

A Study Of The Relationship Between Locus of Control And Body Mass Index Of Adolescents Using Ex-Post Facto Research Design.

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Received: July 12, 2018

Accepted: August 20, 2018

ABSTRACT

Every nation in the world is affected by one or other forms of malnutrition. Battling malnutrition in all its forms is one of the greatest and serious global health challenges. Specially among children and adolescents. Health locus of control concerns the beliefs of individuals about the agents acting on their health. It is concerned with the individual's beliefs that either they are responsible for their own health status (internal locus of control), or their state of health is due to chance (chance locus of control) or controlled by 'powerful others'. Therefore, it becomes relevant to study the path from hunger and satiation to an individual's actual behavior that may often be moderated by psychological factors, including locus of control. Since a majority of researches are on the late adolescents and adult population, it would be interesting to know whether the locus of control finds an expression as early as 10-14 years or it expresses only in adulthood. The sample consisted of 250 adolescents and their Body mass index was measured with the help of BMI machine and criteria for measuring BMI was taken from Indian Academy of Pediatrics. Result were computed with the help of SPSS software using ANOVA and Duncan multiple range test. Locus of Control scale by Nowicki and Strickland was used to assess Locus of control of adolescents. It was found that adolescents who were obese scored significantly higher scores on locus of control indicating external locus of control in comparison to underweight and normal weight adolescents, who scored in the score range of internal locus of control. It shows that external locus of control is a provoking factor for developing obesity/overweight at an early age.

Keywords: Adolescents, BMI, Locus of Control, Obesity.

Introduction

Obesity and Underweight are among the top five major risk factors for the global burden of disease (WHO, 2002). In 2016, more than 1.9 billion adults, 18 years and older, were overweight and of these over 650 million were obese. 41 million children under the age of 5 were overweight/obese in 2016. Over 340 million children and adolescents aged 5-19 were overweight/obese in 2016 (WHO, 2016). Similarly, 462 million people are underweight in the world and of these 155 million are undernourished (aged 5 to 15 years) (WHO, 2016). The available data shows that every nation in the world is affected by one or other forms of malnutrition. Battling malnutrition in all its forms is one of the greatest and serious global health challenges. The concept of locus of control based on Rotter, (1966). Wallston, (2005) developed and applied a model specific to health. Health locus of control concerns the beliefs of individuals about the agents acting on their health. It is concerned with the individual's beliefs that either they are responsible for their own health status (internal locus of control), or their state of health is due to chance (chance locus of control) or controlled by 'powerful others' (Tabak, Piyal, Celen, Karakoc & Ozen, 2009; Evans Ogden, 2012). Tucker, Marsiske, Rice, Nielson & Herman, (2011) reported that an internal locus of control recognizes the importance of health being a responsibility of the individual. Several pieces of research evidence have reported some association between eating disorders such as bulimia nervosa, anorexia nervosa, as well as binge eating with a more external locus of control (Lazzeretti, 2015; Froreich, Vartanian, Grisham & Touyz, 2016). In a cross-sectional study, obese girls were found to have a more external locus of control than girls with normal weight (Rao, 2006). The studies of health loci are mostly in the adult population. Mills, (1992) studied 65 adult females and reported that those who had an external locus of control could not control over their unhealthy eating habits. Neymotin, (2014) reported that external locus generally relates more to depression, anxiety and obesity making adolescents more likely to give up instead of persevering and facing the problems related to obesity. Stone & Werner, (2012) reported that externally focused obese individuals receive poorer treatment from dieticians as they express less patience and afford less time on their health behaviors.

Gap identification: The literature and empirical studies have documented the correlation between locus of control and partial spectrum of body mass index. Therefore, it becomes relevant to study the path from hunger and satiation to an individual's actual behavior that may often be moderated by psychological factors, including locus of control. Since a majority of researches are on the late adolescents and adult population, it would be interesting to know whether the locus of control finds an expression as early as 10-14 years or it expresses only in adulthood.

Objective:

To investigate the effects of locus of control on body mass index during early adolescence.

Hypothesis:

The three groups (underweight, normal and overweight) of early adolescents would differ significantly in their locus of control.

