ABSTRACT

FINAL REPORT

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Study on Somatotype, Physical Efforts & Perception of Physical Activity in Persons with Disabilities

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By

Dr. Mohd Arshad Bari
(Project Director)

DEPARTMENT OF PHYSICAL EDUCATION
ALIGARH MUSLIM UNIVERSITY
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Abstract

1. INTRODUCTION

Somatometry is a fundamental research method in anthropology. It involves the measurement of bodily proportions and sizes in living individuals. Before the start of measuring it is necessary to ask three basic questions:

- What is necessary to measure and evaluate and what kind of data should be obtained by measuring?
- How will the given dimensions be obtained? (determination of anthropometric points)
- What instruments should be chosen?

A somatotype is understood as the description of the current morphological condition of an individual, expressed through 3 numbers, where each of them represents one of the 3 basic components of body composition (Carter, 1996).

2. Yoga and Disability

Yoga practice among people with disabilities has long been associated with a number of physical benefits including (Body composition) lowered blood pressure and reduced heart rate, reduction in inflammatory responses, and reduction of pain. The many positive effects observed among those persons with disabilities or chronic illness who practiced Yoga were thought to be brought about by the stimulation of pressure receptors under the skin (much like massage therapy) which causes an increase in vagal activity and a decrease in cortisol- a primary stress hormone. The mechanisms by which these systems operate have not yet been explored, but positive outcomes in terms of patient reported Quality of Life and reported levels of pain have been documented.

3. Disability and Exercise

All humans should engage in regular physical activity at a level appropriate to their capacities, needs, and interests. All participants and adults should set and reach a goal of accumulating 30 minutes of moderate-intensity physical activity on most, and preferably all, days of the week. Those who currently meet these standards may derive additional health and fitness benefits by becoming more physically active or including more vigorous activity (NIH Consensus Statement, December 18-20, 1995).

There is a pressing need for the public health community to begin to develop exercise guidelines for persons with disabilities, and for consumers to use this information to become more involved in maintaining their health and well-being. A new and potentially valuable tool for improving the assessment of physical activity utilizes the Global Positioning System (GPS). Greater understanding of the nature of physical activity (or inactivity) is essential if we are to develop and implement effective interventions. Global positioning system (GPS) technology has the potential to improve our understanding of physical activity by providing location information. Researchers have begun to integrate GPS technology into physical activity-related studies, however because the technology is relatively new, only a handful of such research studies currently exist. Keeping in view the above lines, the researcher have proposed the study entitled 'Study of Somatotype, Physical Efforts & Perception of Physical Activity in Persons with Disabilities'.

4. Delimitations of the Study:

Following participants would be taken for the study:

1) **For the Analysis of Somatotype & Physical Efforts :**

   Persons with Disabilities: 25 from each of the following category:

   a. Orthopaedic disabled
   b. Visual disabled and
   c. Intellectual disabled persons

2) **For the Analysis of Perception of Health Enhancing Physical Activity (Focus Group)**

   (A) Seventy Five (50) Disabled Persons;
   (B) Ten (10) Fitness/recreation Professionals;
   (C) Ten (10) Teachers of Inclusive Education & Adapted Physical Education;
   (D) Ten (10) Therapists & other Health Practitioners and
   (E) Seventy Five (75) Parents and/or guardians of the disabled persons were contacted.

3) Disabled participants 12-18 years of age were selected as subjects of this study.

4) Somatotypes of the disabled persons were determined by using the Three Dimensional Somatoploting Method of Heath & Carter.
5) The Physical Efforts for the daily living of the disabled persons were analysed by using GPS Information Tracker & Accelerometer.
6) Focus Group Methodology was taken to analyse the Perception of Participation in Health Enhancing Physical Activity (i.e. barriers & facilitators of Physical Activity) by the participants.
7) A Conceptual Model of Physical Activity for People with a Disability (PAD) model of van der Ploeg HP, van der Beck AJ, van der Woude LH, and van Mechelen W (2004) were taken to analyze the barriers to & facilitators of physical activity under the perception of physical activity.
8) Effect of yogic exercises on body composition of disabled persons was analyses.

5. Statement of the Problem:

After thorough review of literature and discussion with experts we found that there are no parameters to assess the anthropometrical profile in disabled population. Therefore, the aim of this investigation will be to analyse the 'Relationship among Somatotype, Physical Efforts & Perception of Physical Activity in Persons with Disabilities'.

6. Significance of the Study:

Acknowledging the scarcity of researches done on somatotype, analysis of disabled persons' daily living physical efforts, and concerns & barriers to and facilitators of physical activity and levels of physical activity among People with disabilities (PwDs) in developing countries, and appreciating the need to establish the status of this 'forgotten' sub-population, the results of this study would contribute to the knowledge of somatotypical profile, detection of physical activity, physical inactivity levels, facilitators, and barriers to physical activity in People with Disabilities in India. The study would also increase knowledge of physical activity promotion and health education needs of PwDs in India.

