# *The Effects of Classroom Furniture on Back, Neck, Lumbar and Leg Fatigue in Student*

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**Abstract**

The purpose of this study was investigation the effects of classroom furniture on back, neck, lumbar and leg fatigue in students when used them, a total of 203 male students with the mean age (13.6±1.9), mean weight (48.87±14.40), and mean height (155±9.87), respectively from among 32 classes of 8 different schools of the urban community were selected randomly in this study. The results of questionnaire show a signification relationship between the tired feelings of the subjects with every dispositional condition of the classroom furniture. It was noted as well that the height of the blackboard exceeds the normal height of (178.15cm) and lies out of the comfortable sight of the users which has to be (139.5cm), ($p \leq 0.05$). Results showed that tired feeling and pain of the students were mainly due to the application of non-standard furniture. The comfortable or uncomfortable feeling of the users indicating pain and local tiredness were also collected by the distributed questionnaires. The information provided in the questionnaire forms also show that 49/3% of the users were dissatisfied and felt some sorts of tiredness. The tiring condition they complained from with regard to ergonomic disposition of the furniture which were considered included 41/9% in the knee, 24.1% in the leg 51.2% in the back, 47.8% in the neck, and 24.6% from the high blackboard. The current results in addition to the incompatibility of the furniture used by the students with the anthropometrical specifications and ergonomic standards clearly showed that tired feeling and pain of the students were mainly due to the application of non-standard furniture and underlined the observance of necessary standards during the manufacture and equipment of schools.

***Key Words:*** school furniture, sitting posture, ergonomic Vastus.

## Introduction

Anthropometric measurements are an important factor that should be taken into account in classroom furniture design. Specific measurements, such as popliteal height, knee height, butttock–popliteal length and elbow height are necessary in order to determine school furniture dimensions that enable the correct sitting posture [1,2]. The science of human factors has rarely been incorporated into the design of school furniture children sit on chairs designed by tradition [3].

Using furniture that promotes proper posture is more important to children than adults because it is at this young age that sitting habits are formed. Bad sitting habits acquired in childhood are very difficult to change later in adolescence or adulthood [4].

Correct standing and sitting posture is an important factor for the prevention of musculoskeletal symptoms [5]. Static posture and prolonged sitting in a forward bending position, as students often acquire, puts an extreme physiological strain on the muscles, the ligaments and in particular on the discs [6,7]. Correct standing and sitting posture is an important factor for the prevention of musculoskeletal symptoms [5].

An experimental study is reported that compares the effects on children's behavior and sitting position of traditional classroom furniture with a recently designed chair known as 'Chair 2000' and associated tables. It was found that children showed a modest but significant improvement in on-task behavior and a marked change in sitting positions following the introduction of the newly-designed furniture. However, these