

**THE DILEMMA OF OVER- AND UNDER- NUTRITION COEXISTENCE  
AMONG WESTERN KENYA CHILDREN**

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## ABSTRACT

Kenya can be considered a relatively better developed country among the sub-Saharan African ranks in terms of social services and yet malnutrition (under-nutrition) is still persistent and on the increase as shown in all nutrition and other surveys carried out in 1977, 1979, 1982, 1983 and 2003. Following these reports, a comprehensive survey was carried out in 2000 to explore all developmental and nutritional issues in Western Kenya, particularly the villages on the eastern shores of Lake Victoria. A comprehensive survey was carried out to explore any health/developmental issues that might have existed in this target group, particularly the school age children. Of the many developmental issues investigated, nutrition concerns were top priority. The analysis of the nutritional component of the survey confirmed coexistence of stunting and over-weight among the surveyed children. However, the impact was more pronounced in boys whereby their respective height- for- age indices were  $\leq$  5<sup>th</sup> centile of the WHO standard reference population and those of the girls were ranging between 5<sup>th</sup> and 25<sup>th</sup> centiles. Concomitantly female children (70%) were more overweight than the boys (42%) in terms of weight- for- age, which can be recognised as a nutrition problem related to child developmental issues. It is also known that childhood obesity and/or overweight have positive correlations to later adult life episodes of degenerative diseases like diabetes mellitus, coronary health diseases and hypertension. On the part of the parents and/or care-givers, about 57% were familiar with growth charts and their respective interpretations indicating more frequent visits to health care centres and posts. From the above findings it can be extrapolated that Kenyan infants/children at the surveyed area are in the midst of nutritional transition. Therefore, local authority's intervention at this critical stage of the subject children's life-cycle is needed to secure the desired child growth trajectory for better health outcomes.

**Key words:** Stunting, overweight, growth-reference, western Kenya

## BACKGROUND

Kenya can be considered a relatively better developed country when compared with other sub-Saharan African countries in terms of social services and yet malnutrition (under-nutrition) is still persistent and on the increase as indicated in all nutrition and other surveys carried out in 1977, 1979, 1982, 1983 and 2003. These surveys pointed out that the hard hit areas were: Coast, Nyanza and Western provinces [1,2,3,4]. According to UNICEF, Kenya fares better in nutrition when compared to other East African countries like Uganda and Tanzania [5]. For instance, UNICEF (2006) reports severe underweight per 1000 children for under-fives (U5s) in Kenya is zero, 4 in Uganda and 7 in Tanzania. In Kenyan terms, however, under nutrition poses a challenge in rural areas such as those of western Kenya [6]. This hypothesis was the basis of this paper, though conducted in 2000, and will sieve out information from a grand questionnaire administered in three locations in Kisumu district of western Kenya.

The comprehensive survey was carried out to explore developmental issues that might exist in this target group, particularly school age children. Of the many developmental issues investigated, nutrition concerns were one of the top priorities. The project area is far from main provincial cities and towns and it was hypothesized that nutritional status of local children could be problematic whereby clinical and health records of Mother and Child health centres (MCH) and other health care facilities were used as the best sources of information. It is also worth mentioning that detection of developmental problems at an early stage would help health care personnel and others involved to rectify the problems effectively [7,8,9,10,11,12]. The outcome of the survey could help those institutions involved in child care projects as well as regional social offices for the welfare of children under similar conditions throughout the developing countries.

## Objective

The main objective of this study was to detect any health and developmental child growth predicament particularly those that could be attributable to nutritional deficiencies in the project area. The immediate objective was to identify any health, growth and nutritional problems in the research area, particularly in school age children. The outcome of this particular objective was designed to alert local authorities (community leaders and local government officials) and NGOs (mainly faith-based organizations) involved in child and mother care to tailor their respective intervention programmes among other indicators along the findings.

## Methods

Both qualitative and quantitative structured questionnaires were designed to capture information related to health status, and indicators that have a bearing on the well being of the mother and child, and the youth. The survey questionnaires were organized to collect information on the following:

- Household incomes, land owned, rent, water and sanitation, occupation of head of household and respondent mother, mother's education;
- Knowledge of mothers about control and management of malaria, acute

- respiratory infection (ARI), diarrhoea and dehydration;
- Antenatal care, place of delivery and assistance during delivery and family planning;
  - Community satisfaction of health care services offered by the various health facilities and their suggestions for improvement of health services;
  - Immunization status of children aged 12-23 months including the coverage rates of BCG, DPT1-3, Polio1B 1-3 and Measles;
  - Child nutritional status and growth monitoring, Knowledge of HIV/AIDS, practices, behavioural changes (youth both in and out of school and households);
  - Sex patterns/life of the youth in and out of school;
  - However, this part of the study will emphasize school age children's growth and well being, particularly indicators of growth trajectory tools of anthropometric measurements.

