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# AN EVALUATION OF ACTUAL AND PERCEIVED WAIST TO HIP RATIO OF VISUALLY AND HEARING IMPAIRED CHILDREN OF KARNATAKA STATE

**Dr. Nagaraja. S.,** Assistant Professor
Department of Physical Education
Veterinary College, Vinobanagara, Shivamogga, Karnataka, India
**Dr. Gajanana Prabhu B. and Dr. Prakash S.M.**
Department of PG Studies & Research in Physical Education
Kuvempu University, Shankaraghatta, Karnataka

## ABSTRACT
India is at present quarters to the world's largest number of visually impaired people of the thirty seven million people across the world who are visually impaired, over fifteen million are from India. Over the past 20 years, a number of subgroups have been identified as special populations for various purposes. The term special populations take in a wide range of categories, many of which do not truly make up a self-identified group. The reason of the present study was to measure the waist to hip ratio visually and hearing impaired children of Karnataka state. Additionally the level of perception on waist to hip ratio was also correlated with their actual status. The present study was conducted on four hundred and fourteen visually impaired and hearing impaired school going children selected through purposive random sampling technique. The study included visually impaired children two hundred and forty three and hearing impaired one hundred and seventy one male category. All the subjects were residents of special schools within Karnataka state. Their age ranged between thirteen to eighteen years. The waist to hip ratio test was done by following the standard procedure and level of perception on waist to hip ratio of visually and hearing impaired school children was done using a 3 point likert scale.
**Keywords:** Assessment, Perception, Visually Impaired, hearing Impaired.

## INTRODUCTION
In this modern world liberalization, privatization and globalization, the need for the study on the persons with disabilities is increasing. The study on the women and children with disability and on the person with severe disabilities and their social, educational, economic, employment, sports and cultural activities is the need of the hour.

Health is the fundamental right of every individual. Health is essential for basic human needs and satisfaction, for improved quality of life. It is not just an escape from death or for matter, escape from disease, rather it is a harmony among the physical, mental and social aspects of an included for the attainment of health. People with visual and hearing impairment need more support in their psychosocial and physical development (Naveen and Reddy, 2010). There are various terms used in obesity such as abdominal obesity, abdominal adiposity, body fat percentage, and predictors for obesity. Body mass index is the most commonly used parameter to measure abdominal obesity for determining whether someone may be defined as poor in body weight, normal weight, overweight or obese (Ahmad et. al., 2016). The waist to hip ration measurement has a huge benefit that it can be easily assessed by anybody at home. Measuring the waist to hip ratio helps us to without difficulty access the quantity of fat carried around the abdomen opposed to the fat around the hips (Ravishankar, Sethu and Jain, 2018). Heavy body weight and Obesity are slowly increasing around the worldwide and the World Health Organization confirms in their 2015 and 2016 reports that childhood obesity is a increasing worldwide public health concern, with more than forty three million obese and heavy body weight children between the ages of five and eleven years (Fredriksen, Skar and Mamen, 2018). Diabetes is the most challenging health problem of the twenty first century. It is expected that by 2030, the number of people with diabetes will increase to more than 366 million, more than twice the number in 2000 (World Health Organization, 2006). Abdominal obesity is more and more identify as a main risk factor for cardiovascular disease. Compared with

the body mass index, anthropometric measures of abdominal obesity for example waist circumference, waist-to-hip ratio, sagittal abdominal width are come into sight to be more powerfully connected with metabolic risk factors, cardiovascular disease and death (Koning, et. al., 2007). Cardio-metabolic risk connected with abdominal obesity is attributed to the presence of visceral adipose tissue, which promotes insulin resistance, dyslipidaemia and hypertension (Tchernof et. al., 1996). Waist to hip ratio and waist circumference are places of abdominal obesity. In Asian population and particularly Indian population abdominal obesity is more pronounced. Hence body mass index can give false negative results. Asian population with normal body mass index may have more than normal abdominal obesity. In 2003 world health organization gave guidelines for screening of type 2 diabetes mellitus, risk factors which included Waist-hip ratio and waist circumference, as important risk predictors of type 2 Diabetes Mellitus (Gokhale et. al., 2017). In this purpose we select the waist to hip ration test in present study.

## METHODOLOGY

The purpose of the present study to determine the ratio of waist circumference to the hip circumference and estimate the amount of fat in that region. A total of 414 subjects with special needs were selected for the present study through purposive random sampling technique. The study included hearing impaired (N=171) and visually impaired (N=243) in male category. All the subjects were residents of special schools within Karnataka state. Their age ranged between 13 to 18 years.

