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Effectiveness of Health Education Given To Prevent Back Pain In Women: Pre- And Post-Test Study

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ABSTRACT: *Back pain is a common symptom that affects all age groups across the globe, when left untreated may eventually lead to disability. A convenient sample selection method was used in this study due to the global Covid-19 pandemic lockdown which was effective in Turkey during the investigation period. Thus, virtual data collection and health education including some health risks were employed. A total population of two hundred adult women was involved in the study but one hundred and twenty-one responses were collected. Findings show that, for socio-demographic characteristics, the pain was found highest in women between the ages of 41-50 and obese/overweight individuals. Although, there was no significant difference recorded in the marital status category. Moreover, statistical mean differences were detected between the scales for ODI (4.18) and BPFS (6.09). Also, $p<0.05$, paired sample t-test was 0.001 ODI and 0.001 BPFS after the training exercise. This suggests that exercise training is inversely correlated with pain severity which implies that training has a significant influence on pain intensity. Thus, it could be concluded that there is a relationship between the training exercise and ODI/BPFS.*

Keywords: *Low back pain, women, exercise, physical activity, health education, Oswestry disability index, Back pain functional scale, ergonomics*

Introduction

Functional health is a general conception of an indication of optimal levels of spiritual functions, psychosocial and physiological maintenance of holistic care in an individual, families, and communities (Gordon, 1994). Nothing can be compared to living healthy. There is a lack of sensitization of health education on low back pain for the populace since the public health programs' concentration is on the awareness of infectious diseases.

Low back pain (LBP) is mostly defined as discomfort and pain, located below the rib and above the buttock, with or without added leg pain. It is prevailing in the general population as a social and economic global problem (Bos et. al., 2007). Painful conditions and chronic pain in the musculoskeletal system affect women in larger numbers than men (Leveille et. al., 2005)). Overall, there is a higher prevalence of LBP experienced in women than men due to pain sensitivity reports associated with menstrual cycle fluctuation in young adults (Riley et. al., 1999). Also, psychosocial factors, responses to pregnancy and childbirth, child-nurturing stress, weight gain in the abdomen, poor postures, and smoking are responsible for LBP (Bailey, 2009). Though back pain affects all populations irrespective of different occupations which are estimated to affect about half the population of adults (Myśliwiec et. al., 2011). But female healthcare personnel are at higher risk to experience LBP (Ghoussoub et al., 2016; Yan et. al., 2017) which is attributable to occupational risk factors such as heavy physical workload, prolonged standing, cyclic movements, transfer of patients, and unhealthy bodily postures (Nourollahi et. al., 2018; Pheasant & Stubbs, 1992; Smedley et. al., 1995). According to a 2013 research carried out in Poland, the absence from work for men and women due to pain were 15% and 10% respectively. Among the Turkish community, the risk factors investigated for LBP were age (a significant risk factor), occupational activities, obesity, lifestyle, smoking, gender, and genetic makeup (Ercalık & Tuncer, 2011).

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Pain (subjective emotion) is a distasteful feeling of the mind but an identifiable unpleasant emotional state felt in the mind but restricted to a part of the body. Pain is a designed resistance for the protection of the injured part from further deterioration (Malcom, 1987). Low back pain is a symptom, not a disease, though a significant burden to patients and can result from several different known or unknown abnormalities or diseases.

Low back pain cause is broadly divided into three:
i) Mechanical (broken vertebra, degenerative discs, and herniated discs)
ii) Non-mechanical (infections and tumors)
iii) Referred pain from internal organs (kidney infections, gallbladder disease) (Manusov, 2012).
A thorough physical examination and medical history check can be used in the identification of conditions causing pain. Imaging tests may be used to eliminate certain causes of pain including tumors even though they are not necessary in most cases. Neurologic tests may be useful in the determination of causes of pain and convenient treatment.

Prevention is categorized into three: primary, secondary, and tertiary.
Primary prevention of low back pain is centered on precautions taken to shun the occurrence of pain and secondary prevention is given to individuals with past episodes of pain. Postural correction and educational procedures enhance the spine functions in the treatment of chronic LBP (Donzelli et. al., 2006). One benefit of health education is the circulation of new information, thereby creating awareness and increasing positive behaviors. Hence, exercise emerge as a primary prevention approach of health education utilized in LBP conditions and also help to prevent recurrences in individuals whose pain has exceeded six weeks (Steffens et. al., 2016; Casazza, 2012).

