International Journal of Advanced Research and Development
ISSN: 2455-4030
Impact Factor: RJIF 5.24
www.advancedjournal.com
Volume 2; Issue 6; November 2017; Page No. 313-318

Health related quality of life among adolescents

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Abstract
Adolescence is a time of dramatic change in life of every human being. Change in lifestyle and food habits during this time affects both nutrient intake and needs. Psychological and socials aspects of life are emphasized in particular when it comes to health related quality of life among adolescents thereby overlooking and neglecting the physical and health status. The present study was carried to study health related quality of life using the SF-36 and food benefit assessment questionnaire to evaluate the perceived positive and negative outcomes associated with diet and food intake that might be suitable in prescribing specific dietary modification to the target group. In addition, physical activity pattern and stress was also studied. A cross sectional study design was adopted for the study. Two hundred college going adolescent girls aged 18-22 years were selected using purposive sampling technique and were categorised into two groups namely normal weight and overweight group using BMI cut offs. Results indicated that difference in mean mental health scores between the groups was statistically significant ($p<0.05$). Also significant difference was noted in mean scores for vitality and digestive comfort domains by both the groups ($p<0.05$). With regard to physical activity pattern, majority of the subjects did not involve in any form of physical activity. Nearly 70 percent of the subjects in both the groups had moderate level of stress and a significant association was observed between stress and BMI of the subjects ($p<0.01$). Therefore, it is necessary for adolescents to adopt a healthy diet pattern and to perceive its positive effects along with inclusion of some form of physical activity in their daily life.

Keywords: adolescents, nutrition, health related quality of life, positive outcomes

Introduction
The term 'adolescence' is derived from the Latin verb '*adolescere*', which means "grow to maturity." It is a change of development from childhood to adolescence that creates special nutritional requirements for optimal growth and development. Though adolescents are generally perceived to be healthy, studies indicate that young people aged 10-24 years representing 27% of the global population accounts for nearly 15% of global disease burden (Gore *et al*., 2011) [9].

In addition, adolescence is a period that is characterized by significant changes in physical, social and psychological development. Some of the psychological health issues that emerge during this stage are associated with physical health concerns that persist into adulthood leading to poor quality of life (Anderson *et al*., 2006; WHO, 2012) [2, 27]. For instance, Aarons *et al*. (2008) [1] reported that mood disorders among females aged 9-18 years was associated with infectious diseases and respiratory disorders. Physical and mental health contributes to quality of life (Zullig *et al*., 2005) [28]. A Portuguese study also emphasized the strong influence of psychological factors in the HRQoL of children and adolescents both directly and in directly (Gaspar *et al*., 2011) [8]. Studies have shown an association between higher levels of anxiety and depressive symptoms and lower subjective well-being, self-esteem along with psychosocial functioning (Derdikman-Eiron *et al*., 2011) [6]. High level of anxiety is always associated with higher depression, sadness and low self-esteem (Moksnes and Espnes, 2012; Lambert *et al*., 2014) [17, 15].

Greater happiness and life satisfaction are associated with better physical and mental health (Simoes *et al*., 2008) [24]. Research suggests the existence of a close relationship between the HRQoL of adolescents and their mental health along with positive psychological dimensions such as happiness or subjective well-being (Gaspar *et al*., 2008) [7]. Assessing and observing adolescent's health in terms of physical, social and psychological aspects is essential as it helps to detect the problems, provides intervention and also prevents the development of long term consequences (Kieling *et al*., 2011) [13]. Health related quality of life (HRQoL) is a subjective and multi-dimensional concept that measures physical, occupational function, psychological state, social interaction and somatic sensation aspects of life (International Society for Quality of Life Research, 2015) [12] that is often seen as a useful indicator of health outcomes (Vami *et al*., 2005) [26].

Adolescents are often labelled as "difficult to manage" when it comes to dietary and eating habits as they have extremes of unhealthy dietary habits, the most common being consumption of junk foods and skipping breakfast. This kind of dietary practice cause lot of nutrient deficiencies, increases the risk of chronic illness in their later life and also results in psychological problems such as depression, anxiety and stress. The concept of using a questionnaire to examine the impact of food on HRQoL to be evaluated is innovative. Most often psychological and social aspects are emphasized in particular when it comes to health related quality of life thereby

overlooking and neglecting the physical and health status. In the present study, health related quality of life was assessed using the food benefit assessment questionnaire to evaluate the perceived positive and negative outcomes associated with diet and food intake that might be suitable in prescribing specific dietary modification to the target group.

