Full Length Research Article

COMPARITIVE STUDY OF MOTOR DEVELOPMENT AMONG INDIAN AND IRANIAN STUDENTS: A CROSS SECTIONAL STUDY

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ABSTRACT

The paper aims compare motor development of Indian and Iranian boy's studentbetween the age of 13 and 18 years in BMI case. The focus is on the relationship between age and motor behavior which makes the study of motor development unique from other viewpoints. Motor development includes age related changes in both posture and movement, the two basic ingredient of motor behavior. The results portrayed by means of statistical tests and standard method of sampling.

INTRODUCTION

This study was conducted keeping in view the following objectives. Study the level and pattern of the development of motor abilities of Indian male student of 13-18 years age. Compare the level and pattern of development of motor abilities of Indian male student with Iranian male student.

Definitions of operational terms motor development

Motor development is the process of change in motor behavior that is related to the age of the individual. The focus on the relationship between age and motor behavior makes the study of motor development unique from other viewpoints motor development include age related changes in both posture and movement, the two basic ingredient of motor behavior. Development processes occur throughout the human life span (Jan Stephen tecklin, 1998). For the purpose of this study the term was understood to mean motor ability through the performance in selected motor fitness components that underlie gross motor skills.

Cross-Sectional Study

The cross–sectional study is a method of study that permits the researcher to collect data on different groups of people at varying age levels at the same point in time.

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The major purpose of the cross-sectional study was to measure of age-related difference in behavior. This method does not permit measurement of age-related change, and has attracted controversy in recent years. Basically the cross-sectional method yield only average difference in groups across real time and not individual change developmental time. The basic assumption behind the cross-sectional study had been that random selection of subjects provides as re preventive sample of the population for each age group test. (David & Gallahue, 1995)

Delimitations

Motor development is an all-inclusive which is the area of interest for child psychologists, social psychologists and sport psychologists alike. Thus the tern motor development is much wider in scope and meaning. For the purpose of this study the term motor development was contained to the concept of motor fitness development as measured through recognized motor fitness components of speed, agility, strength, flexibility, power and endurance. The study was also delimited to high school student of 13-18 years. The study was further delimited to Indian students in Chandigarh and Iranian student in Tehran. The study was further more delimited to male students.

Limitation

Even though, no motivational techniques were employed, but ever effort was made by the researcher to encourage the

subjects to do their best. In spite of that researcher could not possibly control the performance differences in effort made by the subject to do their best. Such variation in effort and home environment, daily routine and diet might distort actual scores collected through and ultimately the final analysis. Variations obtained in score due to this factor were duly recognized as the limitation of the study.

Significance of the study

In the past one decade physical education has found its right place in the school curriculum. To a large extent it has found its academic recognition at par with other subjects. Having found its place in the school curriculum, the teacher of physical education is confronted with numerous problems relating to classroom instruction in physical education. One specific problem that relates to instruction is the extent to which the school student may be provided combine instruction irrespective of their age. Another problem is catering to the individual needs. Even though providing the individualized instruction in physical education may be a far off dream, yet the teacher had to ensure that each group has only acceptable variation in abilities in order to provide effective instruction and avoid damages.

The teaching policies signs and teachers, therefor, should be well familiar with the development trends and generalized pattern of development at different stages. This may help to adjust to programmers to the needs of the group as a whole. Thus, the present investigation may be great significance in understanding thepatterns of development in motor ability. This may help to draw out effective learning environment and to provide scope for individual attention to extent possible. The result of the study may also help to understand the classification criterion in a better way. The result of the study help to understand the role of diet patterns, topography, genetic factor and the effect of educational system on school going children, in affecting the development pattern of children.

