Sitting Weight – More Relevant to Study for the Current and Future Generation

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ABSTRACT

Introduction: Sitting for a long time considered a sedentary lifestyle and has an adverse effect on health. With the increase in sitting activities, the active lifestyle of individuals declining due to lack of time and other various reasons. The objective of the research was to study the sitting weight as it is more relevant in the recent years due to the lifestyle and as well as the transformation of working nature of the human beings all around the world in every sector due to the usage of software and technology products which in turn affecting the health. Need for an alternative active lifestyle while sitting is becoming a necessity.

Material and methods: In this study combination of eight Subjects of different ages and gender chosen and focused mainly on sitting weight data behavior. Sitting weight Right posture identified and followed just like standard right standing weight posture. sitting weight (siw) and standing weight (stw) captured in the morning before breakfast (BB) and after breakfast (AB), in the afternoon before lunch (BL) and after lunch (AL), in the night before dinner (BD) and after dinner (AD) without any food restriction and even in between the mentioned time interval.

Results: Using the data studied the variation of sitting weight and standing weight and derived a relationship formula defining an empirical value "e" with lower limit 1.05 and upper limit 1.3. From the observation, sitting weight is always less than the standing weight and the corresponding variations plotted for each subject and discussed.

Conclusion: Sitting weight is the first parameter considered in this study, which is always less than standing weight and varies directly proportional to it. The results showed a promising future to build an active lifestyle around sitting and hence more research is required for additional relevant medical parameters building a standard scale and score for all different ages, weight, and height.

Keywords: Sitting Weight (SIW), Standing Weight (STW), Empirical Value (e), Right Posture, Weighing Machine, Lifestyle, Active Lifestyle

INTRODUCTION

With the advancement of information technology, usage of software and technical products in every domain, it is imperative that it has changed all the perspective of the life and as well as the working nature irrespective of the urban and rural areas. The Lifestyle of people more or less moving towards to sit for doing any activities and as well as to work. However, standing, walking and exercising considered as the active lifestyle from long time.[1-4]

Lower levels of physical activity considered as sedentary lifestyle leading to adverse health outcomes, which increases the risk of weight gain, metabolic syndrome, diabetes, heart disease, neck and back pain.[1-5] More time spent on sitting activities during leisure and as well as in working time.[6-7] Working/Reading/Playing/Learning along with computers/ Laptop/ Mobile/ Television and more and more activities making people irrespective of age, gender and region to sit and do above- mentioned activities for long hours, which is becoming unavoidable due to the nature of the work and dependency on them increasing day by day. As a complication to this, many people are getting into health issues mentioned, as they are not getting time for the active life style.[8-9]

Considering the transformation in the overall lifestyle all around the world, sitting weight is more relevant to monitor. Monitoring of sitting weight and building an alternative active lifestyle system while sitting is the requirement of the hour. Need to change the branding of sitting as a sedentary behavior that helps individuals to overcome the side effects of sitting and health issues with the help of sitting activities and monitoring their health while sitting itself. With this approach sitting weight as the main parameter, conducted the study so that people can monitor their sitting weight throughout the day.

Right Posture for sitting weight

In order to take standing weight either through the digital weighing machine or other analog machines, the machine has to be on a hard surface. Individuals stand straight on that with their neck and head held straight considered as the ideal posture for recording standing weight. Just like the standing weight posture, even the sitting weight ideal proper posture defined in Fig 1 and need to be sit on the weighing machine placed on the hard surface. Need to sit straight with neck and head held high and straight as shown in Fig 1 and in the same figure wrong posture showed slightly leaning backward or

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forward. In this research, a digital weighing machine used and placed on a flat surface.

MATERIAL AND METHODS

Combination of Subjects with different ages and gender chosen for the study, however, we focused our study on only sitting weight irrespective of age and gender in this research paper. Just like standing weight posture, even here sitting weight posture followed as mentioned in the above section for capturing sitting weight. Readings were taken in the morning before breakfast (BB) and after breakfast (AB), in the afternoon before lunch (BL) and after lunch (AL), in the night before dinner (BD), and after dinner (AD) without any restriction on any food, drinks, snacks, and even in between the mentioned time interval. Data captured over two weeks as the focus is mainly on sitting weight data behavior. Post the data recording, an average of the sitting weight (siw) and the standing weight (stw) is calculated as a whole and as well as at the recording points BB, AB, BL, AL, BD and AD. At the same time, standing weight to sitting weight ratio calculated.

