

Impact of Institutionalization on Somatotype among Adolescents

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KEYWORDS Emotional. Deprivation. Institutionalization. Somatotype. Adolescents

ABSTRACT The present cross-sectional study was carried out on 1074 subjects (504 emotionally deprived and 570 control ones including both the sexes) from the orphanages and similar economic level educational institutions belonging to the areas of Punjab, Haryana and Chandigarh. From body measurements somatotype components were evaluated. The objective of the present study is to analyze the effect of emotional deprivation on somatotype. The values for endomorphy component were lesser in male and female adolescents in institutionalized than their control coevals with statistically significant differences. The mesomorphy component was almost same in the two groups of males, while in some groups of females, emotionally deprived were more mesomorphic than controls. In ectomorphy, significant differences were observed between two groups of males but females showed non-significant differences.

INTRODUCTION

Emotional means concerned with your emotions and the way you are feeling rather than physical health or condition. Deprivation means that you do not have or are prevented from having something that you need or want (Collins 1987). Deprivation has many faces: the child grows in a culturally and educationally non-stimulating home, handicapped by environmental deprivation; the presence of a non-caring, non-loving mother, tending for maternal deprivation; the child is unloved and rejected by his parents, suffers emotional deprivation; and the child who lives in institutional care yet again experiences emotional deprivation. The destitute children are put up in the orphanages and it can be said that they are emotionally deprived. In the present work, institutionalization and emotional deprivation are used synonymously.

Children come to orphanages not according to their own will but their destiny brings them there. The health problems of children residing in orphanages are complex and clearly related to the sub-standard living conditions in the institutions. Growth failure secondary to emotional deprivation can be transient or sustained depending on the duration of institutionalization. According to Census of India (2001), India has 391,399,591 children in the age range of 0-19 years, accounting for the second largest child population in the world. The unofficial reports present that there are 32 million destitute in our country. While some are eking out a miserable and endangered existence, struggling for survival on streets, at stations or as child labour, a large number are in

orphanages and institutions, which are run either by the government or NGOs. Data regarding orphans and orphans in need is not available in government records. UNAIDS (2006) provides information that in India, the children (0-17 years) orphaned due to all causes by the end of 2005 are estimated to be 25,700,000 as compared to the world estimate of 132,700,000.

Studies on the role of extreme maternal neglect and emotional deprivation on the development of children are exceedingly rare in the last decade of the last century. The effects of bleak care due to institutionalized environment were studied initially by Goldfarb (1945) and Spitz (1945). A longitudinal follow up study by Stock and Smythe (1976), over an 11 year period of emotionally undernourished children exhibited reduced intellectual and physical development. Macovei (1986), a Romanian scientist, assessed the developmental delays of institutionalized children in the district of Iasi from 1976 to 1986. Developmental delays have been reported by Galler and Ross 1993; Johnson and Groze 1993; Benoit et al. 1996; Albers et al. 1997; Aronson et al. 1997; Rutter et al. 1998; Miller 1999; Judge 2003. But no literature is there to depict the comparative account of somatotype of institutionalized adolescents and controls. The objective of the present study is to analyze the effect of emotional deprivation on somatotype i.e. the human physique.

MATERIAL AND METHODS

The present study was based on cross-sectional data collected on subjects ranging in

age from 11 to 17 years, belonging to different areas of Chandigarh (U.T.), Haryana and Punjab. The sampling technique followed was cluster sampling. A total of 1074 subjects (504 emotionally deprived and 570 control ones) were studied. Further efforts were made to study approximately equal number of subjects for the two sexes in the seven age groups. Data were collected from March, 2003 to August, 2004. All the subjects of the present study were examined for a total of 23 anthropometric measurements (height, weight, 8 circumferences, 5 body widths and 8 skinfolds) following the standard techniques described by Lohman et al. (1988). To find out whether the differences observed in the two samples were significant or if were due to random sampling error, t-test was applied.

Although somatotype was developed mainly as a "shape" characteristic, Carter (1980) further described it as a measure of shape – a phenotype of individual body build. The three components of somatotype are endomorphy, mesomorphy and ectomorphy. Endomorphy presumed to describe the relative fatness and the calculations were based on sum of skinfolds with height adjustment. Mesomorphy is conceptualized as representing the relative musculo-skeletal development and is calculated based on bone breadths and limb

circumferences corrected for skinfold thicknesses. Ectomorphy refers to relative linearity of body build. The physique of emotionally deprived and controls has been judged with the help of Heath and Carter (1980) somatotype method. The test of significance (t-test) was applied to observe the magnitude of differences in the three components between the two groups at each level. The three components were evaluated using the equations given by Carter (1980).

RESULTS

The endomorphy component of institutionalized males decreases until 13 years after which it is constant and further decreases 15 years onwards (Table 1, Fig. 1). In their control counterparts, mean values for endomorphy showed a fluctuating trend throughout the adolescent years. The endomorphy values were lesser in male adolescents residing in orphanages than the controls at all age levels, with statistically significant differences. This elucidated lesser tendency towards fatness in emotionally deprived males compared to controls.

