

Analysis of Body Composition and Hand Grip Strength in Active and Inactive College Level Girls

Miss. Tangarani^{1*} Dr. Gajanana Prabhu B.² Mr. Shivamurthy A.³

¹Research Scholar in Physical Education, Kuvempu University, Shankaraghatta

²Assistant Professor in Physical Education, Kuvempu University, Shankaraghatta

³Physical Education Director, Sahyadri Arts & Commerce College, Shimoga

Abstract – The purpose of the present cross sectional investigation was to compare the body mass index and grip strength of physically active and sedentary college going girls. The results of the present study will fuel the growing awareness that physical activity and sport are enormously important in the lives of girls. Participation in regular physical activity is an important factor to achieve the health benefits for people especially who are engaged in sedentary lifestyles. Despite the known benefits of physical activity on health and future life opportunities, recent evidence consistently demonstrates that a majority of adolescents do not meet current physical activity and public health recommendations. Subjects for the present study were ninety seven college going girls of Shimoga District, Karnataka State. Among them 50 girls were actively involved in inter collegiate sports and remaining 47 girls did not participate in any sort of sporting endeavors. Standing height and weight were measured using standard protocols through a wall mounted stadiometer and weighing machine respectively. Assessment of dominant hand grip strength was done by Analogue Hand Grip Dynamometer in a normal sitting position. Independent sample ‘t’ test was employed in order to compare means of two groups. The results on body mass index in the present cross sectional investigation provides platform to explore under weight problem among college going girls. In order to enhance physical performance measured in terms of hand grip strength the college girls without active lifestyle need to undergo physical activities in the form of sports and games.

Key words: Body composition, Body Mass Index, Hand grip strength, Dynamometer, College girls.

INTRODUCTION

Physical activity provides important health benefits for adolescents, including increased physical fitness, reduced body fatness, favorable cardiovascular and metabolic disease risk profiles, enhanced bone health, and reduced symptoms of depression and anxiety (Physical Activity Guidelines Advisory Committee 2008). Participation in regular physical activity is an important factor to achieve the health benefits for people especially who are engaged in sedentary lifestyles. Taking part in sport activities has various benefits. For psychological benefits, through participating in physical activities, people can escape from physical and personal pressure, nostalgia and perceived autonomy (Cordes & Ibrahim, 1999). For health benefits, through participating in physical activity, people could improve health and reduce the risk of disease (Parry and Shaw, 1999). The study indicated that physical activity increase is a possible

prevention strategy for cancer, obesity, and cardiovascular disease (Salmo, Owen, Crawford, Bauman & Sallis, 2003). For social benefits, playing sport can strength social cohesion and make new friends.

Despite the known benefits of physical activity on health and future life opportunities, recent evidence consistently demonstrates that a majority of adolescents do not meet current physical activity and public health recommendations (Eaton *et al.* 2006, Fogelholm *et al.* 2007, Physical Activity Guidelines Advisory Committee 2008, Tammelin *et al.* 2007, Whitt-Glover *et al.* 2009).

Since many chronic diseases and other adverse life chances have their roots in childhood and adolescence (Kuh & Ben-Shlomo 2004), the question of inequalities in young people's health behaviours, health and education is critical. Physical activity has a

significant role in enhancing adolescents' health, educational attainment and other life chances. Systematic physical activity can produce marked improvement in strength for girls, probably due to the improvement in motor unit activation and coordination (Sewall & Micheli, 1986; Wilmore, 1974).

Weight management

For the general population of girls, their daily routine provides an adequate balance of physical activity and caloric intake. Problems with weight control occur when the caloric intake does not match the caloric expenditure. Vogel (1986) presented an extensive review of physical education programs and concluded that daily programs can produce changes in body composition (i.e., percent lean versus fat mass). The body mass index is a measure of the body weight relative to height which can be used to determine if a person is underweight, at a normal weight, overweight or obese. It is defined as the individual's body mass divided by the square of his or her height. The body mass index was derived by Quetlet's index from body weight (kg) / Height (m²) In India, underweight BMI is below 19, normal is less than 23, overweight is above 23 and obese is above 25 as per revised values by Health Ministry in 2008 (food.sify.com).

Muscle strength

Muscular strength is the ability to generate force and includes dynamic or isotonic strength (i.e., the ability to generate force through a range of motion) and isometric strength (i.e., the ability to generate force at a single point in the range of motion where muscle length does not change). Increases in physical activity and short-term training programs can produce positive changes in several forms of "strength-related" factors, including anaerobic power and muscle endurance.

