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Comparison of Female Students' Skill about Spinal Care Behaviors

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ABSTRACT

Aim: The lifetime prevalence of Low Back Pain (LBP) in children and adolescents increases significantly between 12 and 18 years old. It is argued that spinal healthy behavior could prevent from this problem. This study aimed to assess the effective of an training program on spinal care behaviors of female students.

Method and Materials: The present study is a clinical trial study that was performed on 104 fifth grade female students in district 22 of Tehran. Participants entered into the study after learning about the objectives and procedures of the study and were divided into two groups of intervention and control (52 students in each group). Just intervention group were trained regarding skills of backpack carrying. Data were collected at 4 time points of before, immediately, three and six months after training in both groups and analyzed using SPSS software version 24 .

Findings: This study showed that there was significant difference in terms of backpack carrying skill in intervention group compared to other group ($p < 0.00$). Furthermore, a positive change in back-related behavior was found for the intervention group from pre-test to post test and all follow-up assessments ($p<0.001$, $\eta p2=0.25$). By contrast, participants of the control group did not experience significant improvement in this regards.

Conclusion: The present study revealed that carrying skill can be improved by skill training of students regarding how to carry backpack correctly. However, it is strongly recommended these kind of researches should be done in future to be able to design more effective studies.

Keywords: Skill Training , Female Student, Spinal care, Backpack Carrying Behaviour.

Introduction

Chronic pain is a huge public health problem worldwide, affecting both sexes in all age-groups [1-3]. Although the majority of chronic pain sufferers are middle-aged [4], it has been argued that about 55% of this problem occurred among older populations aged above 60 years old [5]. Moreover, prevalence among children and adolescents can be up to 88%, depending on pain location [6]. Hereafter referred to as children, it has been estimated that about 11–38 percent of children might be suffered from chronic pain [7], and about 36 percent of these children seeking specialty care for their pain [8]. While chronic pain can be resulted from an initial injury or illness, one third of children seeking care for their chronic pain, reported no precipitating event preceding the onset of their pain [9].

Recently an investigation undertaken in 2019 concludes that chronic back pain is a considerable public health worry [10] which has consequences at both educational and health levels and so has a significant impact on health system costs [11] because consumes considerable healthcare services [12]. A recent study carried out in 2020 finds that back pain during this period of life is a matter of concern since it has health implications in adulthood [12]. In the short term, the consequences include an increase in medical care and school absenteeism and a restricted ability to perform

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Table 1) Demographic characteristics of the participants

Variables	Intervention group (n = 52)	Control group (n = 52)	P value
Father's job	N (%)	N (%)	
Employed	45 (86.6)	47 (90.4)	0.37
Unemployed	4 (7.7)	1 (1.9)	
Retired	3 (5.8)	3 (5.8)	
Mother's job	N (%)	N (%)	
Employed	16 (30.8)	13 (25)	0.51
Housewife	36 (69.2)	39 (75)	
Father's education	N (%)	N (%)	
≤Diploma	36 (69.2)	39 (75)	
University	16 (30)	13 (25)	
Mother's education	N (%)	N (%)	
Diploma	34 (65.3)	34 (65.4)	
University	18 (34.6)	18 (34.6)	
Child rating	N (%)	N (%)	
First	30 (57.7)	25 (48.1)	0.58
Second	17 (32.7%)	20 (38.5%)	
Other	5 (9.6%)	7 (13.5%)	
How to get to and from school	N (%)	N (%)	
on foot	3 (5.8)	13 (25)	0.19
Public transportation	5 (9.6)	2 (3.8)	
School service	15 (28.8)	22 (42.3)	
private car	29 (55.8)	15 (28.8)	

daily activities [13], and can affect their social behavior [14]. A cross-sectional study performed in Australia [12], reported that adolescence, which is the period in which secondary education takes place, is an ideal time to establish and instill basic health concepts to favor a teenager's physical and mental wellbeing, potentially continuing to benefit from this into adulthood. During adolescence, the high level of inactivity plays a negative role in the appearance of back pain [15]. In addition, according to a review study, prolonged sitting is one of the greatest risk factors of back pain [16]. Likewise, other reports show that, in late adolescence, the prevalence of back pain reaches similar levels to adulthood [17, 18] and is a predictor of the long-term course of this health challenge[16]. As one of the most important causes of back pain among adolescent students is backpack carrying, this study aimed to assess the effectiveness of an training program on spinal care behaviors of female students regarding backpack carrying behaviors.

