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Correlation of body dimenstions with officer chair

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ABSTRACT

This study was conducted on a randomly selected sample of two hundred male and female workers in Marathwada Agricultural University, Parbhani (Maharashatra) office invariably using office chair. Maximum body breadth measurements were positively correlated with chair dimensions. This may result in discomfort while using chair. Sitting height, knee height and popliteal height had highly positive correlation with chair dimension. Thigh height, eye height, shoulder height had non significant correlation. Non of the chairs fulfilled the need of respondents because in same chair height of chair was good in other chair seat height was comfortable and it was observed that in many chairs arm height and chair breadth were comfortable.

Key words : Anthropometry, Office chair, Ergonomics, Ergonomics chair, Sitting posture

The basic requirements for sitting is to provide stable support for the body that is comfortable over a period of time which allows the users to change position easily without loosing the support. It must also be appropriate to the task or activity which is to be performed and suit the height of the work surface.

It has been noticed that the lack of adequate knowledge on account of human facilities, other limitations and the cost effectiveness of the utility of human resources have led man-made designs of daily usable commodities and work spaces as unusable for the users. This dearth has greatly decreased human efficiency, performance, operations smoothness, etc. causing dissatisfaction and thereby adversely affecting the acceptance of the design by the common users. Man with his structural, physiological and behavioural limitations should be considered when designing.

In most offices, the workstation consists primarily of a chair and a work surface. The primary factors, which play important roles, are the specific job tasks, body size and equipment. The most aspects to be considered will be the design and size of the chair, and the height and design of the workstation. The types of equipments used by the worker will largely affect the design.

Prolonged and repetitive motions and excessive force can cause muscle and joint problems. The parts of the body that office work most often affects the back, arms, wrists, hands, neck and shoulders. Back problems can occur when workers use poorly adjusted chairs and workstations and spend long periods working in one position. If there is no proper relation of anthropometry and dimensions of chair, it will create health problem to worker.

METHODOLOGY

This study was conducted on a randomly selected sample of two hundred male and female workers in MAU office invariably using chairs. The anthropometric measurements (sitting and breadth measurement) of the selected respondents were recorded. The dimensions of the office chair were recorded for working out the user suitability. The physical problems of the office chair were studied. The data thus collected were classified, tabulated and analyzed by working out percentiles and correlation.

RESULTS AND DISCUSSION

Table 1 explains the correlation between anthropometric measurements and chair dimensions. It is observed from the results that setting height had positive significant correlation with chair height (r=0.64**), seat height (r=0.84**) back rest of chair (r=0.54**), arm height (r=0.35**) and chair breadth (r=0.58**) where as thigh height had highly positive significant correlation with seat height of chair (0.77**) and non significant for all other dimensions of chair.

Elbow height was negatively correlated with chair height (r=-0.14*), seat height(r=-0.20**) and back rest of chair(r=-0.15*). Non-significant results were noted for arm height and chair breadth.

Eye height and shoulder height were not significantly correlated with all the parameters of chair.

Knee height was positively correlated with chair height (0.83**), seat height (r=0.81**) arm height (r=0.65**) and chair breadth (r=0.87**)

The popliteal height of workers was positively correlated with back rest (r=0.81**), arm height (r=0.68**) and for chair breadth (r=0.87**).

Table 1 : Correlation between sitting anthropometric measurements with chair dimension

Anthropometric measurements	Chair height	Seat height	Back rest of chair arm	Arm height	Chair breadth
Seating height	0.64**	0.84**	0.54**	0.35**	0.58**
Thigh height	-0.05NS	0.77**	-0.11NS	-0.02NS	-0.07NS
Eye height	-0.04NS	0.01NS	-0.05NS	-0.04NS	-0.08NS
Shoulder height	-0.09NS	-0.03NS	-0.08NS	-0.08NS	-0.07NS
Elbow height	-0.14*	-0.20**	-0.15*	-0.1NS	-0.13NS
Knee height	0.83**	0.81**	0.9NS	0.65**	0.87**
Popliteal height	0.8NS	0.8NS	0.81**	0.68**	0.87**

* and ** indicates significance of values at P=0.05 and 0.01, respectively NS – Non significant

Correlation between anthropometric breadth measurements and chair dimension was given in Table 2. It was cognizant from the results that shoulder breadth had highly positive correlation with chair height (r=0.73**); seat height (r=0.70**) and arm height (r=0.54**) where as backrest of chair and chair breadth had non significant values.

