

International Journal of Scientific Research and Reviews

Endurance Time During Biering Sorenson Test In College Going Students

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ABSTRACT:

Background: Endurance refers to ability to perform low intensity, repetitive or sustained activities over a prolonged period of time. **Objective:** Our aim is to estimate average time for holding static back extensor muscles in college going students. **Methodology:** Endurance of low back musculature was assessed using Biering Sorenson test. Subjects were in prone lying position with trunk unsupported from anterior superior iliac spine (ASIS) outside the plinth. Subject was stabilized firmly from ankle & pelvis and all trick movements were avoided. Subject was asked to hold the trunk in horizontal position in same line with the plinth with his arm crossed over chest and holding time was noted down in seconds with stopwatch. Rest time between each repetition was 5 min. The process was repeated for 3 times & best of 3 repetitions was used for analysis. **Analysis:** Mean and SD for endurance time were determined. Analysis is done for 250 subjects. **Results:** Mean endurance time for all subjects is 27.39 sec. and Standard deviation is 13.09 sec. 25th, 50th and 75th Percentile for all subjects is 20, 24 and 30 sec. respectively. For Males, Mean endurance time is 28.00 sec and Standard deviation is 14.98 sec. For Females, Mean endurance time is 27.25 sec and Standard deviation is 12.68 sec. **Conclusion:** Endurance in college going students is found to be very poor suggestive of need of regular exercises in this age group.

Keywords: Endurance, Biering Sorenson test, Back Extensors

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INTRODUCTION

Endurance refers to ability to perform low intensity, repetitive or sustained activities over a prolonged period of time. Low endurance of the back muscles has been implicated as a major reason for chronicity and recurrence of Low Back Pain (LBP).^[1] The Biering-Sørensen Test of Static Muscular Endurance (BSME) either in its original version or as a variant has been widely used in the assessment of static endurance of the back extensor muscles in health and disease.^[2] It is found to be reliable measure of holding time in asymptomatic subjects as well as in subjects with current or previous non specific low back pain.^[3] It is recommended that clinicians who treat LBP can use established baseline data among normal subjects as a means to recognize decreased back muscle endurance as one of the impairments resulting in LBP.^[2] Since there is a lack of baseline values for various populations in India, there is a need to quantify the endurance of back extensor muscles in different populations and age groups.

Adedoyin et al did the study on normative data for adults for endurance of low back muscles. 561 healthy adults with age between 19-67 years participated in the study. Endurance was assessed using modified Biering-Sørensen Test. They concluded mean endurance time to be 113±46 seconds. Gender and age variations were also found with variation in percentile values.^[1]

Mbada et al studied on healthy Nigerian adults to establish gender and age reference values of static back endurance muscle endurance. 373 participants were included with age group 21-60 years. Mean endurance was 113±49 seconds. For the age group 21-30 years they found mean endurance 145±44.7 seconds, 25th percentile is 110 seconds, 50th percentile is 152 seconds and 75th percentile is 178 seconds. They concluded gender and age differences in the hold time of back extensors.^[2]

Observational cross-sectional study was done on 150 Physiotherapy students with age between 18-24 years. The objective of the study was to evaluate back Range Of Motion (ROM), strength, endurance and hamstring flexibility among them. ROM was assessed by modified Scober's test; Strength of upper and lower trunk flexors and extensors by manual muscle testing; Endurance of trunk flexor by holding time of prone forearm plank position and trunk extensor by Sorenson test; Hamstring flexibility by active knee extension test. They found mean back endurance to be 93±46.01 seconds and stated it to be below average.^[4]

Thus the objective of our study is to estimate average hold-time for static back extensor muscles in college going students.

MATERIALS AND METHOD

Observational; cross sectional study design was conducted on 250 (45 males and 205 females) normal healthy individuals between the age group of 18-22 years. Sample size was decided based on previous study.^[4] Subjects were called for the study through mouth to mouth publicity.

Every alternate subject who was willing to participate was enrolled. Then on the basis of inclusion and exclusion criteria final subjects participated in the study. Each subject filled out the Subject information sheet and signed informed consent form (in vernacular language if needed). Demographic data such as age, gender, weight and height was taken of subject. Weight was measured on standard weighing scale (OMRON; HN - 286). Height was measured with stadiometer (Krupps). Random sampling and Blinding was done in the study. Inclusion criteria for the study was subjects with age group between 18-22 years, willingness to participate and able to understand the technique. Subjects with Low back pain, Lumbar spine surgery, Severe kyphosis or scoliosis and any pathology related to spine were excluded. Materials used for the study were Stabilisation belt, Plinth and Stopwatch (ERMA; DS-1045)