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Table2) Distribution and comparison of frequency of answers to skills questions in the intervention and control groups over time (N=52)

Time	Baseline N (%)			Immediately Follow up N (%)			3- months Follow up N (%)			6- months Follow up N(%)			χ^2	df	P Value*
Score / Skills	Zero	one	two	zero	one	two	zero	one	two	zero	One	two			
1-1															
*Cont. (N=52)	37 (71.2)	9 (17.3)	6 (11.5)	30 (57.7)	10 (19.2)	11 (21.2)	41 (78.8)	7 (13/5)	4 (7.7)	32 (61.5)	10 (19.2)	9 (17.3)	6.28	3	0.10
**Inter. (N=52)	34 (65.4)	8 (15.4)	10 (19.2)	6 (11.5)	2 (3.8)	44 (84.6)	4 (7.7)	1 (1.9)	45 (86.5)	6 (11.5)	0 (0)	44 (84.6)	83.65	3	**<0.001**
2-1															
Cont (N=52)	23 (44.2)	1 (1.9)	28 (53.8)	22 (42.3)	0 (0)	22 (55.8)	22 (55.8)	1 (1.9)	29 (55.8)	26 (50)	0 (0)	25 (48.1)	0.83	3	0.84
Inter. (N=520	21 (40.4)	0 (0)	31 (59.6)	1 (1.9)	5 (9.6)	46 (88.5)	0 (0)	4 (7.7)	46 (88.5)	0 (0)	7 (13.5)	44 (84.6)	28.85	3	**<0.001**
3-1															
Cont. (n=52)	45 (86.5)	0 (0)	7 (13.5)	39 (75)	0 (0)	12 (23.1)	47 (90.4)	0 (0)	5 (9.6)	42 (80.8)	0 (0)	9 (17.3)	4.06	3	0.25
Inter. (n=52)	41 (78.8)	0 (0)	11 (21.2)	8 (15.4)	1 (1.9)	43 (82.7)	5 (9.6)	1 (1.9)	44 (84.6)	8 (15.4)	1 (1.9)	42 (80.8)	74.67	3	**<0.001**
1-2															
Cont. (n=52)	44 (84.6)	2 (3.8)	6 (11.5)	45 (86.5)	1 (1.9)	5 (9.6)	45 (86.5)	2 (3.8)	5 (9.6)	47 (90.4)	0 (0)	4 (7.7)	1.35	3	0.72
Inter. (n=52)	47 (90.4)	1 (1.9)	4 (7.7)	4 (7.7)	3 (5.8)	45 (86.5)	7 (13.5)	2 (3.8)	41 (78.8)	7 (13.5)	3 (5.8)	41 (78.8)	104.89	3	**<0.001**
2-2															
Cont. (n=52)	36 (69.2)	10 (19.2)	6 (11.5)	37 (71.2)	9 (17.3)	5 (9.6)	37 (71.2)	10 (19.2)	5 (9.6)	35 (67.3)	11 (21.2)	4 (7.7)	0.154	3	0.98
Inter. (n=52)	33 (63.5)	14 (26.9)	4 (7.7)	3 (5.8)	6 (11.5)	43 (82.7)	7 (13.5)	3 (5.8)	40 (76.9)	5 (9/6)	5 (9/6)	41 (78/8)	90.75	3	**<0.001**
3-2															
Cont. (n=52)	36 (69.2)	2 (3.8)	14 (26.9)	37 (71.2)	2 (3.8)	12 (23.1)	37 (71.2)	2 (3.8)	13 (25)	35 (67.3)	0 (0)	16 (30.8)	0.37	3	0.95
Inter. (n=52)	33 (63.5)	2 (3.8)	17 (32.7)	4 (7.7)	1 (1.9)	47 (90.4)	6 (11.5)	3 (5.8)	41 (78/8)	7 (13.5)	2 (3.8)	42 (80.8)	56.44		<0.001
4-2															
Cont. (N=52)	46 (88.5)	0 (0)	6 (11.5)	46 (88.5)	0 (0)	5 (9.6)	47 (90.4)	0 (0)	5 (9/.6)	47 (90.4)	0 (0)	4 (7.7)	0.40	3	0.94
Inter. (N=52)	48 (92.3)	0 (0)	4 (7.7)	6 (11.5)	0 (0)	46 (88.5)	9 (17.3)	0 (0)	41 (78.8)	10 (19.2)	0 (0)	41 (78.8)	98.02	3	**<0.001**
5-2															
Cont. (N=52)	46 (88.5)	0 (0)	6 (11.5)	46 (88.5)	0 (0)	5 (9.6)	47 (90.4)	0 (0)	5 (9.6)	47 (90.4)	0 (0)	4 (7.7)	0/40	3	0/94
Inter. (N=52)	48 (92.3)	0 (0)	4 (7.7)	21 (40.4)	1 (1.9)	30 (57.7)	20 (38.5)	0 (0)	30 (57.7)	18 (34.6)	0 (0)	33 (63.5)	44.84		**<0.001**
1-3															
Cont. (N=52)	29 (55/8)	0 (0)	23 (44.2)	27 (51.9)	0 (0)	24 (46.2)	31 (59.6)	0 (0)	21 (40.4)	30 (57.7)	0 (0)	21 (40.4)	0.58	3	0.90
Inter. (N=52)	31 (59.6)	0 (0)	21 (40.4)	13 (25)	0 (0)	39 (75)	9 (17.3)	0 (0)	41 (78.8)	8 (15.4)	0 (0)	43 (82.7)	30.729	3	**<0.001**
2-3															
Cont. (N=52)	6 (11.5)	22 (55/8)	24 (46.2)	5 (9.6)	21 (40.4)	25 (48.1)	8 (15.4)	22 (55.8)	22 (55.8)	5 (9/6)	25 (48/1)	21 (40/4)	0/88	3	0.83

