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Assessment of anthropometric measurement with suitable of table

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ABSTRACT

This study was conducted on a randomly selected sample of 200 male and female workers in Marathwada Agricultural University Parbhani (Maharashatra) office invariably using tables. Sitting height knee to knee closed and knee-to-knee relaxed along with knee height were considered as important anthropometric measurements for table height and table width. There was positive correlation with table dimensions such as height, width and length and drawer depth of table. Thigh height was negatively correlated with table height, which causes discomfort for worker.

Key words : Anthropometry, Ergonomics, Workspace

Age, sex, geographical regions, even different occupations, all influence human body dimensions. The need for anthropometric data arises because people are different. Anthropometric data can be used as a basis for general standards and specific requirements, in the design of new systems and in the evaluation of existing ones. The reason for applying anthropometric data to the selection of design of tools, equipments, workstation etc. is to make sure that the design can be used easily, comfortably and productively by all workers who will be required to use it (Stoudt, 1981).

Bone, muscle and other minute detailed dimensions of the anatomy are mostly referred to for medical and other necessities. But even while designing products for human use, the external body dimensions are of importance and the anthropometry has to be considered. While designing individual items or products, one has to take into consideration the dimensions of the production, their layout pattern in a given space the ease of reach, their use, etc. to match with the anthropometry of the users (Anderson, 1987).

The worker should have adequate workspaces to perform each of the tasks required by the job. Lack of adequate space is one of the most frequent complaints and individual body size is most crucial and should also be considered in the design of the workstation. Designed furniture can reduce pain and injury, increases productivity, improves moral and decrease complains.

METHODOLOGY

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

RESULTS AND DISCUSSION

Table 1 exhibits correlation between sitting anthropometric measurement with table dimension that the knee height (r=0.36**) had highly positive significant correlation with table height, while table length was noted to have (r=-0.17*) negative significant correlation with knee height. The other two values for table width and depth were non significant. The popliteal height had no significant correlation with the table dimensions. The thigh height(r=0.19**) was positively and significantly correlated with table width and negatively correlated with table length (r=0.22**). While in case of drawer depth (r=0.16*) and table width (r=0.19**) reflected positive significant correlation and highly significant correlation was seen with reference to forearm length (r=0.67**). The table width (r=-0.20**) and drawer depth (r=-0.22**) were negatively highly significantly correlated. The relation of table height(r=0.67**) was positively highly significant for forearm length

A high positive significant correlation was noted for sitting height (r=0.52**) with table height and table width (r=0.62). The drawer depth (r=-0.16*) was found to be negatively significantly correlated with sitting height. Similar trend of results was observed for knee-to-knee closed (r=-0.18**) and knee-to-knee relaxed (r=-0.26**).

Table length had no significant correlation with forearm length. Sitting height (r=0.52**) knee to knee closed (r=0.80**) and knee-to-knee relaxed dimension (r=82**) were found to be highly positively significant.

Correlations between anthropometric measurements and table dimensions are given in Table 2. The results depict highly positive correlation of reach anthropometric measurement with all table dimensions.

Table 3 discloses the information about observed existing table dimensions used and type of table categorized as per their ranges.

Regarding table width, 3 per cent of tables were observed for 103-122 cm category where as 1.5 per cent tables were in 123-140 cm category (Table 3). Table width had only 0.5 per cent tables including under 141-153 cm range. One per cent tables were having 12-35 cm drawer depth. Related to drawer depth, only 0.5 per cent tables belonged to 36-50 cm. and 3.5 per cent tables were included in 51-68 cm category. Regarding table length, 0.5 per cent tables were noted under 28-40 cm category and 2 per cent tables were observed in 41-59 cm range. Two point five per cent tables were noted for 60-76 cm category related with table length. It can be concluded that tables do not have similar dimensions, thus can affect the health of respondents because anthropometry of all user may not be same and there is relation between anthropometric measurements with table (Bendix, 1986).

Thigh height was negatively correlated with table height, which causes discomfort for workers (Carealt and Bishop, 1976).

Conclusion:

Sitting height knee to knee closed and knee-to-knee relaxed along with knee height are important anthropometric measurement to be considered for table height and table width.

Table 1 : Correlation between sitting anthropometric measurements with table dimensions

Sr. No.	Sitting anthropometric measurement	Table height	Table width	Drawer depth	Table length
1.	Knee height	0.36**	-0.04NS	-0.09NS	-0.17*
2.	Popliteal height	0.04NS	-0.01NS	-0.01NS	0.04NS
3.	Thigh height	-0.15*	0.19**	0.016*	-0.22**
4.	Forearm length	0.67**	-0.20**	-0.22**	0.05NS
5.	Sitting height	0.52**	0.62**	-0.16*	0.06NS
6.	Knee to knee closed	0.80**	0.71**	-0.18**	0.04NS
7.	Knee to knee relaxed	0.82**	0.66**	-0.26**	0.04NS

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

Table 2 : Correlations between reach anthropometric measurements and table dimensions

Anthropometric measurements	Table height	Table width	Table depth	Table length	Drawer depth
Girth	0.22*	0.81**	0.77**	0.65**	0.74**
Minimum vertical reach	0.24**	0.69**	0.56**	0.39**	0.47**
Maximum vertical reach	0.20**	0.56**	0.54**	0.34**	0.36**
Minimum horizontal forward	0.20**	0.65**	0.057**	0.61**	0.73**
Span	0.19**	0.61**	0.53**	0.57**	0.69**
Span Akimbo	0.18**	0.66**	0.59**	0.66**	0.85**
Minimum lateral reach	0.30**	0.77**	0.70**	0.68**	0.77**
Maximum lateral reach	0.20**	0.70**	0.65**	0.84**	0.84**
Distance between thigh height to top of table	0.14**	0.72**	0.65**	0.70**	0.83**

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

Table 3 : Observed existing table dimensions

Sr. No.	Table height (cm)	Frequency percentage	Table width (cm)	Frequency percentage	Drawer depth (cm)	Frequency percentage	Table length (cm)	Frequency percentage
1.	72-73	2 (1)	103-122	6 (3)	12.35	2 (1)	28-40	1 (0.5)
2.	74-75	3 (1.5)	123-140	3 (1.5)	36-50	1 (0.5)	41-59	4 (2)
3.	76-78	5 (2.5)	141-153	1 (0.5)	51-68	7 (3.5)	60-76	5 (2.5)

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