Transitioning from high school to college and the years following can be extremely stressful times for young adults. For many this is the first time they have held certain responsibilities and freedoms. Physical activity and sport are not simply things young girls do in addition to the rest of their lives, but rather, they comprise an interdependent set of physiological, psychological and social processes that can influence growth and development of girls. The results of the present study will fuel the growing awareness that physical activity and sport are enormously important in the lives of girls.

OBJECTIVE OF THE STUDY

The purpose of the present cross sectional investigation was to compare the body mass index and grip strength of physically active and sedentary college going girls.

METHODOLOGY

Subjects for the present study were ninety seven college going girls of Shimoga District, Karnataka State. Among them 50 girls were actively involved in inter collegiate sports and remaining 47 girls did not participate in any sort of sporting endeavors. Information on subject characteristics is provided in table 1.

Table 1. Details on characteristics of subjects (Mean ± Standard Deviation)

Characteristics	Active	Sedentary
Age (in years)	20±2.19	19±1.01
Height (in cms)	1.58±0.06	1.56±0.05
Weight (in kgs)	45±5.47	46±7.42
BMI	18±1.91	19±2.58
Hand Grip Strength (in kgs)	28±4.22	24±4.07

Standing height and weight were measured using standard protocols through a wall mounted Stadiometer and weighing machine respectively. Assessment of dominant hand grip strength was done by Analogue Hand Grip Dynamometer in a normal sitting position. Three non consecutive trials were permitted to each subject and the best was considered. Spare time of the subjects was made known and necessary tests were administered with prior consent. Independent sample 't' test was employed in order to compare means and find any significant differences between active and sedentary groups.

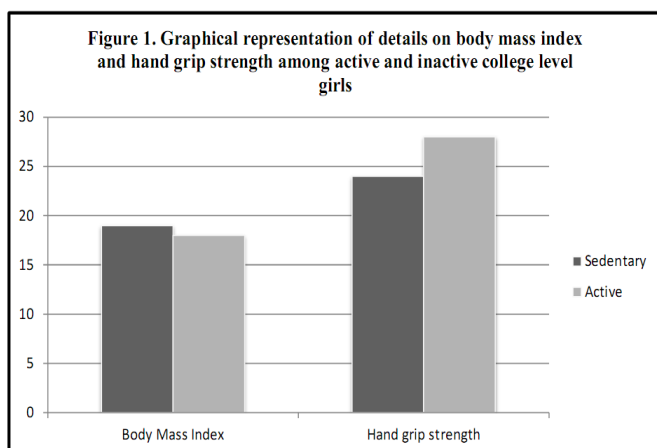
FINDINGS OF THE STUDY

Mean and Standard Deviations of active and sedentary groups on Body Mass Index and dominant hand grip strength reveals that the data is normally distributed and homogeneity of sample in terms of Standard Deviation is satisfactory. Statistical analysis was carried out in order to examine any statistical significance in the mean scores among the groups using 't' test for independent samples. The results are presented in Table 2.

Table 2. Summary of Independent Samples Test for hand grip strength and body mass index of active and sedentary groups

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Body Mass Index	1.472	95	.144	.6762	.4594
Hand grip strength	4.824	95	.000	-4.0668	.8429

Table 2 on 't' test indicates that there is no significant difference in terms of body mass index among active and sedentary groups. Further it is observed that there is significant difference in dominant hand grip strength among the two groups since the calculated 't' value (4.824) is higher than the table value (2.364) .01 levels in the present cross-sectional investigation. The above results are graphically depicted as below.



DISCUSSION ON FINDINGS

The results of the study on Body Mass Index between active and sedentary groups of college going females did not demonstrate statistically significant differences during comparison. The results are contrary to the popular belief quoted in similar studies. In a similar study undertaken to analyze the differences in BMI in sedentary and non-sedentary female subjects in the age group of 25-55 years by Jayalakshmi et. al. (2011) sedentary lifestyle was associated with increase in body mass index. In another study, the odds of being overweight or obese were associated more strongly with sedentary than with active behaviours (Buchowski, et. al. 2010). Further it is observed that the sedentary college going girls are underweight in the present study.

Grip strength has long been thought of as a possible predictor of overall body strength. Grip strength among the two groups showed statistically significant results. It was evident that the active girls possessed higher

grip strength than sedentary girls. The significance in the results may be due to the benefits derived from physical activities and sports. Muscular strength is an important health related physical fitness component necessary to carry out day to day tasks with efficiency. Increased activity in the form of sports and games should be promoted early in adulthood to ensure the maintenance of physical performance in later life.

