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Original Article

Risk Factors Associated with Back Pain in School-Aged Children: A Cross Sectional Study

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Abstract

Background: *Low Back Pain (LBP) is increasingly recognized as a common health issue among children and adolescents, yet its risk factors in this age group, particularly in Bangladesh-remain poorly understood. As early-onset LBP can lead to long-term health consequences, this study aims to identify and assess potential risk factors contributing to LBP among school-aged children.*

Materials and methods: *This is a cross sectional study done in the Department of Physical Medicine & Rehabilitation, Bangladesh Medical University, Dhaka during the period of 12 months from 3rd February 2017 to 2nd February 2018. The study population was the school children from "Willes Little Flower School" Dhaka. The sample was calculated as 96 and sampling was done by purposive sampling technique. Data cleaning validation and analysis performed using the SPSS (Version 23.0) for Windows. The result presented in tables in mean, Standard Deviation (SD) and percentages. Student's 't' tests, Chi-square test were done as required to see the level of significance. "p" value <0.05 considered as significant.*

Results: *Among 96 school children (Mean age 11.1±2.7 years), low back pain was significantly more common in those over 10 years of age (p=0.020) with irregular physical activity (p=0.020) carrying school bags over 4 kg (p=0.029) and frequent smartphone use (p=0.042). No significant associations were found with reading habits, screen time, distance to school, mode of transport, or homework posture.*

Conclusion: *Low back pain in school children is significantly associated with age, irregular physical activity, heavy school bags and smartphone use. Early interventions targeting these factors may help in prevention.*

Key words: Back pain; Risk factor; School children.

INTRODUCTION

Low Back Pain is defined as any pain below 12th rib up to the gluteal folds. Even though it is a major adult health disorder, it is also very common in children.[1] The lifetime prevalence of LBP in children and adolescents in previous studies ranges from 9% to 69% and increases significantly between 12 and 18 years.[2] Approximately 10% to 30% of the normal young population can be expected to experience back pain by the time they reach their teens.[3] The causes of Low Back Pain (LBP) in children are as varied as those in adults. However, there is significantly less research and data available on LBP in children compared to adults.[4]

Low Back Pain (LBP) is a common chronic pain illness that places a significant financial and social burden on individuals and society.[5] To ensure accurate diagnosis and treatment and to prevent potential complications, it is essential to assess back pain in children promptly.[6] Additionally, low back pain significantly affects cognitive abilities and physical fitness. It is also linked to elevated healthcare utilization, higher treatment expenses and considerable reductions in workplace productivity.[7]

To understand the initial causes of low back pain and their potential connection to symptoms in adulthood, it is essential for researchers to investigate the condition from an early age. School children undergo various physical adaptations as their body's change, which can lead to musculoskeletal disorders and biomechanical alterations. These adaptations may subsequently result in the development of low back pain.[8] Factors such as diet, occupational activities, sedentary behavior, physical fitness, muscle flexibility, joint mobility, muscle strength, backpack weight in school, school furniture, and psychosocial elements are all potential contributors to back pain.[9,10,11] The development and intensity of low back pain are influenced by a combination of genetic predispositions and environmental factors. Many individuals with low back pain that limits their physical activity tend to experience recurrent episodes.[12] While numerous studies have highlighted the factors affecting low back pain across various populations, the specific contributors to low back pain in the young and adolescent demographic in Bangladesh remain unclear.[13,14] This study aimed to assess the potential factors contributing to low back pain among school children.

MATERIALS AND METHODS

A cross-sectional study was conducted in the Department of Physical Medicine & Rehabilitation at Bangladesh Medical University (BMU) Dhaka, over a 12-month period from February 3, 2017, to February 2, 2018. The study targeted school children from Willes Little Flower School, Dhaka. A total of 96 participants were selected using purposive sampling, based on a calculated sample size.

Data were collected through a structured, investigator-administered questionnaire comprising binary (Yes/no) questions. The questionnaire was completed by students during school hours in the presence of the investigator. For minor participants, a parent was present to provide assistance when necessary. Informed consent was obtained prior to data collection.

Collected data were reviewed for completeness and consistency, then coded and entered into SPSS software (Version 23.0, Windows). Data cleaning, validation, and analysis were performed using the same program. Descriptive statistics were presented as means, Standard Deviations (SD) and percentages. Inferential analysis was conducted using Student's t-test and Chi-square test where appropriate. A p-value of less than 0.05 was considered statistically significant.