Literature

Haley (1972) conducted a study of motor fitness. The sample included children studying in grades one through six. Thirty boys were randomly selected from each grade. Their ages ranged from five years nine months to 12 years two months. Jerry Conard welch (1974). Cross-section ally analyzed the development of agility t select one or more test items which could assess the agility of boys and girls aged 5 through 17. Barbante (1976) made a study on Brazilian boys and girls. The purpose of this investigation was to determine the statues of physical fitness of selected Brazilian boys and girls. Morrow (1979) conducted study on Korean secondary student of physical fitness. The aim of his study was to compare 1979 KSPFT and KPSFT results and to see if change in occurring Analysis of the data supports. Frederick (1979) made a study to determine motor ability differences along five age groups composed of black and white boys and girls in the performance of 20 years run vertical jump, standing jump, and balance on the right side foot, equilibrium on the left foot, kicking for a distance, pitching for accuracy and kicking for accuracy. Schmidt (1982) after reviewing numerous studies

pointed out which by the time an individual research the age of 18 he experiences large improvement in his motor behavior. The manner in which motor proficiency improves as children grow old has been reviewed extensively by Cratty (1979). HaiphotChanchiclung (1985) conducted an assessment of physical fitness of lower secondary school boys of Thailand. The samples for the study were 13500 lower secondary school boys selected through randomized clustered sampling. The modified Fleishman physical fitness test battery which consists of item for flexibility, quickness, strength, muscular endurance, matching, balance and cardiovascular endurance was administrated to the subjects.

Reet Mahindersingh (1986) Prepared physical fitness norms for high school boys of panjab state. Data were collected on 5000 subjects selected randomly from various schools in the state. The test battery managed comprised of eight items.,I.e. Rachhpal Singh Brar (1987). Conducted in effects of short interval and long interval running with two recovery types on aerobic and anaerobic capacities and running performance of high school boys, the subject were 100 untrained students of grades nine and ten in Shivalik public school, Sahibzda A jitsinghnagar (panjab). Daljit Kaur (1989). Conducted a study on the physical fitness of high school girls of the panjab belonging in the age group of 12 to 15, the purpose of the study was to prepare norms for the girls of panjab belonging to this age group. Meera Chauhan (1989). Compared the motor fitness performance of sports and non-sports school girls (13-15) years' old living at the high altitude of 2960 ms at Shimla and 487 ms at Chandigarh. Sukhpal Kaur (1990). Conducted across-sectional study of motor abilities of pan jab and Chandigarh girls in the age group of 7 to 11 years, the investigator studied the developmental changes in motor abilities which take place during the mentioned period Amarpreet Singh (1993) conducted a study on the relationship of varying levels of motor fitness to Socio-Economic statues and structural variations among school student in the age group of 14 to 16 years.

Shilendra Kumar Sinha (1996) conducted a study of anthropometric and motor quality profiles of 8-14 years boys of eastern and north east region of India. Kamal Kant Sharma (1997) conducted a study on construction and standardization of motor fitness test battery for elementary school children in Delhi (U.T), the objectives of study were as follow: to find out how how motor fitness variables, such as speed, strength, balance, flexibility and endurance, develop among boys and girls in the age group of eight to eleven years. Dinesh kumar (1998) showed on a normative study of fitness status in male students (13-16) years of age belonging to the schools of Himachal Pradesh, followed by development of norms for future uses. Jasbire Kaur (1999) Conducted as assessment of motor fitness of rural and urban senior secondary school girls of Punjab state Sonam Angchok (1999) conducting a study to establish norms for the high and higher secondary male student of ladakh, among the age group 13 to 17. Sujata Devi (2000) conducted a study to compare the physical fitness and psychological trait of tribal and non-tribal high school students of high altitude areas between the age group of 14 and 17 years. Mandeep Brar (2004) conducted a study on motor development of school children of union territory of Chandigarh a cross sectional analysis 12 to 14 years.

Body mass index (BMI) widely used simple assessment of fatness and leanness. Body Mass Index (BMI) is assessed with this formula [weight/ (height) ²] where weight is in kilograms and height is in meters. Collins Cynthia *et al*. used BMI for age among US children and adolescents, 2003-2006; they concluded that; children and adolescents aged 2 through 19 years showed no significant trends between 1999 and 2006. Zephyr E *et al*., studied (12,559) American Indian children and adolescents (5-17 y) Age-adjusted prevalence's of overweight were 39.1% and 38.0% for males and females, respectively, and corresponding age-adjusted prevalence's for obesity were 22.0% and 18.0%, respectively. Chiara Milanese *et al*., conducted on anthropometry and motor fitness in children aged 6-12 years in Spanish, they concluded that BMI did not differ between genders age range 6-12 years. Kemer *et al*., conducted in the Amsterdam Growth and Health Study (AGAHLS), a cohort of about 400 boys and girls (mean age 13 years) were followed over a period of 20 years.

