# TRENDS IN PHYSICAL ACTIVITY, DIETARY BEHAVIOUR AND BODY MASS INDEX AMONG DOGRA ADOLESCENTS

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# RESEARCH ARTICLE

# TRENDS IN PHYSICAL ACTIVITY, DIETARY BEHAVIOUR AND BODY MASS INDEX AMONG DOGRA ADOLESCENTS

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## ABSTRACT

**Background:** The present age has witnessed many life style changes resulting into multifarious health issues, especially among the younger age groups. During this period, adolescent becomes more independent and have increased access to food choices apart from those available at home. It is also in this period that adolescents increase their social interactions with peers of similar age and develop individual eating habits and physical-activity patterns.

**Objectives:** Determine the physical activity, dietary intake and BMI and compare with standardised values for any deviation.

**Methods:** Sample of the study comprised 100 school going adolescents (divided equally across gender) belonging to Dogra community of urban area of Jammu city. Purposive sampling technique was used to select the sample. The tools used for the study included anthropometric measurements, 24 hour dietary recall method , seven day Global physical activity questionnaire developed by WHO and socio economic status scale.

**Results:** The sample adolescents were short in their height when compared with standard height for age. Even when compared for weight, majority among sample adolescents were underweight. Respondents were consuming less than standard RDA and skipped one of their basic meal. Majority of sample (girls outnumbered boys) was following sedentary lifestyle.

**Conclusion:** The high prevalence of sedentary behaviours, physical inactivity and unhealthy dietary habits among adolescents is a major public health concern. There is an urgent need for national policy promoting active living and healthy eating and reducing sedentary behaviours among children and adolescents.

## INTRODUCTION

The current health scenario worldwide is depicting the major public health challenge of non communicable diseases (NCDs). Mortality, morbidity, and disability due to major NCDs account for about sixty percent of all deaths and forty seven percent of the global burden of disease. In South Asia, half of the disease burden is attributable to NCDs. According to the WHO health report (2005) many low and middle income countries are now facing a "double burden" of the disease. On one side they continue to deal with the problem of under nutrition, at the same time they are facing threats of obesity. According to the UNICEF Global Report card on adolescents 2012, 47% of adolescent girls aged 15-19 in India were underweight with a body mass index of less than the prescribed level of 18.5. The south Asia region as a whole fared badly on the body mass index level with Bangladesh and Nepal having 35% and 26% underweight girls respectively (http://www.dnaindia.co m/in dia/report-adolescent-report-card-47-indian-girls-unhealthy-1682342). Health status of young population is a matter of concern in the present times. Sedentary lifestyle coupled with inappropriate eating habits are largely responsible for this state of affairs among adolescents. Adolescents are the most valuable resource and its best hope for the future, it is indeed true that the future is in the hands of the young generation. Hence the health and wellbeing of this generation go a long way in nurturing them into better adults. Adolescence is a period when peer pressure can effect teenage eating behavior and they may start skipping meals or possible under eating or over eating. Behaviors such as extreme dieting, binge eating and bringing up food on purpose also affect more teenager than adults and more girls than boys (Bundy *et al* 2011). Poor lifestyle factors are thought to account for deviation from standard BMI for height, indirectly affecting the clustering of non communicable disease risk factors. Lifestyle factors such as eating unhealthy foods and physical inactivity may contribute to the development of overweight status in adolescents (Goran, 2001; Hill & Melanson, 1999).

The present research has been undertaken to study interrelation between body mass index and selected lifestyle variable among adolescents residing in Jammu city of J&K state. Culture has played a crucial role in human evolution. Today's world is characterized as a single global-scale culture, in which people

