



Research Article

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## ***Backache: Association with Stature, Posture and Work-Station Ergonomics in Information Technology Professionals-An Analytical Study***

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### **ABSTRACT**

*The Information technology has been the bane of contention in the present scenario and has been an inevitable part of the life of every citizen in the society. With the improvement in communication, it has brought many health related problems and one among them is the backache. The main aim of the study was to examine the association between the stature, posture and work-station Ergonomics in Information Technology Professionals. One hundred IT professional who had more than 3 years of work experience aged between 20-30 years were surveyed. The anthropometric and workstation measurement were stature, height of tabletop, angle of backrest, position of knees, sitting posture, presence or absence of footrest. The results showed that persons with height of less than 163 cm (21%) and more than 170 cm (72%) suffered backache. But professionals with a height range of 164-169 cm suffered 7% due to many factors. It was concluded that a table top of 75 cm was recommended to persons with all heights which may greatly reduce the risk of backache in the IT professionals.*

**Key words:** *Stature, Backache, Ergonomics, Professionals.*

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### **INTRODUCTION**

New techniques and devices are introduced to the market annually [1]. Innovations brought by today's changes and technology affect closely structures, operations, goals, and targets of institutions [2]. The present decade epitomizes the revolution in the area of computing and communication. Internet provides a wide range of information which helps in increasing the knowledge of the people, it is also used most commonly for easy communication [3]. It is believed that technological advancement and usage of information technology will endure at a fast pace [4]. These progresses not only present numerous momentous openings but also pose main challenges. Today, novelties in information technology are obligating extensive effects through copious dominions of society. Adoptions completed now will require extensive enduring magnitudes, and responsiveness essentially to be paid to their social, economic and health impacts [5].

One of the most trivial outcomes of the progress of information technology is probably the growing concern about the effects on health and safety of people in these occupations. Additionally, human resource is the most basic strategic resource of any organization. Undoubtedly, the success of the organization and workplace depends on the more efficient human resources [6]. In the present scenario, computers are solitary apparatuses in industries, scholastic foundations, workplaces, homes and even in cars. Although, these technologies

containing computers have affected our lives considerably making it very easy but they have also fashioned numerous perils for human health [7].

The undesirable risks accompanying with the practise of these technologies are swelling with their rising demand every day. Already, it affects such large population as seamless application of computers has made prolonged sitting as a must which has many ramifications on the human body resulting in high risk factor causing spondylosis of the neck and back [8].

The IT professionals are continuously on their job of handling the data, modifying and answering calls. They spend prolonged hours sticking to their chairs in fixed postures. The job requirement of the IT professional and others who use the computers for long hours demand high degree of concentration. They are unaware of the resultant causative factor of poor posture during their functioning. This eventually leads to impediments in the body stature and posture of these individuals which is health vulnerability and results in abnormal lifestyle [9].

[10] stated that prolonged sitting commonly exacerbates low back pain (LBP). They further indicated that numerous alterations to seated stance and chair design have been suggested, like using chairs with backrests and also chairs that decrease hip flexion. It is imperative that the IT professionals have safe operational surroundings and stress free work setting encompassing information and preparation with regard to the work place posture and ergonomics. It is believed that poor carriage at work is a main source of back pain, workroom pressure, repetitive tension damage, which can result in lost time, reduced output, poor worker health, low morale and greater overheads.

Keeping in mind the above factors, this study is embarked on to discover how the ergonomics affects the IT professionals leading to backache.

## METHOD

A total of 100 subjects who had back pain were selected as subjects for the investigation. Their ages ranged between 20-30 years and were working around 9 hours per day for the past 2-3 years in similar jobs of ITC. Such of the subjects who had pervious history of complicated backaches, trauma, post-surgery, backache due to anatomical problems and backache due to infections were excluded from the study. The subjects who were included in the observations were with symptoms of pain at low back, muscle spasm, tenderness and the trigger points were active.

All the measurements were completed at the worksite of subjects. Data associated with backache and office ergonomics were collected with the help of a detailed questionnaire. Anthropometric measurements like stature were measured with the stadiometer, body weight was taken on a calibrated weighing scale (Seca medical balance-Germany), skinfolds were measured by a Fat-a-measure (skin fold caliper) and circumferences were measured by a flexible tape.

The ergonomic measurements like the height of the tabletop was measured from the floor to the top of the table, height of the chair form the floor to the pan, angle of back rest and the angle at knee joint was measured with the help of goniometer for all subjects. The presence and absence of the foot rest was also noted.

The physical examinations of the subjects such as the SLR (Straight leg raising test), muscle testing, and trigger point evaluation were carried out. The checkup of the lower back was investigated by an x-ray of the lumbosacral spine apart from other biochemical tests.

