

Teenagers opinion regarding existing school furniture and musculo-skeletal problems

S.N. ADMANKAR* AND H.L. SARAMBekar

Department of Family Resource Management, College of Home Science, Vasanttrao Naik Marathwada Agricultural University, PARBHANI (M.S.) INDIA (Email : sarmhema@yahoo.co.in)

ABSTRACT : Teenagers spend a large part of their school days in the classroom, and yet the effect of the design of school furniture on their behavior and health has received comparatively little attention. The desk height, desk depth, length of desk, chair depth, chair breadth for girls and combined group was noted to be less than required. Inclusive of these dimensions the backrest height and breadth was less than required by the boys resulting in uncomfortable feeling and pain due to use of furniture. The furniture used by teenagers was opined as comfortable and uncomfortable the results of these opinions are given in the Fig. 1 and 2. It is clear from the figures that 47.3 and 50 per cent girls and boys felt that the desk height was comfortable while (52% to 49%) girls and boys said that they experienced uncomfortable due to desk height. The Table 1 depicts the frequency of musculo-skeletal problems faced by the teenagers. It is clear from the table that 62.7 per cent boys and 46.7 per cent girls never experienced fatigue. While the fatigue was rarely felt by 47 per cent girls and 34 per cent boys. Frequency of fatigue experienced sometimes was at par in girls and boys (3.33 %). Frequent fatigue was felt by of meager per cent of girls (2.2).

KEY WORDS : Teenagers, Opinion, Existing furniture, Frequency, Pain

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INTRODUCTION

Students spend a large part of their school days in the classroom and the design of school furniture affects their health. A high proportion of students report suffering from musculo-skeletal discomfort and low back pain (Travelyan and Legg, 2003).

The neck, shoulder and back pain problems are common already among school children. Students experience that the problems are due to school tables and chairs. Any study which is being conducted needs to be supported by the similar studies conducted during last decades as they provide a strong base for planning, conducting and evaluating the study thereby the studies were reviewed.

Khanam *et al.* (2006) gathered the opinion on the design of seating furniture used in classroom with regard to opinion of users it was noticed that in the case of bench height that was above 470 mm, 80 per cent users expressed it as uncomfortable as it was not able to facilitate the foot to rest on the floor while sitting straight. Regarding the bench width 60 to 80 per cent users expressed it as uncomfortable.

Amitaba De *et al.* (2001) conducted a studied on Indian classrooms and observed that there is need of focusing on the furniture design for seating the students, as majority of the sample felt difficult to sit in furniture, due to insufficient space and lack of storage provision to keep their belongings. Studies on seating furniture has revealed that the mismatch between

school furniture and body size as a causative factor for musculo-skeletal disorders and low back pain amongst school students (Balague *et al.*, 1988; Parcels *et al.*, 1999; Lin and Kang, 2000; Whittfield *et al.*, 2001, 2003; Murphy *et al.*, 2003; Legg *et al.*, 2003). There are studies in which students have experienced musculo-skeletal pains, headache and low back pain due to incompatible seating furniture in a number of schools (Zinchenko and Munipov, 1989; Chaffin and Anderson, 1991; Kroemer and Grandjean, 1997). According to Pheasant (1986) the purpose of seating furniture is to provide stable body support in a posture that is comfortable over a period of time, physiologically satisfactory and is appropriate to the task or activity being considered. Chakrabarti (1997) also stated that one should consider appropriate anthropometrical requirements for sitting, for seat and work surface dimensions, legroom and clearances for getting in and out. The surrounding free movement space should also be present.

Students spend a large part of their school days in the classroom and the design of school furniture affects their health. A high proportion of students report suffering from musculo-skeletal discomfort and low back pain (Travelyan and Legg, 2003). This is great concern because the strongest predictor of having future back pain is often considered to be a previous history of such symptoms (Burton *et al.*, 1996).

METHODOLOGY

The present study was conducted in order to appropriate the anthropometric measurement for evaluating furniture used to by teenager. This study was conducted in Parbhani city. The group of teenage was purposefully selected as they are in the formative years and can express the problems faced due to uncomfortable furniture. Total 300 teenagers (150 each of girls and boys) within age range 13-18 years were selected randomly. The data was collected through survey method with the help of an interview schedule cum questionnaire.

