

EFFECT OF AEROBIC TRAINING EXERCISE ON THE QUALITY OF LIFE OF PERSONS WITH MILD INTELLECTUAL DISABILITY IN IBADAN, OYO STATE

Joy Esther IKWUEGBU

joyvictor2013@gmail.com

and

John Olusegun OYUNDOYIN, Ph.D

johnoyundoyin@gmail.com

Department of Special Education,
University of Ibadan, Ibadan, Nigeria

Abstract

This study investigated the effect of aerobic training exercise on the quality of life of persons with mild intellectual disability with emphasis on some selected aspects of quality of life which includes the physical, psychological and social or interpersonal relationship. The participants were twenty pupils from two special schools in Ibadan, Oyo State, Nigeria. This study is significant as it revealed that pupils with intellectual disability have low quality of life in areas such as physical health, psychological well-being and social relations. These aspects of quality of life where they lag behind are so vital for their development and so should be given priority. Aerobic training on the other hand has been noted as a means of boosting quality of life. Two valid and reliable instruments (Slosson Intelligence Test ($r=84$) and World Health Quality of Life Scale (adopted) ($r=92$) were used to collect data. Three research hypotheses were tested at 0.05 level of significance. The data collected were analysed using descriptive and inferential statistics of Analysis of Covariance and Scheffe post-hoc test. Two (8.7%) of the participants had low socio-economic status, while six had (35.3%) average socio-economic status. There was significant difference in the quality of life of experimental participants in the pre-test and post-test ($t=-16.219$). The participants exposed to aerobic training exercise obtained a mean score of ($x=52$) while those of the control had ($x=42.5$). There was no significant main effect of aerobic training exercise and gender on the quality of life of the participants. There was no significant main effect of aerobic training on gender and socio-economic status on the quality of life of the participants. Based on the findings of this study, it was recommended that aerobic training exercise should be encouraged by teachers of persons with mild intellectual disability as this will help to enhance their quality of life.

Keywords: *Persons with intellectual disability, aerobic training exercise, gender and socio-economic status.*

Introduction

“Health is wealth” is an axiom that is very popular in our culture and society. Quality of life of citizens is a *sine qua non* to societal development. Everyone wants to enjoy life, live healthy and be satisfied irrespective of his/her status, background, race or religious affiliation. To derive maximum satisfaction, happiness and joy in life, people engage in all sorts of things such as strenuous and time consuming jobs, healthy diets exercises and the like. The quality of life people desire is so evident in the kind of life they live, the type of environment they live in, the type of houses they built and the type of friends they keep. To enjoy quality life, one needs to exercise. For persons with intellectual disability, aerobic training exercise is highly recommended because of its numerous health, physical, social and even psychological benefits.

The word aerobic is a Greek word for ‘with air’ Aerobic training refers to exercises that promote cardiovascular fitness by elevating the heart rate for an extended length of time, which increases the flow of oxygenated blood throughout the body (Aerobics, 2010). Aerobic exercise (also known as cardio) is a physical exercise that depends primarily on aerobic energy generating process (Sharon, Plowman, Denise and Smith, 2007). It strengthens the heart, lungs and trains the cardiovascular system to manage and deliver oxygen more quickly and efficiently throughout the body. On the other hand, exercise is defined as planned, structured, repetitive physical activity that is done to condition the body in a particular component of fitness (Centers

for Disease Control and Prevention, 2010). Cardiovascular system comprises of the heart and blood vessels (arteries and capillaries) that transport blood throughout the body. Lack of physical exercise has been identified as the most significant global behavioural risks of health (World Health Organization, 2009).

Aerobic training is, therefore, any structured exercise and (in terms of time, intensity and duration) bodily activity that enhance or maintain physical fitness and overall health and wellness. It is performed for various reasons, including increasing growth and development, preventing ageing, strengthening muscles and the cardiovascular system, weight loss or maintenance, improve quality of life and merely for enjoyment. Frequent and regular aerobic exercise boosts the immune system and helps prevent diseases of affluence such as cardiovascular disease, type 2 diabetes and obesity which is common among some children with intellectual disability (Hu, Manson, Stampfer, Colditz, Liu, Solomon and Willett, 2001). The goal of aerobic exercise is to increase cardiovascular endurance. Examples of aerobic exercise include cycling, swimming, brisk walking, skipping rope rowing, hiking, playing tennis, continuous training, and long slow distance training (National Institutes of Health, National Heart, Lung and Blood Institute, 2006).