In the present study the measurement of waist to hip ratio of an individual was calculated by following the protocol given by world health organization. The measurement of waist and hip region was taken in standing position without upper body coverings except shorts using (health o meter digital non-stretchable) measuring tape. The reading of an individual waist was taken by placing the tape in between the novel and float rib region by selecting waist site in the digital tape. The circumference of the waist was recorded in centimetres. The hip circumference was recorded by using the same tape and the measurement was recorded by placing the tape on the highest point of the buttocks region by selecting hip site in the digital tape. The circumference of the hip of an individual was recorded in centimetre. Waist to hip ratio was calculated by using the formula Waist to Hip Ratio = measurement of waist ÷ measurement of hip (W ÷ H).The levels of perception on waist to hip ratio of visually as well as hearing impaired subjects was done using a three point likert scale. The subject was asked to rate his waist to hip ratio on a questionnaire wherein he was given to tick one of the three options viz a) Higher than the normal b) Normal or c) lower than the normal. The response given by the subject was purely based on the perception of the subject under investigation (Rahmani-Nia, et al., 2011). The researcher gave a brief overview of waist to hip ratio in order to make them familiar and express their levels of perception. The data from visually impaired students was collected through dictation and response record method. Similarly, data from hearing impaired students was collected through sign language method with help of a trained helper. The data was collected at the residential schools with prior intimation and permission. Pearson product moment correlation was used a statistical tool apart from descriptive statistics like mean and standard deviation.

In order to test the hypotheses suitable statistical techniques were employed. Descriptive statistics like mean and standard deviation were calculated for raw data of each variable to identify the normal distribution of data per cent analysis was done to find out the number of subjects coming under each category as per normative values where ever norms are available.

## FINDINGS AND RESULTS

In case if norms were not readily available, based on previous studies on age and population matched subjects, the norms were constructed using mean value and standard deviation. For this purpose, five categories were done with 0.5, 1 and 1.5 Standard Deviation based on principles of normal probability curve. In this way norms were prepared with five categories as given in table 1.

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TABLE 1
CRITERIA FOR CONSTRUCTIONS OF NORMS

| | |
|---|---|
| Mean + 1.5 S.D and above | Extreme |
| Mean + 0.5 S.D to Mean + 1.5 S.D | High |
| Mean – 0.5 S.D to Mean + 0.5 S.D | Average |
| Mean – 0.5 S.D to Mean – 1.5 S.D | Good |
| Mean – 1.5 S.D and below | Excellent |

Table 1 reveals that the raw data on levels of perception was converted to standard 'Z' scores using SPSS 21.00 version. Pearson product moment correlation coefficient was calculated between perceived and measured health/fitness scores on different tests. The level of significance was fixed at 0.05 levels of significance.

Findings of the study

Descriptive statistics including mean and standard deviation were employed to the raw data collected on waist to hip ratio of the subjects selected for the study. The results are provided in table 2.

TABLE 2
DESCRIPTIVE RESULTS ON CHARACTERISTICS OF VISUALLY AND HEARING IMPAIRED CHILDREN OF KARNATAKA STATE

| **Variable** | **Units** | **13 to 14 years** | **15 to 16 years** | **17 to 18 years** |
|---|---|---|---|---|
| | | **Mean ± S. D** | **Mean ± S. D** | **Mean ± S. D** |
| **N** | | 128 | 176 | 110 |
| **Age** | in years | 13.45 ± 0.50 | 15.45 ± 0.50 | 17.45 ± 0.50 |
| **Waist to Hip ratio** | in centimetres | 0.84 ± 0.04 | 0.82 ± 0.05 | 0.83 ± 0.05 |
| | | | | |

N= Numbers, $\bar{x}$= Mean, S.D = Standard Deviation

Analysis of the table 2 reveals that the age of visually and hearing impaired children under investigation was 13.45 ± 0.50 in (the first score indicates mean followed by standard deviation) 13 to 14 years; 15.45 ± 0.50 in 15 to 16 years and 17.45 ± 0.50 in 17 to 18 years. The waist to hip ratio was 0.84 ± 0.04 in 13 to 14 years; 0.82 ± 0.05 in 15 to 16 years; and 0.83 ± 0.05 in 17 to 18 years.. Table 3 provides results on waist to hip ratio Index of visually as well as hearing impaired children with reference to available norms.