The endomorphy component in female adolescents residing in orphanages had almost

Table 1: Mean and t-values of different components of somatotype in males and females of emotionally deprived and control groups.

Age (yrs)	Group Type	Endomorphy		Mesomorphy		Ectomorphy	
		Males	Females	Males	Females	Males	Females
11	ED	2.32	2.66	3.73	2.94	2.03	3.20
	Controls	2.70	2.81	3.55	3.30	2.99	3.27
	t-value	2.38*	1.15	0.82	1.50	2.67*	0.18
12	ED	2.31	2.69	3.09	2.64	2.26	2.77
	Controls	2.90	3.28	3.14	2.80	3.55	3.18
	t-value	3.69***	3.47***	0.22	0.67	3.58**	1.05
13	ED	2.18	2.68	3.62	2.54	3.08	3.22
	Controls	2.97	3.56	2.92	2.20	3.96	3.55
	t-value	4.94***	4.40***	3.33**	1.42	2.67*	1.03
14	ED	2.19	2.68	2.51	2.71	3.86	3.55
	Controls	2.68	3.72	2.11	2.06	4.36	4.05
	t-value	4.08***	5.47***	1.38	2.50*	1.72	1.47
15	ED	2.11	2.72	2.00	2.12	3.97	3.67
	Controls	2.82	4.02	2.04	2.19	4.48	3.43
	t-value	5.07***	5.65***	0.14	0.29	1.89	0.80
16	ED	2.01	3.32	2.20	3.56	3.21	2.95
	Controls	2.84	3.59	2.06	2.04	4.78	2.90
	t-value	5.93***	1.50	0.54	2.00*	6.54***	0.19
17	ED	2.04	3.14	2.04	3.28	3.54	2.96
	Controls	2.59	3.88	2.64	2.86	4.27	2.55
	t-value	3.24**	2.85**	1.82	2.23*	2.21*	1.52

* Statistically significant $p < 0.05$

** Statistically significant $p < 0.01$

*** Statistically significant $p < 0.001$

ED – Emotionally deprived

constant values till 15 years, then an increase followed by a slight decrease (Table 1, Fig. 1). The controls followed a trend of increase till 15 years, then a decrease and further an increase again. The rating of endomorphy was lesser in institutionalized females when compared to controls. This presented relatively lesser fatness in emotionally deprived ones. Statistically significant differences were observed between the two groups except at 11 and 16 years.

The mesomorphy component presents a fluctuating trend in its values in the institutionalized males (Table 1, Fig. 2). The controls followed a trend of decrease over the adolescent years with an increase being observed at 17 years. Although the mesomorphic component was almost the same in the two groups of males, denoting similar musculo-skeletal development but the emotionally deprived had greater values. The differences between the two groups of males were statistically non-significant, except 13 years.

The mesomorphy values decreased throughout the adolescence, with intermittent increase at 14 and 16 years in the emotionally deprived females (Table 1, Fig. 2). Their control coevals also showed a similar trend of decrease with an increase at 15 and 17 years. In some age groups, the emotionally deprived females were more mesomorphic and in others, the controls. Statistically significant differences were observed only at 14, 16 and 17 years.

The ectomorphy factor of males' somatotype increases with age till 15 years, followed by a decrease thereafter in the institutionally deprived males (Table 1, Fig. 3). The controls showed a trend of increase throughout the adolescent years. The component of relative body linearity was greater in emotionally deprived males when compared to the controls. Statistically significant differences were observed between the two groups of males at all age levels except 14 and 15 years.

