prevalence of EPOS in males was 2.4% between the ages of 50 and 60 and 17% over the age of 70 (WHO, 2019).

The primary cause of mortality and physical deterioration in elderly people is falls. Exercise may lower the chance of falling and improve balance in many individuals. Aging populations have grown together with the pace of life expectancy growth. As we age, our hearing, vision, and brain function all deteriorate, which gradually makes it more difficult for the brain to communicate information about bodily balance to the nerves. Exercise restores the body's equilibrium and reduces muscular bulk and strength. Exercises help with rehabilitation, posture management, and control of posture (Patti et al, 2021).

Methodology

A quasi- experimental design was used in the present study with the application of a pre-tests/ post-tests approach for the study group and control group after the implementation of the instructional program. The period of the study was from 16th of October 2022 to 10th of June 2023. The study was conducted senior homes in Babylon city. Non-probability (purposive) sample of (100) osteoporotic patients were selected from senior homes. The study sample in this research was divided into two groups; (50) osteoporotic patients for the study, which was exposed to the health instructional program, and (50) osteoporotic patients for control group. The study group was exposed to an instructional program, while the control group was not exposed to the program. The groups were almost matched relative to their characteristics. Verbal consent from each participant of the study sample was obtained and the participation was confidential and voluntary, the information was for research purposes only. A total of (124) patients suffering from osteoporosis, they were met the study criteria and agreed to contribute in the study. The remaining (10) patients for were excluded out of original sample for being Pilot Study. Another (10) excluded from the study sample for doing the preliminary assessment. While (4) participants were dropped out of the study because they did not complete the post-test, they were excluded. Finally, the sample included in the present study is (100) participants. The sample is divided into two groups; (50) participants as a study group and they are exposed to the program and (50) participants who are not exposed to the program, considered as a control group. Through a review of the related literature and studies, the observational checklist is constructed as a means of data collection. It consisted of (3) major parts; the first part is concerned with the patient's socio-demographic characteristics of gender, age, level of education, marital status, and occupation. The second part is concerned with clinical features of body weight, height, body mass

index, going on diet, C and D supplements, years of osteoporosis, chronic diseases, smoking, drinking alcohol, and drinking beverages. The third part is concerned with the balance level (berg balance scale) which includes 14 items. The validity of an instrument's contents is its ability to gather the data intended to be gathered. Content validity for the early-developed instrument is determined through of expert panel to investigate the clarity, relevancy, and adequacy of the questionnaire to measure the concept of interest. A cluster sample of (10) osteoporotic patients was selected purposively from the senior homes in Babylon City. It is applied to osteoporotic patients who had the same criteria as the original study sample to determine the Alpha Correlation (r) reliability of the questionnaire related to osteoporotic patients' performance towards the prevention of falls. The reliability of the questionnaire related to osteoporotic patient's performance towards the prevention of fall were (0.98 on the pre-test and 0.92 on the post-test) for the study group and (0.97 on the pre-test and 0.94 at the post-test) for the control group.

Results of the Study

Table 1. Distribution of participants' socio-demographic characteristics of the sample

List	Gender	Study Group		Control Group	
		Frequency	Percent	Frequency	Percent
1	Male	22	44	19	38
	Female	28	56	31	62
	Total	50	100	50	100
2	**Age**	**Study Group**		**Control Group**	
		Frequency	**Percent**	**Frequency**	**Percent**
	60-70	15	30	20	40
	70-80	26	52	21	42
	80-90	7	14	8	16
	90-100	2	4	1	2
	Total	50	100	50	100
3	**Education level**	**Study Group**		**Control Group**	
		Frequency	**Percent**	**Frequency**	**Percent**
	Not read and write	3	6	3	6
	Read and write	16	32	16	32
	Primary school	11	22	15	30
	Secondary school	16	32	11	22
	Graduated	2	4	3	6
	Post graduated	2	4	2	4
	Total	50	100	50	100
4	Marital Status	**Study Group**		**Control Group**	
		Frequency	**Percent**	**Frequency**	**Percent**
	Single	3	6	6	12
	Married	3	6	10	20
	Divorce	7	14	5	10
	Separate	10	20	6	12
	Widow	27	54	23	46
	Total	50	100	50	100
5	**Occupation**	**Study Group**		**Control Group**	
		Frequency	**Percent**	**Frequency**	**Percent**
	Unemployed	37	74	40	80