OBSERVATION AND ASSESSMENT

In the present study opinion of 300 teenagers (150 each of girls and boys) regarding their existing school furniture was gathered with the help of a interview schedule cum questionnaire.

The furniture used by teenagers was opined as comfortable and uncomfortable the results of these opinions are given in the Fig. 1 and 2. It is clear that 47.3 and 50 per cent girls and boys felt that the desk height was comfortable while (52% to 49%) girls and boys said that they experienced uncomfortable due to desk height.

The depth of desk was found to be comfortable by

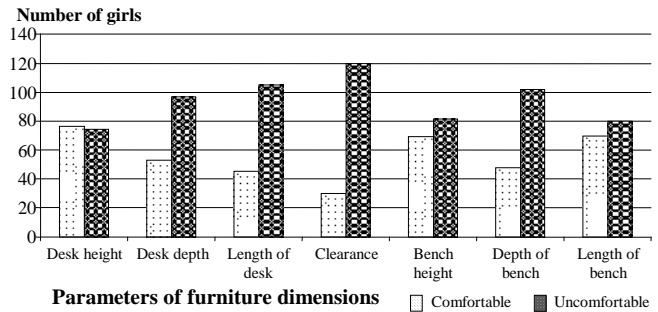


Fig. 1: Opinion of girls regarding furniture

(36.6% and 35.3%) girls and boys and uncomfortable by 63.3 and 64.7 per cent girls and boys. Length of the desk was felt as comfortable by thirty per cent of girls and boys while the percentage of girls (69%) and boys (70%) was more for the uncomfortable feeling due to length of the desk.

Clearance space was opined as uncomfortable by (79% and 80%) of girls and boys. While the percentage of girls and boys with feeling of comfort were at par (20%).

Bench height was noted to be comfortable for forty two per cent girls and forty six per cent boys while the percentage for uncomfortable feeling were on the higher side *i.e.* (58% and 54%) for girls and boys, respectively.

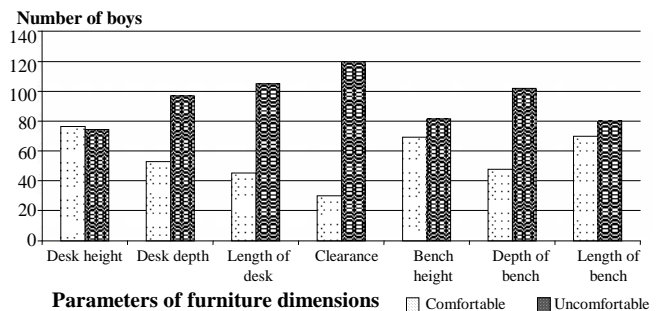


Fig. 2: Opinion of boys regarding furniture

Comfortable depth of bench was recorded by thirty four per cent girls and thirty two per cent boys. Uncomfortable depth of bench was expressed by girls (65%) and boys (68%).

Frequency of musculo-skeletal problems faced by teenagers :

The Table 1 depicts the frequency of musculo-skeletal problems faced by the teenagers. It is clear from the table that 62.7 per cent boys and 46.7 per cent girls never experienced fatigue. While the fatigue was rarely felt by 47 per cent girls and 34 per cent boys. Frequency of fatigue experienced sometimes was at par in girls and boys (3.33%). Frequent fatigue was felt by of meager per cent of girls (2.2).

Headache was never experienced by 19.3 per cent of girls and boys (52.7 %). Rare feeling of headache was observed in 49.3 per cent girls and 35.3 per cent boys. Headache was sometimes prevalent in girls (28%) and boys (12%). Frequent headache was noted in only three per cent girls.

Pain in neck was not faced by 14 and 20 per cent girls and boys. Neck pain was rarely noted in 6.7 and 16.7 per cent girls and boys. The percentages in the sometimes category was greater in girls (34.7%) than boys (26.7%). Similar trend was noted for frequent neck pain in girls (42.7%) and (36.7%) boys. The frequencies of shoulder pain felt by girls and boys were as never (21.33% and 0.4%) followed by rarely (17.33% and 30%) sometimes (35.33% and 50%) and frequently 25.33 and 16 per cent.

