THE FACTORS FOR LOW BACK PAIN AMONG THE SCHOOL CHILDREN

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Abstract: *The human spine is in the sagittal plane, the cervical spine and the lumbar spine have a lordotic curve, which is cunter-balanced by thoracic kypotic curv., These curves provide optimal biomechanical anchoring to the numerous muscle groups. These curves allow optimal load transfer along the spine and abdominal cavity. Any significant change in these curves structurally alters the stress transfer across the vertebral units, potentially subjecting them to injury, which invariably leads to pain. The purpose of the study was to find out the proportion of low back pain among the school children. Having the mechanical problem associated with low back pain among the school children by using school desk assess the psychological factors associated with low back pain among the study subject and assess the others factors associated with low back pain among the study subject. In this cross-sectional study a total of 136 school children (male 59, 43.4%; female 77, 56.6%), mean age 13.18 years, duration of the work near about six months were obtained from different area of Dhaka city. A total 136 school children included in the study among them 68.4% have low back pain and 31.6% did not have low back pain. Significant factors are physical activities, mode of transport and duration sedenty activity.*

Keywords: *Low Back Pain (LBP), Body Mass Index (BMI), School Children*

Introduction

Low back pain is generally as a result of some problems associated with the spine and other adjoining tissue in the sagittal plane, the cervical spine and the lumbar spine have a lordotic curve, which is cunter-balanced by thoracic kypotic curve, these curves provide optimal biomechanical anchoring to the numerous muscle groups that provide both spinal and appendicular motion. The back pain is frequently a result of "macrotrauma or repetitive micorotrauma", "underlying neoplasm", developmental anomaly", infection and inactivity have also been implicated for all age groups.

The prevalence of low back pain among 300 boys and 300 girls school children in Ilorin (Nigeria) and found male 20% & female 28%[1]. Survey in Finland, there was the prevalence of low back pain was increased with age, being 18% both among 14- and 16-year-old adolescents. No gender difference was found. Recurrent or chronic pain was reported by 26% of the boys and 33% of the girls who reported low back pain, and the proportion of recurrent and chronic pains of all low back pain incidents increased with age[3]. The LBP of school children in the city of Antwerp in Belgium had total of 287

children where 51 children (17.8%) reporting suffering at least one lifetime episode of LBP [4], 245 students of New Zealand intermediate school children aged 11–14 years. The Low back pain was significantly related to low desk height. School bag weight was not significantly related to low back pain but carrying the bag on one shoulder was. It is concluded that, amongst these intermediate school children, psychological, social and emotional factors had a stronger relationship with back pain than physical factors[5]. In Malaysia, all children with school-age of 6-18 years old attend school have musculoskeletal disorder (MSD) with lifetime prevalence (LP) of 33% and a periodic prevalence (PP) of 15.3%, followed by the upper back pain (UBP) with a LP of 20.2% and a PP of 9.1% and lastly low back pain (LBP) with a LP of 13.1% and a PP of 8.1%[6].

There is increasing evidence that non-specific low back pain (LBP) is common among children and adolescents. The current study aimed to investigate the proportion of low back pain among the school children .This study will give help to promote life style of school going children's health. This study will help to increase awareness of the general people about LBP among school going children.

Low back pain has several different possible causes: Body mass index (BMI), school bag weight, part time jobs involving heavy lifting, and physical activity. Back pain that is associated with a somatoform disorder or other psychiatric disturbance. BMI was calculated as the ratio of weight (kg) to height (m) squared and will transform into quintiles for analysis. The mass of book, pen, panicle, hand book, paper sheet inside the bag which are carried to school. Lifting any load for part time occupation or daily life which give the pressure on the back. Physical activity means any type sports like cricket, football, tennis, hockey, swim, gym or any type exercise. This allows the total time participating to be calculated. Physical activity means watching television, computer and video games. This allows the total time participating to be calculated. Social support, depression, stress, fear of punishment which can causes of somatoform pain disorder. A position of the body or of body parts during sitting posture, laying posture is related with back pain. Ergonomics is the study of workplace design and the physical and psychological impact on workers.