It is envisaged, as Rimmer, Rubin and Braddock (2000) also indicate, that future designs of physiotherapy treatments and physical education programmes will use this kind of new knowledge to provide interventions and exercises with a higher rate of improving physical activity participation. This would be through equalization of opportunities for participation in physical activities and use of adaptive environments.

It is also envisaged that health education will be used by physiotherapists and physical educators as a core strategy to prevent disease and help promote the quality of life and independence among People with disabilities in India.

Conclusions drawn from this study will be shared with parents, health professionals and Government of India and will include recommendations for making the policy for increasing physical activity at the community level while taking into considerations of concerns & barriers to and facilitators of physical activity participation among PwDs in India. People with disabilities can help establish healthier lifestyles if they include Health Enhancing Physical Activity (HEPA) in their daily routines.

7. METHODOLOGY

8. Participants of the Study:

Two Hundred & Thirty (230) participants were targeted for the study, out of which seventy five (75) would be the persons with three types of disabilities i.e. Orthopaedic; Visual; & Mental. The ages of the participants were between 12 - 18 years. Each subject was somatotyped by the Heath- Carter Anthropometric Method. Data were analyzed with mean, standard deviation the five groups for the focus group will be included in the study are:

1) People with disabilities (Orthopaedic; Visual); (50 in number)
2) Fitness/recreation professionals/Managers/Owners (10 in number);
3) Teachers of Inclusive Education & Adapted Physical Education (10 in number);
4) Therapists & other Health Practitioners (10 in number); and
5) Parents/Guardians of the disabled persons (75 in number).

Participants were recruited through the regional offices of the Disability and Community Centres of Health Services, Health Commissionaires, NGOs working with people with disabilities, educational institutes offering higher inclusive education, fitness and recreation centres.

9. Methodology for Detecting Daily Living Physical Efforts of Disabled Persons via Signal Processing

Daily Living Physical Activities were recognized from the data by using 3-D accelerometers via smart/sports watch or any other portable instrument on wrist/hip/pocket and GPS information tracker via phone or any other portable instrument.

Signal features would be calculated for each second of the data collection.

Frequency-domain features included the estimation of power of the frequency peak and signal power in different frequency bands. Speed would be calculated from GPS location data.

The feature selection proceeded by identifying for each activity, the feature having the best performance in discriminating the corresponding activity from other activities. The performance of each feature would be evaluated by the area under the receiver operator characteristic (ROC).

The following signal features would be selected for activity classification:-

1. Walking speed
2. Steps/day
3. Cadence
4. Distance covered/day
5. Activity m/d (I/O)

10. Activity (Barriers to & Facilitators of) among Persons with Disabilities

Focus groups were facilitated by a member of the research team who were travel to the designated institutes/areas to conduct the sessions. At the beginning of each focus group session, group facilitators were explain the purpose of the study and obtain written consent from participants. Guardians/parents/participant/SE of the children with disabilities aged below 18 years will be requested to sign on the behalf of the children participants.

11.Methodology for Detecting effect of yogic exercise on body composition of Disabled Persons

12.Selection of the subject:

Twenty Four (24) students of Ahmadi School for Visually challenged, aging < 18 years are randomly selected as a subject for this study.

a. Control group 12 subjects

b. Experimental group—12 subject (Yogic exercise)

13.Statistical Analysis:

- Descriptive statistics for the variables such as somatotypical profile; physical efforts, levels of physical activity, barriers to and facilities & concerns of physical activity for the People with Disabilities were calculated..
- The SPSS version 20.0 software was used to analyze the data related to the physical efforts about health enhancing physical activity among disabled persons.
- The SPSS version 20.0 software was used to analyze the data related to the somatotype and effect of yogic exercise among disabled persons
- The software package called 'PROSOMAN', developed by S.P. Aubry et al. (1983) was used with a large computer MAC for calculating somatotypes, descriptive & comparative statistics, and plotting somatocharts. Various components of PROSOMAN are mentioned above.

14.DISCUSSION AND CONCLUSION

The present study was undertaken to report the somtotypes of Orthopaedic, Visual and Intellectual disabled parsons. One of the objectives of the study was to explore the changes with disabilities in mean somatotypes of the boys as orthopaedic, Visual and Intellectual disabled. The results presented in the previous chapters have shown that the Orthopaedic, Visual and Intellectual disabled boys are ectomorphic-mesomorph at different types physical disabilities considered in the study, however, some statistically significant somatotypes changes are observed for each component values among various disabilities group comparisons.

15. Somatotype Distribution:

16.Differences:

In order to evaluate population similarities/differences, one of the objectives of the present study was to understand the present findings with other such studies. Therefore, the somatotypes of disabled persons are compared among orthopedic, intellectual and visual disabled person of comparable ages from other populations of Indian region.