### **Survey organization/schedule of activities**

The fieldwork for the survey was undertaken in 13 consecutive days, running from October 31 to November 12, 2000. There were three supervisors and 17 enumerators. The supervisors and enumerators organized themselves into groups of two survey teams. On arrival at the designated site areas supervisors contacted the village elders who guided the survey teams in establishing the ward/ area boundaries.

The supervisors observed at least one complete interview conducted by the enumerators every day. The supervisors also checked each questionnaire for completeness before leaving an enumeration area. Where major omissions in the questionnaire were detected the responsible team supervisor and enumerator returned to the area to fill the gaps. Call-backs were then organized to enumerate the remaining households.

### **Sampling selection and study site**

The sample selection procedure followed in the survey is described in the WHO Quarterly Statistics Report [13].

The list of areas and the approximate number of households obtained from the 1999 Kenya population census were utilized. In this method the relative size of the enumeration areas/ locations and communities covered by the programme were delineated and the corresponding number of households estimated.

The selection of the 30 villages contained in the 15 operation areas of the programme was done by sampling with probability proportional to size (PPS). The EPI methodology does this by creating a cumulative list of area/village/cluster populations and selecting a systematic sample from a random start. In order to select 30 areas that are part of three locations covered in 6 sub locations, the estimated total population was divided by the number of clusters required for enumeration (n=30) to obtain the sampling interval. A random number between 1 and the sampling interval was chosen and fitted into position in the list of cumulated population to identify the first

community in the sample. To select the next ward/village, the sampling interval was added to the initial random number and this process was repeated 30 times to obtain the 30 areas/wards from among the 15 operation areas of the programme.

In order to give each area its corresponding weight, a number of households that is proportional to the total number of households were selected within each selected ward/cluster. Such a sampling procedure is said to be self-weighting and does not require calculation of weights.

The project areas fall within 3 administrative locations in Winam Division of Kisumu District. The locations are East Kisumu, West Kolwa and Kondele. There are 6 sub locations in this area covering the 15 operation zones of the Pandipieri program. In total, 30 areas were selected from the three locations. The locations which have most of their areas covered by the program, therefore, had a higher probability of being selected and vice versa. Out of the 30 enumeration areas, only one came from East Kisumu while the rest were divided between West Kolwa and Kondele based on the proportional population weights.

### **Selection of Households**

The selection of households was done following the EPI sampling methodology. No listing of households was done and the procedure required enumeration of households, using a random start from a central position within an area/cluster. Since children of the target age 12-23 months are found only in a small proportion of households visited, enumerators were instructed to visit sufficient households and only carry out interviews in households in which a child aged 12-23 months was found. Enumeration of households was completed after a desired number of the target population (children) was covered.