Regarding back pain higher percentage of girls 24 per cent and boys 10.7 per cent reported no pain experience, while in girls (9.33%) and boys (11.33%) rare back pain was noted. Thirty and thirty eight per cent girls and boys said they had back pain sometime whereas back pain was frequently experienced by (36.6% and 40 %) girls and boys.

Elbow pain was not faced by 43.3 per cent and 18.7 per cent girls and boys. Pain in elbow was rarely and sometimes experienced by 41.3 and 15.3 per cent girls while 32.7 per cent and 8.7 per cent boys had pain in elbow sometimes. Frequent pain in elbow was not faced by any girls and boys.

The frequencies of pain in wrist as never, rarely, sometimes frequently were noted to be as (31.3% 41.3% 18.7% and 2.7%) in girls and (58% 36.7% and 5.3%) boys, respectively. Thigh/buttock pain was not experienced by 18 per cent girls and 14.7 per cent boys. Higher percentage of boys (40%) felt the pain rarely compared to (18%) girls. Similar trend was noted for pain in thigh/buttock sometimes (35.3 %) boys and (28 %) girls. While frequent thigh/buttock pain was noted in 35.3 per cent girls and 10 per cent boys.

Forty seven per cent boys and sixty six per cent girls had never experienced knee pain and it was experienced rarely by 32 per cent girls and boys. Twenty per cent girls reported pain in knee while only two per cent boys had pain in knee sometimes. None of the girls and boys had frequent knee pain.

Feet pain was not felt by almost 56 per cent boys and girls. Rare feet pain was found in (44 and 22 %) girls and boys, and twenty two per cent boys had frequent feet pain.

Chaffin and Anderson (1991) found leg support is also critical for distributing and reducing buttock and thigh loads. Feet need to rest firmly on the floor or foot support so that the lower leg weight is not supported by the front part of thigh resting on the seat.

Severity of musculo-skeletal problems faced by teenagers :

The Table 2 discloses the information regarding the musculo-skeletal problems faced by the teenagers. Neck pain was experienced by 86 per cent girls and 80 per cent boys. The neck pain was mild in case of 86.04 per cent girls while in 80 per cent boys it was mild. Severity of neck pain was experienced by fourteen per cent girls and twenty per cent boys, respectively. No neck pain was experienced by (14 and 2 %) girls and boys.

Shoulder pain was reported by 78.6 per cent girls and

96 per cent boys. The degree of pain was mild in eighty one per cent girls and eighty six per cent boys. Severe shoulder pain was experienced by (18.65%) girls and (13.20%) boys. While (21.34 and 4%) girls and boys, respectively had no shoulder pain.

Fifty six per cent of girls and forty one per cent of boys reported elbow pain and 43.3 per cent girls and 58.7 per cent boys had no elbow pain. Mild elbow pain was reported by 82.3 per cent girls and 71 per cent boys. Severity of elbow pain was experienced by girls (17.7 % and 29.04 %) and boys.

Majority of the girls (68.7%) experienced wrist pain as against boys (42 %) and (31.3 and 58 %) girls and boys did not feel the wrist pain. Mild pain in wrist was felt by girls and boys (76.7% and 68.25 %), respectively. While the severity was experienced by (23.31 and 31.34 %) girls and boys, respectively.

Very high percentage of girls (76 %) and (89.3%) boys felt the back pain. Mild pain was reported by (68.4 %) girls and (75.50 %) boys. While percentage ranges for severity were 31.50 and 24.63 for girls and boys, respectively.

Pain in thigh was endorsed by eighty two per cent girls and eighty five per cent boys. The percentage of mild pain in girls (78.04 %) was higher than the boys (83.60 %). Whereas it was noted to be vice versa for the severity (22 % and 18 %) in girls and boys.

Knee pain was observed less in boys (34 %) than girls (52.7 %). Mild pain was registered by (84.81 %) girls followed by 70.9 per cent boys. Severity of pain was reported by fifteen per cent girls and twenty nine per cent boys. Sixty six per cent boys had no knee pain followed by forty seven per cent girls.