Intellectual disability is a state of incomplete mental development that results in significant limitations of intellectual functioning and adaptive skills with onset

during the developmental period. The American Association on Intellectual and Developmental Disabilities (AAIDD, 2012) defined intellectual disability as a disability characterised by significant limitations both in intellectual functioning and in adaptive behaviour, which covers many everyday social and practical skills, originating before the age of eighteen. Slosson Intelligence Test Revised (SIT-R3) classified persons with intellectual disability into three based on their intelligence quotient (IQ). The classification is severe/profound intellectual disability with IQ of 35 and below, moderate intellectual disability with IQ that ranges from 36-51, and mild intellectual disability with IQ ranging from 52-68 (Slosson, 2005).

Persons with mild intellectual disability may not really have some noticeable physical traits as majority of them look normal but with slight changes in behaviour, deficiencies in social interaction, communication skills, and motor performance and they are usually overweight because of inactivity. In addition, there are some medical conditions that are more common among persons with mild intellectual disability. These include: Congenital heart disease (40-50% of people with Down syndrome have this and approximately half requires surgery of some form), thyroid problems hearing and sight problems (found in significant number of people with Down syndrome) Excessive weight gain (obesity) (National Down Syndrome Society, 2011).

People always seek good life. In an attempt to describe what constitute a good life, Scholars tried to describe good life and their descriptions resulted into the concept,

“Quality of Life” (QoL) (Fatah, Moghadam, Falahi, Khoshknab, Rahgooi and Karimloo, 2005). To them quality of life means a good life. A good life is the same as living a life with high quality, being happy and fulfillment of needs. Many researchers believed that quality of life is a complex issue and has different dimensions. Quality of life is a perception of a person in relation to combination of physical, mental and social welfare (Molav, Nojoomi and Anbari, 2008). Quality of life is feeling of life satisfaction or dissatisfaction and has different facets (World Health Organization, 2005; Frisch, 2006).

In general, quality of life is the perceived quality of an individual’s daily life, that is, assessment of their well-being or lack thereof. This includes emotional, social, and physical aspects of the individual’s life. Quality of life is considered as a concept that identifies what is important, necessary and satisfying in human existence. The World Health Organization (WHO, 1997) describes quality of life as “a state of complete physical, mental and social well-being and not merely an absence of disease or infirmity. According to Parmet, Lynm and Glass (2002), quality of life refers to an individual perceived physical and mental well-being. Quality of life is a concept that is unique to the human experience, one that crosses lines of disability, of gender, of age and of socio-economic status. Some dimensions even cross cultures (Ryff and Singer, 2000).

The study examined three aspects of quality of life of persons with mild intellectual disability which are: physical health, social relationship and psychological

well-being. Physical health which is made up of activities of daily living skills (mobility, energy and fatigue, sleep and rest, pain and discomfort), social relationships (personal relationship, social support and sexual activity) and lastly psychological well-being (bodily image and appearance, negative feelings, positive feelings, self-esteem, thinking, learning, memory and concentration) (World Health Quality of Life, 1997). A person is said to have a good quality of life if he/she can carry out his or her daily living skills effectively, make and enjoy wholesome association and be able to accept self. Persons with mild intellectual disability are found lacking in this regard.

Aerobic training is a structured exercise which is intended to bring about some changes in an individual engaging in it. Persons with disabilities, particularly those with intellectual disability, tend to be more sedentary and lack motivation in regard to exercise when compared to persons without disabilities (Faison-Hodge & Porretta, 2004; Kessel and Merrick, 2004; Obrusnikova, Valkova, and Block, 2003; and Kavale and Forness, 2000). These individuals seldom take part in leisure time pursuits and physical activities (Rizzo, Faison-Hodge, Woodard, & Sayers, 2003). Participation in regular physical exercises has also been associated with independence and improved quality of life through its potential in controlling body weight, improving healthy bones, joint flexibility, muscular strength, healthy friendship, improved socialization and postural stability (Pollock 2000; Warburton, Gledhill, and Quinney, 2001).