Majority of the studies were found to compare selected somatotype parameters with same age group from North India. But no studies were found till date to compare selected somatotype parameter of disabled person. Most of these studies have followed the Heath Carter method of somatotyping which are most significant with our study. Different studies have presented findings on different age groups. However, so many studies are reported which are being compared few of them studies present mean somatotypes at age groups similar to the present study (i.e., 12 to 18 years).

These studies are based on cross-sectional samples of Gujjar and Tibetan boys of Jammu and Leh District of Jammu & Kashmir (Bhasin and Singh, 1991), Bodhs and Baltis boys of Ladakh, Jammu & Kashmir (Bhasin and Singh, 1992), Gaddi Rajput boys of Chamba District of Himachal Pradesh (Singh and Sidhu, 1980), Jat Sikh and Bania from Punjab (Kansal, 1981), boys from Bangalore, Karnataka (Rangan, 1982), Jat Sikh boys from Chandigarh (Handa et al., 1995), Brahmin and Rajput boys of Chamba district of Himachal Pradesh (Singh & Singh, 1991), Dogra Brahmin boys of Jammu and Kashmir (Bhasin and Singh, 1991), and Punjabi boys of Patiala, Punjab (Sethi and Sidhu, 1992). The mean somatoplots of age groups 12 to 18 years respectively, for the present study as compared with other studies on Indian normal populations. The comparison of the present study with normal population of Indian context helps us to understand the differences exist between normal population and disabled person. Therefore it is also helpful to understand the changes in body physique of disabled person due to different kind of disability (Orthopaedic, Visual and Intellectual disabled persons).

Orthopedic, Visual, Intellectual challenged populations reported highest rating score on mesomorphy, lowest on ectomorphy except ectomorphy of intellectual person, and low on endomorphy in comparison with normal population of North-India. Orthopaedic challenged persons of present study are closest to Tibetan (J&K) in endomorphy. Endomorphy rating of visually challenged person is significant less as compare to the studies (Kansal 1981), (Rangan 1982), (Handa et al. 1995), (Singh and Singh 1991), (Sethi and Sidhu 1992). These differences exist in visually challenged person due to life style and diet of the visual challenged person.

The present studies shows that Mesomorphic and Ectomorphic rating of orthopaedic and visually disabled person is highest as compare with normal population as reported previous studies i.e. (Bhasim and Singh, 1980, 91 and 92), (Kansal 1981), (Rangan 1982), (Handa et al. 1995), (Singh and Singh 1991), (Sethi and Sidhu 1992).

Parizkova and Carter (1976) and Walker (1978) have reported change in component dominance during adolescence. In the somatotype comparisons presented above almost all the population groups, Excluding the orthopedic, visual and intellectual challenged persons of the present study; do not reveal any changes in component dominance during the adolescent period. Hoewer the present study reported changes in component dominance. In the somototype comparison of orthopedic, visual and intellectual challenged person with all population revealed that orthopedic, visual and intellectual challenged person significant differ with normal population of somatotype rating due to disability and life style.

Tanner (1964 and 82) had reported that there is not much change in somatotype ratings during the course of growth of normal population. Almost all studies show some change in the component ratings as the children. From the comparisons presented above it becomes clear that though at the ages 12 the somatotype of challenged person may have some similarity to the somatotypes of some other populations, but by the age of 18 years the challenged show a somatotype (balanced mesomorph) which is quite different from that of the other populations compared (others being, mesomorph-ectomorph, or mesomorphic ectomorph, or balanced ectomorph).

One of the aims of present study was to make some suggestions in the light of findings of the present study. - In an earlier study (Dkhar, 1991) it was suggested that one of the major applications of somatotyping is to explore changes with disability in the physique. How the physique of a child is transformed into that of an disabled adult ? It was also suggested that extensive somatotype survey should be conducted among children of Meghalaya, which might help in· spotting and training such children who later on grown as adult would possess the type of physique which may best suit for a kind of sport. Shape and size are two determinants of success in a particular sport since performance is determined by interaction of these variables with Physical, Visual and Intellectual disability, physiological capacities, psychological status, technique skill and socio-economic factors. As discussed in earlier various cross-sectional and longitudinal studies reflect extensive somatotype variations suggesting differences mainly due to disability, genetics, nutrition, physical activity, and age. Longitudinal studies have also shown that children's somatotypes change in a generally consistent pattern. In general the somatotypes of boys aged 12 to 16 years progress from endo-mesomorphy towards balanced mesomorphy; "thereafter, the boys tend to decrease in mesomorphy and increase slightly in ectomorphy in midadolesence, when there is dramatic reversal toward ectomesomorphy, balanced mesomorphy or endo-mesomorphy" (Carter & Heath, 1990). Various studies have also shown that somatotypes of some children are subject to significant changes while those of others are quite stable over a period of growth.

The findings of the present study reveal that on the whole orthopedic disabled person ecto-mesomorphic higher in rating, though average values of all the three components register changes with disability. Among the three components mesomorphy dominates, while endomorphy is at the lowest. In other words, the physique of orthopedic, visual and intellectual disabled persons may be described as showing a high musculo-skeletal development with relatively less fat.