Public health programs should aim for the provision of a forum to decrease the impact of low back pain on daily living. Also, health education regarding mechanisms, prognosis, causes, history, beneficial impacts of exercise, and physical activity should be delivered on regular basis by healthcare professionals (Buchbinder et. al., 2018). Studies have shown that a combination of education and/or exercise is proven to be effective in the prevention of low back pain (Steffens et. al., 2016).

There is an improvement in acute or sub-chronic low back pain over time irrespective of the treatment. Improvement is often evident within the first month. Avoiding pain-triggering activities and remaining active are highly recommended. Low back pain management depends on the cause prompted by any of the three categories: mechanical, non-mechanical, or referred pain. Comprehensive treatment programs may help with the management of sub-chronic or chronic low back pain. Non-medication treatments such as massage, spinal manipulation, or superficial heat are recommended as initial management. There is valid evidence that patient education may positively have an impact on low back pain, with 150 minutes of an educational meeting having more effect than regular care offered to help people return to work.

Methodology

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The study was an interventional design with the distribution of brochures and health education lecture to participants. The convenience sampling (also known as availability sampling) technique was used in this study. One hundred and twenty-one internship students in Turkey which consisted of adult women between the ages of 18 and 65 participated in the study. Due to the effective global covid-19 pandemic lockdown in Turkey during this period, health education theoretically and face-to-face techniques were carried out virtually and data were collected via google mails. The questionnaire used in this study comprises of 5 sections, namely: socio-demographic information (age, gender, years of experience, etc), visual analog form, 12-item back pain functional scale questionnaire, 10-item Oswestry disability index questionnaire extracted from (Spine, 2000) and back pain health education intervention.
The data garnered was analyzed using frequency counts and descriptive statistics while the relationship between the socio-demographic characteristics, Oswestry Disability Index and Back Pain Functional Scale were analyzed using Paired Sample Test and Kruskal Wallis test to determine the extent of the pain severity before and after the training exercise given to the women with the low back pains participants. This was analyzed at a 95% level of confidence which is *p*-value 0.05 significant level on Statistical Package for Social Science (SPSS) 26.

Results

Table 1. Socio-demographic characteristics of the participants (n = 121)

Characteristics		n	%
Age	<30	25	20.70
	31-40	20	16.50
	41-50	46	38.00
	>50	30	24.80
BMI	Normal	39	32.20
	Overweight	52	43.00
	Obese	30	24.80
Marital Status	Single	21	17.40
	Married	92	76.00
	Divorced	8	6.60
Family Type	Nuclear	92	76.00
	Large	29	24.00
Family Economic Situation	Insufficient without help	23	19.00
	Enough	93	76.90
	Very good	2	4.10
Jobs' money in 6 months	No	78	64.50
	Employed	33	27.20
	Self-employed	10	8.20
General Health Status	Very good	4	3.30
	Good	37	30.60
	Medium	51	42.10
	Not bad	25	20.70
	Bad	4	3.30
Smoking Status	No	94	77.70
	<10 pieces	13	10.70
	>11 pieces	3	2.50
	>1 pack	11	9.10
Hours of sleep on average per day	<6 hrs	22	18.20
	>6 hrs	99	80.90
Regular sport/exercise	No	76	62.80
	<3 times/week	36	29.70

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	>3 times/week	9	7.40

Majority were between 41-50 years 38% (n = 46) and 20.7% (n = 25) below 30 years. Overweight had the highest percentage with 43% (n = 52) and 24.8% (n = 30) were obese. Majority were married with 76% (n = 92) and 6.6% (n = 8) divorced. Nuclear family group had the highest frequency of 76% (n = 92) while the large group has the lowest frequency of 29% (n = 24.00). In terms of family economic situation, 76.9% (n = 93) had enough, 19% (n= 23) were insufficient without help and 4.1% (n = 2) were very good. For jobs that bring money in 6 months, more than half 64.5% (n = 78) indicated no while 8.2% (n = 10) of the respondents indicated self-employed. Almost half of the group 42.1% (n = 51) had a medium health status, 33.9% (n =41) good and very good while 24% (n = 29) were bad. Majority were non-smokers 77.7% (n = 94). Most of the respondents sleep more than 6 hours 80.9% (n = 99) and 18.2% (n = 22) sleep less than 6 hours. Majority never exercise 62.8% (n = 76) and very few exercises more than 3 times a week 7.4% (n = 9).