Methodology

Design of the study and study population

A cross sectional study design was adopted for the study. Two hundred college going adolescent girls aged 18-22 years were selected using purposive sampling technique. The study was conducted for a period of five months (November 2016 – March 2017). The subjects were categorised into two groups namely normal weight and overweight girls based on BMI cut off as it is an age independent anthropometric criteria (Misra *et al*., 2006) [16].

Criteria for sample selection

1. Willingness to participate in the study.
2. Subjects with BMI between 18.5 to 22.9 kg/m^2 for normal weight subjects and BMI between 23-24.9 kg/m^2 for overweight subjects.
3. Subjects with food allergies and who are on restrictive diets.
4. Subjects with eating disorders such as anorexia nervosa, bulimia nervosa and binge eating.

Ethics and Consent

The study protocol was approved by the Independent Institutional Ethics Committee (approval number: WCC/HSC/IIEC-2016:63) organized by Department of Home Science, Women's Christian College, Chennai, India. The participants were informed about the aim as well as the anticipating benefits of the study. In addition, they were asked to provide an informed consent prior to their participation in the research.

Tools used for data collection

A questionnaire was used to elicit the necessary data required for the study. It had two parts. Part I included questions about socio-demographic profile such as age, educational qualification, socio-economic status and type of family. Part II included questions on the following aspects such as

a) Quality of life

Quality of life was measured using the Short Form Health Survey (SF-36). The SF- 36 is a generic instrument that consists of eight subscales: physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health. Scores in each subscale range from zero to 100, with zero representing the worst score and 100 representing the best possible score. Previous evaluations of the original as well as the Persian version of the SF-36 indicated good reliability and construct validity (Montazeri *et al*., 2005) [18].

b) Food Benefit Assessment

The food benefit assessment questionnaire developed by (Guyonnet *et al*., 2008) [11] was used in the present study. It contains 41 items that covers the following 7 domains such as:-

1. Vitality (10 items)
2. Digestive discomfort (9 items)
3. Well –being (6 items)
4. Disease prevention (6 items)
5. Aesthetics (5 items)
6. Snacking (2 items)
7. Physical appearance (3 items)

Additional Measures

Physical activity index score

Physical activity pattern was assessed using the physical activity index score developed by (Sharkey and Gaskill, 2006) [23] to understand the current activity level of the subjects. As the intensity, duration and frequency of exercise increases, the index score and fitness also rises. A score of 40 or more on the activity index is an indication that the individual is active enough to earn many of the health benefits associated with physical activity. If the index score is below 40, the individual should begin to increase the daily activity levels.

Perceived stress scale (PSS)

Stress level of the subjects was assessed using perceived stress scale (PSS) developed by Cohen *et al*. (1983) [5]. It consists of 14 items that includes questions about participant's stressful thoughts or feelings related to situations in their life within the last month. Each item is rated on a 5-point answer scale ranging from 0: "never" to 4: "very often." The PSS scores ranged from 0 to 56, with the higher scores indicating higher levels of perceived stress and the lower scores indicating lower levels of stress.

Statistical analysis

The data obtained was coded and entered into MS excel 2010. All statistical analysis was performed using SPSS (Statistical Package for Social Sciences). Descriptive statistics was used for socio-demographic variables. Student 't' test and chi-square test were used. Statistical significance was accepted at ($p<0.05$) or ($p<0.01$).

Results and Discussion

Table 1: Distribution of subjects based on demographic profile

Particulars		Normal weight N=100	Overweight N=100
Age	<20	43	52
	>20	57	48
Educational qualification	Undergraduates	46	50
	Postgraduates	54	50
Socioeconomic status	Upper Class	33	28

	Middle class	67	72
Family type	Nuclear	78	64
	Joint	20	32
	Extended	2	4

In the present study the age of the adolescent girls who participated in the study ranged between 18-22 years. With regard to educational qualification 50 percent of the subjects were undergraduates while the remaining 50 percent were post-graduates. Socioeconomic status depends on a combination of variables such as occupation, education and income Revised Kuppuswamy's socioeconomic status scale given by Charu *et al*. (2015) [4] was used to study the socioeconomic status of the subjects. From the above table, it can be observed that about 67 percent and 72 percent of the subjects in normal and overweight group were categorized under middle class respectively. Only a small percent of the subjects belonged to lower middle class. A higher percent of overweight (64%) and normal (78%) subjects were from nuclear family.