The present study of somatotypes show a tendency to move away from upper axis of endomorphy towards upper axis of mesomorphy. Considering the total sample of 75 disabled persons, a majority visually disabled person (80%) fall in one categories, i.e., Ectomorphic-Mesomorph. Majority Intellectual disabled person (40%) fall in two categories, i.e., Ectomorphic-Mesomorph and Endomorphic Mesomorph. And

Orthopedic disabled person 80% fall in two categories Ectomorphic Mesomorph and Endomorphic Mesomorph.

17.Conclusion of Challenged Persons

A. Orthopedic Challenged Person

1. Result of the study shows that the somatotype ratings of mesomorphy were greater then ectomorphy and endomorphy somatotype rating.
2. The result shows that orthopaedic challenged participants were more mesomorphic and less endomorphic in comparison to ectomorphic from overall profiles somatotype data.
3. The result shows total number of people and total number percentage which fall under the category of Balanced Mesomorph (8%) from overall somatotype profiles data.
5. The result shows total number of people and total number percentage which fall under the category of Ectomorphic- Mesomorph (68%), Mesomorphic-Ectomorph (08%) and
   Endomorphic Mesomorph (12%) from overall Somatotype profiles data.
6. Considering the total sample of 25 orthopaedic disabled persons, a majority (80%) fall in two categories, i.e., Ectomorphic-Mesomorph and Endomorphic Mesomorph.
7. Result clearly indicates that visually challenged participants have low level of body fat and observed more percentage in mesomorphic and ectomorphic category.
8. It is very important for orthopedic challenged participants to get involved in physical activity and yoga because they have improper skeleto-muscular development system and having unbalanced lifestyle.
9. It is necessary for orthopedic participants to involve in special physical education program to develop their fitness level.

18.Visual Challenged Person

1. Result of the study shows that the Somatotype rating of Mesomorphy were greater then ectomorphy and endomorphy somatotype rating.
2. The result shows that visually challenged participants were more mesomorphic and less endomorphic in comparison to ectomorphic from overall Profiles Somatotype data.
3. The result shows total number of people and total number percentage which falls under the category of Balanced Mesomorph (8%) from overall Somatotype profiles data.
5. The result shows total number of people and total number percentage which fall under the category of Ectomorphic- Mesomorph (80%), Mesomorphic-Ectomorph (04%) and

   Endomorphic Mesomorph (04%) from overall Somatotype profiles data.
6. Considering the total sample of 25 visual disabled persons, a majority (88%) fall in two categories, i.e., Ectomorphic-Eesomorph and Balanced Mesomorph.
7. Result clearly indicates that visually challenged participants have low level of body fat and observed more percentage in mesomorphic and ectomorphic category.
8. It is very important for visually challenged participants to get involved in physical activity and yoga because they have improper skeleto-muscular development system and having unbalanced lifestyle.
9. It is necessary for visually participants to involve in special physical education program to develop their fitness level.

19. Intellectual Challenged Person

1. Result of the study shows that the Somatotype rating of mesomorphy were greater then ectomorphy and endomorphy somatotype rating.
2. The result shows that intellectual challenged participants were more mesomorphic and less endomorphic in comparison to ectomorphic from overall Profiles Somatotype data.
3. The result shows total number of people and total number percentage which falls under the category of Balanced Mesomorph (4%) and Balance Ectomorph (08%) from overall Somatotype profiles data.
5. The result shows total number of people and total number percentage which fall under the category of Ectomorphic- Mesomorph (28%), Mesomorphic-Ectomorph (12%) and
   Endomorphic Mesomorph (12%) from overall Somatotype profiles data.
6. Considering the total sample of 25 visual disabled persons, a majority (42%) fall in three categories, i.e., Ectomorphic-Mesomorph, Mesomorphic-Ectomorph, Endomorphic-Mesomorph and Mesomorph- Ectomorph.
7. Result clearly indicates that visually challenged participants have low level of body fat and observed more percentage in Mesomorphic and Ectomorphic category.
8. It is very important for intellectual challenged participants to get involved in physical activity and yoga because they have improper muscular-skeletal development system and having unbalanced lifestyle and disability.
9. It is necessary for intellectual participants to involve in special physical education program to develop their fitness level.

20.Discussion: Effect of Yoga on Body Composition of different Disabled Persons

This chapter of the study deals with the analysis of data collected from visually disabled person. In this study 24 (Twenty Four) visually disabled person aged between 12-18 years were selected for the study as the subjects from Ahmadi School for Visually Challenged, Aligarh Muslim University, Aligarh.

The subjects of the study were divided into two groups, each 12 (Twelve) namely Experimental Group No. I and Control Group No. II. The control group was free from the yogic exercises and has no given any training but in active rest. The two groups of this study a) experimental group b) control group were analyzed for the differences in body composition components in relation with pre test and post test.

