

Heavy School Bags and Their Effect on the Growth of Children in Karachi

Ovais Siraj Siddiqui

Author's Affiliation

Department of Mathematics, Sir
Syed University of Engineering
and Technology, Karachi.

Article Info

Received: Nov 07, 2016

Revised: Dec 21, 2016

Accepted: Dec 26, 2016

How to Cite this Manuscript

Siddiqui OS. (2016). Heavy School
Bags and Their Effect on the
Growth of Children in
Karachi. JICTRA, Volume 7, 55-59.

Funding Source: Nil

Conflict of Interest: Nil

Address of Correspondence:

ogroup01@gmail.com

ABSTRACT

In this abstract, we are calculating relation Back Pain Versus body mass(kg), bag mass(kg), Height in (cm). Neck pain versus body mass(kg), bag mass(kg), height (cm) and Shoulder pain versus body weight, bag weight, height (cm) we develop multiple regression models by taking data of girls age 12-14 in Karachi

Keywords: Back pain, height, multiple regression.

Introduction

School bags usually contains the books copies or a good stuff but nowadays this blessing stuff causes a dangerous and harmful effect on the health of the child in order to grow properly; Abundant school bags are 'deferment' children as growing numbers suffer invertible back problems called Scoliosis. Limited to all children endure back pain by the age of 14 and physicians are informing an advance in cases of back abnormalities in the learner. Health artist says children danger long- term and basically constant damage if they repeatedly carry more than 15 percent approximately of their body mass over their shoulders.¹ The word **scoliosis** (say: sko-lee-OH-sis) comes from a Greek word meaning crooked. If you have scoliosis, you're not alone. Approximately 3 out of 100 people have some form of scoliosis, though for many people it's not much of a problem. it is defined as if a lateral spinal curvature of at least about 10°¹ when measured with Cobb's method Scoliosis is present equally in males and females for curves of approximately 10°; but with larger curves, the popularity for scoliosis is larger in females.

The vertebrae of an individual with scoliosis may glance more like an "S" or a "C", comparatively than a straight line. (Uneven musculature on one side of the vertebrae), odd hips, arms or leg lengths. Slow nerve action (in some cases). The physician recommendations for bracing include curves progressing to greater than 25°, curves displaying between 30° and 45°. Due to wearing Braces physically ache like the effect of pressure on the stomach. Hard to take breathe; Children may drop weight from the brace, due to larger pressure on the abdominal area. Abcission is usually recommended by orthopedists when very analytical state occur like spinal curve are larger than 45° to 50°. There are two main types of surgeries: Anterior fusion: This surgical way is through an incision at the side of the chest wall while the Posterior fusion is the surgical way which is through an incision on the back and include the use of metal apparatus to correct the curve. Disadvantages of surgery are, they affect physiological functions such as taking a breath and it is hopeless to completely straighten a scoliosis curve vertebrae. In this study, we are generalizing theses effects by using multiple linear regression models and predicting

them by using this report that helps us to prevent the child from this irreversible deformity

Methodology

Following are the procedure we took for measuring the height of school child (cm); their mass (kg) and their school bags mass (kg).

For measuring the mass of student:

To calculate the best time is in the morning between 9 a.m.to 12 noon. The floor should be clean. Analyze the matched of the floor by taking spirit level. If the floor is not even (inclined), along with the line (formed by joining heels of the standing adult), one shift the place or use a wooden board, which is a balance to horizontal level by keeping paper supports under the edges. Analyze the weight machine remove zero error if any. Request the child to depart shoes, socks and hair band (if have).request the child to step on the machine; hands should be straight and open request the child to take breathe perfectly. Note down the weight (mass) on a weighing machine. Request the child to step over from the machine. Use a microscope r if you need one. The measurement should be done with the cooperation of a scientist or a teacher.