TABLE 3
NORMS BASED RESULTS ON WAIST TO HIP RATIO OF VISUALLY AND HEARING IMPAIRED CHILDREN OF KARNATAKA STATE

| Normative category | 13 to 14 Years | | 15 to 16 Years | | 17 to 18 Years | |
|---|---|---|---|---|---|---|
| | F | % | F | % | F | % |
| **Extreme** | 29 | 22.66 | 28 | 15.91 | 36 | 32.73 |
| **High** | 63 | 49.22 | 61 | 34.66 | 24 | 21.82 |
| **Average** | 36 | 28.13 | 85 | 48.30 | 50 | 45.45 |
| **Good** | 0 | 0 | 2 | 1.14 | 0 | 0 |
| **Excellent** | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL** | 128 | | 176 | | 110 | |

Analysis of table 3 depicts that in visually and hearing impaired children of 13 to 14 years (22.66%) were extreme waist to hip ratio; high waist to hip ratio (49.22%); average waist to hip ratio (28.13%) and none of the subjects was good and excellent in waist to hip ratio. In visually as well as hearing impaired children of 15 to 16 years it is observed that (15.91%) were extreme waist to hip ratio; high waist to hip ratio (34.66%); average waist to hip ratio(48.30%); good waist to hip ratio (1.14%) and none of the subjects was excellent in waist to hip ratio. Further, in visually and hearing impaired children of 17 to 18 years it is found that (32.73%) were extreme waist to hip ratio; high waist to hip ratio (21.82%); average waist to hip ratio (45.45%); and none of the subjects was good and excellent in waist to hip ratio. The norms for the present percent analysis were obtained from (Pathak and Datta 2008). Table 6 provides information on right hand grip strength of visually and hearing impaired children under investigation. The above results are graphically depicted in figure 1.

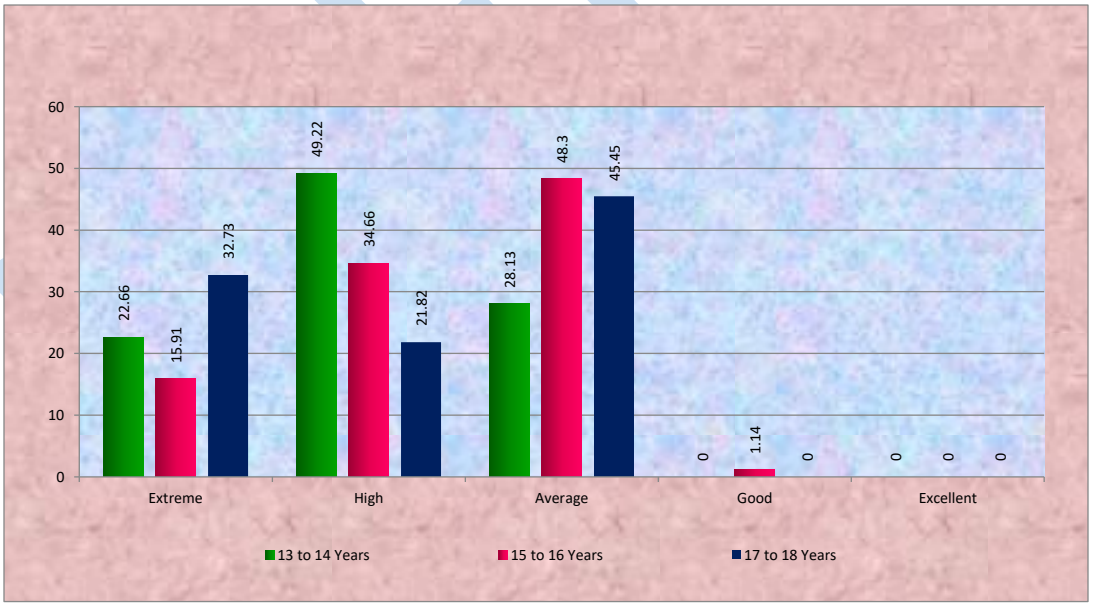


Fig. No. 1: Norms Based Results on Waist to Hip Ratio of Visually and Hearing Impaired Children of Karnataka State.

TABLE 4
CORRELATION BETWEEN PERCEIVED AND ACTUAL WAIST TO HIP RATIO IN 13 TO 14 YEARS

| | | **Actual Waist to Hip Ratio** |
|---|---|---|
| **Perceived Waist to Hip Ratio** | Pearson Correlation | .040 |
| | Sig. (2-tailed) | .653 |
| | N | 128 |

*. Correlation is significant at the 0.05 level (2-tailed).