Only Experimental Group-I also called training group. Experimental group underwent training program of different yogic exercises of 05 days of a week for the period of 06 week with proper assistance of technical experts. To test the significance of changes made from the pre and post test on two groups (Experimental and Control) groups' independent t -test was applied. The significance of the means of the obtained test results was tested at 0.05 level of confidence. Thus the obtained results were interpreted with earlier studies.

21.Conclusion Effect of Yoga on Body Composition

Many research studies have been done on the usefulness of yoga in the treatment of various lifestyle related diseases especially cardiovascular disease but no studies have been found regarding the impact of yoga on disabled person. Previous studies national or international level proved that that yoga has significantly impact on health and life style of the man. The findings of the study revealed statistically insignificant in the respect of all selected body composition variables. On the basis of the results obtained from the present analysis and within the limitation, the following conclusions are drawn after giving the 05 times a week total six (6) week of yoga practice.

1) The body composition parameters i.e. the Pulse Rate was significantly reduced after giving the six (6) week of yoga exercise.

2) The body composition parameters i.e the Weight, BMI, Body Fat %, Fat Free Weight, Blood Pressure (Systolic and Diastolic) were insignificantly reduced after giving the six (6) week of yoga exercise.

3) The body composition parameters i.e. the Body Water %, Skeletal Muscles % and B.M.R were insignificantly increase after giving the six (6) week of yoga exercise.

22.Recommendations

1. Yogic practices may also be recommended for controlling body composition parameters of disabled person.
2. Yogic practices may be recommended for visually, intellectually, and orthopedic disabled person also.
3. Yogic practices may be included in the curriculum of disabled person.
4. The government may encourage yogic practices to improve health status of disabled persons. 5. Yogic practices may be done to promote fitness and wellness of the disabled persons.

23.Discussion: Physical Effort by Person with Disability

The main aim of the study was to compare different daily physical effort variables among orthopedic, visual and intellectual disabilities. Results of the study show that there is significant differences exist among Physical, Intellectual and Visual disabled person in their step count per day. The present study indicated that orthopedic disabled person more active as compare with visual and intellectual disabled person. Despite that orthopedic disabled persons were comes under the moderate daily activity in comparison with normal population (Tudor-Locke and Bassett, 2004). The participants were on average 9402 step/day orthopedic disabled, 6891 step/day visual disabled, intellectual and 6213 step/day intellectual disabled person. This study contraindicate with previous studies, the basic recommendation (embodied in most public health guidelines world-wide) of 60 minutes of MVPA is associated with 10,000-14,000 free-living steps/day in preschool children (≅4-6 years of age), 13,000 to 15,000 steps/day in male schoolchildren, 11,000 to 12,000 steps/day in primary/elementary school children, and 10,000-11,700 steps/day for adolescents. This variation of step/day count between disabled and normal population is the major problem is disability of the children. This is indicating that visual disability is a biggest hurdle of physical activity of the children. (Tudor-Locke and Bassett, 2004 and Schmidt et al. 2009) recommended that step/day <5000 sedentary life style, 5000-7499 physically inactive, 7500-9999 moderate active, >10000 physically active and > 12500 very active. However, the US, P. C. S. N, 2016 has set daily step goals as part of its President's Active Lifestyle Award 12,000 steps per day for youth aged 8–17 years, and 8500 steps per day for adults. As per the previous studies (Tudor-Locke and Bassett, 2004) we can conclude that physically disable children come under the category of moderate active and intellectual and visually disabled person comes under the category of physically in active.

Cadence is the action of steps taken per unit time (i.e., steps/minute) and it can be used to infer intensity of eternal ambulation (Tudor-Locke et al. 2005 and Marshall et al. 2009. Result shows that there is significant differences exist among Physical, Intellectual and visual disabled person in their cadence. The study determined step taking by orthopedic disabled person 115.1 step/minutes > 99.35 step/minutes taken by intellectual disable person > 69 step/minutes by visual disable person. Visually

disabled person reported extremely slow pace of walking. Walking speed of cadence was slowed by about 10% in vision disability and raised their foot higher when stepping over obstacles (Hayhoe et al. 2009). Visually challenged person spent proportionately more time to fixating the obstacles and fixated longer while guiding foot placement near an obstacle. W.H.O- recommendation of at least on an average 6677 step per day. The average counts per minute (cpm) (intensity) are 1,040 ± 431 and the children and adolescents spent 92 ± 46 min per day at moderate-to-vigorous intensity.

From previous research in intellectual disability, raw data have hardly been reported. Only Phillips and Holland (2011) reported steps per day: in their small pediatric subgroup (12–15 years; n = 7), boys took 7,181 ± 179 steps per day, which is comparable higher to the current results (99.35 step/m). Counts per minute were more often reported: many studies in youth with intellectual disability showed average cpm between 300 and 450 cpm (Einarsson et al., 2015, 2016).