## RESULTS

The results of the study were analyzed as per the data collected from the subjects as follows:

**Table 1:** The anthropometric measurements of the subjects

SN	Variable	Measurement
1	Subjects	100
2	Age(years)	20-30
3	Work experience (years)	>2
4	Working hours(h/day)	9

5	No exercise (%)	100
6	Short group (cm)	<163
7	Normal Group (cm)	164-169
8	Tall group (cm)	>170

The table clearly indicates that a total of 100 male subjects were selected whose age ranged between 20 and 30 years. The anthropometric variables of the study were short group height, normal group height and tall group height. This apart the subject's work experience in years, daily working hours and the indulgence in exercise were recorded. The table showed that short group height was > 162 cm, the normal group height was between 164 and 169 cm and the tall group height was >170 cm. The subjects of the study were working around 9 hours per day and they were engaged in the work for more than 2 years. Almost all the subjects were sedentary in nature and were not involved in any type of exercise.

**Table 2:** The measurements and observations of the ergonomics of the subjects

SN	Name of the implement	Measurement
1	Table Top in cm, from the floor	72
2	Chair seat height in cm	45-55
3	Angle of the back rest in degrees	120-140
4	Position of the Knee angle in degrees	<80- > 120

Table 2 indicates the measurements which were carried for the selected subjects. The ergonomics recording was done from the top of the table to the floor, the seat height of the chair, the angle of back rest and the angle position of the knee. It is seen from the above observation that the measurement from the floor to the top of the table was 72 cm. The chair height ranged from 45-55 cm and the angle of the back rest vacillated between 120 to 140 degrees. The position of the knee angle was less than 80 degrees and more than 120 degrees.

**Table 3:** showing the prevalence of backache as per the stature of the subjects

SN	Subjects-group	Height (cm)	% suffered from backache
1	Short group	< 163	21%
2	Normal group	164-169	7%
3	Tall group	>170	72%

Table 3 specifies about the prevalence of the backache in the subjects with various statures. The percentages were calculated based on the number of subjects who suffered from backache in each category. It is establish from the analyzed data that the highest percentage of backache was in the tall group with 72% followed by the short group with 21%. The normal group was the lowest in the occurrence of backache with 7%.

## DISCUSSION

The key objective of the study was to discover the relationship of backache with stature, posture and work station ergonomics in IT professionals.

Computers have become an integrated part of the present day life. It is observed that people from all walks of life be it individuals or experts use them on a large scale. As per the report of one of the investigation in 2003, there are around 190 million computer consumers [11]. The usage of Computers proliferates through extensive ambit of age groups, adolescents and school children more common than adults according to a 2001 exploration [12]. Musculo skeletal disorders have been defined as discomforts, injuries or situations in which the nerves, tendons or muscles of one's body are involved [13].

Putz-Anderson [14] described accumulative trauma syndromes as uneasiness and complications that develop due to accumulative, recurring exposure to stressors which impact precise body parts and ultimately results in trauma or impairment of tissue and joints. In several industrial nations, among computer users and the general populace, musculoskeletal discomfort relating to neck, shoulder, arms and specifically the backache are recurrent according to the study of [11].

[15] in his doctoral thesis indicated that computer workers modify their position a lot, owing to the main cause of discomfort to the body. He found that distress as reported by each member differed from eye strain to back pain. The figures of back associated pain and specifically the discomfort indicates that computer handlers might experience discomfort to the back which compels them to modify their posture frequently. Besides the study also observed that there was a variation in posture because habit is strictly ensuing the major top two reasons. This denotes that most of the computer professionals alter their posture because of agitated or natural tendency in addition to discomforts.

The subjects in the present investigation were comparatively young but most of them were complaining of the recurring problem of backache. It was detected that these professional were able to recuperate after resting time and during the off days. The strata of the study were furnished with up-to-date office chairs which had foam padded back rests, non-adjustable in height and depth with interstellar wheelbases.

The main observation noticed was the height of the table top which was 72 cm from the floor, but the office floor were covered with one inch thick carpet, which effectively reduced the leg space. This had an adverse effect on the subjects who were tall in stature as they developed the habit of extending their knee joints resulting in forward head posture and inability to use the back rest properly.

These postural adjustments while working possibly lead to sustained isometric contractions of back extensor muscles leading to pain [16-19]. They also hold the mouse without resting their forearm on the table for long hours which affects the neck and the shoulder, further adding to extra pain.

Besides, the problem with the short group of subjects was that they were not able to reach the floor, and hence they used the dust-bins as footrest or fold their feet on to the chair itself. Now in both circumstances the position of the back is off from the backrest. This places strain on the back muscles due to the constant pull on the back as well as contraction of the back muscles [20, 21]. Added to this, working on the computer can create such repetitive strain injuries [21].

It was found that the angle of backrest was 120 degrees which is ergonomically not at all appropriate for the healthy back. If a computer professional changes his position away from backrest [22] and in the absence of footrest, the mass of the lower limbs (60% of body mass) places an anomalous pressure on the lower back.

This results in most of the back muscles to remain in an isometric contraction causing immense pain [23]. The IT professionals being very much involved in their occupation for long hours with the ergonomics are at greater risk for postural and musculo-skeletal problems.

## CONCLUSION

It is concluded that there is a significant relationship between stature and ergonomics of the IT professionals with regard to the sitting posture, correct backrest, table top heights which are very critical in assuming stress free posture during sustained sitting job

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