Research findings showed that regular exercises can improve the functional status and can decrease the level of assistance that people with mild intellectual disability may need in order to perform activities of daily living by increasing muscular strength, endurance, BMI, flexibility, balance, cardiovascular and respiratory efficiency (Rimmer, 1999). Exercise can also reduce the incidence of secondary health complications in persons with disabilities (loss of cardio respiratory and muscular function, metabolic alterations and systematic dysfunctions), which may maintain or enhance quality of life (Noreau and Shephard, 1995). The positive contributions that exercise programmes entail have led to the implementation of various intervention programmes for individuals with Intellectual Disability (ID). These programmes included:

Stair climbing, walking, running, stretching and aerobic exercises, floor and flexibility exercises, a mile run, use of a rowing machine, weight lifting, bicycle training, treadmill training and brisk walking (Lotan, Isakov, Kessel, and Merrick, 2004)

Quality of life has five domains and each domain has expected activities embedded in it. This study investigated three out of the six domains. The reason for choosing these three areas is simply because these are areas that mostly affect persons with ID directly and hinder them from enjoying a good quality of life.

Domains	Facets incorporated within the domains
	Overall Quality of Life and General Health
1. Physical Health	Activities of daily living skills, sleep and rest, energy and fatigue, pain and discomfort.
2. Psychological Well-Being	Bodily image and appearance, negative feelings, positive feelings, Self- esteem, thinking, learning, memory and concentration.
3. Social Relationships	Personal relationship, social support, sexual activity.
4. Environment	Financial resources, freedom, physical safety and security, health and social care, opportunities for acquiring new information and skill, transportation.
5. Spirituality/Religion/Personal beliefs	Religion/spirituality and personal beliefs

Figure 1: World Health Organization Quality of Life, 1997.

To ensure a healthy lifestyle, World Health Organization (WHO) recommended eating a lot of fruits and vegetable, reducing fat, sugar, salt intake and exercising. This is so because persons with mild intellectual disability have a higher risk of obesity and the associated health risk which are factors that could have an impact on their quality of life. Research has shown that more than two-thirds of people with mild to moderate levels of intellectual disability do not participate adequately in physical activity for improvements in health (Temple, 2006).

Many national and international health organizations such as WHO, United States Department of Health and Human Services (USDHHS) and American College of Sports Medicine (ACSM) reported that children and adolescents with or without either mild intellectual disability or obesity can improve their health and quality of life by including moderate amount of physical

activities in most days of the week and that additional benefits could be attained with greater amounts of activity (USDHHS 2000, Fernhall 2003; Spear 2007 & Donnelly 2009). Evidence continues to mount on the benefits of physical exercise for the well-being of the body, mind and the reduction of risk from chronic disease (Biddle, Fox, and Boutcher, 2000). Growing bodies of research have examined the relationship of aerobic exercise to psychological well-being and functional outcomes in many disease situations, (Stenstor, 1994). Physical exercise is associated with physical and psychological benefits (Gignac 2003). Studies by Hunt (2003) showed that aerobic exercise improved psychological well-being (the way in which one deals with stress and mental functioning, such as decision making, planning and short-term memory), reduced anxiety and promoted healthier sleeping patterns.

Another aspect of quality of life that this study focused is social relationship. Social relationship refers to the ability of an individual to relate successfully with others. Among the characteristics exhibited by persons with mild intellectual disability is inability to make friends and this is because some of them are loners who exhibit maladjusted behaviours which hinders them from initiating or keeping friends. Special Olympics have done a lot in this regard. Special Olympics is the largest global provider of regular sports activities for people with mild intellectual disability; with more than three million athletes in two hundred and twenty countries worldwide. Special Olympics offers year-round sports training and athletic competition in a variety of Olympic-type sports for children and adults with mild intellectual disability, giving them continuing opportunities to develop physical fitness, demonstrate courage, experience joy and participate in a sharing of gifts, skills and friendship with their families as well as other. According to (Dykens and Rosner 1998), Special Olympics have a wider mission to use the power of sport to develop the social and emotional well-being of athletes, to change negative attitudes towards people with intellectual disabilities and to promote social inclusion and equality.

Research has also shown that socio-economic status of parents also influences quality of life of all persons. Family income, occupational prestige and educational attainment are measures of socio-economic status (SES) that have been found to influence an individual's life opportunities. Life opportunities can manifest themselves

in various ways, such as availability of resources to an individual within the health care system or individual's perception about his/her quality of life. In order for one to live a good and quality life, one needs to be financially stable with a good source of income. Often times, persons with mild ID do not have a gainful employment and as a result have to depend on their parents and family. Also, persons with mild ID due to health and physical issues constantly require the help and care of medical and Paramedical personnel's to be able to function effectively (speech therapist, physiotherapist, special educator and occupational therapist among others). Persons from low SES experience health and developmental problems than their counterparts from more affluent homes and the consequences are often severe (Parker, 1998).