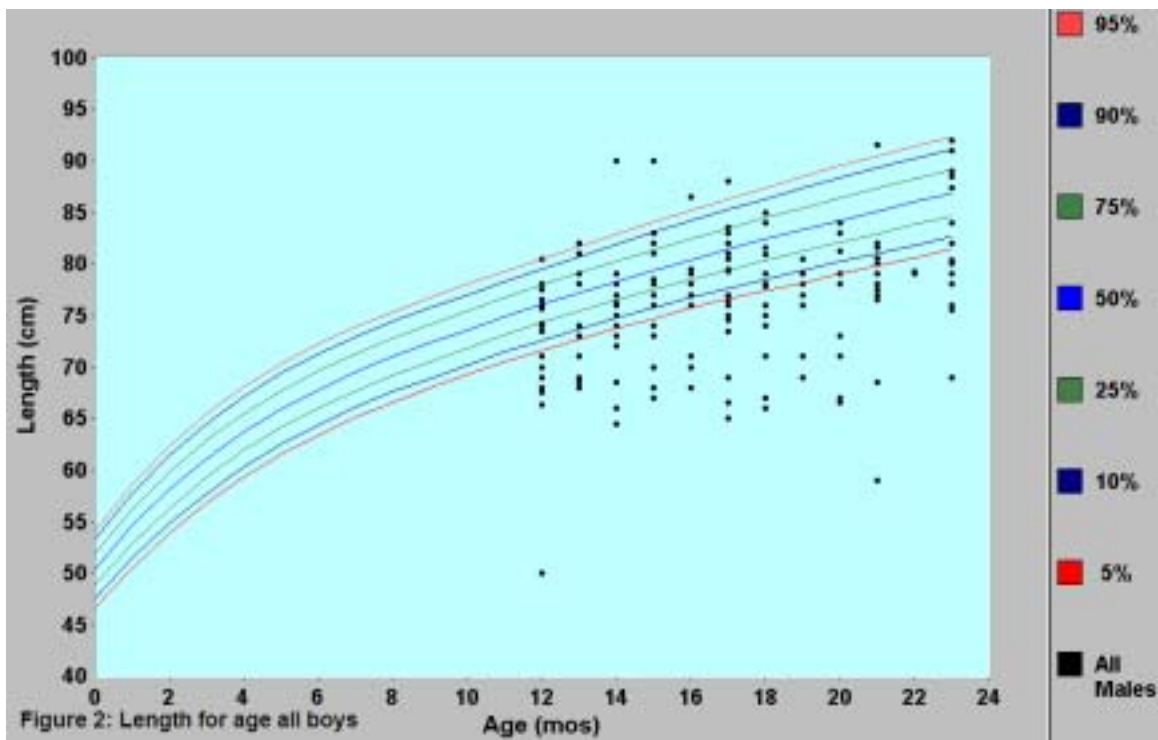
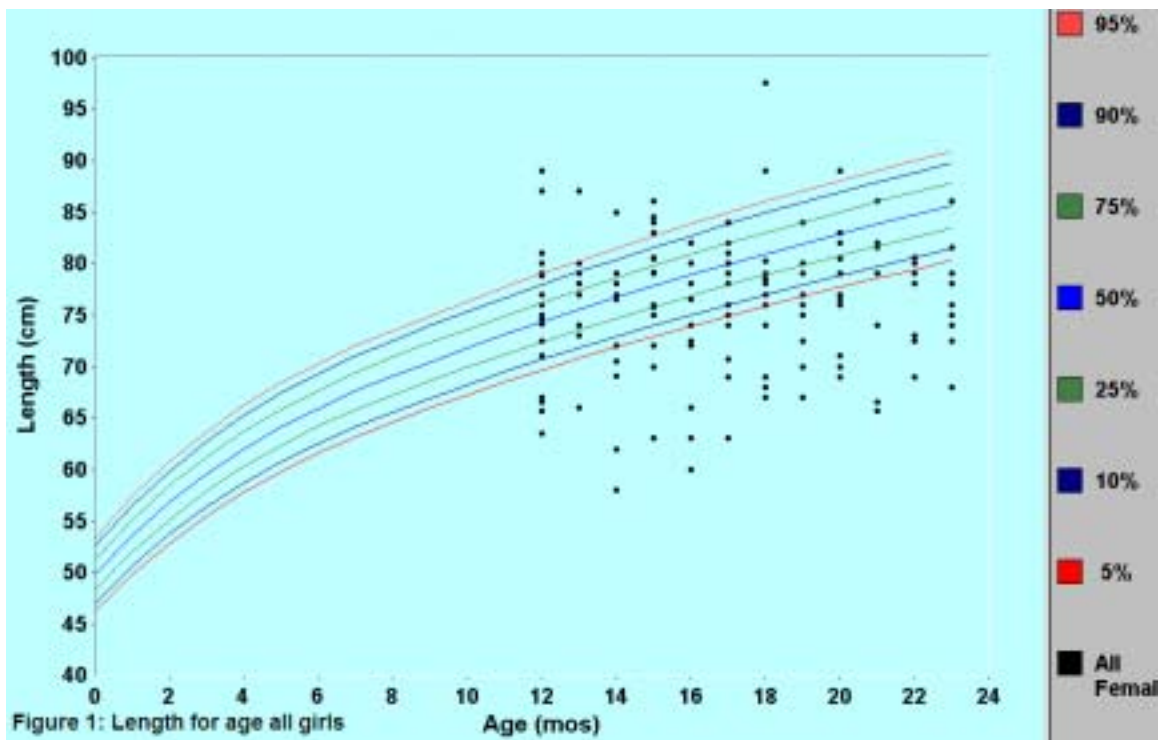
### **Data analysis**