The analysis of data shows that there is significant differences exist among Physical, Intellectual and visual disabled person in their walking speed m/s. The participants were divided into three different categories orthopaedic, visual and intellectual disabled persons. Intellectual and visual disabled persons with self selected speed lower than 0.80 m/s and orthopedics disabled persons greater than 0.80 m/s speed. Perry et al. (1995) conclude that 0.80 m/s and Armand et al. (2016) conclude 0.88 m/s were the mean value for classify the value for classifying the peoples. The study determined walking speed m/s by orthopedic disabled person 0.90m/s > intellectual disabled person 0.62 m/s > visual disabled person 0.48 m/s. this is indicate that visually disabled person walking speed lesser and Orthopedic disabled person reported higher walking speed among all three categories of disabled population. The walking speed generally analyzed for clinical purpose. Slow walking speed is associated with different diverse health outcome i.e. physical, visual and intellectual disability. Normal walking speed of the adult who are healthy with range 0.90 m/s to 130.0 m/s (Hageman and Blanke, 1986, Langlois JA, Keyl PM, Guralnik JM, et al. 1997, , Krishnamurthy and Verghese, 2006) . Whereas walking speed range of 0.60 to 0.70 m/s are comes under the risk factor which is associated with poor health

outcome (Montero-Odasso et al. 2005). In reference with previous studied indicate that intellectual and visual disabled persons associated with poor health outcome.

This division has been used in a previous study that evaluated walking performance in different environments in subject's post-strok (Taylor, Stretton, Mudge, and Garrett, 2006). Perry et al (1995) concluded that 0.8 m/s was the mean value for classifying people with disability as community walkers. This division has been used in a previous study that evaluated walking performance in different environments in subjects post-stroke (Taylor, Stretton, Mudge, and Garrett, 2006). Perry et al (1995) concluded that 0.8 m/s was the mean value for classifying people with stroke.

If adopted, such a steps/day scale should continue to reinforce the importance and added value of taking at least an age-appropriate portion of daily steps (e.g., 10,000 - 12000 steps per day) at minimally moderate intensity, and if at all possible, at vigorous intensity, congruent with public health guidelines world-wide. Of course, non-ambulatory moderate and vigorous intensity activities (e.g., swimming, bicycling) are also valuable. Recommendations are based on a limited number of relevant studies and must therefore be considered preliminary.

The analysis of the study shows that there is significant differences exist among Physical, Intellectual and visual disabled person in their walking distance covered /day (m) and daily life style activity (indoor and outdoor). Intellectual disabled person covered greater distance per day and activity (indoor) minute per day as compare with orthopedics and visual disabled persons. Whereas orthopedics disabled person activity (outdoor) minute per day minimum as compare with visual and intellectual disabled person. The level of intellectual disable person was another potential factor influencing the volume of physical activity (Hilgenkamp et al., 2012; Phillips & Holland, 2011). This is in contradiction to previous studies, whicli showed that that physical activity levels seem to decrease with increasing severity of intellectual disability in adults and elderly (Hilgenkamp et al., 2012; Phillips & Holland, 2011).

Mc Garty et al. (2017) examine in their review of five different studies and meta-analysis of two studies that current interventions are insignificantly increasing

physical activity levels. Therefore, research on effective intervention components for this specific population is needed. One of the other component of physical effort might be motor skill. These studies indicate that participant with low motor development less physically active and those are having high motor development high amount physically active. Unfortunately, high amount of distance covered by intellectual disable person as compare with others disability indicate that intellectual disable person having high motor component. Based on previous study Hocking, McNeil, and Campbell (2016) suggested in their reviews that task-specific training may be useful, but that the overall quality of evidence is low. More research is needed to study if and how motor development can be increased in person with disability.

24.Conclusions:

1. Orthopedic disabled person more active as compare with visual and intellectual disabled person.
2. Orthopedic disabled persons were comes under the moderate daily activity
3. Physically disable children come under the category of moderate active and intellectual and visually disabled person comes under the category of physically in active.
4. Visual disability is a biggest hurdle of physical activity of the children.
5. The study determined step taking by orthopedic disabled person 115.1 step/minutes > 99.35 step/minutes taken by intellectual disable person > 69 step/minutes by visual disable person.
6. Significant differences exist among Physical, Intellectual and visual disabled person in their walking speed (m/s).
7. Intellectual and visual disabled persons with self selected speed lower than the standard and orthopedics disabled persons greater than standard speed.
8. The study determined walking speed m/s by orthopedic disabled person 0.90m/s > intellectual disabled person 0.62 m/s > visual disabled person 0.48 m/s.
9. Visually disabled person walking speed lesser and Orthopedic disabled person reported higher walking speed among all three categories of disabled population.
10. Intellectual and visual disabled persons associated with poor health outcome.

11. Significant differences exist among Physical, Intellectual and visual disabled person in their walking distance covered /day (m) and daily life style activity (indoor and outdoor).
12. Intellectual disabled person covered greater distance per day and physical activity (indoor) minute per day as compare with orthopedics and visual disabled persons
13. These studies indicate that participant with low motor development less physically active and those are having high motor development high amount physically active.
14. More research is needed to study if and how motor development can be increased in person with disability.