Gender has also been identified as a contributing factor in aerobic training. Several studies have demonstrated that there is a substantial difference between gender in recreational exercise and sport participation, with women and girls reporting to be less interested in exercise and finding exercise less enjoyable than their male counterparts (Chuang, 2009). Tang (2010) found that there is a considerable relationship between gender and leisure activities. Girls with mild ID are more inclined to static activities and sometimes girls and boys have a greater preference for dynamic activities.

However, girls and boys with mild ID are both interested in recreational sports participation for physical and mental health, personal interest and physical appearance. They also enjoyed participating in recreational activities (Fu, 2009). Lately, it

has been noticed that females' involvement in exercise and sport has increased considerably, thereby improving their quality of life. In the United States of America for example, female with mild ID participation in high school sports rose from 294,015 to 3,665,367 between 1972 and 2007 and it is observed that disease such as cancer and type 2 diabetes reduced in this population (Dufur & Linford, 2010). Despite this dramatic growth, males with mild ID still participate more in aerobic exercise and sports more than females. It could be observed that the findings on aerobic training in enhancing quality of life was carried out in other countries, while there were little or no research findings as regards aerobic training in Nigeria.

Statement of the Problem

Persons with mild intellectual disability as result of sub-average intellectual functioning limit their communication, practical adaptive skills and appropriate interpersonal relationship. The difficulty includes inability to carry out activities of daily living skills effectively on their own, enjoying wholesome socialization and association like their colleagues. They also battle with depression which often leads to feelings of low self-esteem and at times the feeling of worthlessness. Their inability to relate well with others and socialize often result in their isolation and this is a great concern to parents, siblings and teachers. Most times, they tend to be overweight or obsess as a result of living a sedentary life which even affects their academic performance. As human beings with feelings and emotions, they may want to commit suicide when they are being segregated and

labelled. Although previous studies in other countries have spoken and researched into the benefits of aerobic training in improving quality of life but none known to the researchers have been done in Nigeria. This study, therefore, investigated the effects of aerobic training on the physical, social and physiological quality of life of persons with mild intellectual disability in Ibadan, Oyo State, Nigeria.

Hypotheses

The following research hypotheses were formulated to guide the study and were tested at 0.05 level of significance.

- HO₁ There is no significant main effect of treatment on quality of life (physical health, social relationship and psychological well-being) of the participants.
- HO₂ There is no significant interaction effect of treatment and socio economic status on quality of life (physical, social relationship and physiological well-being) the participants.
- HO₃ There is no significant interaction effect of treatment and gender on quality of life of the participants.

Methodology

The pretest-posttest control group quasi-experimental design with a 3x2x2 factorial matrix was adopted. Socio-economic status considered at three levels (high, middle and low socio-economic status). The population of the study was made up of persons with mild intellectual disability in Ibadan, Oyo state. A sample size of twenty (20) persons with mild intellectual

disability was purposively selected from two (2) selected special schools in Ibadan namely: Cheshire Primary school and Home School for the Handicapped, Ijokodo. The participants comprises of 10 males and 10 females. The schools were purposively selected.

The following instruments were used for data collection;

- (1) **Weighing Balance:** A standard weighing balance, of iron make, to take individual weight. Graded from 0-120kg.
- (2) **Calibrated Wall:** A well calibrated wall with the use of a measuring tape that indicates height from 1-7.0 meters.

Instruments

Two instruments were used for the study: Body Mass Index Scale (BMI) and World Health Quality of Life Scale (WHOQOL, 1997). BMI is a measure of body fat based on a person's weight, height and age. The weight is measured in kilograms over height which is squared and measured in centimeters. This is represented mathematically in this way $BMI = \frac{\text{Weight in kilogram}}{\text{Height in M}^2}$. According to the Mayo Clinic, a BMI rating of 18.5 to 24.9 is considered the healthiest. If a person BMI is between 25 and 29.9, then the person is overweight. Anything over a BMI of 30 is viewed as obese.

World Health Quality of Life scale (WHOQOL) scale assesses the quality of life of all persons with or without disability. The scale contains four domains of life that it assesses. It was adapted for use for persons with intellectual disability.