Materials and Methods

A cross-sectional Study was conducted to determine the proportion of low back pain among the school children. This study was conducted in Government Laboratory School, Child Haven International School, Oxford International School, Alatunnessa High School, Sirajmia Memorial School, Budda Government Primary School of Dhaka city, Bangladesh. The study population was the school children whose age between 11 years to 14 years in Dhaka, Bangladesh. Data collection was performed by face to face interview. Data was collected by semi-structured questionnaires. The data was analyzed by Statistical Package for Social Science (SPSS) software version 16, for continuous data only frequency and transferred into categorical data, for categorical data Chi-square tests was considered as a test of significance.

Result

This chapter describes the results that have been obtained from 126 questionnaires of school children. The information about the sample size, response rate, demographic characteristics data about the subjects are presented.

Table 1: socio-demographic Characteristics of the respondents (n=136)

Variable	Class	Number	Percent(%)
Gender	Male	59	43.4
	Female	77	56.6
Age	Less Than 13.18 years	77	56.6
	More than and Equal 13.18 years	59	43.4
Level of education	Up to primary school	22	16.2
	Up to secondary school	95	69.9
	Up to SSC	19	14
	Mean value(±SD)		
Age	13.18(±1.33)		

This study among 136 school children was participants .Where about three hundreds were sample size. There students were 43.4% male and 56.6% female. The mean age of the respondents was 13.18 years and standard deviation was ±1.33. About 69.9% of the total respondent whose general educational level was up to secondary school.

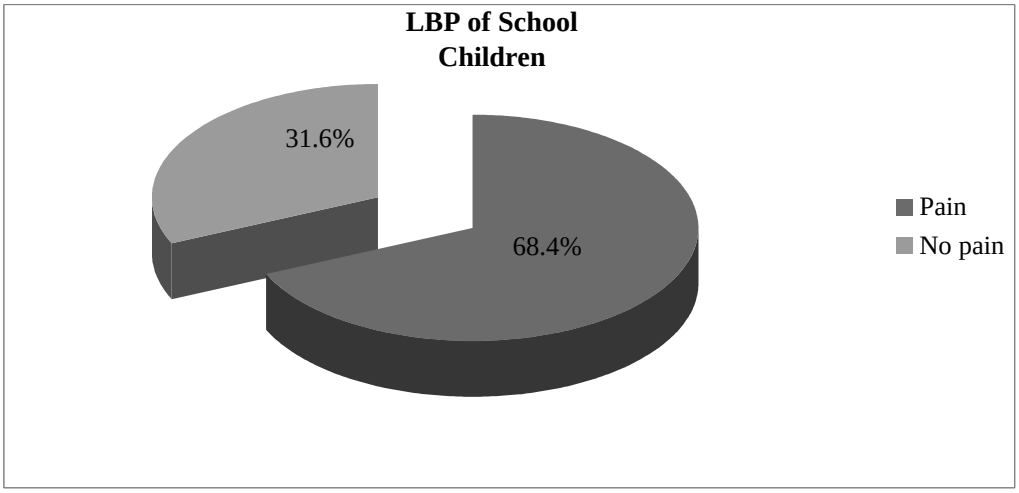

Figure 1: Distribution of the school children according to their LBP.
According to show on figure- 3, Over 136 school children. Among the schoolchildren, LBP present 68.4%, absent 31.6%.

Table 2: Characteristic of BMI and relation between BMI and low back pain (n=136)

Variable	Class	Pain		Chi-value	P-value	*df*
		Yes	No			
Type of BMI	under weight (Less Than 18.5)	79(58%)	33(24.3%)	3.825	0.147	2
	normal weight (18.5-24.9)	13(9.6%)	7(5.1%)			
	over weight (25-30)	1(0.7%)	3(2.2%)			

This study, BMI of the respondents was below weight 58% presented low back pain. But which p-value 0.147 and chi-value 3.825.Which was not significant. Because significant level $\alpha = 0.05$ since the p-value was greater than 0.05.