The sitting weight taken before and after breakfast, lunch, and dinner. Data captured for the different age groups to study the

variation of sitting weight before and after food. Table 1 and Fig. 2 gives the average of stw, siw and ratio of all time for each subject. Table 2 and Fig. 3 gives the details of stw, siw and its ratio for each subject at different interval BB, AB, BL, AL, BD and AD respectively. Data captured for all the subjects for two weeks and average is taken at each interval for each subject. The behavior of data was almost similar to the daily data captured and hence the decision to take the average siw and stw for each subject at each interval. From the Figure 3 plot it is very clear that sitting weight (siw) is always less than the standing weight (stw) and it varies directly proportional to the standing weight (stw).

Subjects	Standing weight (stw)	Sitting weight (siw)	Stw/siw
1	67.4333	60.7942	1.1108
2	54.325	43.1952	1.2576
3	78.785	67.1464	1.1733
4	99.1	83.8994	1.1811
5	40.5583	35.1771	1.1529
6	66.3416	55.2375	1.2010
7	87.7166	81.7966	1.0723
8	68.3716	61.8769	1.1049

Table-1: Average of sitting weight and standing weight

Subject1	BB	AB	BL	AL	BD	AD
stw1	66.55	67.15	67.1	67.9	67.75	68.15
siw1	60.33636	60.95455	59.63909	60.82273	61.10818	61.90455
e1	1.102983	1.101641	1.125101	1.116359	1.10869	1.100888
Subject2						
stw2	53.6	54.1	54.15	54.45	54.45	55.2
siw2	42.74286	43.27143	43.31429	43.87857	42.56429	43.4
e2	1.254011	1.250248	1.250165	1.240925	1.279241	1.271889
Subject3						
stw3	78.65	79.01	79	79.6	77.95	78.5
siw3	66.63889	68.09222	66.33889	67.70556	66.61667	67.48667
e3	1.180242	1.160338	1.190855	1.175679	1.170128	1.163193
Subject4						
stw4	99.35	99.7	99.4	99.7	98.15	98.3
siw4	83.96167	84.55	83.38	83.71333	83.39167	84.4
e4	1.183278	1.179184	1.192132	1.190969	1.176976	1.164692
Subject5						
stw5	40.05	41.1	40.15	40.5	40.55	41
siw5	34.82	35.535	34.973	35.345	35.045	35.345
e5	1.150201	1.156606	1.148028	1.145848	1.157084	1.159994
Subject6						
stw6	66.1	66.95	66.2	66.9	65.4	66.5
siw6	54.85	55.82778	54.77778	55.58333	54.91111	55.475
e6	1.205105	1.199224	1.208519	1.203598	1.191016	1.198738
Subject7						
stw7	87.3	87.9	87.6	88.2	87.2	88.1
siw7	81.40167	81.85833	81.58667	81.915	81.76833	82.25
e7	1.07246	1.073806	1.073705	1.076726	1.066428	1.071125
Subject8						
stw8	68.1	68.3	68.4	68.78	68.25	68.4
siw8	61.77143	62.21429	61.6	62.29571	61.26857	62.11143
e8	1.102451	1.097819	1.11039	1.104089	1.113948	1.101247