Table 2: Comparison of SF-36 scores between normal weight and overweight adolescent girls

Domains		**Mean ± S.D**	**'t' value**	**'p' value**
Physical Functioning	Normal weight	63.00±32.27	-1.196	.233^{NS}
	Overweight	68.00±26.55		
Role Limitations Physical	Normal weight	54.10±31.01	1.632	.104^{NS}
	Overweight	61.15±30.01		
Bodily Pain	Normal weight	68.15±23.83	.591	.555^{NS}
	Overweight	66.25±21.83		
General health	Normal weight	65.40±17.16	-.665	.507^{NS}
	Overweight	67.40±21.87		
Vitality	Normal weight	57.00±19.56	.407	.685^{NS}
	Overweight	55.80±22.07		
Social Functioning	Normal weight	62.00±25.24	-.581	.562^{NS}
	Overweight	64.25±29.35		
Role Limitation Mental	Normal weight	47.60±29.28	-.298	.766^{NS}
	Overweight	48.90±32.36		
Mental Health	Normal weight	58.46±14.67	-4.114	.000**
	Overweight	66.93±14.43		

** Significant at p<0.05
NS – Not significant

The mean score on health aspects of life is presented in Table 2. Results indicate no significant differences between mean scores on physical functionality, bodily pain, health perception, energy and social functionality. From the above table it is clear that the difference in mean mental health score between both the groups was statistically significant (p<0.05). It is necessary for adolescents to pay attention to their physical and mental health and examine their emotions to avoid onset of stress-induced depression or physical disorders.

Table 3: Comparison of mean scores on health using food benefit assessment domains

Domains		**Mean ± S.D**	**'t' value**	**'p' value**
Vitality	Normal weight	53.35±10.25	-2.813	.005**
	Overweight	57.15±8.67		
Digestive Comfort	Normal weight	21.95±10.28	-9.294	.000**
	Overweight	34.67±9.04		
Disease Prevention	Normal weight	67.05±15.59	2.903	.004**
	Overweight	60.95±14.10		
Well-being	Normal weight	55.12±13.71	-2.536	.012^{NS}
	Overweight	60.58±16.69		
Aesthetics	Normal weight	70.30±14.01	-1.612	.108^{NS}
	Overweight	73.80±16.56		
Physical Appearance	Normal weight	61.83±17.81	2.057	.041^{NS}
	Overweight	56.60±18.16		
Snacking	Normal weight	44.62±24.24	-1.391	.166^{NS}
	Overweight	49.50±25.31		

** Significant at p<0.01
NS – Not significant

In the present study dietary effects and its impact as perceived by adolescent girls was assessed using the new food benefit assessment questionnaire. Though overweight subjects were found to have the highest scores for most of the aspects on the FBA scale when compared to healthy subjects, significant difference was noted only in vitality and digestive comfort domains ($p<0.05$). The mean score obtained for disease prevention by normal weight subjects was significantly higher when compared to overweight subjects ($p<0.05$). The results of the study clearly portraits that physical appearance and digestive comfort are factors that determine the dietary habits and also the type of food consumed by individuals. The mean score obtained for snacking by overweight subjects was high when compared to their counter parts. Absence of snacking or snacking health foods can be considered as part of a healthy diet pattern that can have a positive impact on their physical appearance.

In accordance to the Health Belief Model, which states that benefits have to be perceived for someone to adopt a healthy or preventive behavior, it is more likely indeed that individuals should be more willing to adopt a healthy nutritional behavior if they can perceive its positive effects and are satisfied with it (Rosenstock, 1966; Rosenstock, 1974) [20, 21].

Table 4: Percent distribution of subjects based on physical activity scores

Physical Activity Index Score			Normal weight	Overweight
Evaluation	**Fitness category**	**Scores**		
Very active Lifestyle	High	100	0	0
Active and healthy	Very good	100-80	0	0
Active	Good	60-80	0	4
Acceptable	Fair	40-60	7	13
Not good enough	Poor	20-40	19	20
Sedentary	Very poor	<20	74	63

It is evident from the above table that majority of the subjects were found to lead to a sedentary lifestyle. About 19 percent and 20 percent of the normal and overweight subjects scored poorly on the physical activity rating scale indicating the need to engage in regular physical exercise.

Physical inactivity sometimes continues from adolescence to young adulthood (Troiano *et al*., 1995) [25]. Being physically inactive specially watching TV for several hours along with snacking is an important biological determinant of obesity (Gortmaker *et al*., 1996) [10]. On the other hand, regular physical activity is associated with enhanced health and well-being, improves functional status, cardiovascular risk factor profile, psychological status and quality of life in individuals (Raitakari *et al*., 1994) [19].