Measuring the weight of school bags:

Follow the above procedure and place the school bags in weighing machine and Note down the weight on weight machine in kilograms

For measuring Height of the children:

We use an authorizing measuring tape seated on the wall with tape. Standing height was recorded to the nearest centimeter with the child's back connecting the tape, feet calm, heels touching the wall, in anatomical position. The child was asked to hold breathe. A set square was used to read off heights in centimeters.

Multiple Linear Regression Model:

In Multiple regression models, we develop the relation between many independent variables and a dependent variable.¹⁵ In the field of research, it is widely used to develop the model for prediction.

$$Y = X_1*b_1 + X_2*b_2 + \dots + X_n*b_n + \text{Constant} \quad (1)$$

Y is Dependent variable (Y), predicted variable

b_1 is the Slope for X_1

X_1 independent variable (first variable) that is defining the variance in Y

b_2 is the Slope for X_2

X_2 independent variable (second variable) that is defining the variance in Y

b_3 is the Slope for X_3

X_n independent variable (Nth variable) that is defining the variance in Y

For calculating purpose we use Minitab 17 for developing the model of MLRE (multiple linear regression models) that's why we use licensed version take a help from¹⁶

Pain intensity scale:

The National Initiative on Pain Control™ (NIPC™) has provided the diagnostic tool to assist the quality of pain experienced by the child in Neck, Shoulder and back pain. We took the written feedback of the pain and ask the students to rate it from 0 to 10.

CALCULATIONS:

Statically analysis of the data:

Here we are taking the data of age (12-14) girls. In order to calculate the multiple linear regression models

By taking their weight (kg) height (cm) and school bags weight (kg) pain in their back, shoulder, and neck