Domain 1- Physical Health

Domain 2- Psychological well-being

Domain 3- Social Relationship

Domain 4- Environment

Domain5-Spirituality/Religion/Personal Beliefs

In all, the scale has twenty- five items.

Procedure

Permission was sought from the selected schools to carry out this study. Sampled schools were visited beforehand to enable the researcher get acquainted with the schools and the participants. The teachers were well informed of the purpose of the study while the participants were equally addressed and intimated with the importance of the research to them. The training started with an introduction, establishing a rapport with the participants and orientation on how the training will be done. The selected participants were randomly assigned into experimental and control group. The measurements of their height and weight were taken with their ages. Their BMI were determined and properly documented before the training commenced.

The researchers and the assistants trained the experimental group on four selected aerobic exercise for six weeks namely:

1. Brisk walking
2. Jogging
3. Skipping
4. Rhythmic dancing

Each of the aerobic exercise was explained and demonstrated to the participants before they were allowed to engage in it. During the training, the participants were allowed to rest and refreshments such as sachet water, glucose and fruits were shared to serve as motivation for them. The control was exposed to general exercise - the conventional way. WHQOL questionnaire adapted was administered to the experimental and control groups before

and after the training. The participants were pre-tested and post-tested. The researchers alongside a research assistant spent one hour per session and altogether eighteen sessions, providing training for the participants.

Method of Data Analysis

The data collected were analysed using inferential statistics of Analysis of Covariance (ANCOVA).

Findings

Table 1 Summary table of 2x2x3 analysis of variance showing the main and interactive effect of aerobic training, gender and socio-economic status on quality of life.

Source	Type III sum of squares	Df	Mean square	F	sig
Correlated model	826.25	8	103.28	1.71	>.05
Treatment	331.74	1	331.74	5.50	<.05
Gender	149.33	1	149.33	2.48	>.05
SES	204.12	2	102.06	1.7	
Treatment *gender	.000	0	-	-	
Treatment *SES	7.05	1	7.05	.12	>0.5
Gender*SES	18.08	1	18.08	30	>0.5
Treatment*Gender*SES	.000	0	-		
Error	663.50	11	60.32		
Total	1489.75	19			
R Squared= .555 Adjusted R Square=.231					

❖ SES= Socio-economic status

Ho1: There is no significant main effect of treatment on quality of life of persons with mild intellectual disability.

The result from Table 1 shows that there is significant difference in the quality of life of experimental participants in the pre-test and the post test ($t(5.50)$, $p = < 0.05$). Hence, the null hypothesis was rejected.

From Table1, the result shows that there is significant difference in the quality of life of experimental participants to the control participants ($t(2.797)$, $p = < .01$).

Ho2: There is no significant main effect of socio-economic status on (physical, social and physiological) quality of life of the participants.

Result from Table 1, .0 attests that there is no significant main effect and interactive effect of aerobic training and socio-economic status on the quality of life of the participants. ($F(8,103.28) = 1.7, p = >0.5$). Therefore, the null hypothesis was accepted.

Ho3: There is no significant main effect of gender on the quality of life of persons with mild intellectual disability.

Result from Table 1.0 reveals that both genders in the treatment group underwent aerobic training and it has a positive effect on their quality of life. $F(8,103.28) = 2.48; p = >0.5$. Hence, the null hypothesis 3 was accepted.

Discussion of findings

Table 1 show that there is significant difference in the quality of life of experimental participants. This infers that the aerobic training programme improved the quality of life of the experimental participants. The stated hypothesis is, therefore, rejected. The reason for this could be as a result of much attention and training given to the experimental group.

The result corroborated with the findings of Lawlor and Hopker, (2001) which submitted that engagement in aerobic activity may have a positive impact on psychosocial and behaviour domains such as depression. It was also in line with the findings of Fernhall (2003), WHO, USDHHS & ACSM, (2000) who reported that children and adolescents with or without either mild intellectual disability or obesity can improve their health and quality of life by including moderate amount of physical activities in most days of the week and that additional benefit could be attained with greater amounts of activity. Thus, the present findings provide support for the previous findings.

The findings were also in line with the work of Pollock (2003) who reported that participation in regular exercise was found to

improve quality of life through its potential in controlling body weight, improving healthy bodies, healthy friendship, socialization and postural control.