Table 2. Characteristics of Participants' Back Pain (n = 121)

Characteristics		n	%
Doctor's diagnosis	No	50	41.30
	Disc shift	14	11.60
	Herniated disc	35	28.90
	Others	22	18.00
Medicine/treatment	No	71	58.70
	Pain relief/cream/Arveles	31	25.60
	Surgical/needle treatment	7	5.80
	Physical therapy/exercise/tape	12	9.90
Work environment on psychology	Stressful	57	47.10
	Comfortable	64	52.90
Position/posture while at work	Sitting	22	18.20
	Standing	54	44.60
	Lifting/handling object	6	5.00
	Others(no work/house chores)	39	32.20
Housework/responsibilities cause LBP	No	53	43.80
	Yes	68	56.20
Hours of sitting and standing on average per day	<8hrs	76	62.80
	>8hrs	45	37.20
Breaks while at work/home	No	13	10.70
	Yes	108	89.40
Suitable materials at home/work	Yes	65	53.70
	No	29	24.00
	Others	27	22.30
Work can cause LBP in daily/business life	No	5	4.00
	Heavy lifting	54	44.60
	Others	62	51.30
Low back pain and bed	Yes	58	47.90
	No	63	52.10
Recent pain	Yes	110	90.90

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	No	11	9.10
Onset of pain	<6 months	47	38.80
	>6 months	74	61.10
The best expression of pain	Flammable	14	11.60
	Ache/Pressure	60	49.60
	Deep/Blunt	47	38.90
When pain is most severe	Morning	41	33.90
	Night	80	66.20
	Few days a week	50	41.30
Frequency of pain character	Everyday	71	58.70
	Continuous	57	47.10
	Occasionally	64	52.90
	Yes	92	76.00
Doctor's visit for pain	No	29	24.00
	Overweight/age	5	4.10
Factors that increase LBP	Movements	110	90.18
	Others (inactivity/smoking)	6	4.30
Factors that reduce LBP	Resting/lying down/sitting	60	49.60
	Massage/relaxant/corset	37	30.50
	Attention to posture/execrcise	24	20.70
Back pain relief activities	Massage/ointment/hot shower	65	53.70
	Resting/ergonomic bed	48	39.70
	Exercise/swimming/attention	8	6.60

Almost half of the group 41.3% (n = 50) had no diagnosis and others with 18% (n = 22). Majority 58.7% (n = 71) received no treatment/medication while a few 5.8% (n = 7) underwent surgical/needle treatment. Psychologically, 52.9% (n = 64) of the respondents were comfortable while 47.1% (n = 57) specified stressful. Most of the respondents 44.6% (n = 54) stands. 56.2% (n = 68) specified yes and 43.8% (n = 53) indicated no for low back pain causing house chores. 62.8% (n = 76) shows less than 8hours to sit/stand on average per day while 37.2% (n = 45) indicated more than 8hours. Nearly all respondents observe breaks 89.4% (n = 108). Majority of the respondents 53.7% (n = 65) indicated yes for suitability of materials at home/work. 51.3% (n= 62) indicated other factors causing LBP in daily/business life. 47.9% (n = 58) responded yes to experiencing low back pain in bed and 52.1% (n = 63) no. Majority 90.9% (n = 110) indicated yes to recent pain. A higher number of respondents 61.1% (n = 74) experienced onset of pain more than 6 months ago. About half of respondents indicated ache/pressure 49.6% (n = 60) for best expression of pain. Similarly, 66.2% (n = 80) experienced severe pain at nights. 58.7% (n = 71) frequency of pain was highest every day. 76% (n = 92) visited doctor for pain. In the category of factors that increase LBP, 90.18% (n = 110) movements was highest. Resting/ lying down and sitting majorly reduced LBP 49.6% (n = 60). Massage/ointments and hot shower 53.7% (n = 65).