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are linked together by industrial technology and markets of commercial exchange. But the apparent variation among cultures proves that every human society has its own particular culture or socio-cultural system consisted of language, ideas, beliefs, customs, taboos, codes works of art, rituals, ceremonies, symbols etc. so is the Dogra culture; the culture of the people of "Duggar Pradesh". Politically, this region is called Jammu division of Jammu and Kashmir state of India ,one of the three regions of the state and the city of Jammu is the winter capital of the state(the summer capital being Srinagar, in the Kashmir Valley). Dogras live a simple living – simple dress and simple food. As this region has two main terrains : hilly and plain. And both are climatically different so the food habits of the people are also different. Wheat and millet are staple food besides Rice, Cereals & Maani, the whole dish is called Daal-Bhatta-Maani and in hilly belt maize is staple food besides Rice, cereals and local vegetables. Mitha Madra, Shree Pulao, Auria, Ambal, Ghyur, Succhiya, Sakaran, Cchile etc. are delicacies prepared, especially during ceremonial and seasonal cooking. Non- vegetarian food was limited to Rajputs only. Khatta Meat – mutton cooked with sour pomegranate seeds or lime juice and flavoured with fumes of a burning charcoal soaked in mustard oil is the specialty of Dogra cuisine (http:/www.dogri.org/tag/dogra-culture, retrievedon 2-10-2014).

While many studies on relationship between health status and lifestyle variables have been undertaken at the national and international levels, no study on this aspect has been in Jammu district (J&K) as per published data. This study is expected to provide data regarding the health risks and associated risk factors among adolescents of Jammu and suggest viable solutions for the problems being faced by them.

## RESEARCH METHODOLOGY

The sample of the study comprised of 100 adolescents (divided across the gender) falling in age group of 16-18yrs and residing in urban Jammu. Sample adolescents was selected using lottery method for various schools of urban areas of Jammu city.

### *The following criteria was considered for the sample selection:*

1. Only respondents from urban areas of Jammu district belonging to Dogra community were selected for the study.
2. Respondents between the age group of 16-18years were included in the sample.
3. Respondents who fall in the SES group (high and middle income) were selected.

### *Tools used*

### *Assessment of body mass index*

- Anthropometric measurements including height, weight and BMI (Qutlet index). The calculations were compared with WHO (2010) standard.

### *Assessment of selected lifestyle variables*

- 24 hour recall method (dietary intake) – An informal, qualitative method in which you ask to recall all of the foods and beverages that were consumed in the last 24 hours, including the quantities and methods of preparation. An advantage of this method is that dietary information is easily obtained. It is also good during a first encounter with new subjects in which there is no other nutritional data. Subjects should be able to recall all that they have consumed in the last 24 hours.
- 7-day global physical activity questionnaire developed by WHO – The global physical questionnaire was developed by WHO for physical activity surveillance in countries. It collects information on physical activity participation three settings or domains and sedentary behavior. These domains are:

  o Activity at work
  o Travel to and fro places
  o Recreational activities

## RESULTS AND DISCUSSION

The data collected from sample adolescents (16-18yrs) of Jammu district was analyzed and presented with the help of tables under the following headings:

1. Anthropometric measurements of the sample group
2. Dietary information among sample group
3. Level of Physical activity among sample adolescents

### *Anthropometric measurements of the sample group*

Anthropometric measurements are the most widely used measure to assess health status. They are concerned with the measurement of the various physical dimensions and gross composition of human body. Lambert Qutlet (1935), the Belgian astronomer and statistician was the person who coined the word anthropometry which is now universally accepted method of physical growth studies. In the study, anthropometric measurements was used for assessing the health status of adolescents:

HEIGHT– Height of the adolescents was measured by using a standard anthropometric rod. The adolescent has been asked to stand erect barefooted, with feet together and heels back against the wall. A slight upward pressure was applied below mastoid process to make Frankfurt plane horizontal. A piece of cardboard was used for crushing hair gently and mark made on wall. Reading was taken by placing the tape from edge of wall the mark. The record was taken to the nearest 0.5cm.

WEIGHT – To record the weight a portable weighing scale was used. The subject was made to stand on the said machine barefooted. Weight was recorded to nearest 0.5kg.

BMI – After recording height and weight of the sample, body mass index was calculated using Quilt's index/formula:

BMI = weight (kg)/height (m)$^2$

The calculations were compared with WHO standard.

| category | bmi range[kg/m$^2$] |
|---|---|
| Very severely underweight | Less than 15 |
| Severely underweight | 15.0 – 16.0 |
| Underweight | 16.0 – 18.5 |
| Normal | 18.5 – 25 |
| Overweight | 25 – 30 |
| Obese 1 | 30 – 35 |
| Obese 2 | 35 – 40 |
| Obese 3 | >=40 |

"BMI Classification". Global Database on Body Mass Index. World Health Organization. 2006. Retrieved July 27, 2012.