Over that period repeated measurements were done of body dimensions (height, weight, skin folds'). Palao *et al*., studied (625 males and 617 females) beach volleyball players that classified in the world tour and in the Olympic Games during seasons 2000-2006, the variables were: height, weight, and BMI, and age, results. The average characteristics for males were 1.93m. 88-89kg, BMI of 23.8-24.1 and age range of 29-31 years, and for females, they were 1.77-1.79m, 66-68kg, a BMI of 19.2-21.1 and an age range of 27-29 years. Conclusion; Beach volleyball players are older and have smaller anthropometric characteristics when compared with indoor volleyball players. Male players present similar values for age and height across rankings. For genders with regard to weight and BMI, the higher, the level, the larger, the value for women, the players at a higher level presented higher values of age, height, weight and BMI. India is a vast country with unique cultural, social, geographical, ethnics and climatic differences. The body mass index varies from one region to another, which ultimately affects physical growth and development. Sodhi and pathmanathan and prakash have reported that the regional variation of morphological characteristics of Indian children occur due to socioeconomic, climatic and genetically variations. Chandigarh is the capital of panjab state located in the north of India, at the foothills of the shivalik range of the Himalayas at an altitude of 321 meters above the sea level and Tehran is the capital of Iran located between 1200 and 1700 meters altitudes.

Agarwal studied BMI of public school going adolescents of 12 cities in India (11,863 male and 7,694 female), (5-18 years) the mean BMI for male were 14.4- 20.4 and 14.4- 20.9 for females. Reddy BN studied a sample of 1119 individuals (456 males and 663 females), aged 18 to 75 years the BMI populations of Andhra Pradesh, India. He revealed that The BMI of the participants ranged from 12.6 to 35.1 in males and from 12.3 to 34.2 in females. There is an increasing trend in mean BMI until about 50 years, followed by a decline. The prevalence of obesity (BMI ≥25) is 6.6% in males and 10% in females. Mean BMI also increases with better socioeconomic status of the constituent groups and with decreased physical activity level. Hardial Singh studied on motor abilities of Indian school boys of 10-16 years old; he concluded that Indian boys are shorter and lighter than the boys of Europe and

North America. The yearly rate of increment in height, weight of Indian boys is lower than European and North American boys. R Khongsdier studied BMI and morbidity of N= 576 adult males (18-59 y) of the War Khasi in Northeast India he concluded that; the mean BMI of reported morbidity N=137 was 19.18, and mean BMI of non reported mobility N= 438, was 20.06. Amirkhani, studied Iranian new born infants-24 month, He accomplished that the growth potential of Iranian children is no less than that of West Europeans, though the majority of the population grows along a very much lower curve. Ayatollahi deliberated those Iranian school children are now significantly taller and heavier for age than their peers born 15 years earlier.

Mosavi Jazayeri, studied on overweight and obesity of school-aged (6-10 years) children of Tehran, he pointed that according to BMI cutoff of IOTF 16.1٪ of all boys were overweight. Mohammadpour- Ahranjani *et al*., studied BMI of 11-16 years of Tehran students in 2000-2001; they revealed that the overall prevalence's of overweight and obesity were 21.1 and 7.8%, respectively. According to latest adapted form WHO, 2004 Indian students classification were 34٪ moderate thinness (16.00-16.99), 34٪ mild thinness (17.00- 18.49) and 34٪ in normal range (18.50- 24.99), Iranian students were in normal range classification and in two country not find overweight (≥25.00).

Methodology and procedure

In this chapter selection of subjects, design of the study, selection of variables, reliability of data, tools used, reliability of instrument, criterion measure, collection of data, administration of selected test items for collection of data, and techniques for data analysis are described.

Selection of subjects

The selection of subjects was completed in two phase 1 – a pilot study had been conducted on 240 student of 13-18 years of age studying in government schools from classes seven to twelve,120 from Chandigarh (India) and 120 from region nine of Tehran (Iran) 20 students from each age, Abbreviations GSSS, GHSSS, GMSSS and JNVS means: government senior secondary school, government high school senior secondary, government model senior secondary school and Jawahar Navodaya Samiti respectively.

Collection of data

The data for selected variables on the randomly selected subjects was collected over a period of eleven month (12/01/09 to 02/12/09). The subjects were made available by school authorities during the physical education classes and other times when the students were available from their regular academic routine. So the data was collected over different times of the day for different times of the day for different variables.