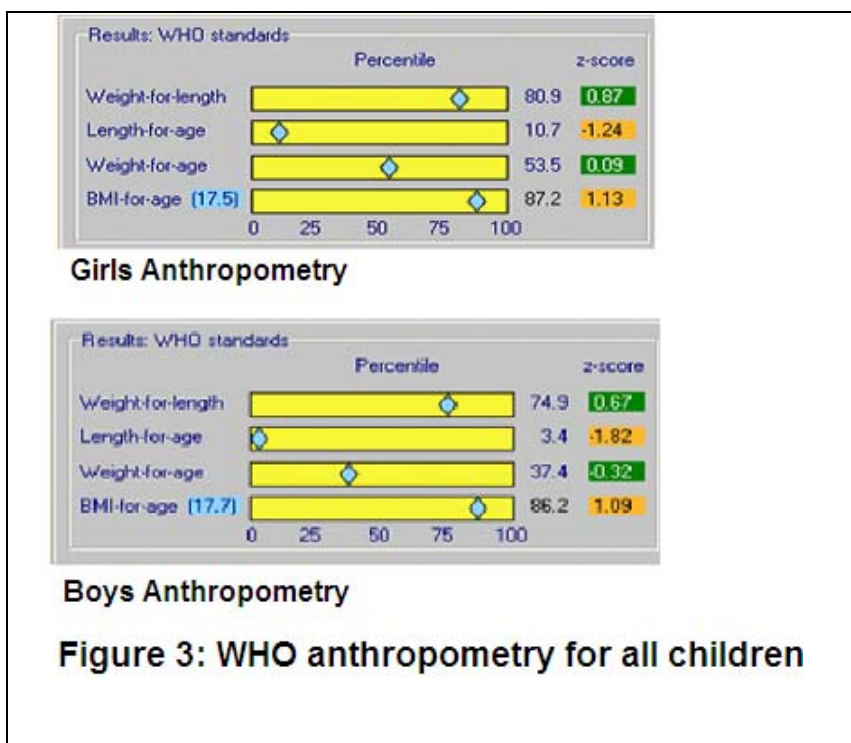
Data entry started in the field where coding was done by supervisors after every day's work for the 13 consecutive days. Three experienced data entry clerks coded the information and entered it into the computer using the SPSS version 5.0 software. Analysis was done using both SPSS version 14.0 and the CDC software as well as the WHO Anthro 2005. Variables like weight, height, gender, and age of the children were analyzed in parallel with parents' knowledge about growth charts and health care attendance.

## **RESULTS**

All data (n= 347) revealed that there is an element of stunting among the investigated school children (Figs 1,2,3). At this stage it is not known whether it is due to reference population issues vis-à-vis ethnical difference or due to genuine malnutrition of stunting as extrapolated by Hoffman *et al.* [14] and Popkin *et al.* [15]. However, the issue of population reference, growth seasonality would need further scrutiny through another research but the element of stunting is there.