* Control group ** Intervention group

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Continuation of Table 2.

Time	Baseline N (%)			Immediately Follow up N (%)			3- months Follow up N (%)			6- months Follow up N(%)			χ^2	df	P Value*
Score / Skills	Zero	one	two	zero	one	two	zero	one	two	zero	One	two			
**Inter. (N=52)	5 (9.6)	25 (48.1)	22 (55.8)	3 (5.8)	10 (19.2)	39 (75)	3 (5.8)	7 (13.5)	40 (76.9)	3 (5.8)	6 (11.5)	42 (80.8)	22.99	3	**<0.001**
1-4															
*Contr. (N=52)	38 (73.1)	0 (0)	14 (26.9)	39 (75)	0 (0)	12 (23.1)	39 (75)	0 (0)	13 (25)	35 (67.3)	0 (0)	16 (30.8)	0.91	3	0.82
Inter. (N=52)	35 (67.3)	0 (0)	17 (32.7)	4 (7.7)	0 (0)	48 (92.3)	8 (15.4)	0 (0)	42 (80.8)	8 (15.4)	0 (0)	43 (82.7)	59.03	3	**<0.001**
2-4															
Cont. (N=52)	35 (67.3)	10 (19.2)	7 (13.5)	36 (69.2)	9 (17.3)	6 (11.5)	37 (71.2)	9 (17.3)	6 (11.5)	37 (71.2)	10 (19.2)	4 (7.7)	0.49	3	0.92
Inter. (N=52)	35 (6.3)	12 (23.1)	5 (9.6)	4 (7.7)	3 (5.8)	45 (86.5)	7 (13.5)	3 (5.8)	40 (76.9)	6 (11.5)	3 (5.8)	42 (80.8)	91.107	3	**<0.001**
1-5															
Cont. (N=52)	43 (82.7)	3 (5.8)	6 (11.5)	44 (84.6)	2 (3.8)	5 (9.6)	44 (84.6)	47 (90.4)	5 (9.6)	47 (90.4)	0 (0)	4 (7.7)	1.959	3	0.58
Inter. (N=52)	46 (88.5)	2 (3.8)	4 (7.7)	4 (7.7)	2 (3.8)	46 (88.5)	7 (13.5)	2 (3.8)	41 (78.8)	7 (13.5)	3 (5.8)	41 (78.8)	105.17	3	**<0.001**
2-5															
Cont. (N=52)	36 (69.2)	2 (3.8)	14 (26.9)	2 (3.8)	2 (3.8)	12 (23.1)	2 (3.8)	2 (3.8)	13 (25)	35 (67.3)	0 (0)	16 (30.8)	0.37	3	0.95
Inter. (N=52)	33 (63.5)	2 (3.8)	17 (32.7)	4 (7.7)	0 (0)	48 (92.3)	7 (13.5)	2 (3.8)	41 (78.8)	7 (13.5)	2 (3.8)	42 (80.8)	57.28	3	**<0.001**
3-5															