**Table 1** Height (in cms) of sample adolescents

| Gender | NCHS (height in cms) | Height of sample in cms | t-value | Prob-value | Inter gender t-value | Inter gender p-value |
|---|---|---|---|---|---|---|
| Girls | 163 | 157.7 | 3.69 | 0.00** | 3.01 | 0.00** |
| Boys | 176 | 163.2 | 9.80 | 0.00** | | |

*Df-49*

Table 1 reflects Comparison between mean height of sample adolescents with standard height for age (National Centre for Health Statistics 2014). Data analysis revealed a highly significant difference (P<0.01) between height of sample adolescents and NCHS values. The sample adolescents were short in their height.

**Table 2** Weight (in kgs) among sample adolescents

| Gender | NCHS (weight in kgs) | weight of sample | t-value | Prob-value | Inter gender t-value | Inter gender p-value |
|---|---|---|---|---|---|---|
| Girls | 54 | 50.38 | 2.74 | 0.00** | 3.22 | 0.00** |
| Boys | 64 | 54.86 | 5.35 | 0.00** | | |

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Table 2 depicts Comparison between weight of sample adolescents with reference weight (National Centre for Health Statistics). When statistically analyzed the p-value was highly significant for both boys and girls. Majority Sample adolescents were underweight.

From table 1and 2 it was concluded that majority of the sample adolescents were stunted in growth.

**Table3** Distribution of sample according to body mass index based on WHO (2006) parameters.

| Category based on WHO, 2006 | BMI | Sample girls(50) | Sample boys(50) | Total (100) |
|---|---|---|---|---|
| Very severely Underweight | Less than 15 | 1 | - | 1 |
| Severely underweight | 15.0 – 16.0 | 3 | 2 | 5 |
| Underweight | 16.0 – 18.5 | 18 | 15 | 33 |
| Normal | 18.5 – 25 | 23 | 25 | 48 |
| Overweight | 25 – 30 | 3 | 8 | 11 |
| Obese 1 | 30 – 35 | 2 | - | 2 |
| Obese 2 | 35 – 40 | - | - | - |
| Obese 3 | >=40 | - | - | - |
| TOTAL | | 50 | 50 | 100 |

Table 3 reveals that less than half of the sample adolescents were having normal BMI (18.5 – 25). 33% of the sample adolescents were underweight, while 5% of the adolescents were severely underweight. Only 11% of sample adolescents were overweight and 2% obese. Among sample boys 50% under normal category while 30% were underweight. 16% of

boys were overweight, while no sample boy was found obese. Among sample girls 36% were underweight. Even 6% girls were severely underweight and 2% were v severely underweight. Only few girls (4%) were falling under obese category.

The sample adolescents were stunted. Most of the sample students were under weight. Few sample girls were severely stunted. No sample boy was hseverely underweight.

*Dietary information among sample group*

An informal, qualitative method was used to collect dietary information. Sample adolescents were asked to recall all of the foods and beverages that were consumed in the last 24 hours, including the quantities and methods of preparation. An advantage of this method is that dietary information is easily obtained.
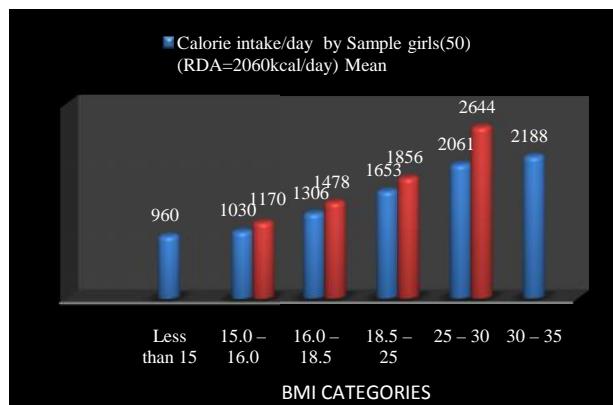


**Fig 1** Average Calorie intake per day by sample adolescents as per BMI

Values mentioned in bars indicate kcal/day
Blue bars indicated value of sample girls
Red bar indicate value of sample boys

Fig 1 showed that sample adolescents who were under weight were consuming less than required dietary allowances per day. Even sample adolescents who were under normal category of BMI were consuming less than required calories. Their BMI may be attributed to their sedentary lifestyle. Sample boys who were overweight and obese were consuming more calories than required dietary allowances per day. This was also observed that sample adolescents were consuming ready to eat foods rather than homemade food.