Before starting this study ethical clearance was taken from the Institutional Review Board (IRB) of BMU.

RESULTS

96 students were included in this study where the mean age was 11.1(±2.7), 45 (46.9%) were male and 51(53.1%) were female.

Table I Distribution of respondents' by age (n=96)

Age (in years)	Frequency	Percentage (%)
Up to10	41	42.7
>10	55	57.3
Mean (±SD)	11.1 (±2.7)	

Table I shows that 41 (42.7%) respondents were from <10 years age group while majority 55 (57.3%) were from >10 years age group. The mean age of the respondents was 11.1 (±2.7) years.

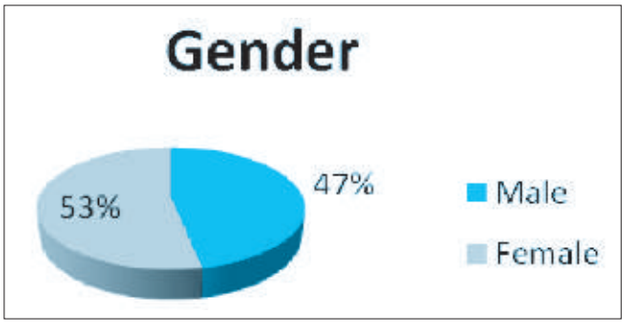

Figure 1 Distribution of respondents by gender (n=96)

Figure 1 shows that among the 96 respondents, 45 (46.9%) were male while 51 (53.1%) were female.

Table II Distribution of respondents by place of homework (n=96)

Place of homework	Frequency	Percentage (%)
Chair	72	75.0
Bed	24	25.0

Table II shows that majority 72 (75.0%) respondents did their homework sitting on a chair while one fourth 24 (25.0%) respondents did their homework on bed.

Table III Association between age of the respondents and presence of back pain (n=96)

Age group (In years)	Back pain present	Back pain absent	p value
Up to 10	5 (21.7%)	36 (49.3%)	0.020
>10	18 (78.3%)	37 (50.7%)	

Table III shows that among the respondents who had back pain, 18 (78.3%) were from >10 years age group while among the respondents who had no back pain, 37 (50.7%) were from >10 years age group. Chi square test showed that back pain was significantly more among higher age group respondents (p=0.020).

Table IV Association between pattern of physical exercise of the respondents and presence of back pain (n=96)

Pattern of physical exercise	Back pain present	Back pain absent	p value
Irregular	18 (78.3%)	37 (50.7%)	0.020
Regular	5 (21.7%)	36 (49.3%)	

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Table IV shows that 18 (78.3%) respondent who did irregular physical exercise had back pain while 5 (21.7%) respondent who did exercise regularly had back pain. Chi square test showed that back pain was significantly more common among respondent who did irregular physical exercise than others (p=0.020).

Table V Association between weight of school bag and presence of back pain (n=96)

Weight of school bag (in kg)	Back pain present	Back pain absent	p value
1-4	6 (26.1%)	38 (52.1%)	0.029
>4	17 (73.9%)	35 (47.9%)	

Table V shows that 6 (26.1%) respondent who carried school bag weighted 1-4 kg had back pain while 17 (73.9%) respondent who carried school bag weighted >4 kg had back pain. Chi square test showed that back pain was significantly more common among respondent who carried heavier school bag than others (p=0.029).

Table VI Association between recreational activities of the respondents and presence of back pain (n=96)

Recreational activities	Back pain present	Back pain absent	p value
Reading story books			
Yes	5 (21.7%)	22 (30.1%)	0.435
No	18 (78.3%)	51 (69.9%)	
Watching movies			
Yes	6 (26.1%)	13 (17.8%)	0.385
No	17 (73.9%)	60 (82.2%)	
Engaging in spending time by smart phones			
Yes	16 (69.6%)	33 (45.2%)	0.042
No	7 (30.4%)	40 (54.8%)	

Table VI shows that there was no significant statistical difference between respondents with or without back pain regarding reading story books and watching movies (p>0.05). However, back pain was significantly more common among respondents who were engaged in spending time by smart phones (p=0.042).