Cont. (N=52)	46 (88.5)	0 (0)	6 (11.5)	46 (88.5)	0 (0)	5 (9.6)	47 (90.4)	0 (0)	5 (9.6)	47 (90.4)	0 (0)	4 (7.7)	0.40	3	0.94
Inter. (N=52)	48 (92.3)	0 (0)	4 (7.7)	6 (11.5)	0 (0)	46 (88.5)	8 (15.4)	0 (0)	42 (80.8)	10 (19.2)	0 (0)	41 (78.8)	100.24	3	**<0.001**
1-6															
Cont. (N=52)	28 (53.8)	0 (0)	24 (46.2)	26 (50)	0 (0)	25 (48.1)	30 (57.7)	0 (0)	22 (55.8)	30 (57.7)	0 (0)	21 (40.4)	0.802	3	0.85
Inter. (N=52)	30 (57.7)	0 (0)	22 (55.8)	11 (21.2)	0 (0)	41 (78.8)	8 (15.4)	0 (0)	42 (80.8)	8 (15.4)	0 (0)	43 (82.7)	31.33	3	**<0.001**
2-6															
Cont. (N=52)	27 (51.9)	1 (1.9)	24 (46.2)	26 (50)	0 (0)	25 (48.1)	29 (55.8)	1 (1.9)	22 (55.8)	30 (57.7)	0 (0)	21 (40.4)	0.79	3	0.85
Inter. (N=52)	30 (57.7)	0 (0)	22 (55.8)	13 (25)	0 (0)	39 (75)	10 (19.2)	0 (0)	40 (76.9)	10 (19.2)	0 (0)	41 (78.8)	24.11	3	**<0.001**
3-6															
Cont. (N=52)	14 (26.9)	22 (55.8)	16 (30.8)	18 (34.6)	18 (34.6)	15 (28.8)	13 (25)	24 (46.2)	15 (28.8)	18 (34.6)	19 (36.5)	14 (26.9)	1.016	3	0.80
Inter. (N=52)	19 (36.5)	19 (36.5)	14 (26.9)	13 (25)	9 (17.3)	30 (57.7)	8 (15.4)	7 (13.5)	35 (67.3)	9 (17.3)	12 (23.1)	30 (57.7)	18.69	3	**<0.001**
1-7															
Cont. (N=52)	44 (84.6)	0 (0)	8 (15.4)	43 (82.7)	0 (0)	8 (15.4)	43 (82.7)	0 (0)	9 (17.3)	40 (76.9)	0 (0)	11 (21.2)	0.86	3	0.83
Inter. (N=52)	40 (76.9)	0 (0)	12 (23.1)	24 (46.2)	0 (0)	28 (53.8)	17 (32.7)	0 (0)	33 (63.5)	21 (40.4)	0 (0)	30 (57.7)	21.98	3	**<0.001**
nter. (N=52)	19 (36.5)	0 (0)	33 (63.5)	2 (3.8)	0 (0)	50 (96.2)	4 (7.7)	0 (0)	46 (88.5)	4 (7.7)	0 (0)	47 (90.4)	29.09	3	**<0.001**

* Control group ** Intervention group

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Continuation of Table 2.