CONCLUSION

The results on body mass index in the present cross sectional investigation provides platform to explore under weight problem among college going girls. In order to enhance physical performance measured in terms of hand grip strength the college girls without active lifestyle need to undergo physical activities in the form of sports and games.

REFERENCES

- Buchowski M.S., Cohen S.S., Matthews C.E., Schlundt D.G., Signorello L.B., Hargreaves M.K., and Blot W.J. (2010). "Physical Activity and Obesity Gap Between Black and White Women in the Southeastern U.S.", *American Journal of Preventive Medicine*; 39 (2): pp. 140 –147.
- Budoff, J.E.. (2004). "The Prevalence of Rotator Cuff Weakness in Patients with Injured Hands.", *J Hand Surg* 29(6): pp. 1154-9.
- Cordes, K. A., & Ibrahim, H. M. (1999). *Applications in recreation & Leisure: For today and the future*. Boston: McGraw-Hill.
- Diana K., Bassej E.J., Butterworth S., Hardy R. and Wadsworth E.J.W. (2005). "Grip Strength, Postural Control, and Functional Leg Power in a Representative Cohort of British Men and Women: Associations with Physical Activity, Health Status, and Socioeconomic Conditions", *Journal of Gerontology* 60 (2): pp. 224-231.
- Eaton DK, Kann L, Kinchen S, Ross J, Hawkins J, Harris WA, Lowry R, McManus T, Chyen D, Shanklin S, Lim C, Grunbaum JA & Wechsler H (2006) Youth risk behavior surveillance – United States, 2005. *MMWR Surveill Summ* 55(5): pp. 1–108.
- Fogelholm M, Paronen O & Miettinen M (2007). *Physical Activity – A Possibility for Welfare Policy. The State and Development of Health-Enhancing Physical Activity in*

Finland. Helsinki, Ministry of Social Affairs and Health.

- Fry, A.C., D. Ciroslan, M.D. Fry, C.D. Leroux, B.K. Schilling, and L.Z. Chiu. (2006) "Anthropometric and Performance Variables Discriminating Elite American Junior Men Weightlifters.", *Journal of Strength and Conditioning Research* 20(4): pp. 861-6. http://food.sify.com/health_tools/body_mass_index_calculator/
- Jayalakshmi M.K., Prabhu Raj N., Shanmukhappa N.J. and Smilee Johncy S. (2011). Effect of sedentary life style on anthropometric and cardiovascular parameters", *International Journal on Biological and Medical Research*; 2(4): pp. 846 – 851.
- Kuh D & Ben-Shlomo Y (2004). *A Life Course Approach to Chronic Disease Epidemiology*. Oxford, Oxford University Press.
- Parry, D.C., & Shaw, S.M. (1999). The role of leisure in women's experiences of menopause and mid-life. *Leisure Sciences*, 21, pp. 205-218.
- Physical Activity Guidelines Advisory Committee (2008) *Physical Activity Guidelines Advisory Committee Report, 2008*. Washington, DC, Department of Health and Human Services.
- Salmon, J.; Owen, N.; Crawford, D.; Bauman, A.; Sallis, J.F.(2003) Physical activity and sedentary behavior: a population-based study of barriers, enjoyment, and preference. *Health Psychology* 22 (2), pp. 178-188
- Sewall, L., & Micheli, L. J. (1986). Strength training for children. *The Journal of Pediatric Orthopaedia Strabismus*, 6, pp. 143–146.
- Tammelin T, Nayha S, Hills AP & Jarvelin MR (2003). Adolescent participation in sports and adult physical activity. *Am J Prev Med* 24(1): pp. 22–28.
- Vogel, P. G. (1986). Effects of physical education programs on children. In V. Seefeldt (Ed.) *Physical activity and well-being* (pp. 455–509). Reston, VA: American Alliance for Health, Physical Education, Recreation and Dance.
- Whitt-Glover MC, Taylor WC, Floyd MF, Yore MM, Yancey AK & Matthews CE (2009). Disparities in physical activity and sedentary behaviors among US children and adolescents: prevalence, correlates, and intervention implications. *J Public Health Policy* 30: S309.
- Wilmore, J. H. (1974). Alterations in strength, body composition and anthropometric measurements consequent to a 10-week training program. *Medicine and Science in Sports*, 6, pp. 133–138.

Corresponding Author

Miss. Tangarani*

Research Scholar in Physical Education, Kuvempu University, Shankaraghatta

E-Mail – lpphilomina300@gmail.com