Table-2: Average of Siw and stw at different intervals for each subject

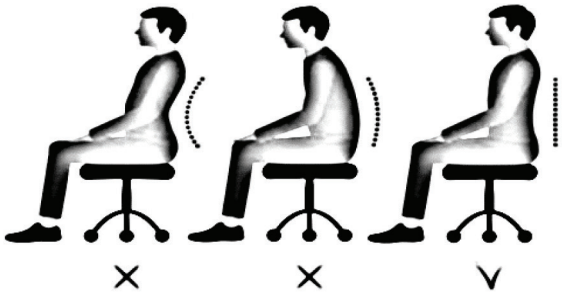

Figure-1: Right-sitting posture for recording Sitting Weight

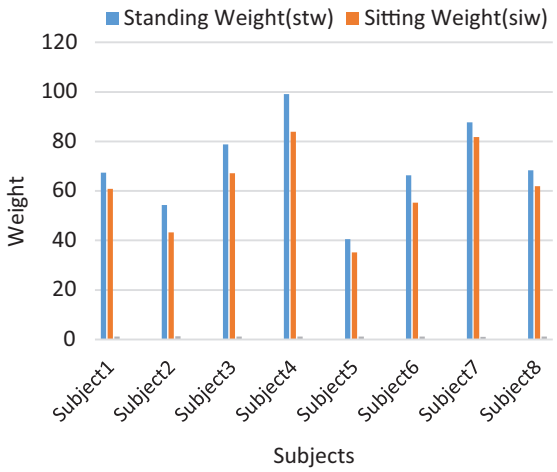

Figure-2: Average of sitting weight (siw) and standing weight (stw)