Time	Baseline N (%)			Immediately Follow up N (%)			3- months Follow up N (%)			6- months Follow up N(%)			χ^2	df	P Value*
Score / Skills	Zero	one	two	zero	one	two	zero	one	two	zero	One	two			
2-7															
Cont. (N=52)	36 (69.2)	2 (3.8)	14 (26.9)	37 (71.2)	2 (3.8)	12 (23.1)	37 (71.2)	2 (3.8)	13 (25)	35 (67.3)	0 (0)	16 (30.8)	0.37	3	0/95
Inter. (N=52)	33 (63.5)	2 (3.8)	17 (32.7)	4 (7.7)	0 (0)	48 (92.3)	6 (11.5)	3 (5.8)	41 (78.8)	7 (13.5)	1 (1.9)	43 (82.7)	59.08	3	**<0.001**
3-7															
Cont. (N=52)	42 (80.8)	4 (7.7)	6 (11.5)	42 (80.8)	4 (7.7)	5 (9.6)	44 (84.6)	3 (5.8)	5 (9.6)	46 (88.5)	1 (1.9)	4 (7.7)	1.80	3	0.61
Inter. (N=52)	45 (86.5)	3 (5.8)	4 (7.7)	3 (5.8)	3 (58)	45 (86.5)	7 (13.5)	2 (3.8)	41 (78.8)	7 (13.5)	3 (5.8)	41 (78.8)	104.98	3	**<0.001**
4-7															
Cont. (N=52)	46 (88.5)	0 (0)	6 (11.5)	46 (88.5)	0 (0)	5 (9.6)	47 (90.4)	0 (0)	5 (9.6)	47 (90.4)	0 (0)	4 (7.7)	0.400	3	0/94
Inter. (N=52)	48 (92.3)	0 (0)	4 (7.7)	6 (11.5)	0 (0)	46 (88.5)	8 (15.4)	0 (0)	42 (80.8)	10 (19.2)	0 (0)	41 (78.8)	100.24	3	**<0.001**
5-7															
Cont. (N=52)	17 (32.7)	0 (0)	35 (67.3)	19 (36.5)	0 (0)	32 (61.5)	21 (40.4)	0 (0)	31 (59.6)	14 (26.9)	0 (0)	37 (71.2)	2.16	3	0.54

Skill1-Sitting at a table:1-1: Straight, not slouched. 2-1: Feet on the floor. 3-1: No twisting. Skill 2: Pick up the crate:1-2: Wide base of support. 2-2-: Load close 3-2: Bend knees. 4-2: Back straight. 5-2: No twisting Skill 3: Carry the crate: 1-3: Back straight (not swayed).2-3: Load close/elbows bent. Skill 4: Set the crate down on the table: 1-4: Bend knees. 2-4: Load close. Skill 5: Pick up an object: 1-5: Wide base of support. 2-5: Bend knees .3-5: Back straight. Skill 6: Move the crate:1-6: Back straight. 2-6: Load close & in front. 3-6: Step/pivot not twist. Skill 7: Backpack: 1-7: Load correctly (order). 2-7: Handling the bag (bend knees). 3-7: Handling the bag (wide base). 4-7: Handling the bag (back straight). 5-7: Carrying the bag – 2 straps

Method and Materials

The present study has a clinical trial design that was performed on fifth grade female students in District 22 of Tehran/Iran in Sep. 2016. Simple random sampling (lottery) was used to select participants. Finally, 104 eligible fifth grade female students were selected and divided into two intervention groups (n = 52) and control group (n = 52). After providing the participants and their parents regarding the objectives and procedures of the study, parents 'written consent for student participation and students' informed consent for voluntary participation were included in the study. Data collection tools included a demographic characteristic questionnaire and a checklist for skill performance evaluation through which 7 skills of the students were observed. These tools were completed before training, and also immediately, three and six months after training of the students in intervention group by both groups. Back care skills items included 23 tasks that were categorized in 7 skills with a score of zero for incorrect execution, one point for relatively correct execution and score of two for correct execution. These seven skills for doing 23 tasks (mentioned at the bottom of Table 2) correctly were trained with the participants by the first author of the study. During this time no training was given to the students in control group. However, after the last follow-up, they were given simple training. These data were entered into SPSS software

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version 24 and they were analyzed using two-way multivariate analysis of variance, Friedman and independent t-test.

Findings

Totally 104 students with age of 11 years old took part in the study and completed the questionnaires. Table 1 shows the demographic characteristics of the students. Table 2 shows that there is no significant difference in the score of skills questions between the control and intervention groups before training, but there is a significant difference in the frequency distribution of the skills scores of the intervention group at different times after follow-up. However, there is no significant difference in control group regarding different skills at different follow-up times.

Table 3 shows the interaction effects of the training program on the mean and standard deviation of the skills over time between both groups. Accordingly, there is no significant difference in this regards before training, but the skill improvement were significantly seen in other time periods. As it is observed in this table, there is a statistically significant difference in the average skill score of the intervention group at different times (P<0.001, F=38.556). Table 4 shows the mean difference of skills scores of the intervention group over time. According to these results, The mean skill score of the intervention group varied significantly from before training to immediate follow-up, three and six months (P <0.001, = 0.25). However, this significant difference is not seen between immediate, three- and six-month follow-up in intervention group.