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Table 3. Oswestry Disability Index Scale pre-test and post-test (n = 121)

Characteristics	Pre-test	Post-test	t-test	p-value
	Mean±SD	Mean±SD		
Pain intensity	3.40±1.28	2.62±1.37	6.081	0.001
Personal precautions	2.38±1.10	2.07±1.06	3.935	0.001
Lifting	2.91±1.36	2.88±1.46	0.197	0.844
Walking	2.67±1.40	2.21±1.20	4.614	0.001
Sitting	2.66±1.02	2.31±1.04	3.731	0.001
Standing	2.93±1.22	2.42±1.08	4.651	0.001
Sleeping	2.28±1.07	1.93±0.89	4.113	0.001
Social life	2.12±1.25	1.81±1.11	3.746	0.001
Travel	2.63±0.96	2.29±1.00	4.426	0.001
Degree of pain	3.45±1.05	2.71±1.21	6.853	0.001
TOTAL SCORE	27.43±11.71	23.25±11.42	42.347	0.844

Pain intensity score pre-test and post-test was 3.40±1.28 and 2.62±1.37 respectively; (t = 6.081, p = 0.001). Personal precaution pre-test score was 2.38±1.10 and 2.07±1.06 post-test; (t = 3.935, p = 0.001). Lifting pre-test and post-test scores were 2.91±1.36 and 2.88±1.46 respectively; (t = 0.197. p = 0.844). Walking scores were 2.67±1.40 and 2.21±1.20; (t = 4.614, p = 0.001). Sitting scores were 2.66±1.02 and 2.31±1.04; (t = 3.731, p = 0.001). Standing 2.93±1.22 and 2.42±1.08; (t = 4.651, p = 0.001). Sleeping 2.28±1.07 and 1.93±0.89; (t = 4.113, p = 0.001). Social life 2.12±1.25 and 1.81±1.11; (t = 3.746, p = 0.001). Travel 2.63 ±0.96 and 2.29±1.00; (t = 4.426, p = 0.001). Degree of pain 3.45±1.05 and 2.71±1.21; (t = 6.853, p = 0.001). While the total Oswestry Disability Index scale scores pre-test (27.43±11.71) and post-test (23.25±11.42); (t = 42.347, p = 0.844), there was a decrease in all sub-scale scores after health education. The highest mean score difference was seen in pain intensity (0.78) sub-scale, lowest mean score difference in lifting sub-scale (0.03) and (4.18) as total mean score difference. Statistical significance was found in all sub-scale mean scores except lifting (p > 0.05).

Table 4. Back Pain Functional Scale pre-test and post-test (n = 121)

Characteristics	Pre-test	Post-test	t-test	p-value	p
	Mean±SD	Mean±SD			
Usual work, housework, or school activities	3.60±0.83	3.23±0.81	4.825	0.001	
Your usual hobbies, entertainment, or sports events	3.74±1.03	3.17±1.14	6.179	0.001	
Doing heavy work in the home	2.89±1.16	2.40±1.17	5.318	0.001	
Twisting or bending	3.10±1.20	2.45±1.16	7.521	0.001	
Wearing your shoes or socks (stockings)	3.85±1.08	3.41±1.24	5.181	0.001	
To lift a heavy box from the ground	2.49±1.36	1.80±1.18	6.984	0.001	
Sleeping	4.35±0.82	4.05±0.93	4.437	0.001	
Standing for 1 hour	3.62±1.09	3.01±1.16	6.445	0.001	
1.5 km walk (about 10-15 minutes' walk)	3.81±1.18	3.40±1.26	4.759	0.001	

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Two levels of stairs climbing up or down (about 20 steps)	3.49±1.12	3.02±1.16	5.913	0.001
Sit for 1 hour	4.08±1.07	3.61±1.15	5.730	0.001
1-hour driving or traveling.	3.83±1.06	3.21±1.22	6.437	0.001
TOTAL SCORE	**42.85±13.00**	**36.76±13.58**	**69.729**	0.001