**Table 4** Meal Intake by sample Adolescents

| Food items | Girls | Boys |
|---|---|---|
| Junk Food | 70% | 75% |
| Homemade | 30% | 25% |
| Skipped meal | 35% | 40% |
| Water intake /day | 4-5glasses | 7-8glasses |

Fig 4 shows that majority of sample consumed junk food on daily basis (including carbonated beverages also). Even besides consuming junk food, they were skipping their meals (one of the three major meal, particularly breakfast) and do not carried lunch packs to their schools. Less than 50% of the sample adolescents were having solely home made food. Even sample adolescents were not having proper water intake too. Sample girls were having only 4-5 glasses of water on average day. It was little better on boys side, as they had nearly 7-8 glasses of water per day. Sample girls felt not being thirsty and sample

boys were consuming more glasses during sports or outdoor activities.

### Physical Activity among Sample Adolescents

To obtain data on physical activity The 'global physical questionnaire developed by WHO' for physical activity surveillance in countries was used.

**Table 4** Physical Activity Level Among Sample Adolescents

| Level of physical activity | Girls(50) | Boys(50) | %age |
|---|---|---|---|
| High | 2(4%) | 8(16%) | 10(10%) |
| Moderate | 13(26%) | 20(40%) | 33(33%) |
| Low | 35(70%) | 22(44%) | 57(57%) |
| Total | 50 | 50 | 100 |

Chi square= 8.05, df= 2, p value=0.01*

Table 4 depicts that boys were more active than the sample girls. They were involved in sports and recreation activity and their sitting hours were less than as that of girls. More than half of the sample adolescents were physically less active. The sample adolescents who were having moderate activity level were either involved in some recreation activity or were bicycling or walking to school. Sample adolescents who were highly active were involved in some type of sports activity. The data was statistically analyzed. There was significant difference in physical activity level of sample boys with sample girls (p<0.05).

## CONCLUSION AND SUGGESTIONS

### The major findings of the research study

- Anthropometric measurements revealed that 48% of sample adolescents were having normal BMI.
- 33% Sample adolescents were underweight and only 11% sample adolescents were overweight. Majority were having stunted growth when compared with NCHS standards for height and weight. A similar study having lower SES was conducted in an urban slum of Varanasi at govt. and private schools of Tamilnadu, where study subjects were suffering from chronic energy deficiency and stunting was present in adolescent girls(Singh & mishra 2001; Parimalavalli and Sangeetha 2011).
- When compared between sample boys and girls, results were also highly significant for both height and weight. Boys were taller and having more weight than girls of same age group, as expected.
- Results of the study were well supported by findings from many studies done at national and international levels. Children and adolescents are eating more food away from home, drinking more sugar-sweetened drinks, and snacking more frequently. Adolescents are getting more of their food away from home. Energy intake from away-from-home food sources increased from 20 to 32 percent from 1977-1978 to 1994-1996 (Lin *et al.*, 1999). There has been a decline in breakfast consumption - especially for children of working mothers (Nielsen and Popkin, 2003). Research indicates that a decrease in daily energy expenditure without a

concomitant decrease in total energy consumption may be the underlying factor for the increase in childhood obesity. Watching television, using the computer, and playing video games occupy a large percentage of adolescent's leisure time, influencing their physical activity levels. In urban areas, space for outdoor recreation can be scarce, preventing kids from having a protected place to play; neighborhood crime, unattended dogs, or lack of street lighting may also inhibit children from being able to walk safely outdoors; and busy traffic can impede commuters from walking or biking to work as a means of daily exercise (Macbeth, 1999).

The need of the hour is to determine strategies to prevent the occurrence of underweight as well as overweight and nutritional deficiencies among children in order to increase their capacity in education as well as extracurricular activities to enable them to grow into complete individuals, with mental as well as physical health.

This requires concentrating both at home and at school where children spend most of their time. Encouraging physical activity and healthy dietary habits, such as increasing fiber intake, reducing the consumption of junk food and saturated fat and increasing levels of physical activity like outdoor games, cycling, swimming, walk, running etc, can prove beneficial for health.

### Acknowledgement

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