Discussion

The findings of the present study showed that there is a significant difference between the mean skills scores of the intervention group compared to the control group and this is the because of a training program given to the intervention group. Another follow-up test showed that in the intervention group there was a significant difference in skills scores before training compared to after training n other follow ups, but no significant difference was observed between subsequent time periods. In independent t-test, it was observed that there was a significant difference in skill scores between the intervention and control groups in the time periods after follow-up. In this study, there was a stable

Table3) Comparison of Mean and standard deviation of skill variable between two groups over times

Time / Group	Baseline	Immediately Follow up	3-month Follow up	6- month Follow up later	P *With in group
	M± SD	M± SD	M± SD	M± SD	
Control	13.70 ±10.18 n =52	13.53 ±10.18 n =49	12.48± 9.29 n =50	12.79 ± 9.68 n =48	0.97
Intervention	13.26±9.37 n =52	38.75±10.30 n =51	38.20±11.83 n =50	37.73±11.63 n =51	<0.001
P ** Between groups	**0.81**	**<0.001**	**<0.001**	**<0.001**	

*Repeated Measure Analysis of Variance test, significance level < 0.05. **Independent t-test, significance level < 0.05.

Table 4) Comparison of the mean difference of skill score of the intervention group over time

Follow ups	Follow ups	Mean Difference	P value*	95% CI	
				Lower CI	Upper CI
Baseline	Immediately	- 12.658	<0.001	- 15.538	- 9.778
	3-months	- 11.860	<0.001	- 14.740	- 8.980
	6 -month	- 11.779	<0.001	- 14.666	- 8891
Immediately	3- month	0.798	0.86	- 2.082	3.678
	6 -month	0.879	0.70	- 2.009	3.767
3 - month Follow up	6-month	0.081	0.85	- 2.806	2.969

*Significance level less than 0.05 is considered.

increase of 53.2% in the mean score of spine care skills of the intervention group in all time periods after the training program In other words, the main interaction between group and time was significant but in control group, no significant improvement was observed. One of the initiatives of this study was the design of training sessions for skill tasks. A study by Cardon et al (19) evaluated the effect of back pain prevention program for students of fourth and fifth grade elementary students that showed the average performance score of the experimental group (198 people) increased by 31.6%. This improvement was reported to be significant in all functional cases. However, the results of the present study were consistent and better than the results of the mentioned study. In the study of Heiser et al [20], the performance of the intervention group was better than the control group, but this significant improvement was not reported. Also, the research of Santos et al [21] showed that there was no significant difference in performance score before and after the intervention. The effect of the present study on improving skills was contrary to the findings of these two studies. The greatest improvement observed after training was related to the skill of "carrying a backpack using two straps and on two shoulders". In the immediate follow up`, majority of the intervention group had obtained fully acquired skills. While in the six-month follow-up the rate of correctly carrying decreased . The study of Cardon et al [19] during the post-test showed that there was no significant difference between the experimental and control groups in the task of using the backpack correctly; therefore, the findings of the findings of present were contrary to the mentioned research. The findings of this study showed the least increase was related to the third sub-task (Step/pivot not twist) in the carrying the crate skill. Only one third of the intervention group in the six-month follow-up had demonstrated the above skill completely correctly. In comparison, one fourth of the participants in the control group had the skills completely in the six-month follow-up. However, the habit of maintaining the natural position of the spine and avoiding its twisting must be institutionalized in individuals. The rotation of the spine and the stepping reduce the pressure on the intervertebral disc, and instead its rotation causes the intervertebral disc to be in an improper position and under pressure.

Conclusion

The present study revealed that carrying

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skill can be improved by skill training of students regarding how to carry backpack correctly. However, it is strongly recommended these kind of researches should be done in future to be able to design more effective studies.

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Authors' Contribution

ZAC was the main investigator, collected and analyzed the data. FMB wrote the first draft. SST supervised the study and contributed to all aspect the study. AM was study advisor and contributed to analysis, interpretation and writing process. All authors read and approved the final manuscript.

Conflicts of Interests

The authors declare that they have no conflicts of interests.

Ethics Permission

The study was registered by the ethics committee of TMU with the code IR.TMU.REC.1396.727. It was in accordance with the Helsinki Declaration. All pupils and their parents were informed regarding aim and procedures of the study and consent form was signed by parents/legal guardians on behalf of their children

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