Table 3: Characteristic of school bag weight and relation between school bag weight and low back pain (n=136)

Variable	Class	Pain		Chi-value	P-value	*df*
		Yes	No			
School bag weight(kg)	Less Than 3.34	55(40.4%)	28(20.6%)	0.442	0.573	1
	More than 3.34	38(27.9%)	15(11%)			
Duration of school bag weight (minutes)	Less Than 33.33	63(46.7%)	33(24.4%)	0.975	0.324	1
	More than or Equal 33.33	29(21.5%)	10(7.4%)			

Children are carried school bag. Below 3.34kg weight of school bag are presented more low back pain about 40.4% . Where was chi-square value 0.442 and p-value 0.573 . Which pain present in chi-square value 0.975 and p-value 0.324. Because significant level $\alpha = 0.05$ since the p-value was greater than 0.05.

Table 4: Characteristic of physical activity and relation between physical activity and low back pain (n=136)

Variable	Class	Pain		Chi-value	P-value	*df*
		Yes	No			
Physical activity (sports)	Cricket	29(21.3%)	7(5.1%)	31.600	0.001*	7
	Foot ball	4(2.9%)	2(1.5%)			
	Basket ball	1(0.7%)	0			
	Tennis	1(0.7%)	0			
	Physical exercise	1(0.7%)	0			
	Gym	1(0.7%)	14(10.3%)			
	Hockey	48(35.3%)	(16)11.8%			
	Swim	8(5.9%)	4(2.9%)			
Duration of physical activity (minutes)	Less Than 41.76	63(46.3%)	32(23.5%)	0.622	0.430	1
	More than or Equal 41.76	30(22.1%)	11(8.1%)			

Fisher exact test is considered here.* = significant<0.001 is considered as a level of significant.

Their physical activity or sports and pain was chi-square value 31.600 and p-value 0.001, which was more significant (p<0.005). Where was 46.3% school children presented low back pain. But there was no relation significant. Because significant level $\alpha = 0.05$ since the p-value was greater than 0.05.

Table 5: Characteristic of the sedentary activity and relation between the sedentary activity and low back pain (n=136)

Variable	Class	Pain		Chi-value	P-value	*df*
		Yes	No			
The sedentary activity or watching television, computer work	Yes	92(68.7%)	41(30.6%)	2.207	0.313	1
	No	0	1(0.7%)			
Duration of sedentary activity(minutes)	Less Than 115.81	40(29.4%)	6(4.4%)	11.092	0.001*	1
	More than or Equal 115.81	53(39%)	37(27.2%)			

* = significant<0.001 is considered as a level of significant.

About almost all school children are watched television or computer work or video games played. The duration of sedentary activity or watching television, computer work and pain was chi-square value 2.207 and p-value 0.001, which was more significant (p<0.005).

Table 6: Relation between the part time job activity and low back pain (n=136)

Variable	Class	Pain		Chi-value	P-value	*df*
		Yes	No			
Part time jobs involving heavy lifting	Yes	1(0.7%)	1(0.7%)	0.338	0.527	1
	No	92(68.1%)	41(30.4%)			

In this study most children was not involve part time job including heavy weight lifting with or without low back pain, there was 0.338 chi-square value and 0.527 provability value, which is not significant.

Table 7: Relation between psychological and low back pain (n=136)

Variable	Class	Pain		Chi-value	P-value	*df*
		Yes	No			
Social support	Good	90(66.2%)	42(30.9%)	0.083	0.773	1
	poor	3(2.2%)	1(0.7%)			
Depression	Yes	14(10.3%)	4(2.9%)	0.748	0.387	1
	No	79(58.1%)	39(28.7%)			
Feeling stress in the	Yes	48(35.6%)	19(14.1%)	0.748	0.387	1

study	No	44(32.6%)	24(17.8%)			
Fear of punishment	Yes	17(12.6%)	12(8.9%)	1.545	0.214	1
	No	75(55.6%)	31(23%)			

This study, there have a no psychological factor significant with association of pain. Those provability was not P<0.005