Statistical technique employed

To establish the reliability of the data person product moment correlation method was used.

In order to analyze development patterns in motor fitness, analysis of variance was carried out for each motor fitness item to determine significance of variance, if any, from age to age, separately for Indian and Iranian students. Whenever F values were found significant, the post-hoc scheffe`s test was employed to determine the significance of difference between the paired means. For analyzing difference between Indian and Iranian at each age in motor fitness test items, the test is applied. The level of significant was set at .05.

MATERIALS AND METHODS

To achieve the purpose of the study twenty four hundred male students, twelve hundred from India: Government Modal Senior Secondary Schools of Chandigarh and twelve hundred from Iran: pre university and high schools of region nine in Tehran, were randomly selected; their age ranged between thirteen year and eighteen year.

RESULTS AND DISCUSSION

The Mean, Mean Difference, Standard Deviation, Standard error Mean, Standard Error differences, and t ratio of selected Height, Weight and body mass index variables among Indian and Iranian male students, were numerically presented in Tables 1- 3.

Results

Table 1 gives the Mean, Mean Differences, Standard Deviation, Standard Error Mean, Standard Error Differences, and t ratio of Indian and Iranian Male students (13 to 18 years) in Height, averaged across the six data setsDevelopment took place among Indian boy's students from 13 to 17 years. But in Iranian boys it took place from 13 to 18 years.Growth spurt took place in Indian boy's (7.84cm) in15 years. But Iranian boy's showed height spurt (10.63cm) in 14 years.

Table 1. Mean,Mean difference, Standard Deviation, Standard Error Mean, Standard Error Differences, and t ratio of Indian and Iranian Male students (13 to 18 years) in Height

Age	Mean		MD	SD		SEM		SED	t
	Indian	Iranian		Indian	Iranian	Indian	Iranian		
13	1.4859	1.5822	-9.630	.08762	.0 8502	.00620	.00601	.0086	-11.15
14	1.5438	1.6885	-14.475	.08307	.07424	.00587	.00525	.0079	-18.37
15	1.6222	1.7021	-7.995	.08039	.06945	.00568	.00491	.0075	-10.64
16	1.6670	1.7207	-5.365	.07381	.06390	.00522	.00452	.0069	-7.77
17	1.6949	1.7557	-.0608	.05970	.05262	.00422	.00372	.0056	-10.81
18	1.6901	1.7611	-7.095	.06327	.05999	.00447	.00424	.0062	-11.51
T	16.173	1.7017	-.08440	.10835	.09054	.00313	.00261	.0041	-20.71

Table 2. Mean, Mean Differences, Standard Deviation, Standard Error Mean, Standard Error Differences and t ratio in Weight of Indian and IranianMale students (13 to 18 years)

Age	Mean		MD	SD		SEM		SED	t
	Indian	Iranian		Indian	Iranian	Indian	Iranian		
13	35.870	49.145	-13.275	8.3391	10.9188	.58966	.77208	.9715	-13.66
14	40.440	56.790	-16.350	7.7295	11.2775	.54656	.79744	.9668	-16.91
15	46.000	61.175	-15.175	8.9370	14.0564	.63194	.99394	1.178	-12.88
16	49.815	63.970	-14.155	9.0887	14.0976	.64267	.99685	1.186	-11.93
17	54.560	67.500	-12.940	10.598	12.1469	.74936	.85892	1.140	-11.35
18	55.065	71.655	-16.590	9.3309	15.1032	.65980	1.0679	1.255	-13.22
T	46.958	61.705	-14.747	11.455	14.9126	.33069	.44305	.5428	-27.17

*Significant at .05 Level of confidence. DF= 398, 2398.