Knee-to-knee closed, knee-to-knee relaxed and girth had highly positive correlation with all chair dimensions

Positive significant correlation was noted between hip breadth with seat height (r=0.64**) backrest of chair (r=0.90*) and chair breadth (r=0.74**) while non-significant findings were noted for chair height and arm height.

Elbow to elbow closed was positively correlated with the chair dimensions except with arm height

Table 3 expresses data about furniture used by respondents. It is clear from the table that 25 number of chair were observed while study.

One point five per cent chairs were in range of 19-35 cm, while 5.5 per cent chairs belonged to 36-52 cm. In 53-66 cm category, 5.5 per cent chairs were observed. With reference to arm height of chairs, 8.5 per cent chairs had arm height of 21-22 cm, similarly 3.5 per cent chairs belonged to 23-24 cm range and only 0.5 per cent chairs were having arm height ranging above 25 cm range of chair. Regarding chair breadth, 2.5 per cent chairs were present in the range of 41-45 cm, 9 per cent ranged from 46 to 50 cm and only 1 per cent chairs were from 51-56 cm category.

It can be summed up from the Tables 1, 2 and 3 single chair cannot fullfil the need of respondents because the chair dimensions were either just appropriate or comfortable.

Conclusion:

Maximum body breadth measurements were positively correlated with chair dimensions, which may

Table 2 : Correlation between breadth anthropometric measurements with measurements and chair dimension

Anthropometric measurements	Chair height	Seat height	Back rest of chair arm	Arm height	Chair breadth
Shoulder breadth	0.73**	0.70**	0.8NS	0.54**	0.9NS
Hip breadth	0.9NS	0.64**	0.090**	0.7NS	0.74**
Elbow to elbow (closed)	0.85**	0.77**	0.87**	0.07NS	0.83**
Elbow to elbow (relaxed)	0.87**	0.80**	0.89**	0.66**	0.81**
Knee to knee (closed)	0.87**	0.63**	0.90**	0.74**	0.61**
Knee to knee (relaxed)	0.84**	0.74**	0.89**	0.62**	0.82**
Girth	0.84**	0.74**	0.85**	0.067**	0.69**

** indicates significance of value at P=0.01 NS – non significant

Table 3 : Observed existing chair dimensions

Sr. No. Range	Height of chairs (cm)	Frequency percentage	Seat height of chair (cm)	Frequency / percentage	Back rest (cm)	Frequency percentage	Arm height (cm)	Frequency percentage	Chair breadth (cm)	Frequency percentage
1.	81-96	9 (4.5)	41-45	8 (4)	19-35	3 (1.5)	21-22	17 (8.5)	41-45	5 (2.5)
2.	97-112	7 (3.5)	45-49	13 (6.5)	36-52	11 (5.5)	23-24	7 (3.5)	46-50	18 (9)
3.	113-125	9 (4.5)	50-52	4 (2)	53-66	11 (5.5)	25 and above	1 (0.5)	51-56	2 (1)

Figures in parenthesis show percentage

result in discomfort while using chair.

Sitting height, knee height and popliteal height had highly positive correlation with chair dimension. Thigh height, eye height, shoulder height had non significant correlation.

None of the chairs fulfilled the need of respondents because in same chair height of chair was good in other chair seat height was comfortable and it was observed that in many chairs arm height and chair breadth were comfortable.

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REFERENCES

Anderson, G. (1987). Biomechanical aspects of sitting: An application of UDT terminals. *Behavior & Information Technol.*, **6**(3): 257-269.

Bendix, T. (1986). Sealed trunk posture at various seat inclinations, seat heights, and table heights, *Human Factors*, (26):695-703.

Carealt, E.N. and Bishop, R.P. (1976). A technique for assessing postural discomfort. *Ergonomics*, **19**(2):175-182.

Sauter, S. and Arndt, R. (1984). Ergonomics in the automated office, gap in knowledge and practice. In : G. Salvendy (ed.), Human - computer interaction, Ansterdam Elsevier.

Stoudt, H.W. (1981). The anthropometry of the ederly. *Human Factors*, **23**(1):29-37.

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