The values of ectomorphy showed a trend of

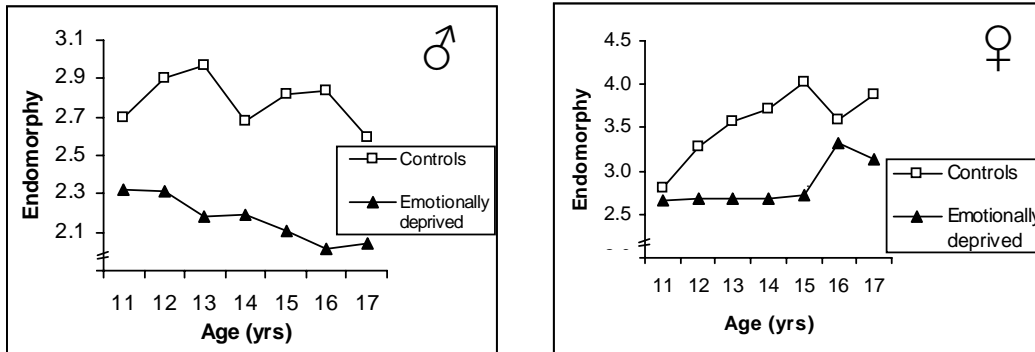


Fig. 1. Endomorphy in males and females of emotionally deprived and controls

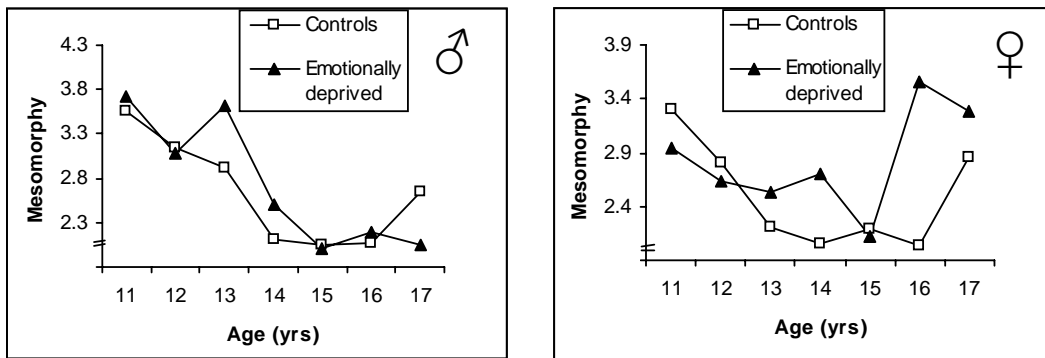


Fig. 2. Mesomorphy in males and females of emotionally deprived and controls

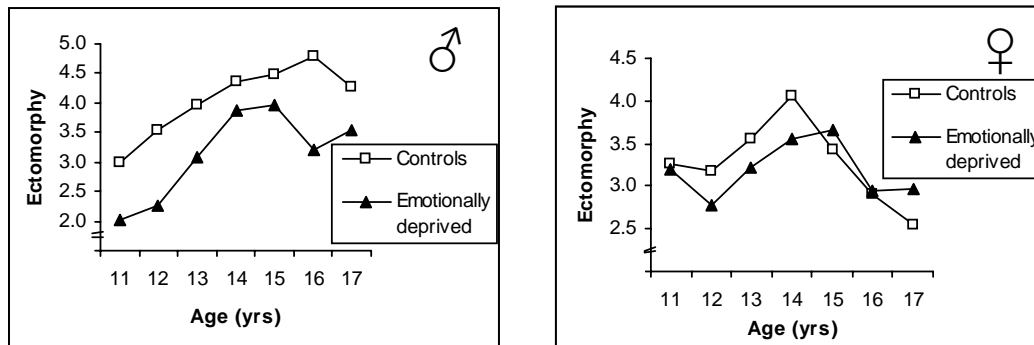


Fig. 3. Ectomorphy in males and females of emotionally deprived and controls

decrease in the initial years, then an increase till 15 years followed by a decrease, after which the values were constant in the female adolescents residing in orphanages (Table 1, Fig. 3). Their control counterparts followed a trend of decrease, then increase and a decrease further on. The females of the two groups did not show marked differences. Thus, the differences were statistically non-significant.

It can well be presented that statistically significant differences were observed for endomorphy component in both sexes and ectomorphy in males. Musculo-skeletal development was practically similar in males and females of both groups.

DISCUSSION

Data on the changes in somatotype with reference to socio-economic differences are meagre (Bodzsar, 1982; Rangan, 1982). Mortan's (1967) report on the Medford boys, aged 9 to 16 years showed that the somatotypes clustered about 3-4-3, with a tendency towards increasing ectomorphy. Rangan's (1982) study elucidated that boys from middle and lower class are more ectomorphic than those from upper class, which had central somatotypes and higher endomorphy. He speculated that low mesomorphy and high ectomorphy for his subjects may be in part genetic and in part due to under-nutrition. Talwar et al. (1994) studied somatotypes of 499 Punjabi girls belonging to higher and lower income groups of Chandigarh. They concluded that higher income group girls were more endomorphic than their lower income group coevals at all age levels (9 to 16 years). The mesomorphic component exhibited a trend of decrease in both the groups. While the lower socio-economic group girls

showed higher mesomorphic rating compared to their counterparts.

This suggests that in the present study, an increase in height, weight and the differences in somatotypes between the two groups are due to an increase in endomorphy among the controls than the emotionally deprived. The mesomorphic ratings were greater in the institutionalized adolescents. The findings are in conformity with earlier studies by Rangan (1982) on boys of Bangalore city and Talwar et al. (1994) on girls of Chandigarh. There is also an indication that the three components of somatotype do not vary on regular basis with age ; they may increase at one age and decrease at the other. This is at par with the findings of Tanner (1970); Kansal (1981) on Jat Sikhs and Baniyas of Punjab ; Eiben (1985) on Hungarian boys ; Bhasin and Singh (1992) on Bodhs and Baltis of Ladakh and J&K and Kumar et al. (1997) on Delhi-born Bengali Kayastha boys.

It can be summarized that good nutrition is not enough for the smooth outcome of emotional development but more important is the element of *joie de vivre* which is enhanced by emotional security itself. Results of the present study elaborate that the emotionally deprived adolescents, on the whole do not grow like their contemporary control counterparts. Importantly, growth in children refers to more than just height and weight patterns but to extends to the other variables including somatotype as well.

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