Introspectively table 4 reveals that there was no significant relationship between levels of perception on waist to hip ratio and actual waist to hip ratio in visually and hearing impaired children of age 13 to 14 years. Table 5 provides information on association between perceived and actual waist to hip ratio of visually and hearing impaired children in the age group 15 to 16 years.

TABLE 5
CORRELATION BETWEEN PERCEIVED AND ACTUAL WAIST TO HIP RATIO IN 15 TO 16 YEARS

| | | **Actual Waist to Hip Ratio** |
|---|---|---|
| **Perceived Waist to Hip Ratio** | Pearson Correlation | .178* |
| | Sig. (2-tailed) | .018 |
| | N | 176 |

*. Correlation is significant at the 0.05 level (2-tailed).

Perusal of table 5 reveals that the levels of perception on waist to hip ratio showed significantly weak positive linear relationship when correlated with actual waist to hip ratio in visually and hearing impaired children of age 15 to 16 years. Table 6 provides information on association between perceived and actual waist to hip ratio of visually and hearing impaired children in the age group 17 to 18 years.

TABLE 6
CORRELATION BETWEEN PERCEIVED AND ACTUAL WAIST TO HIP RATIO IN 17 TO 18 YEARS

| | | **Actual Waist to Hip Ratio** |
|---|---|---|
| **Perceived Waist to Hip Ratio** | Pearson Correlation | .220* |
| | Sig. (2-tailed) | .021 |
| | N | 110 |

*. Correlation is significant at the 0.05 level (2-tailed).

Table 6 clearly depicts that the levels of perception on waist to hip ratio showed significantly weak positive linear relationship when correlated with actual waist to hip ratio in visually and hearing impaired children of age 17 to 18 years.

## DISCUSSION

In 13 to 14 years of visually and hearing impaired children in Karnataka, (22.66%) had extreme waist to hip ratio; in 15 to 16 years, (15.91%) were extreme; and in 17 to 18 years, (32.73%) were extreme. High waist circumference and waist to hip ratio is suggestive of obesity and its related health hazards. Inactivity is one probable reason for higher wait to hip ratio in visually and hearing impaired children of Karnataka state. The problem needs to be addressed at the earliest in order to avoid casualties in near future. It is satisfactory to know that the visually and hearing impaired children under investigation is aware of their waist to hip ratio status through levels of perception. (Bacopoulou, et. al., 2015) has developed age- and gender-specific waist circumference, waist to hip ratio and waist to height ratio smoothed reference percentiles for abdominal obesity among Greek adolescents aged 12 to 17 years, to investigate possible obesity cut-offs of waist to hip ratio and waist to height ratio and to compare waist circumference percentiles to other

adolescent populations. Waist to hip ratio was found to be useful in identifying children and adolescents at risk of developing high blood pressure in a study by (Zhang, et. al., 2014) examining the distribution of waist to hip ratio and the relationship with blood pressure among children and adolescents in Shandong, People's Republic of China. These findings, together with the known tracking of blood pressure from adolescence into adulthood, highlight the importance of preventing overweight and obesity among children and adolescents in order to prevent the development of hypertension in adults. (De, K, 2017) conducted a study on waist Circumference, Waist-Hip Ratio and Body Mass Index in Assessing Nutritional Status and Central Obesity of Indian adolescents. The results indicated that the central obesity had significant effect on chronic heart disease. According to the study, the girls with central obesity had chances to experience heart disease in future. (Magalhaes, et. al., 2014) assessed the anthropometric parameters waist circumference, waist to height ratio and neck circumference as indicators of central obesity in children. The predictive ability of waist circumference and waist to height ratio to indicate central adiposity in children was controversial. The cut-off points suggested for the parameters varied among studies, and some differences may be related to ethnicity and lack of standardization of anatomical site used for measurement. Levels of perception on waist to hip ratio showed significantly weak positive linear relationship when correlated with actual waist to hip ratio in visually and hearing impaired children of Karnataka in most of the age groups under investigation.

## CONCLUSION

The subjects having high waist to hip ratio are not fully aware of their condition. The situation is not very favourable and needs to be given due attention. The levels of perception on waist to hip ratio showed that there was no significant relationship in 13 to 14 years group and significantly weak positive linear relationship in 15 to 16 years and 17 to 18 years group when correlated with actual waist to hip ratio.

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