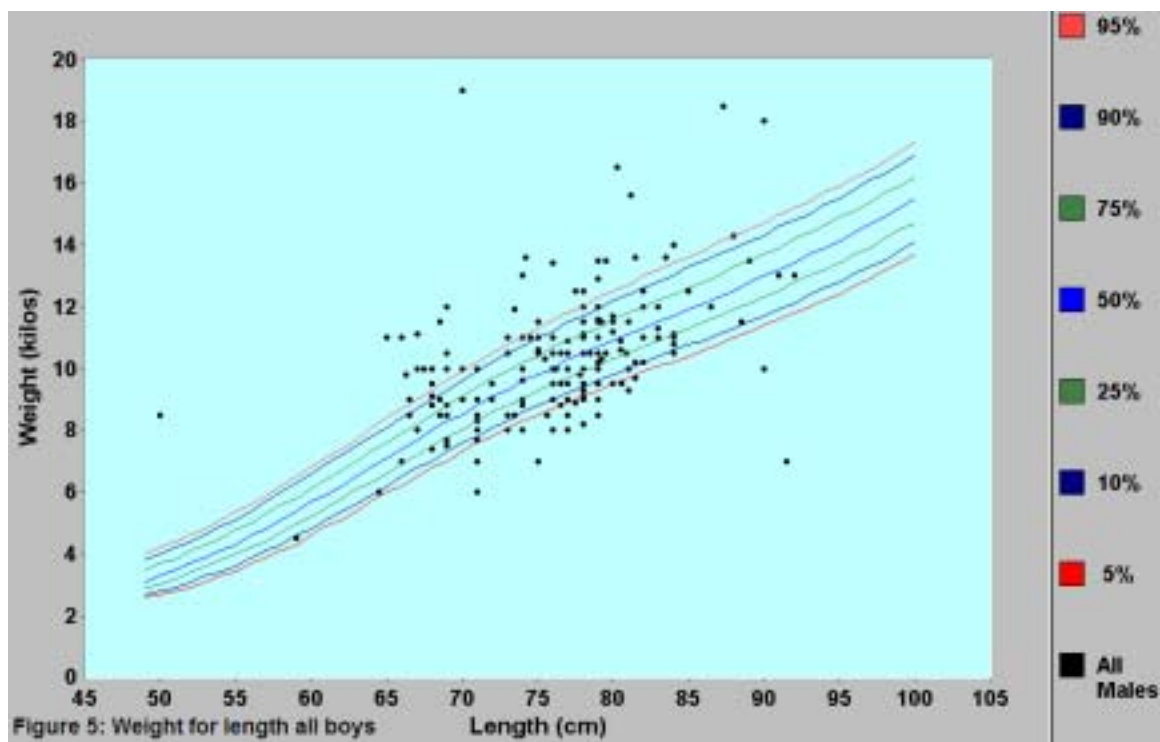
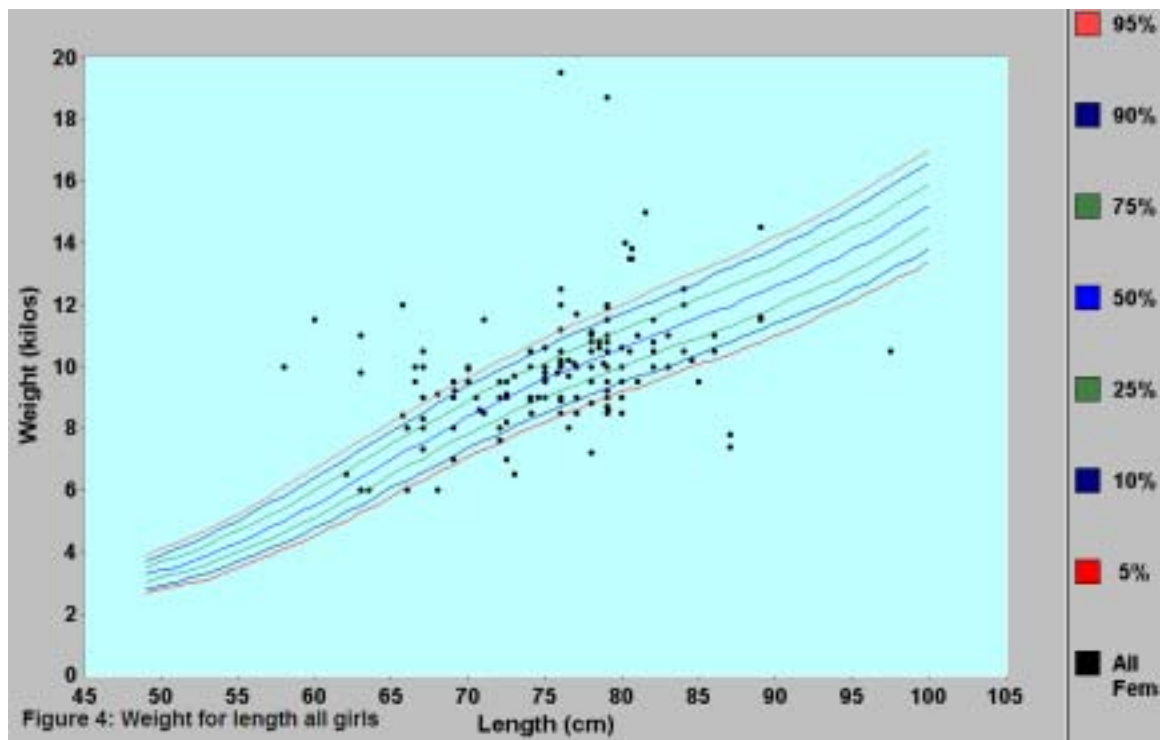




When it comes to weight-for-height the picture is completely different. All investigated children seem to have no indication of wasting whereby most of them are above the critical line (Figures 1, 3, 4, 5; Table 2).