FOCUS GROUP INTERVIEW

(A) (Physical Education Teachers & Fitness Professionals)
General Perception about HEPA

1) All the participants have agreed that the specially-challenged population need vigorous physical activity, in a same way as their counter-parts do need.
2) Special equipments must be evolved for the special population.
3) Each fitness training centre must have at-least one instructor especially for the challenged population.
4) The instructor for this population must be trained specially to take on such population.
5) Government of India must take initiative to renovate the stadia at grass root level in relation to our special population.
6) Regular sports competitions must be initiated immediately, without any entry fee.
7) There must be certain policies of GoI to improve the socio-economic status of sports persons belonging to special population.
8) No physical activity directives are available in our country in regard to this population. It must be evolved.
9) All types of special population, according to their age and maturity, have potential to carry out all types of physical activities, irrespective of their intensity, volume and frequency.

10) Challenged individuals must be made understand that they have to exercise regularly and at a specific intensity so they can experience the health benefits which can be achieved from the exercise they participate in.
11) There is a need for young people with disabilities, to be educated, encouraged and supported in becoming physically active.
12) There is a need to increase each individual's knowledge of exercise benefits so to help promote physical activity amongst participants.
13) Physical activity should be promoted through all national sporting bodies and national voluntary disability groups who can explain the benefits and improvements that can be achieved from physical activity participation.
14) Leisure centres should develop partnerships with local voluntary disability groups so that they can encourage physical activity participation and provide an integrated setting, which would allow for people with disabilities to enter into an integrated community.

25. FOCUS GROUP INTERVIEW (Parents and Guardian of Disabled Persons) General Perception about HEPA

1. All the participants have agreed that the specially-challenged population need vigorous physical activity, in a same way as their counter-parts do need.
2. All Parents and guardian have lack knowledge and means.
3. All Guardian and parents of disabled persons have lack of professional or practical instructional training.
4. Approximate 60% guardian and parents have negative societal attitude toward the disability.
5. Approximate 90% guardian and parents have doubt about the child safety and security during physical activity.
6. All guardian and parents are not asked about how they can participate.
7. All guardian and parents are agreed lack of transportation of disabled person.
8. Each school of disabled person must have at least basic equipment and trained instructor for challenged population.
9. Special equipment must be evolved for special population.
10. Each School of disabled person organized regular sports completion, with proper arrangement of transports and safety.

11. All guardian and parents are agreed that, No physical activity directives are available in our country in regard to this population. It must be evolved.
12. There is a need for young people with disabilities, to be educated, encouraged and supported in becoming physically active.
13. Encourage the disabled persons to participate in physical activity from early childhood.
14. Ensure children with disability meaningful participation in physical activity.
15. Ensure proper playground with safety in disabled schools.
16. All guardian and parents are agreed that the disabled person having very less previous experience regarding physical activity.

26. Barriers of HEPA among Challenged Population as Perceived by the Physical Education Teachers & Fitness Professionals and Parents/ Guardian.

1. There are many barriers intrinsic and environmental, faced by people with disabilities when participating in physical activity. The participants identified a number of barriers that faced adults in the general population who participated in physical activities and these included motivation, availability and time, these are barriers that are also faced by people with physical and sensory disabilities.
2. Intrinsic barriers include not having knowledge about the benefits of physical activity. There is very little information available to people with disabilities about the benefits of activity for their main condition or its potential in preventing secondary complications occurring. This lack of knowledge can lead to uncertainty occurring for people with disabilities as to whether physical activity is beneficial or harmful to the persons' condition.
3. People with disabilities also face the barrier of their own attitude where they may feel frustrated about lost abilities together with embarrassment and loss of dignity infront of others participating in the activity.
4. According to the Adapted Physical Education Teachers the main barriers faced by people with disabilities were the attitudes of others, inaccessibility, transport, communication and finance. Additional barriers included the lack of coaches/trainers and family. In relation to participation in exercise and

physical activity, the attitudes of service providers were also identified as a problem, in that it was perceived that they were often ignorant of the requirements of people with physical and sensory disabilities.

5. Inaccessibility to facilities is an obstacle that hinders participation of people with a physical or sensory disability, as often buildings are not designed to accommodate people with physical and sensory disabilities, i.e. ramps, doors, changing facilities etc. The Building Regulation law in India that came into effect very recently now covers this barrier and all buildings are supposed to comply with these regulations.
6. Transport is another major barrier as many people with disabilities do not have their own transport and as a result have to rely on public transport or someone else to bring them to the facility. This can be an inconvenience to both the person with the disability and those providing the transport.
7. Finance is a limiting factor in what individuals can spend on physical activities and leisure pursuits.
8. Families can also act as a barrier to participation, as they may not understand the benefits that physical activity can bring to people with disabilities, while also fearing that injury or accidents may occur while participating in sport.