Methodology

Research design: The present study has used a quasi-experimental investigation using the ex-post facto approach with contrast group comparison that compared three types of samples: 1. Overweight/obese adolescents with higher than 30 BMI or 85 to 95 percentile 2. Underweight adolescents with lower than 18 BMI or who fall on less than 5 percentile and 3. Normal adolescents who had BMI- 25 to 30 or 5-85 percentile according to Indian Academy of Pediatrics (Khadiolkar & Khadiolkar, 2015).

Setting of the present study:

The present study is a field-based study of a cross-sectional sample from three different private schools of Jaipur city (Rajasthan) to identify children with different body mass index (overweight/obese, underweight and normal).

Sample:

It was a non-probability purposive sample. The selection of the sample of this study was based on the pre-determined criteria of BMI (those who were overweight/obese or underweight or with normal BMI). A total number of 250 students from three different schools of Jaipur city (capital of Rajasthan) were selected. Out of 250 school children, 100 children who measured normal body mass index, 100 children who measured above normal body mass index and 50 children who measured below normal body mass were selected. An equal number of girls and boys in each BMI group of children balanced the gender ratio of this sample. Due to the special relevance of early adolescents in understanding the variables that influence BMI during early adolescence, this study was confined to a sample of students in the age range of 10-14 years (enrolled in class V to IX). The children with normal BMI served as the control comparison group for both above normal and below normal BMI. Equal numbers of students in each category of BMI were selected from each grade and each school to minimize the systematic bias or error variance due to sample selection.

Ethical consideration:

The present study is a simple ex-post facto quasi-experimental research and did not require any clinical trials for altering body mass index of children. Therefore no ethical violation was done. In addition, permission was obtained from the School Principal, Class Teachers' and informed consent from the Parental of the adolescents of this study was obtained through a circular explaining the purpose and procedure of the study. Informed consent from the students' sample was also taken prior to data collection.

Inclusion criteria:

1. Since it is a study of body mass index among early adolescents, children of the age range 10-14 years who were studying in the grades of V – IX were included in the study.
2. This study was restricted to children from three comparable schools with similar standards of education, reputation and fee structure.
3. Only those students and their parents were included in the study who had given the written consent to participate in the study based on the informed decision. Some 20 students/parents amounting to 4% did not respond to our appeal of the study. 20 extra students/parents were contacted depending on the need of the category based on BMI.

Exclusion criteria

1. This study was restricted to three private schools and of grade V-IX, students of higher secondary and children out of school were not included in this study.
2. Those children/parents who did not give the written consent to participate in the study.
3. Those who were taking treatment for certain alignments.

Statistical tool

Contrast group comparison of underweight, overweight and normal weight adolescents was identified and computed with the Analysis of Variance (ANOVA) and Post hoc Duncan multiple range test using LSD method with the help of SPSS software IBM-20.

BMI measuring tool

Body mass index of adolescents was measured by using the BMI machine model (OMRON-HBF 212).

Psychological test

Locus of control scale- Nowicki-Strickland, (1972) it is a self-administered paper -and - pencil scale. Consisting of 41 items further divided as 20 items (for grade 1st to 6th) and 21 items for grades (7th to 12th), that refer to beliefs or causes related to events of daily life, for example, to catch a cold, get good grades in school and be scolded for doing something. Items are answered either yes or no responses with a value of 1-0 being marked next to the question (higher score indicates a more external locus of control). The locus of control scale for children has internal consistency through split-half method $r = .63$ (grades = iii, iv,v); $r = .68$ (grades= vi,vii,viii) ; $r = .74$ (grades = ix,x,xi) $r =.81$ (xii grade) and test-retest reliabilities at grade levels (iii) .63, (vii.) .66 and (x) .71.Permission to use the test was granted from the author through e-mail.