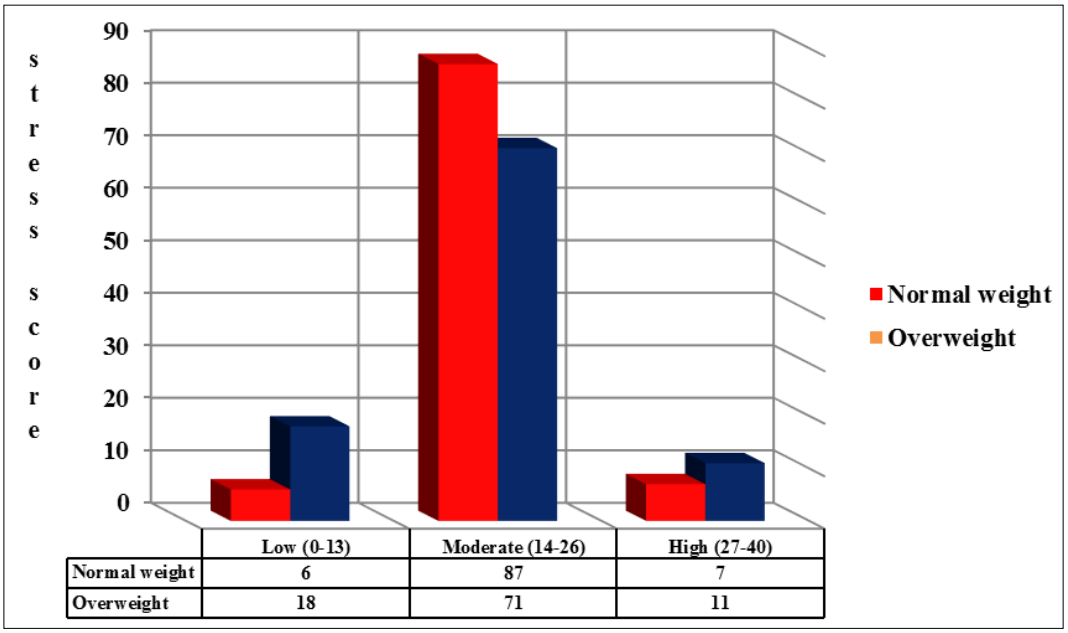

Fig 1: Distribution of subjects based on stress level

Stress is considered to be an inevitable part of life that can have a significant impact on long term physical and mental health. Adolescent stress is a pivotal health issue because of its abilities to disrupt an adolescent's capacity to handle demands of daily life (Chandra and Batada, 2006) [3]. Based on the stress scores obtained, it is clear that majority of the subject (87%) of normal weight girls and (71%) of overweight girls had moderate level of stress. Only a small percent of subjects reported to have high level of stress. Subjects reported academic pressure as the main source of stress in the present study. Krenke *et al*. (2009) [14] also reported that academic achievements contributed to stress among

adolescents. Other caustic factors inducing stress among adolescents include arguments with parents, relationship with opposite sex, peer pressure, peer influence, death of family members and dissatisfaction with physical appearance (Chandra and Batada, 2006) [3].

Table 5: Association between Stress and BMI

Stress level	Normal weight	Overweight	Chi-square Value	p value
Low Stress	6	18	8.509	.014**
Moderate Stress	87	71		
High Stress	7	11		

** Significant at p<0.01

From the above table it is clear that a significant association was observed between stress and BMI of the subjects (p<0.01). People with long term stress may be more likely to be obese. Scott (2013) [22] in his study also observed a significant relationship between BMI and stress (p<0.01). Chronic stress can cause body to release excess cortisol, a hormone known to increase appetite and cravings for sugary or fatty foods. During this period one may over eat resulting in increase in weight.

Conclusion

In short, the present study was carried out to evaluate the overall health related quality of life using the new food benefit assessment among overweight and normal adolescent girls as adolescence is a period where adolescents are prone to suffer from both psychological and physical health problems. One of the health problems includes change in eating habits. Hence it is necessary to identify and address these issues to prevent it to continue to adulthood. The results indicate that there is a relevant distinction in perceptions of health related quality of life (HRQoL) between normal weight and overweight adolescent girls and they should be taught how to adopt healthy eating habits. The results obtained in this study create a platform for carrying out new lines of research in adolescence on various insights such as health and well-being of adolescents to ensure that they would have a healthier and happy progression into adulthood.

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