	Retired	13	26	10	20
	Total	50	100	50	100
6	**BMI**	**Study Group**		**Control Group**	
		Frequency	**Percent**	**Frequency**	**Percent**
	Under weight	15	30	17	34
	Healthy weight	12	24	13	26
	Overweight	17	34	18	36
	Obese	6	12	2	4
	Total	50	100	50	100
7	**Go On Diet**	**Study Group**		**Control Group**	
		Frequency	**Percent**	**Frequency**	**Percent**
	No	28	56	30	60
	Yes	22	44	20	40
	Total	50	100	50	100
8	**Take C and D Supplement**	**Study Group**		**Control Group**	
		Frequency	**Percent**	**Frequency**	**Percent**
	No	26	52	33	66
	Yes	24	48	17	34
	Total	50	100	50	100
9	**How many years you have osteoporosis**	**Study Group**		**Control Group**	
		Frequency	**Percent**	**Frequency**	**Percent**
	1-3	10	20	9	18
	3-6	21	42	23	46
	6-9	11	22	12	24
	9 and more	8	16	6	12
	Total	50	100	50	100
10	**Smoking**	**Study Group**		**Control Group**	
		Frequency	**Percent**	**Frequency**	**Percent**
	No	32	64	38	76
	Yes	18	36	12	24
	Total	50	100	50	100
11	**Drinking Alcohol**	**Study Group**		**Control Group**	
		Frequency	**Percent**	**Frequency**	**Percent**
	No	40	80	43	86
	Yes	10	20	7	14
	Total	50	100	50	100

Table 2. Balance level and risk of fall:

Balance level						
Group	**Pre-Test**			**Post-Test**		
	0-20 High risk	**21-40 Moderate risk**	**41-56 Low risk**	**0-20 High risk**	**21-40 Moderate risk**	**41-56 Low risk**
	f (%)	**f (%)**	**f (%)**	**f (%)**	**f (%)**	**f (%)**
Study	6 (12%)	44 (88%)				50 (100%)
	M.S 1.88	**S.D. .328**		**M.S 3**	S.D. .00	
Control	11 (22%)	39 (78%)		3 (6%)	47 (94%)	
	M.S 1.78	S.D. .4184		M.S 1.94	S.D. .2399	

Table 3. Significant Differences in osteoporotic patients' balance level and falls risk Pre & Post-Test for Study and Control Groups

Balance level	Study Group (N=20)					Control Group (N=20)				
	M.	t	df	p-value	Sig.	M.	t	df	p-value	Sig.
Pre-test	1.88	24.126	49	.00	HS	1.78	2.419	49	0.019	HS
Post-test	3					1.94				

Table 4. Comparison of significance between the periods of post-tests related to patients' balance of the study and control groups

Balance level	Mean	T	df	P-value	sig
Post-test (Study group)	3	31.244	98	.000	HS
Post-test (Control group)	1.94				

Table 5. Association Between Osteoporotic Patients' Balance Level and their Sociodemographic (gender, age, level of education, marital status, and occupation) data for Study Group

List	Balance Socio-demographic data	Sig. Pearson Chi-Square.	Association Sig.
1.	Gender	.131	**N.S.**
2.	Age	.797	**N.S.**
3.	level of Education	.010	**S.**
4.	Marital Status	.334	**N.S.**
5.	Occupation	.620	**N.S.**

Desiccation

The descriptive analysis of the sample in Table (1) for both groups shows that more than half of the sample were females with (56%) of the study group and (62%) of the control group. These results agree with the findings of Salech et al, (2021) in the study that aim to describe the prevalence of osteosarcopenia and its association with falls, fractures, and mortality in community-dwelling older adults. The sample of 1119 participants (68.5% female) had a mean age of 72 years. Also, these findings agree with Abdulsaheb & Fadhil, (2019) who stated that more than half of the participants were females (268/ 66.5%) in their study aimed to evaluate the Knowledge of elderly clients toward the prevention of falls. Based on the study results (table 1), (52%) of the patients were in age (70-80), on the other hand, (42%) of the control group aged (70-80). These findings are supported by a study conducted by Ahn et al, (2021) who find the demographic characteristics of the 94 participants (47 participants in the intervention group and 47 participants in the control group) who completed the study. Participants in the intervention group and the control group had a mean age of 72.36 ± 3.29 (SD) years and 70.11 ± 3.67 years. Additional support is found by Salech et al, (2021) in the study that aims to describe the prevalence of osteosarcopenia and its association with falls, fractures, and mortality in community-dwelling older adults. The sample of 1119 participants (68.5% female) had a mean age of 72 years. Regarding educational level, (32%) of the patients for both groups just read and write. These findings agree with a study by Hammoudeh et al. (2015) who found that (20.9%) of participants have no education and (29.1%) with elementary school education. Additional support by Mohammed & Abdulwahed, (2021) stated that the majority of the study sample is married and housewives with low education levels. The results in Table (1) reveal that Most of the participants in the study group are widows (54 %), and a smaller proportion of the widow participants in the control group (46%). These findings agree with a study done by Mohsin et al, (2012) who showed that (44.7%) of participants were widows in them study done to assessment of health problems and identify demographical information to the elderly. Based on the study results in Table (1), the majority of