The data were analyzed at a 95% level of confidence which implies 0.05 level of significance. Work activities score pre-test and post-test was 3.60±0.83 and 3.23±0.81 respectively; (t = 4.825, p = 0.001). Events pre-test score was 3.74±1.03 and 3.17±1.14 post-test; (t = 6.179, p = 0.001). Heavy work pre-test and post-test scores were 2.89±1.16 and 2.40±1.17 respectively; (t = 5.318, p = 0.001). Twisting or bending scores were 3.10±1.20 and 2.45±1.16; (t = 7.521, p = 0.001). Wearing shoes scores were 3.85±1.08 and 3.41±1.24; (t = 5.181, p = 0.001). Lifting heavy box from the ground 2.49±1.36 and 1.80±1.18; (t = 6.984, p = 0.001). Sleeping 4.35±0.82 and 4.05±0.93; (t = 4.437, p =0.001). Standing for 1 hour 3.62±1.09 and 3.01±1.16; (t = 6.445, p = 0.001). 1.5km walk 3.81±1.18 and 3.40±1.26; (t = 4.759, p = 0.001). Two levels of stairs climbing 3.49±1.12 and 3.02±1.16; (t = 5.913, p = 0.001). Sit for 1 hour 4.08±1.07 and 3.61±1.15; (t = 5.730, p = 0.001). 1 hour driving or travelling 3.83 ±1.06 and 3.21±1.22; (t = 6.437, p = 0.001). While the total Back Pain Functional Scale scores pre-test (42.85±13.00) and post-test (36.76±13.58); (t = 69.729, p 0.001), there was a decrease in all sub-scale scores after health education. The highest mean score difference was seen in lifting heavy box from ground (0.69) sub-scale, lowest mean score difference in sleeping sub-scale (0.30) and (6.09) as total mean score difference. Convincingly, the table depicts a reduction in all the back pain functional scale items. However, it can be deduced from the mean differences that the training has a statistical significant impact on the women suffering from low back pains.

Table 5. Comparison of Oswestry Disability Index scale score and Back Pain Functional Scale score (n = 121)

Characteristics	**Oswestry Disability Index Total score pre-test**			**Oswestry Disability Index Total score post-test**		
	Mean±SD	**Mean±SD**	**t-test p-value**	**Mean±SD**	**Mean±SD**	**t-test p-value**
Back Pain Functional Scale total score	42.85±13.00	27.43±11.71	-2.093 0.001	36.76±13.58	23.25±11.42	-10.636 0.001

In pre-test period, the mean scores were 42.85±13.00 and 27.43±11.71; (t = -12.093, p = 0.001), post-test period, mean scores were 36.76±13.58 and 23.25±11.42; (t = -10.636, p = 0.001). There was a decrease in the pain levels of both scales after health education. This depicts a statistical difference of $p<0.05$.

Discussion

Low back pain is most frequent among women than men and increases in effect with age. It affects the 45-55 years age range and most prevalent among female health personnel which can be accredited to prolonged standing at work (Whelan et al., 2005). Also, age and obesity which is a high Body Mass Index (BMI) can be significant factors in low back pain (Ercalik & Tuncer, 2011). This study reveals majority of the participants were between the ages 41-50, overweight, married, and had no job that generates income in 6 months. Hence, having an understanding of back pain is important to its mitigation through exercise, because therapy can prove hard when the cause is unknown (McGill, 2011). More so, exercise and weight loss programs with a

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healthy lifestyle can control the BMI for the individual to live a healthy life which corroborates Nabiyev & Acaroglu, (2015) study. According to this study, it was revealed that 62.80% of participants never exercised, 29.70% less than 3 times a week, and 7.40% more than 3 times a week. This simply means lack of exercise contributed more to LBP. Previous reports have it that the prevalence of LBP is greater in smokers than in non-smokers and former smokers. Participants' smoking status reveals that 77.70% were non-smokers.