Histogram And Normal Curve Of The Data Of The Students Age

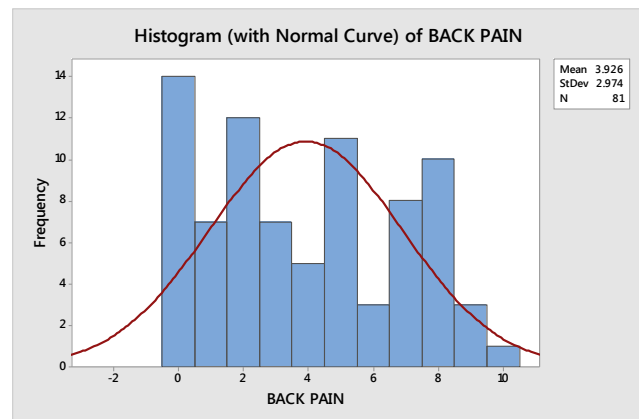


Figure-A

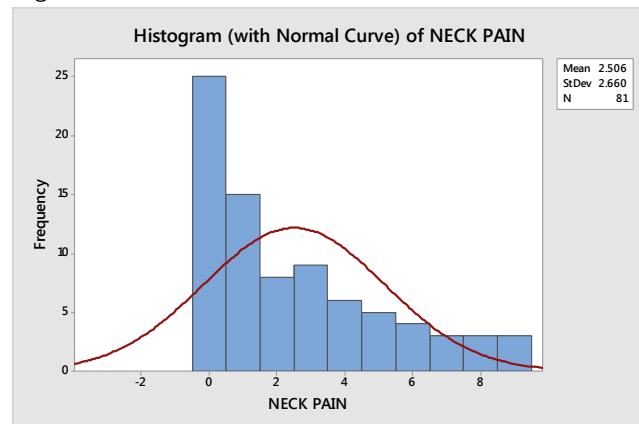


Figure-B

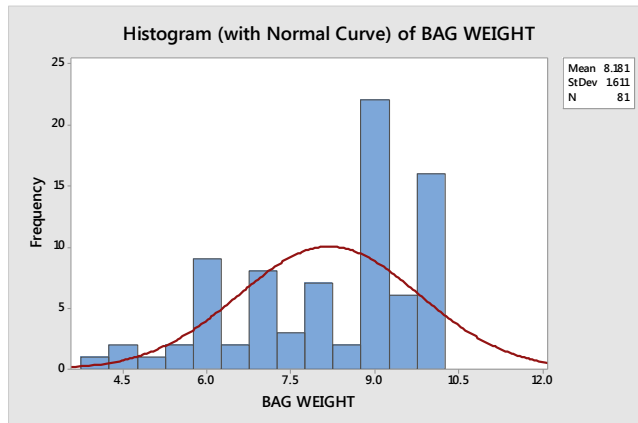


Figure-C

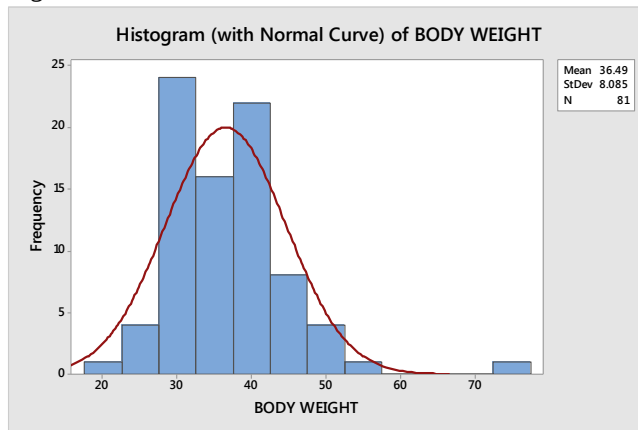


Figure-D

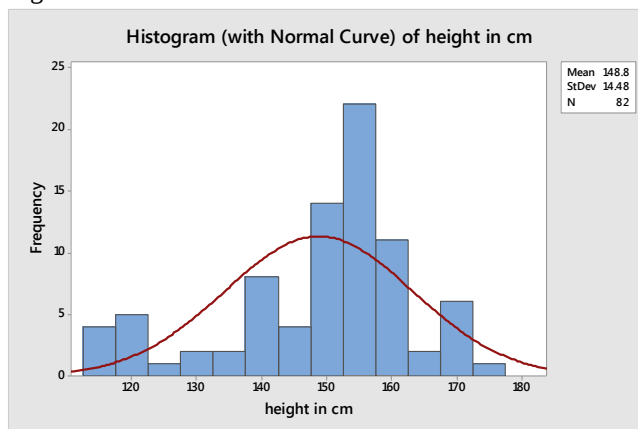


Figure-E

we took 100 observations of the girls age 12-14 and take their heights(cm) weight(kg) school bags weight (kg) pain of neck ,shoulder and back if any and their statically analysis are as following from fig(a) it shows if girls age 12-14 have bad pain intensity than maximum data lie between 2-5 from fig(b) and neck pain is lie between 1-3 no girl found having neck pain intensity of 10. Figure-C shows that girls of age 12-14 carrying a bag of 8.5kg -10 kg. Figure-D shows that 20kg -45 kg of weight fig(e) we are taking the data having a height 150cm-160cm.

Multiple Regression Analysis

Back Pain versus Body Weight (kg), Bag Weight (kg), Height in (cm)

Multiple Regression Equation Model

$$\text{Backpain} = -1.86 - 0.0221 \text{bodyweight(kg)} + 0.419 \text{bagweight(kg)} (2)$$

This equation helps us to predict the intensity of the back pain of the students if they are certain bag weight, body weight and height .fig(f) from Matlab shows that the residual plots in a standardized form.