Feet pain was noticed in girls and boys their percentage being almost at par (44 and 44.7%), respectively. Mild feet pain was reported by ninety one per cent girls whereas (100 %) boys had reported mild pain in feet. Severity in feet pain was registered by only six per cent of the girls. Fifty five per cent of boys had no feet pain while only 56 per cent girls had no feet pain.

While there was no response from the respondent for the pain due to accident activity at home and activity at school. On the whole it can be said that irrespective of gender the musculo-skeletal problems due to use of furniture were prevalent amongst teenagers. Except for severity of feet pain in boys.

Similar results regarding neck pain were found in the study of Murphy *et al.* (2004). The results showed that 24 per cent students rated the neck pain as medium, 13 per cent of students reported as lot of pain when at its worst also in respect with 30 per cent of students had low back pain in the last week. 12 per cent students reported it as medium pain and 8 per cent reported a lot of pain when at its worst.

Poussa *et al.* (2004) reported that the role of anthropometric factors in the development of neck pain at young adulthood seems only modest. Short stature may be a

Table 1: Frequency of musculo-skeletal problems faced by teenagers

Sr. No.	Parameter	Never		Rarely		Sometimes		Frequently	
		Girl (n=150)	Boys (n=150)	Girl (n=150)	Boys (n=150)	Girl (n=150)	Boys (n=150)	Girl (n=150)	Boys (n=150)
1.	Fatigue	70 (46.66)	94 (62.66)	71 (47.33)	51 (34)	5 (3.33)	5 (3.33)	4 (2.2)	-
2.	Headache	29 (19.33)	79 (52.7)	74 (49.33)	53 (35.33)	42 (28)	16 (12)	5 (3.33)	-
3.	Neck pain	21 (14)	30 (20)	13 (8.7)	25 (16.7)	52 (34.7)	40 (26.7)	64 (42.7)	55 (36.76)
4.	Shoulder pain	3.2 (2.1.33)	6 (4)	26 (17.33)	45 (30)	53 (35.33)	75 (50)	38 (25.33)	24 (16)
5.	Back pain	36 (24)	16 (10.7)	34 (9.33)	17 (11.33)	45 (30)	57 (38)	55 (36.60)	60 (40)
6.	Elbow pain	65 (43.33)	88 (58.7)	62 (41.33)	49 (32.7)	23 (15.33)	13 (8.7)	0	-
7.	Pain in hand	47 (31.33)	87 (58)	71 (41.33)	55 (36.7)	28 (18.7)	8 (5.33)	4 (2.7)	-
8.	Thigh pain	27 (18)	22 (14.7)	28 (18.7)	60 (40)	42 (28)	53 (35.33)	53 (35.33)	15 (10)
9.	Knee pain	71 (47.33)	99 (66)	48 (32.)	48 (32)	31 (20.7)	3 (2)	-	-
10.	Feet pain	84 (56)	83 (55.33)	66 (44)	33 (22)	-	34 (22.6)	-	-

Figures in parentheses show percentage

Table 2: Severity of musculo-skeletal problem faced by teenagers

Sr. No.	Yes				No	
	Girls (n=150)		Boys (n=150)		Boys (n=150)	
	Yes	Severe	Yes	Mild	Severe	Boys (n=150)
1.	129 (86)	11 (86.04)	120 (80)	56 (80)	24 (20)	30 (20)
2.	118 (78.66)	96 (81.35)	144 (96)	125 (86.80)	19 (13.20)	6 (4)
3.	85 (56.76)	70 (82.35)	62 (41.33)	44 (71)	18 (29.04)	88 (58.67)
4.	103 (68.70)	79 (76.70)	63 (42)	43 (68.25)	20 (31.75)	87 (58)
5.	114 (76)	78 (58.42)	134 (89.33)	101 (75.00)	33 (24.63)	16 (10.67)
6.	123 (82)	96 (78.04)	128 (85.33)	107 (83.60)	21 (16.41)	22 (14.67)
7.	79 (52.70)	67 (34.81)	51 (34)	36 (70.90)	15 (29.42)	99 (66)
8.	66 (44)	60 (31.00)	67 (44.70)	67 (100)	-	83 (55.34)

Figure in parentheses show percentages

risk determinant of neck pain.

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