Procedure: A total of 300 subjects were enrolled for the study. Out of which 50 subjects were excluded as they did not fit in the inclusion criteria. Therefore subjects included in the study were 250. Subjects were than familiarized with the technique to perform Bering Sorenson test. Familiarization was done by demonstrating the technique. Subjects were given prone lying position with trunk unsupported that is Anterior Superior Iliac Spine (ASIS) were outside the plinth. Ankle and pelvis were firmly stabilized with stabilization belts. Trick Movements such as lifting of ankle or pelvis, shivering of trunk were avoided. Subjects were asked to hold the trunk in horizontal position in the same line with the plinth with arms crossed over chest. [4] Holding time was noted in seconds with the help of stopwatch. The entire process was repeated 3 times and best of 3 repetitions was taken for analysis. The rest time between each repetition was 5 mins. Data was analysed using SPSS version 20. Mean and Standard Deviation (SD) for endurance time were determined. Percentiles were calculated for analysis.

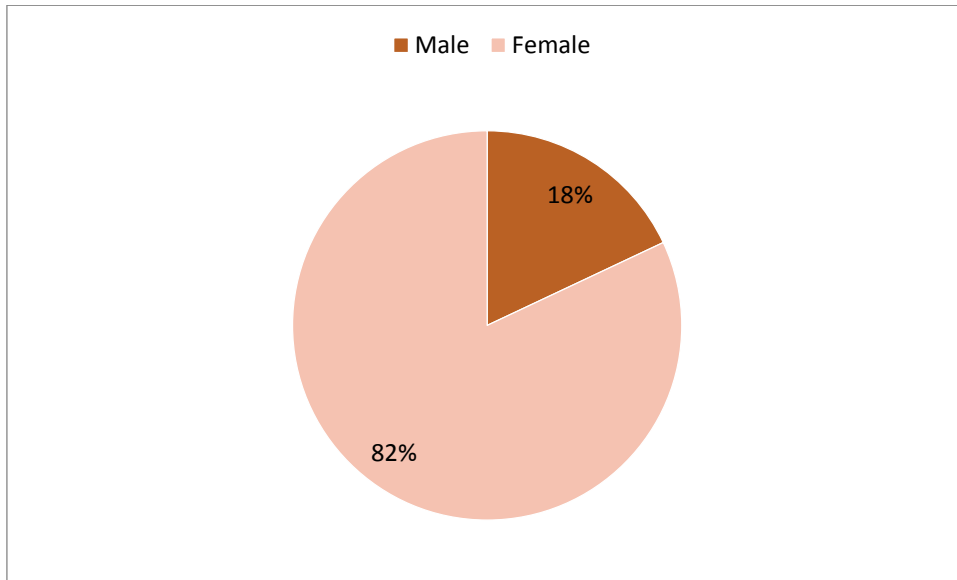
RESULTS:

Table 1: Demographic characteristics of all subjects

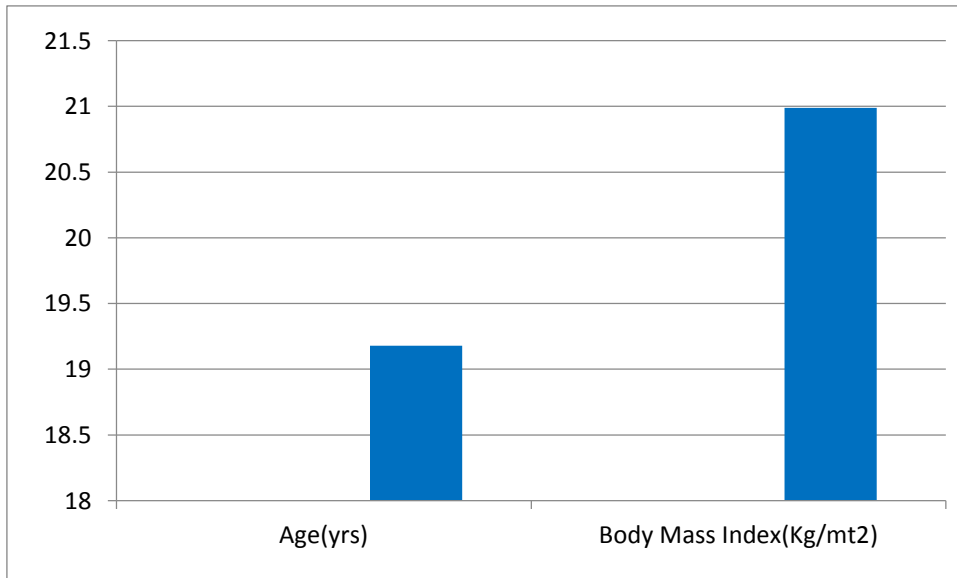
Gender	N	Age(yrs)	Height (meters)	Weight (Kgs)	Body Mass Index(Kg/mt ²)
Male	45	19.13(1.07)	1.59(0.07)	52.93(10.29)	20.86(3.46)
Female	205	19.19(1.33)	1.59(0.08)	53.37(11.71)	21.01(4.21)
Total	250	19.18(1.29)	1.59(0.08)	53.29(11.45)	20.99(4.08)

All data are expressed as Mean (SD), N= number of subjects

As shown in table 1, total subjects included 82% females and 18 % males. Mean age of all subjects was 19.18 years and BMI was 20.99 Kg/mt².