From above equation, if we want to obtained what should students have age 12-14 (girls) bag weights

Taking the values from the data we put all values in Minitab 17 obtained the multiple linear regression models Obtained its multiple linear regression models and its residual error .and the graph of residual error shown below Figure-F

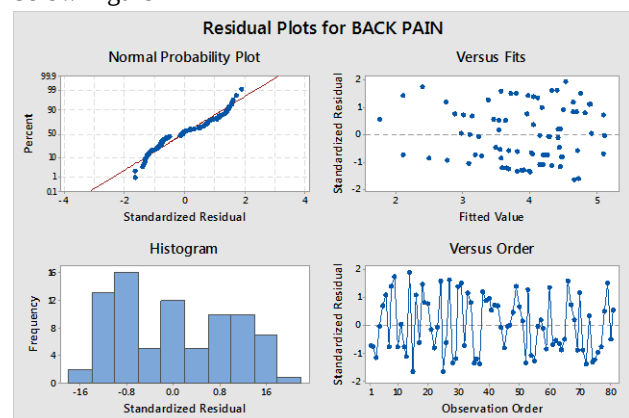


Figure-F

Multiple Regression Analysis:

NECK PAIN versus BODY WEIGHT, BAG WEIGHT, height in cm

By putting data in Matlab 17 we obtained multiple linear regression models. which help us to predict the intensity of the back pain of the students if they have certain bag weight, body weight, and height.

Multiple Regression Equation Model

$$\text{Neckpain} = -1.96 + 0.0317 \text{bodyweight(kg)} + 0.315 \text{bagweight(kg)} + 0.0201 \text{height(cm)} (3)$$

(3)

From the software, we obtained its residual error .and the graph of residual error shown below Figure-G

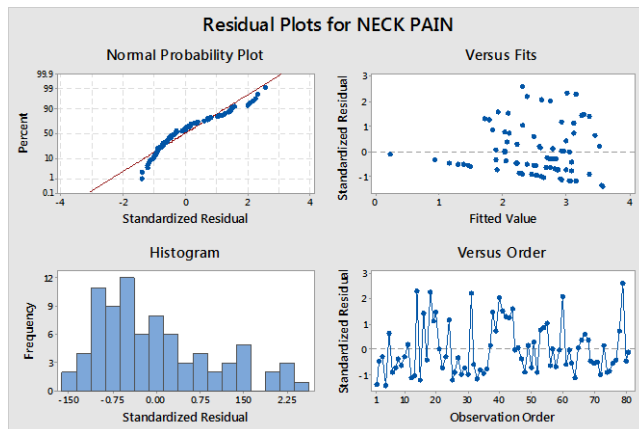


Figure-G

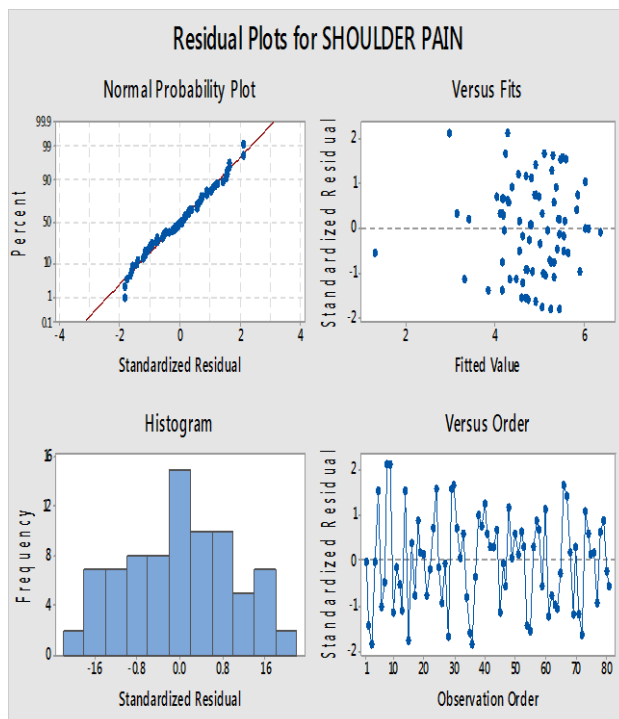
Multiple Regression Analysis:

SHOULDER PAIN versus BODY WEIGHT, BAG WEIGHT, height in cm

Similarly, we use the same procedure as done above and develop the linear model which predicts the shoulder pain of the students and residual error.