participants are unemployed divided between (74%) in the study group and (80 %) of participants in the control group. This finding agrees with a study done by Rabe'a, (2016) stated that (74.4%) of the sample was not employed in the study aimed to assess Socio-Demographic, Reproductive Characteristics, and healthy dietary behaviors. among women with osteoporosis. To determine the relationship between the socio-demographic characteristics, reproductive data, and dietary-related behaviors. Based on the study results, the participants in the study (34%) and (36%) of the control groups are overweight according to body mass index indicators. These findings are supported by Cuaya et al, (2020) that aim to investigate the performance of the different machine learning models built on spatiotemporal gait parameters to predict falls particularly in subjects with osteoporosis. They found the characteristics and spatiotemporal gait parameters of osteoporosis groups (mean age 74.3 ± 6.3, height 148.5 ± 6.4, weight 58.3 ± 8.8, BMI 26.5 ± 3.8). These findings agree with a study done by Al-Ardhi & Atiyah, (2022) who found that a high percentage of the study sample (44.9%) was overweight in the study that aim to identify the association between the risk for falls and body mass index among diabetic elderly patients. Also, Niama & Naji, (2022) stated that regarding the body mass index (BMI), less than half of the participants in the experimental group are overweight (n = 17; 48.6%). The current results reveal that More than half of the participants in the study group do not go on a diet (56%) and the same in the control group (60 %). This finding agrees with a study done by Park (2017) that stated that the pt. with osteoporosis in his sample does not take special dietary elements in his study aimed to evaluate the changes in osteoporosis knowledge, osteoporosis self-efficacy, fall self-efficacy, physical exercise, and changes in dietary pattern of calcium and vitamin D intake after osteoporosis education. The current results reveal that exactly a quarter of the study group were using Ca^{+} and vitamin D supplements so just (5%) of the control group were using Ca^{+} and vitamin D supplements. These findings agree with a study done by Midi (2008) who showed that (15.7%) of participants took Ca supplements and (4.9) took vitamin D supplements. The current results reveal that Exactly (42%) of the study group suffer from osteoporosis for a period of (3-6) years so and a higher proportion of the participants in the control group (46%) for the same period. These findings agree with a study done by Hammoudeh et al. (2015) who showed that (30.2%) of the participants suffer from osteoporosis for a period of (3-5) years. Ultimately, (36%) of participants in the study group reported that they are smokers, and (24%) in the control group. These findings agree with a study done by Geller and Derman (2010) who indicated (52%) of participants were smoking. This finding agrees with a study done by Taylor (2019) who showed that (29%) of participants were smoking. Based on the study results, The both groups less than quarter of sample of participants were drinking alcohol. This finding agree with a study done by Midi (2008) who indicated (8.82%) of participants were drinking alcohol. The result of this study represents the levels of balance and risk for falls among participants which reveals that most of osteoporotic patients had moderate risk of falls (88%) at pre-test results. The post-test results indicates that all osteoporotic patients in the study group were having low risk of fall (100%), while the most of osteoporotic patients in control group were holding moderate risk for falling (78%) at pretest and (94%) of them had moderate fall risk at posttest. Joshua et al, 2014 stated most of their sample show a risk of falls according to the balance scale in their study aimed to evaluate the effectiveness of individualized progressive resistance strength training (PRT) program in improving balance for forward limits of stability in elderly with balance impairment, compared to traditional balance exercise (TBE), and combination of both (COMBI). The result of this study represents that the effectiveness of instructional program on fall prevention performance, the results refer to highly significant difference among osteoporotic patients' balance level between pretest and posttest in the study group at p-value= 0.00 respectively, and there is high significant difference among osteoporotic patients' balance level between pretest and posttest in the control group at p-value= 0.05 respectively.This agrees with the results of Smulders et al, (2010) in his study that aim to evaluate the efficacy of the Nijmegen Falls Prevention Program (NFPP) for persons with osteoporosis and a fall history in a randomized controlled trial. Persons with osteoporosis are at

risk for fall-related fractures because of decreased bone strength. A decrease in the number of falls therefore is expected to be particularly beneficial for these persons. The NFPP for persons with osteoporosis was effective in decreasing the number of falls and improving balance level.

Conclusion and Recommendations

- The results refer to highly significant differences among osteoporotic patients' performance in the study group. There is no significant difference in osteoporotic patients' performance in the control group. The results refer to a highly significant difference among osteoporotic patients' performance levels between the pretest and posttest in the study group respectively, and there is a highly significant difference among osteoporotic patients' balance levels between the pretest and posttest in the control group.
- Further research on a larger sample should be carried out to estimate the incidence of osteoporosis and osteoporotic fractures related to falls that result from balance disturbance in Iraq and induce the practical application of the instructions, precautions, management methods, preventive measurements, and monitoring its impact on the long-term lifestyle of the osteoporotic patients.

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