Table 3. Mean, Mean Differences, Standard Differences, Standard Error Mean, Standard Error Differences, and t ratiobetween Indian and IranianMale students (13-18 years) in BMI

Age	Mean		MD	SD		S E M		SED	t ratio
	India	Iran		India	Iran	India	Iran		
13	16.291	19.566	-3.275	3.547	3.761	.2508	.2659	.3656	-8.961*
14	16.906	19.814	-2.908	2.404	3.378	.1700	.2389	.2932	-9.916*
15	17.448	21.048	-3.599	2.919	4.381	.2064	.3098	.3723	-9.669*
16	17.821	21.508	-3.687	2.592	4.175	.1833	.2952	.3475	-10.61*
17	18.957	22.115	-3.158	3.322	5.073	.2349	.3587	.4288	-7.364*
18	19.248	23.053	-3.805	2.933	4.417	.2074	.3123	.3749	-10.148*
total	17.779	21.184	-3.405	3.153	4.397	.0910	.1269	.1562	-21.804*

*Significant at .05 Level of confidence. DF= 398, 2398.

The subjects were tested on selected variables namely, standing height was measured by wall mounted stadiometer counted in centimeters and body weight was measured in kilograms by portable weighing machine. The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS, version 16.0). Mean, mean difference (MD), standard deviation (SD), standard error deviation (SED) and t test were employed. The level of significance was set at .05.

Table 2 gives the Mean, Mean Differences, Standard Deviation, Standard Error Mean, Standard Error Differences, and t ratioof Indian and Iranian Male students (13 to 18 years) Development in weight took place from 13 to 18 years in Indian and Iranian boy's students**.** Indian and Iranian boy's weight was increased year to year but weight spurt of Indian boys were at 14 to 15 and Iranian boys were at 13 to 14 year age.

Table 3 looks at the Mean, Mean Differences, Standard Deviation, Standard Error Mean, Standard Error Differences, and t ratios of Indian and Iranian Male students (13 to 18 years) Development in BMI, that took place from 13 to 18 years in Indian and Iranian boy's students. Indian and Iranian boy's body mass index was increased year to year.

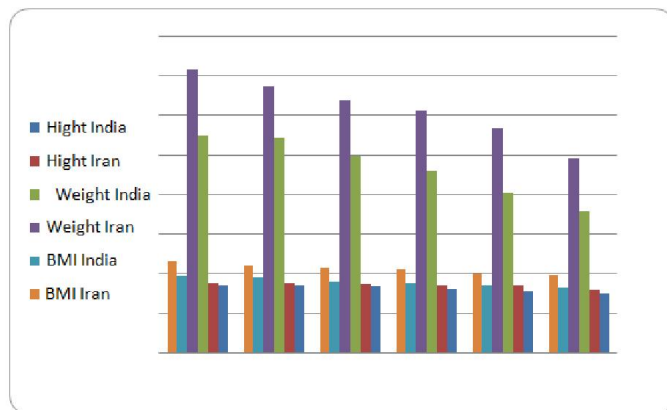**Figure 1. Height, Weight, and BMI among Indian and Iranian Students-A cross sectional study**

Figure 1 shows the graphically differences of Height, Weight, and BMI among Indian and Iranian male Students.

Discussion

From the results, it was observed that in height, body weight and body mass index show significant differences between Iranian and Indian students. It may be attributed to the fact that Iranian male student's sample was taken from Teheran city which is situated on high altitude (19) as comparison to Chandigarh which is situated on low altitude (17). This difference may be due to high altitude and terrain where Iranian male students walk up and down the hills in their daily life routine and the regional variation of morphological characteristics occur due to socioeconomic, climatic and genetically variations (12), Secondly the diet of Indian and Iranian male students was entirely different. According to latest adapted form WHO, 2004 (16) Indian students classification in BMI were 34٪ moderate thinness (16.00-16.99), 34٪ mild thinness (17.00- 18.49) and 34٪ in normal range (18.50- 24.99) and Iranian students 100٪were in normal range classification and in two country not find overweight (≥25.00).

The Iranian male students were almost non-vegetarian and mutton/ beef were the part of their daily diet which provides protein in abundance. The protein helps to build a good body size especially during growth period hence the Body Mass Index was the indicator of the bigger body size of Iranian Male Students (Amirkhani). The results are supported by Palao *et al* (11), Sodhi (15), pathmanathan and prakash (12). The findings are in line with Kemper, *et al*, (8) and Reddy BN (14), Palao J. M. *et al*., (11), K.N. Agarwal *et al*., (7), Pathmanathan G *et al*., (12), R Khongsider (13).

Findings

- The results revealed that in both countries BMI of subjects varied by age.

- The results revealed that there was significant difference among Indian and Iranian male students on body mass index.

Acknowledgements

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