Table 1 show that there is no significant interaction effect of aerobic training exercise and gender on the quality of life of the participants, hence, the hypothesis is rejected. This is contrary to the findings of Fu (2009) who conducted a study of the effect of physical exercise on persons with mild ID and found out that female's exercise participation increased and as such, increased their quality of life. This could be as a result of the assumption that females are more willing to cooperate and accept in doing things quickly or immediately it is introduced to them while males may be reluctant to accept but become more active when they finally accept. Dufur and Linfor (2010) also found out a recent involvement of more females in physical exercise while the study of Chuang, (2009) contradicted that finding as it reported girls with mild ID are more inclined to static activities. The findings from this study show that mild male persons with ID participated more and were more willing to be involved in physical exercise.

Table 1 show that there is no significant interaction effect of aerobic training exercise, gender and socio-economic status on the quality of life of the participants as revealed in the table. Hence, the hypothesis was accepted. Sidebotham (2006), in his study, found that low socio-economic status is common among persons with mild intellectual disability. This could be as a result of the fact that persons with mild ID have comorbidity problems which make them spend more. This study contradicts that finding as it shows that persons with mild ID show a high socio-economic status here in Nigeria. Irrespective of either high or low

socio- economic status, aerobic training exercise has been found to improve quality of life of pupils with mild intellectual disability.

Conclusion

This study has shown that aerobic training exercise goes a long way in improving the quality of life of persons with mild intellectual disability in the areas of physical health, social relationship and psychological well-being identified in the study. Though, the intervention was significant in improving quality of life of persons with mild intellectual disability, socio-economic status and gender played a moderating role on the quality of life of the participants. In this study, it was observed that gender had no effect on quality of life of the participants, nor was there significant interaction effect of socio-economic status on quality of persons with mild ID.

Recommendations

In order to improve the quality of life of persons with mild intellectual disability in respect to physical health, social relationship and psychological well-being, the following recommendations are made:

1. Aerobic training exercise should be encouraged by teachers of persons with mild intellectual disability as this will help to enhance concentration, reduce hyperactivity, improve memory and thereby improve academic performance.
2. Parents should make physical exercises part of their children's daily activity; this will help improve their physical health, social relationship and psychological well-being.
3. Professionals working with persons with mild ID need to be flexible and apply not just classroom method in teaching but should adopt aerobic

training so as to make impact in all aspects of life of their clients.

4. Curriculum planners should include aerobic training as part of their co-curricular activities for persons with mild ID as this will go a long way in improving their physical health, social relationship and psychological well-being.
5. Government should make school environment friendlier and also provide sporting facilities to schools for persons with mild ID.
6. Non-Governmental Organisations should support schools for persons with mild intellectual disability by helping to train teachers in the area of aerobic training.

References

- ACSM American College of Sport Medicine (2000). Guidelines for exercise testing (6th ed) Activity intervention for older adults with intellectual disability: report on a pilot project. *Mental Retardation*, 42, 272-283.
- Aerobics. (2010). *Columbia Electronic Encyclopedia, 6th Edition*, 1. Retrieved from EBSCOhost.
- American Association on Intellectual and Developmental Disabilities AAIDD (2012). definition of intellectual disability. Washington, DC:AAIDD Available at: www.aaidd.org/content/100.cfm?navID=21 (accessed September 2012).
- Biddle, S.J.H., Fox, K.r. and Boutcher, S.H. (2000). Physical activity and psychological well-being. Routledge, London.
- Centers for Disease Control and Prevention. (2010). Physical activity and health: The benefits of physical activity Retrieved