Graph 1: Gender distribution

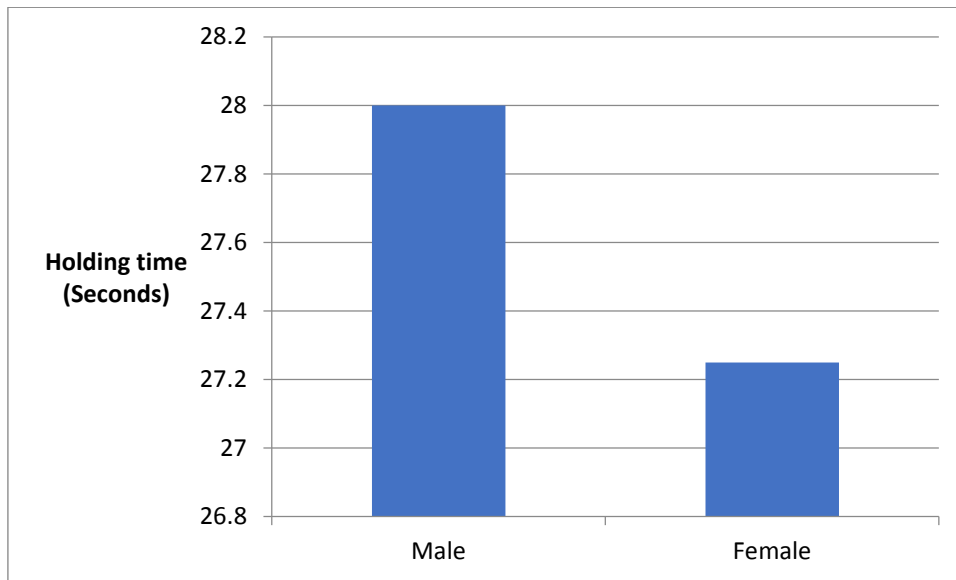


Graph 2: Mean age and BMI

Table 2: Holding time in Biering Sorenson test

	Mean (secs)	Standard Deviation	25 th Percentile	50 th Percentile (Median)	75 th Percentile
Male	28.00	14.98	20	24	29
Female	27.25	12.68	20	24	30
Total	27.39	13.09	20	24	30

As shown in table 2, Mean holding time for male is 28 seconds and female is 27.25 seconds.



Graph 3: Mean Holding time in back extension

DISCUSSION

The present study was conducted on college going students to assess the endurance of back extensor muscles. Results of the present study showed that mean holding time during Biering Sorenson test is 27.39 Seconds. Latimer et al. found that the Biering–Sorensen test provides reliable measures of holding time in asymptomatic subjects as well as in subjects with current or previous nonspecific low back pain.³

Our study tried to minimize the effect of motivation by giving the participants full information about the nature of the test. None of the subjects were given any verbal encouragement during the testing. It is found that the mean base line of endurance of back extensors musculature is significantly reduced, as compared to the findings of M. Patel et al. But, there was a difference in the methodology because M. Patel et al. used verbal cues for encouragement and correction of the position.⁴

From this study, it was found that healthy college going males have similar back extensor muscle endurance to their female counterparts. This finding was not consistent with Mbada et al. who found that males have a greater muscular endurance capacity when compared to females.²

All the subjects included in the study were residing in hostel. Physical inactivity may be one of the factors for the low levels of endurance seen in these students. Khera et al. found that hostellers had significantly lesser physical activity compared to the day scholars.⁵

In our study it is found that males and females had 25th percentile at 20 seconds and 50th percentile at 24 seconds. 75th percentile for male is at 29 seconds and female is at 30 seconds.

Limitations of the study are strength of the back muscles was not assessed, Data was collected only from the young adult population, i.e. 18-22 years, all the subjects were college going

students studying in the same institute and no other sophisticated methods like isokinetic dynamometry were used to measure trunk muscle endurance.

Future recommendations can be to generate reference values in our population with large sample size, other parameters such as strength, range of motion and flexibility can be assessed, influence of other factors such as physical activity and occupation can be assessed.

CONCLUSION

Endurance in college going students is found to be very poor suggestive of need of regular exercises in this age group.

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