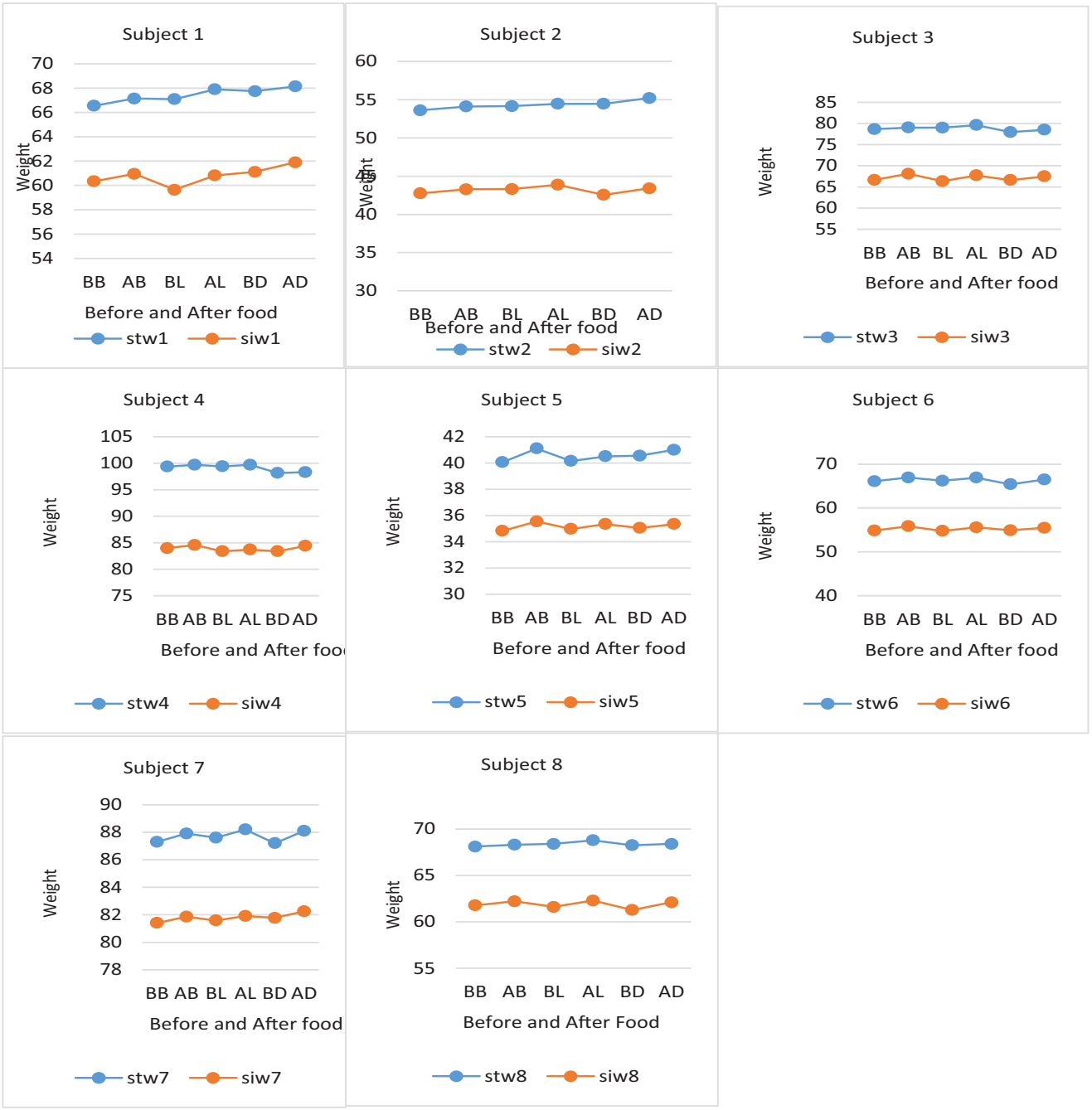

Figure-3: Variation of average Stw and siw for each subject

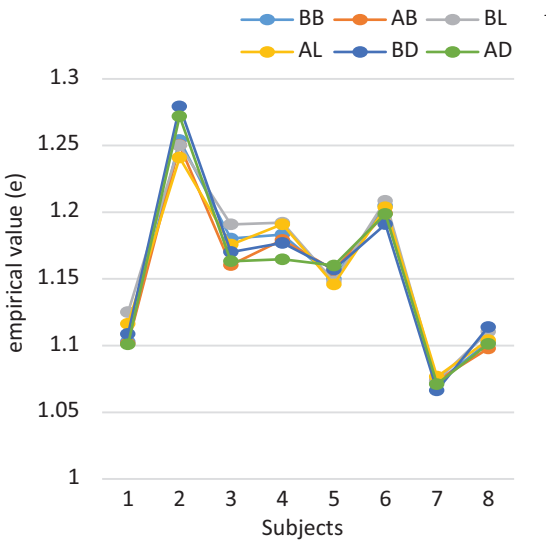

Figure-4: Variation of empirical value e

Looking at the ratio of standing weight (stw) to sitting weight (siw), in most of the case it varies from 1.1 to 1.26. In few cases, it was low at 1.07 and as well as high at 1.28, however, considering the small percentage of errors in the weighing machine and as well as errors in the posture of the subjects along with age, height and weight the ratio stw to siw would be between 1.05 to 1.3.

At any point of time,

$$\frac{\text{Standing weight (stw)}}{\text{Sitting weight (siw)}} = e \quad (1)$$

Where "e" is an empirical value, which varies from 1.05 to 1.3.

$$\text{Stw/siw} = e \quad (2)$$

$$\text{Stw} = e \times \text{siw} \quad (3)$$

$$\text{Siw} = \text{stw}/e \quad (4)$$

With this derived formula, both stw and siw are directly proportional to each other. If stw increases, siw also increases and if stw decreases, siw decreases. The same relationship observed when data plotted (Fig. 3) at different interval of time, BB, AB, BL, AL, BD and AD.

In addition, the variation of empirical value "e" (e1 for subject 1, e2 for subject 2….e8 for subject 8) plotted (Fig. 4) for all the subjects at the same interval of time which shows the variations and all the values fall between the lower limit 1.05 to upper limit 1.3.

Considering known fact that standing weight is the individual/object relative mass and the actual mass can be more or less than the weight shown due to net forces acting. Regarding sitting weight from the data studied, always less than the standing weight by factor "e' whose value varies between lower limit 1.05 to upper limit 1.3. It means acting force or pressure decreases. Pressure decreased means either force decreased or area increased as Pressure = force/area. On the other hand, force decreased means either mass decreased or the acceleration as force = mass multiplied by acceleration. Since sitting weight is taken without any movement, it should be the mass of the body affecting the force to decrease. With these relationships, it can be explained that while sitting force acting area increases compared to standing on the leg and as well as the mass of the upper body is less compared to the whole mass of the body while standing and hence sitting weight is always less than the standing weight [10-12]. However further research needs to be done on why it varies considering the variation of "e" value limits.

CONCLUSION

In this study, relationship and behavior of sitting weight and standing weight data showed promising results. From the observation, sitting weight is always less than the standing weight and the corresponding variations plotted for each subject and discussed. New relationship formula derived between sitting weight and standing weight with new empirical value "e" defining lower limit value 1.05 and upper limit value 1.3.

Sitting weight is the first parameter we have considered for building an alternative active life system and further research is required considering the body mass index, body fat mass, lean body mass, and other medical parameters monitored while sitting. With the help of these studies, standard score and scale for each medical parameter according to their sitting weight, age and gender need to be established. Based on that we need to build sitting activities to control and monitor these medical parameters, which help individuals to overcome the health issues and maintain good health.

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