Pain may occur as a result of spinal nerve roots irritation, abdominal muscle weakness, and imbalanced facet joints. The clinical symptoms of LBP comprise lumbar pain, restricting the movements, and identifying stiffness of the lumbar spine (Hoppenfeld, 1987). This study reveals that 41.3% of the participants had no medical diagnosis but used pain killers, muscle relaxants, antidepressants, and non-steroid anti-inflammatory drugs (NSAIDs) that are commonly prescribed for chronic low back pain (Miller, 2012). In this study, 58% of the participants who suffered low back pain didn't undergo any medical treatment. This study reveals that 90.18% of movements as a factor contributes to a surge in low back pain, 89.4% take break while at work, 53.7% mentioned having suitable materials at home/work and 52.1% revealed that bed doesn't cause LBP. This was by Delleman & Dul, (2007) that stated in their study that Occupational LBP is in connection with vulnerability to ergonomic strain at work, psychosocial and environmental factors.

The Oswestry Disability Index (ODI) got its derivation from the Oswestry LBP Questionnaire used by researchers and clinicians for the quantification of low back pain disability (Fairbank & Pynsent, 2000). This study reveals a decline in all sub-scale scores (pain intensity, personal precaution, lifting, walking, sitting, standing, sleeping, social life, travel, degree of pain) after health education with a mean score difference of 4.18 (Table 3). It implies that health education was highly effective as all sub-scale mean scores were statistically significant except lifting ($p>0.05$).

The Back Pain Functional Scale (BPFS) established by Stratford et. al., (2000) is subjectively used in the measurement of the physical function of patients after LBP with an overall score of 60. The original scale (BPFS) was compared with this study; the minimum score in this study was 1 and a maximum of 60. Hence, it implies that the instrument used is proven valid and reliable. Paired sample t-test was used in the comparison of scale questions (pre-test and post-test). Convincingly, the result depicts a reduction in all the back pain functional scale items after exercise as indicated in (Table 4).

The BPFS is a suitable and reliable tool in assessing patients with low back pain. It has internal consistency, retest reliability, and susceptible to change (Straford & Binkley, 2000). Although despite ODI limitation of insufficiency in indicating disability level, it is a valid, reliable, and most frequently used scale for LBP (Yakut et. al., 2004). From this study, there is a statistical mean difference of 4.18 and 6.09 for ODI and BPFS respectively before and after the training exercise $p = 0.000$ which is less than the critical value $p<0.05$ (Table 5). This suggests a relationship between the ODI and BPFS which is in agreement with the literature of Koç et. al. (2018) and Maras et. al. (2019) that found out in their investigations that BPFS has a significant correlation with ODI functional measures. Convincingly, it could, however, be inferred with the

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training put in place, there is a likelihood of a large statistical mean difference if the period is wide.

Conclusion

This study has considered the importance of exercise through education to pain lessening in women although it can be deduced from the findings of this study that there are a lot of factors responsible for back pain in women. These factors include prolonged standing, weight gain during pregnancy, stress, poor posture, smoking, occupational risk factors (female healthcare personnel), disc degeneration, spine infection, osteoporosis, ovarian cyst and cancer, and a lot more. But in all, if women can cultivate continuous or regular exercise habits into their lifestyle regardless of having pains or not, the level of pain suffering will be minimized if not eradicated. For the older women, it could be deduced that the significant reduction in pain intensity could be attributable to their judicious implementation of the training exercise while the young women should be actively engaged. In other words, active involvement in regular physical activities keeps the body fit. Therefore, engaging people in exercise could be of great help. It can then be concluded that there is an inverse correlation between the training and the severity of the pain.

Recommendation

This study has been limited in scope to the Near East University Public Health students and their relatives. However, other workers in other schools or organizations could have different observations for the effectiveness of health education given to prevent back pain in women: pre-test and post-test study. Hence, this should cut across different geographical zones. More so, this study has a great limitation of no sufficient recent resources in terms of outcomes. The available kinds of literature did not show major statistical results that can be compared with this study. In other words, there were no previous studies that show much in-depth in terms of statistical analysis. In the same way, widen the time frame between the pre-test and post-test to a period of three months, persuasion on the individual exercise participation should expatiate and this calls for a need for further study to be conducted.

Limitations of the Study

The major limitation of this study is confined to geographical as this research is restricted to women who consented to take part in this research. Likewise, the time frame for the period between the pre-test and the post-test is statistically short. This implies that the results in this study cannot be used as a benchmark to determine the effectiveness of health education given to prevent low back pain in women on the exterior of geographical space.

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