Table 8: Cross Tabulation between others factors and low back pain

Variable	Class	Pain		Chi-square	p-value	Significant/ Non Significant	*df*
sex	Male	39(28.7%)	20(14.7%)	0.251	0.617	Not Significant	1
	Female	54(39.7%)	23(16.9%)				
Level of education	Up to primary	16(11.8%)	6(4.4%)	1.211	0.545	Not Significant	2
	Up to secondary	66(48%)	29(21.3%)				
	Up to SSC	11(8.1%)	8(5.9%)				
Age of responded	Less Than 13.18	52(38.2%)	25(18.4%)	0.059	0.808	Not Significant	1
	More than or Equal 13.18	41(30.1%)	18(13.2%)				
School shoes	Causal and formal	80(59.7%)	42(31.3%)	3.413	0.065	Not Significant	1
	Flat and heel sandal	11(8.2%)	1(0.7%)				
School ergonomics	High bench	24(17.6%)	8(5.9%)	0.968	0.616	Not Significant	2
	Low bench	32(23.5%)	15(11%)				
	Back supported chair and others	37(27.2%)	20(14.7%)				
Study room ergonomics	Chair and table	79(58.1%)	38(27.9%)	0.287	0.592	Not Significant	1
	Bed and others	14(10.3%)	5(3.7%)				
The posture of student during study	Sitting	84(63.6%)	40(30.3%)	3.094	0.759	No Significant	1
	Laying	5(3.8%)	3(2.3%)				
Take school bag at the side of shoulder	Right or left shoulder	57(41.9%)	26(19.1%)	0.008	0.927	No Significant	1
	Both shoulders	36(26.5%)	17(12.5%)				
Mode of transport	Walking	65(47.8%)	20(14.7%)	18.817	0.001	Significant	4
	Rickshaw/van	18(13.2%)	13(9.6%)				

	Public bus	6(4.4%)	1(0.7%)				
	School transport	2(1.5%)	0				
	Car	2(1.5%)	9(6.6%)				
Duration of study at home (hours)	Less Than 4	60(41%)	22(16.2%)	2.190	0.139	Not Significant	1
	More than or Equal 4	33(24.3%)	21(15.4%)				
Duration of school(hours)	Less Than 5.68	38(27.9)%	16(11.8%)	0.164	0.416	Not Significant	1
	More than or Equal 5.68	55(40.4%)	27(19.9%)				
Duration of school go	Less Than 26.85	56(41.1%)	31(23%)	1.61	0.204	Not Significant	1
	More than or Equal 26.85	36(26.7)%	12(8.9%)				

There are male and female student are study in different level of education with different age which have low back pain. Schoolchildren are maintained posture in home during study in sitting and laying, standing or walking. Where study room furniture in the home was chair and table, bed. Children are study in home at this position in duration of study time. But there is no relation significant. Because significant level $\alpha = 0.05$ since the p-value was greater than 0.05. The most students were mode of transport walking, rickshaws or van, bus and car. Which are significant. Because significant level $\alpha = 0.05$ since the p-value was less than 0.05.

The school furniture was high bench, low bench, back supported chair with table and others. students are spend at this position in a duration of school .Children are go to school to wear causal shoe, formal shoe, sandal, heel sandal .Where children take the school bag on right shoulder, left shoulder and both shoulders . But there is no relation significant. Because significant level $\alpha = 0.05$ since the p-value was greater than 0.05

Discussion

The school children growth spurt with the inability of the musculotendinous units and ligaments to keep up with the growth of the body elements produces significant imbalance, resulting in susceptibility to recurrent injuries and pain. The loss of trunk and abdominal muscle strength has also been implicated in low back pain. Low back pain (LBP) with no apparent clinical cause in childhood, but the etiology of this pain remains unclear. This study is a cross-section study. The proportion of LBP presents 68.4%, absent 31.6% among the school children (n=136). Where founded the prevalence of LBP in the study population was 23.9 %(n=330)[2].