Multiple Regression Equation Model

SHOULDER PAIN = 2.05 - 0.0668 BODY WEIGHT + 0.273 BAG WEIGHT + 0.0201 height in cm (4)



Conclusion

Now from the above calculation we reached the result that if the students of 12-14 girls in Karachi Of height from 147.17 cm to 150.36 cm; weight from 28.403 kg to 44.573 kg and having bag weight from

7.207 to 10.429; having back pain intensity 0.952 to 6.9 (out of 10); shoulder pain intensity From 1.799 to 7.855(out off 10); neck pain intensity 0(neglecting negative scale) to 5.166 (out off 10).

Above linear model of (2);(3) and (4) can help us to predict pain intensity of the students and through which we can help them and prevent them from scoliosis and another factor which affect their growth.

References

1. Negrini S Carabolona R and Sibilla P. Backpack as a daily load for schoolchildren. The Lancet. 354 (1999)1974.
2. Grimmer K, Williams M. Gender-age environmental associates of adolescent low back pain. Appl Ergon 2000; 31:343–360.
3. Hong Y and Li J. Influence of load and carrying methods on gait phase and ground reactions in children's stair walking. Gait and Posture. 22 (2005) 63-68.
4. Mackie HW, Legg SJ. Postural and subjective responses to realistic schoolbag carriage. Ergonomics 2008; 51:217–231. [15] van Gent C, Dols JJCM, de Rover CM, Sing RAH, de Vet HCV. The weight of schoolbags and the occurrence of the neck, shoulder, and back pain in young adolescents. Spine 2003; 28:916–921.
5. Grimmer K Williams M and Gill T. The associations between adolescent head-on-neck posture, backpack weight, and anthropometric features. Spine. 24 (1999) 2262-2267.
6. Forjuoh S Lane B and Schuchmann J. Percentage of body weight carried by students in their school backpacks. American Journal of Physical Medicine and Rehabilitation. 82 (2003) 261-266.
7. Skoffer B. Low back pain in 15 to 16-year-old children in relation to school furniture and carrying of the school bag. Spine 2007; 32:713–717
8. Harreby M, Nygaard B, Jessen T, Larsen E, Storr-Paulsen A, Lindahl A, Fisker I, Laegaard E. Risk factors for low back pain in a cohort of 1389 Danish school children: an epidemiologic study. European Spine Journal1999; 8:444–450.
9. Szpalski M, Gunzburg R, Balagué F, Nordin M, Mélot C. A 2-year prospective longitudinal study on low back pain in primary school children. European Spine Journal 2002; 11:459–464.
10. Casey G and Dockrell S. (1996) A pilot study of the weight of schoolbags carried by 10-year old children. Physiotherapy Ireland. 17 (1996) 17-21.
11. Grimmer K and Williams M. Gender-age environmental associates of adolescent low back pain. Applied Ergonomics. 31 (2000) 343-360. [13] Negrini S and Carabalona R. Backpacks on! Schoolchildren's perceptions of load, associations with back pain and factors determining the load. Spine. 27 (2002) 187-195.

12. Puckree T Silal S and Lin J. School bag carriage and pain in school children. Disability and Rehabilitation. 26 (2004) 54-59.
13. [13]School Bag Weight and the Occurrence of Shoulder, Hand/Wrist and Low Back Symptoms among Iranian Elementary Schoolchildren 23 (2011) 77-85
14. S. Dockrella, C. Kanea, E. O’Keeffea Schoolbag weight and the effects of schoolbag carriage on secondary school students
15. [15] J.C DeFries and D.W. fulker Multiple regression analysis of twin data 10(1985) 467-468
16. <http://support.minitab.com/en-us/minitab/17/getting-started/introduction>
17. Ferreira-Valente MA¹, Pais-Ribeiro JL, Jensen MP Validity of four pain intensity rating scales.