- on January 31, 2011 from
<http://www.cdc.gov/hysicalactivity/everyone/health/index.html>
- Chuang O.L, (2009). Gender differences in sports participation, sport enjoyment and self-perceptions. *J.Phs: Edu. High.Edu.* 11:27-37.
- Dufur, M. J., & Linford, M. K. (2010). Title IX: consequences for gender relations in sport. *Sociology Compass*, 4, 732e748. <http://dx.doi.org/10.1111/j.1751-9020.2010.00317.x>.
- Fattah Moghadam, L., Fallahi khoshknab, M. Rahgooi, A, Karimloo M. (2008). Quality of life and related factors in psychiatric nurses in Tehran. *Hakim*, 9 (4), 24-30.
- Faison-Hodge, J. and Porretta, D.L. (2004). Physical activity levels of students with mental retardation and students without disabilities. *Adapted Physical Activity Quarterly*, 21,139-152.
- Fernhall, B.O. (2003). Mental retardation. In J.L. Durstine, & G.E. Moore (Eds.), *Exercise management for persons with chronic disease and disabilities* (2nd ed., pp. 304- 310).
- Frisch, M.B. (2006). Quality of life therapy : applying a life satisfaction approach to positive psychology and cognitive therapy .John Wiley Sons, Inc.hoboken ,New Jersey.
- Gignac, M.A.M. (2003). Leisure time physical activity and well-being: learning from people living with arthritis. *J. Rheumatol.* 30(11), 2299–2301
- Hunt, A. (2003). Musculoskeletal fitness: the keystone in overall well-being and injury prevention. *Clin. Orthop.* (409), 96–105.
- Hu, Manson, Stampfer, Colditz, Liu, Solomon & Willett (2001). Diet, lifestyle, and the risk of type 2 diabetes ellitus in women. *The New England Journal of Medicine* 345 (11):790-797.
- Kavale, K.A., & Forness, S.R. (2000). History, rhetoric, and reality: Analysis of the inclusion debate. *Remedial and Special Education*, 21, 279-96.
- Lawlor, D.A and Hopker, S.W. (2001). 'The Effectiveness of Exercise As an Intervention in the Management of Depression: A Systematic Review and Meta-Regression Analysis of Rando-mised Controlled Trials', *British Medical Journal*, Vol. 322, No. 1-8.
- Lotan, M., Isakov, E., Kessel, S. and Merrick, J. (2004). Physical fitness and functional ability of children with intellectual disability: effects of a short-term daily treadmill intervention. *Scientific World Journal*; 14 (4), 449-57.
- National Down Syndrome Society. (2011). Down syndrome facts. Retrieved from <http://http://www.ndss.org/Down-Syndrome/Down-Syndrome-Facts/>
- Noreau, L. and Shephard, R.J. (1995). Spinal cord injury, exercise and quality of life. *Sports Med.* 20(4), 226–250.
- Molavinojoomi, M. and Anbari, K.H. (2009). Quality of life among patient with HIV-positive and AIDS compared with healthy individuals. *Medical Journal*, 58, 176-169.
- Pollock, M.L., Franklin, B.A., Balady, G.J., Chaitman, B.L., Fleg, J.L., Fletcher, B., Limacher, M., Pina, I.L., Stein, R.A., Williams, M., and Bazzarre, T. (2000). Resistance exercise in individuals with and without cardiovascular diseases: Benefits, rationale, safety, and

- prescription: An advisory from the Committee on exercise, Rehabilitation, and Prevention, Council on Clinical Cardiology, American Heart Association *Circulation*, 101-828.
- Rimmer, J. H. (1999). Health promotion for people with disabilities: the emerging paradigm shift from disability prevention to prevention of secondary conditions. *Phys. Ther.* **79**(5), 495–502
- Ryff, C.D. and Singer, B.H. (2002). From social structure biology, integrative science in pursuit of human health and well-being In C.R. Snyder, & S. J. Lopez (Eds.) *Hand book of positive psychology* (COPP 541-554) London: Oxford university Press.
- Slosson, R.L. (2005). Slosson intelligence test revised for children and adults (3rd ed.) New York: Slosson Educational publications Inc.
- Stenstrom, C.H. (1994). Therapeutic exercise in rheumatoid arthritis. *Arthritis Care Res.* **7**, 190–196.
- Temple, V.A., Frey, G.C. and Stanish, H. I. (2006). Physical Activity of Adults With Mental Retardation: Review and Research Needs. *American Journal of Health Promotion* **21**, 2–12
- U.S. Department of Health and Human Services. (2000). *Healthy people 2010: Understanding and improving health* (2nd ed.). Washington D.C.: Government Printing Office.
- Warburton, D.E., Gledhill, N., & Quinney, A. (2001). Musculoskeletal fitness and health *Canadian Journal of Applied Physiology*, **26**(2), 217-237.
- World Health Organization, Preventing Chronic Disease: A Vital Investment. (2005), p.2: http://www.who.int/chp/chronic_isease_report/en/index.html
- World Health Organization. (2009). *International statistical classification of diseases and related health problems: ICD-10*. Geneva: World Health Organization.
- World Health Organisation. (1997). *WHOQOL-BREF Introduction administration, scoring and generic version of the assessment*. Retrieved from http://www.-who.int/mental_health/media/en/76.pdf.