Result

Table: 1.1 Mean, SD, F value, df and level of significance of locus of control of adolescents with different levels of and body mass index

Body mass index	Mean	Std. deviation	F value	"df"	"p" value
Normal	9.19	1.542	450.02	2	.00***
Underweight	9.04	1.862			
Overweight/obese	17.46	2.709			
Significant at = .05*; .01** beyond .01*** N=250					

Table:1.2Duncan multiple range (LSD method) and Level of Significance of locus of control of different level of body mass index of early adolescents

	BMI	Mean Difference	"p" value
Locus of Control	Normal Underweight	.150	.685
	Normal Obese	-8.270	.00***
	Underweight Obese	-8.420	.00***
Significant at = .05*; .01** beyond .01*** N=250			

Present hypothesis explores the association of body mass index with locus of control in early adolescents. Table: 1.1 and 1.2 Shows the mean comparison of locus of control and body mass index of adolescents. The norms of Locus of control scale (Nowicki & Strickland, 1972) were used in this study to interpret the results. The result analysis revealed that adolescents who were obese scored significantly higher scores on locus of control indicating external locus of control (M=17.46) in comparison to underweight and normal weight adolescents, who scored in the score range of internal locus of control (M= 9.04; M=9.19; F=450.02,p<.01). Results show that early adolescents with normal body mass index and below normal BMI were showing internal locus of control. Whereas, adolescents with above normal BMI show a clear trend of external locus of control. Further, the post hoc comparison of Locus of control by Duncan LSD method revealed following results. There was no significant difference found in adolescents with normal BMI and below than normal BMI (mean difference=.150,p>.05). The difference was found to be significant between other two groups - adolescents with normal BMI and higher BMI and adolescents with below than normal BMI and higher BMI (mean difference= -8.270;p<.01; -8.420,p<.01).

Discussion

The locus of control is a person's belief in the amount of control they have in a specific event in their life. An internal locus refers to the belief that one's behavior or stable personal characteristics control specific events or outcomes, while an external locus of control refers to the belief that these events or outcomes are controlled by forces external to oneself (Rotter, 1954). It is considered to be a stable trait, and so it cannot easily be manipulated with increasing age (Rettew & McKee, 2005).

The probable reasons for higher body mass index among early adolescents who develop an external locus of control could be:

Externally focused early adolescent, in principle, have higher levels of cortisol, very likely also affecting their long-term health e.g. developing overweight/obesity (Gale, Batty & Deary, 2008). *Locus of control has emerged as an important psychological variable in relation to obesity because it indicates whether*

an individual believes that his or her environment and choices are under his or her control. Thus, in addition to actual physical cues of hunger or satiation, the ability to interpret those cues appropriately in a given social setting will help in determining how obesity develops and persists in an individual as a result of locus of control (Filippello, Sorrenti, Buzzai & Costa, 2015). The early adolescent with an external locus of control have less patience and are not time focused on their health behaviors such as postponing or withholding temptation to eat and avoid overweight (Holt, Clark & Kreuter, 2001). The famous marshmallow experiment widely used to assess inhibitory control in young children reports clearly that externally controlled children are not able to self-regulate themselves or control their gratification for attractive snacks and consequently run the risk of overweight gradually in life (Schlam, Wilson, Shoda, Mischel & Ayduk, 2013). Some other evidence in support could be that early adolescence with an external locus of control have a victim mentality, in which children blame others for their problems, as a result, it encourages self-loathing and low physical functioning in early adolescent (Wolhunter & Steyn, 2003). Externality on health locus of control scale also shows negative outcomes such as decreased success in losing weight, inability in maintaining the proper diet, avoiding/ ignoring health promoting foods (Lazzeretti, 2015). On contrary, early adolescents with traits of internal locus of control are associated positively with their health (have BMI of 5th- 85th percentile/ normal).

Conclusion

The findings of the present study have suggested that the early years (infant-childhood) are very crucial and associated with positive or negative BMI related health outcomes. If a child is raised with forming healthy relationships with the environment and better control (internal) he is expected to be good and healthy. Conversely, if it is external locus of control it might lead to the unhealthy development like obesity/overeating as compensatory adaptive behaviours of the child in the long run. Future research could explore the long-term impact of locus of control on a wide range of BMI.

Limitation

A similar study with much larger sample from diverse locations of the country with varied demographic specifications enhances the general ability. Multiple regression analysis could further fix the proportion of the variance of individual variables.

Conflict of Interest: The authors declare no conflict of interests.

Source of funding: Self

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