This positive indication raises questions such as why these children seem to have stunting but no wasting. Some of the answer to this question can be elaborated in the discussion section of this paper.

On the other hand, almost 60% of caregivers seem to be familiar with growth chart interpretations while another 26% seemed to withhold information about their knowledge (Table 1). From this perspective, it can be extrapolated that most caregivers are indeed exposed up to some degree to Maternal and Child Health (MCH) centres or similar health care facilities for some time.





The interesting development of having good weight for length for all sexes of the children under investigation was further confirmed through Body Mass Index (BMI) calculations (Table 2).

## DISCUSSION

Paradoxically, Kenya is better off when compared to other East African countries like Uganda and Tanzania [5], which have similar ethnic groups in their respective populations. On the other hand, the official Kenya Bureau of Statistics [6] supported by other researchers from the field [4] do indicate malnutrition in Kenya and particularly in the research area of Kisumu District.

Some research on seasonality of child nutritional status have yet another phenomenon that postulates nutritional status of growing children that can be positively correlated to the seasonal harvest, hence the available foods [16,17].

The dilemma here is how to solve these emerging challenges about malnutrition, standards reference interpretations and seasonality of growth. Interestingly, the most commonly used reference and the one used in this report is the U.S. National Center for Health Statistics (NCHS) standard, which is recommended for use by the World Health Organisation (WHO). The proponents of this reference population standard argue that its use is based on the finding that young children of all population groups have similar genetic potential for growth.

Another nutritional phenomenon which was put forward by Popkin *et al.* [15] explains that stunting coexisting with overweight is due to an earlier malnutrition occurrence(s) in the subject child. This was further confirmed by Hoffman *et al.* [14], who claimed that earlier under-nutrition would have effect on fat metabolism resulting in overweight and stunting in childhood growth era. Concomitantly, the third phenomenon of seasonality growth vis-à-vis “harvest cycle” also offers an explanation for the possibility of coexistence of the so called “double burden” of nutritional status, for example stunting and overweight for school age children in this study.

If all the above facts are accepted, then it would be necessary that each country redefines its respective national standards when interpreting research findings based on some sort of socioeconomic determinants and environmental issues, in order to uncover hidden malnutrition. This would require a huge political undertaking from the political leaders to support nutritionists and community leaders for unmasking hidden malnutrition as well as subsequent research on this important issue of coexistence of over- and under-nutrition

On the other hand, one of the limitations of this study was its design as it only used survey questionnaires and anthropometric measurements without supporting intervention tools of biochemical blood analysis. Furthermore, confounding factors were not considered both during data collection and interpretations. Hence caution

needs to be exercised regarding the interpretations as suggested by the title of the paper.

### **RECOMMENDATION**

The only recommendation feasible at this stage is to call for more research on these phenomena and how they can interact and provide plausible explanations of the stunting and overweight coexistences and their respective determinants. Seemingly, over-nutrition and stunting might mask an actual under-nutritional distress if the actual relationships of the above mentioned three phenomena are not well grasped by people in the field, especially in remote areas of the developing countries such as the ones in this survey study.

### **CONCLUSION**

This study has found the coexistence of stunting and overweight among school age children in the study area. The root cause of this finding cannot be explained at this stage; therefore further well designed research to investigate root causes of these findings will be required.

**Table 1: Knowledge of growth chart**

Growth Curve	Correct interpretation	197	57%
	Incorrect interpretation	34	10%
	Do not know	25	7%
	Not available	91	26%
	<b>Total</b>	<b>347</b>	<b>100%</b>

**Table 2: Summary of statistics**

Sex		Age in months	Weight in Kg	Height in cm	BMI
Male	N	185	185	185	18
	Mean	17.02	10.36	76.46	
	Std. Deviation	3.47	2.02	6.02	
	% of Total	53.31	53.31	53.31	
Female	N	162	162	162	17
	Mean	16.90	9.87	75.70	
	Std. Deviation	3.49	1.91	6.16	
	% of Total	46.69	46.69	46.69	
Total	N	347	347	347	
	Mean	16.97	10.13	76.11	
	Std. Deviation	3.47	1.98	6.09	
	% of Total	100	100	100	

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