This study have female children are more experience low back pain then male children. But there was a no significant prevalence value. In Szpalski and Talabi found a recurrent

or chronic pain was reported by 26% of the boys and 33% of the girls who reported low back pain[1,4]. This could be due to gender differences as the physical and physiological characteristics of males and females are different. Males and females differ in their muscle strength as females tend to have lower muscle strength than males, particularly in the upper limb musculature as supported by Katzmarzyk[7] and Watson[2] fined ,Girls reported higher prevalence rates than boys (28% *v* 19%; c2 = 14.7, $p < 0.001$) and, in both genders, prevalence increased significantly with age (girls: LBP at 11 years, 18%; LBP at 14 years, 34% (c2 trend = 13.5; $p < 0.001$); boys: LBP at 11 years, 14%; LBP at 14 years, 25% (c2 trend = 7.3; $p = 0.007$)).Taimela found school children, increased low back pain with age, being 18% both among 14- and 16-year-old adolescents[3], a significant part of the pains are recurrent or chronic already with 14-year-old adolescents and talabi found increased low back pain chronologically with their age ,but not significant with their increased age[1].

Here, the study found low age student are more affected. But it is also not significant. Which students are low body weights (BMI) there are more suffer in low back pain. Watson reported, the lowest risk was among those carrying the highest percentage body weight[2]. The median average load was 9.7% of body weight .In total, 91 (8%) children were carrying loads greater than 8 kg, representing approximately one fifth of their body weight. However, there was no significant relation between percentage body weight carried and the likelihood of reporting LBP.

Carrying a school bag causes counter rotation of the pelvis and thorax[8].The counter rotation is decreased as the weight in the bag is increased. This limitation of movement is a risk factor for back pain as stated by Grimmer and Williams[9]. School bag weight was significantly associated with lower back pain ($p = 0.048$). However, it should be noticed that children with lower back pain carried lighter bags (mean weight = 3.21 kg) than those without lower back pain (mean weight = 4.44 kg). The prolonged pain caused them to respond by bringing fewer loads to avoid pain attributed to carrying heavy loads. Heavy bags also cause a significantly increased flexion of the trunk in relation to the pelvis and extension of the head in relation to the trunk[11].This could cause the onset of lower back pain and spinal injuries. In my study school bag weight was below 3.34kg more low back experience, but which is not significant ($p=0.573$).

It was reported, The benefits of exercise are clear the literature recommends exercising some caution to prevent the growing spine from being over exposed to excessive loads[12]. In England. There was school children reported pain, who had a part time job had a 60% increase in odds of reporting LBP. Although among those with a part time job there was no association with reporting lifting heavy items[2].

Mohd Azuan In Malaysia, have 2 factors related to furniture comfort was significantly associated, that is satisfaction with backrest shape ($p = 0.012$) and satisfaction with desk height ($p = 0.041$)[6]. This showed that the shape of the backrest and height of the desk in the classroom had significant influence on the incidence of neck pain. It is stated that

when children feel uncomfortable, they may have to adopt flexed or static postures for prolonged periods of time, increasing muscular fatigue in the neck thus causing pain in those areas. Higher percentage of children who were dissatisfied with the features of the furniture was among those with musculoskeletal pain. A possible explanation can be found in biomechanical studies, showing that sitting with a flexed trunk increases the spinal load, compared to standing and prolonged static sitting increases intradiscal pressure, resulting in decreased nutrition to the disc and also causing pain [10]. Trevelyan & Legg[5] founded low back pain in New Zealand school children carrying the bag on one shoulder was ($p < 0.05$) but this study have showed ($P<0.008$) between LBP and take school bag on the side of shoulder.

Conclusion

Low back pain are presented more than half of school children .The result of duration sedentary activity like watched television ,computer worked and mode of transportation for go to school and physical activity or sports associated with low back pain among school children. This study concludes that school children suffer from low back pain due to frequently exposure to certain risk factors for long period of sedentary activity with poor posture or remaining with position for long period of time with little or no movement, playing without correct biomechanics or maintain poor dynamic or extreme or repeated stretch muscle strain or tear and stress full mode of transport or un-appropriated load transfer through the back. The result showed that the most complicated problem is low back pain. Practically, the result of this study would help in preventing injury associated with the factors of low back pain among school children, which can use of treatment and promote school children life. A total 136 school children were included in the study among them 68.4% have low back pain and 31.6% did not have low back pain. Significant factors are physical activities, mode of transport and duration sedenty activity.

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