Table VII Association between distance of school from home and presence of back pain (n=96)

Distance (In meter)	Back pain present	Back pain absent	p value
<200	2 (8.7%)	8 (11.0%)	0.676
200-400	19 (82.6%)	54 (74.0%)	
>400	2 (8.7%)	11 (15.1%)	

Fisher Exact test.

Table VII shows that there was no significant statistical difference between respondents with or without back pain regarding distance of school from home (p=0.676).

Table VIII Association between vehicle of coming school and presence of back pain (n=96)

Vehicle of coming school	Back pain present	Back pain absent	p value
No vehicle (Walking)	17 (73.9%)	57 (78.1%)	0.462
By rickshaw	1 (4.3%)	7 (9.6%)	
By bus	3 (13.0%)	7 (9.6%)	
By car	2 (8.7%)	2 (2.7%)	

Fisher Exact test.

Table VIII shows that there was no significant statistical difference between respondents with or without back pain regarding vehicle of coming school (p=0.462).

Table IX Association between place of doing homework and presence of back pain (n=96)

Place of homework	Back pain present	Back pain absent	p value
Chair	16 (69.6%)	56 (76.7%)	0.490
Bed	7 (30.4%)	17 (23.3%)	

Table IX shows that there was no significant statistical difference between respondents with or without back pain regarding place of doing homework (p=0.490).

DISCUSSION

LowBack Pain (LBP) is a growing concern among school-aged children, with multiple studies emphasizing its rising prevalence and associated risk factors. The present study, conducted among school children in Dhaka, identified key factors contributing to back pain, including age, physical activity patterns, school bag weight and smartphone usage. These findings align with previous research highlighting similar risk determinants in pediatric populations.

Age has been frequently cited as a significant factor influencing LBP prevalence. Our study found that children aged above 10 years experienced significantly higher rates of back pain compared to younger children (p=0.020). This is consistent with findings from a study by Jeffries et al. which reported an increasing prevalence of LBP with advancing age among school-aged children.[15] A similar trend was noted in a cross-sectional study by Jones et al. which linked musculoskeletal pain progression to age-related biomechanical changes and increased academic workload.[16]

Physical activity patterns also showed a significant correlation with back pain prevalence. Irregular physical exercise was associated with a higher incidence of LBP (p=0.020) supporting the notion that reduced physical activity contributes

to musculoskeletal discomfort. This finding is in agreement with studies conducted by Hestbaek et al. and Burton et al. which found that physically inactive children were at a greater risk of developing back pain due to weakened core musculature and poor postural habits.[17,18]

The impact of school bag weight on back pain has been widely studied. In our research, students carrying bags heavier than 4 kg had a significantly higher prevalence of LBP (p=0.029). This aligns with findings from Negrini & Carabalona who reported a direct association between excessive school bag weight and increased risk of spinal discomfort in children.[19] Additionally, Balague et al. suggested that carrying heavy school bags contributes to postural alterations and spinal strain, increasing the likelihood of developing chronic pain conditions.[20]

The role of sedentary activities, particularly smartphone usage, was another key finding. Students who spent more time using smartphones reported significantly higher occurrences of back pain (p=0.042). These results are consistent with a study by Hakala et al. which demonstrated a link between prolonged screen time and increased musculoskeletal pain in children due to poor ergonomics and forward head posture.[21] Additionally, Kim et al. found that extended smartphone use contributes to postural deviations and muscular imbalances, leading to pain syndromes.[22]

Contrary to some literature, our study did not find a significant association between back pain and factors such as the distance traveled to school (p=0.676), mode of transportation (p=0.462), or homework posture (p=0.490). This is in contrast with research by Brzek & Plinta which suggested that improper study posture and prolonged travel times could contribute to LBP.[23] The discrepancy may be attributed to differences in sample size, study settings, or cultural variations in lifestyle habits.

CONCLUSION

Overall, our study reinforces existing literature on the multifactorial nature of pediatric back pain. The findings emphasize the need for preventive interventions, such as promoting regular physical activity, encouraging ergonomic school bag use and educating students on proper posture during smartphone usage and study sessions. Future longitudinal studies with larger cohorts are recommended to establish causality and develop targeted preventive strategies for minimizing LBP among school-aged children.

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DISCLOSURE

All the authors declared no competing interest.

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