27.General Perception and Facilitators about HEPA as Perceived by Intellectual Disabilities

1. All the participants have agreed that the intellectual-challenged population need proper facility of gym without architectonic barrier, policies and programme.
2. All the participants have agreed that the intellectual-challenged population need the improve health, strength; enhance physical skills and cognitive ability to understand rules.
3. Support from others: Being with peers, positive influence of the child's environment, positive encouragement from others, skilled instructors, family involvement, , organising sports activities during school hours.
4. Personal perceptions: Internal motivation, Enjoyment, Fun, sense of success, sense of involvements and determined individuals.

28. General Perception and Facilitators about HEPA as Perceived by Orthopaedic Disabilities

1. All the participants have agreed that the orthopaedic disabled population need more participation in physical activity.
2. All the participants have agreed that the orthopaedic disabled population need more facility and opportunity for physical activity.
3. All the participants have agreed that the orthopaedic disabled population need adaptive equipment, better utilization of available equipment, trained instructor, and recreational facilities.
4. Fitness and safety: Maintenance of basic fitness/ muscle strength, walking ability, wheelchair skills, perceiving health benefits, physical appearance, weight loss, endurance etc.
5. Financial assistance is required for promotion physical activity in disabled population.
6. Organized competitive structure is required for promotion of physical activity.
7. Physical activity should be a part of main curriculum and given extra advantage.
8. Social supports is required: Social supports, , teachers and instructors supporting, parental support, motivation from PE teacher and friends, motivation from PE parents, parents involvement, community education campaigns, special agency support to provide information, therapeutic advice, and counselling time to time.
9. Communication: improve communication, advertisement of events, asking for help, information and awareness, information on activity provided to parents by school, collaborative approach between organisations and communities, dissemination networks between parents.
10. Suitability of orthopaedic disabled person: type of Activity, access to suitable facilities, disability-adopted programs, increased accessibility, programme emphasis on development of social skills and development of self-confidence, , better programmes, that are structured, sensitive to children with special needs, age appropriate and include a variety of things to do, more community-based programmes and opportunities to be active, non-competitive programmes that promote fun and socialisation, programmes that are not

therapy oriented, activity relates to a game, , emphasis on skill development and child's ability.

29.General Perception and Facilitators about HEPA as Perceived by Visual Disabilities

1. All visual disabled people having lack of knowledge regarding the physical activity.
2. All visual disabled people having lack of equipment and trained teachers.
3. Personal perceptions of visual disabled person are internal motivation toward activity, Enjoyment, Fun, sense of success, sense of involvements and determined individuals.
4. Vision and safety: Maintenance of basic fitness/ muscle strength, walking ability, Assistance exercises, perceiving health benefits.
5. All visual disabled people are required safety equipment, special equipment and proper ground facilities.
6. All visual disabled people are required assistive training programme.
7. All visual disabled people are required skilled trainer in the schools.

30. Barriers of HEPA as Perceived by Intellectual Disabilities:

There are many barriers faced by the intellectual disabilities as follows.

1. Intellectual disabled person have lack of sorts facilities.
2. Lack of equipments is one of the most important barriers of HEPA as perceived by intellectual disabilities.
3. Lack of sports event/programme also considered most important barrier of HEPA as perceived by intellectual disabilities.
4. Health: lack of coordination, motivation, fatigue, lack of concentration, longer to developed skills, obesity, lack of interpret the instruction of instructors, poor motor skill.
5. Safety: Lack of equipment, lack of adjustment, love energy level, lack of understands the rules and instructions.
6. Transportation facility to reach the competitive place.
7. Lack of financial assistance because extra cost are required for raising with the child of intellectual disability.
8. Lack of financial or social supports with others.

9. Lack of advertisements of events, parents' lack of knowledge and children are not asked about the how they can participate.
10. Frustration, lack of motivation, and loss of confidence when intellectual disabled person compare with others.
11. Over protecting parents
12. Negative social attitude toward disability

31.Barriers of HEPA as Perceived Visual Disabilities:

1. Visual disabled person have lack of sorts facilities.
2. Visual disabled person have lack of Professional Preparation.
3. Visual disabled person have lack of qualified teachers. Unqualified staff who cannot modify or adapt individual and group exercise classes for people with visual disabilities. Visual disabled person have lack of assistive training programme.
4. Visual disabled have limited expectation.
5. Visual disabled person have parental over protectiveness.
6. Visual disabled person have apathy of teachers
7. Support from others: Lack of specific knowledge about the benefits of physical activity, lack of knowledge about how to exercise, lack of information about physical activity, no counselling.
8. Visual disability is one of the most important barriers to participate in physical activity.
9. Longer to developed skills due to visual disability
10. Loss of confidence when child compare with others
11. Need extra assistive support to participate
12. Provider's attitudes, knowledge, and understanding of people with disabilities
13. Lack of access to accessible or convenient transportation for people who are not able to drive because of vision or cognitive impairments