ISSN P - 0973-5666
ISSN E - 0973-5674

Volume 12 | Number 2 | April-June 2018

Indian Journal of Physiotherapy and Occupational Therapy

An International Journal

website: www.ijpot.com

Indian Journal of Physiotherapy and Occupational Therapy

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Print- ISSN: 0973-5666, Electronic - ISSN: 0973-5674, Frequency: Quarterly (4 issues per volume).

Website: www.ijpot.com

Editor

Archna Sharma
Institute of Medico-legal Publications
501, Manisha Building, 75-76, Nehru Place,
New Delhi-110019

Printed, published and owned by

Archna Sharma
Institute of Medico-legal Publications
501, Manisha Building, 75-76, Nehru Place,
New Delhi-110019

Published at

Institute of Medico-legal Publications
501, Manisha Building, 75-76, Nehru Place,
New Delhi-110019

Indian Journal of Physiotherapy and Occupational Therapy

www.ijpot.com

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Volume 12, Number 2 **April-June 2018**

DOI Number: 10.5958/0973-5674.2018.00028.X

Relationship of Physical Activity T.V. Watching, Computer Use with BMI and Stoutness Level among Children of Hisar

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ABSTRACT

Background: Physical Activity is defined as any bodily movement produced by skeletal muscles that results in energy expenditure. The prevalence of overweight also increased in children and adolescents due to sedentary leisure- time activities. Hence, relationship between these variables has to be determined so as to develop strategies to promote lifelong physical activity modifications among children to counteract the adverse health consequences due to inactivity.

Method: The data collection was done using questionnaire which was distributed among school going children of Hisar aged between 10-15 years and were instructed to fill it up properly. After that, anthropometric variables like weight, height and waist circumference were measured and their BMI was calculated.

Results: This study indicated that as age increase ,T.V. watching and computer use, BMI and stoutness level also increases. There was negative or no correlation between BMI and physical activity or between BMI and T.V. watching, computer use, stoutness level and physical activity respectively. There was positive correlation was seen between stoutness level and T.V. watching and computer use ($p<0.05$).

Conclusion: An inverse association was found between BMI and physical activity among children. Low levels of physical activity are associated with an increasing risk of obesity.

Keywords: *Physical Activity, BMI, Anthropometric variables, waist circumference*

INTRODUCTION

Physical activity is " any bodily movement produced by skeletal muscles that results in energy expenditure". Specific form of physical activity and exercise in which young people might include walking, bicycling, playing actively, participating in organized sports, dancing, doing active household chores, and working at a job that has physical demands.[1]

Although more research is needed on the association between physical activity results in some health among young people, evidence shows that physical activity result in some health benefit for children and adolescents.[1]

The prevalence of obesity has increased in both children and adults.2 In the 12 years between Second National health and nutrition Examination Survey (NHANES II, 1976 through 1980) and NHANES III (1988 through 1991), the prevalence of overweight in US adults increased from 25% to 33%. The prevalence of overweight also increased by similar magnitudes among all sex and age- groups of children and adolescents. Sedentary leisure- time activities such as T.V. watching, playing vediogames, and personal computing have contributed to the increasing prevalence of overweight in America.[3]

Andersen et al. in 1998 concluded that boys and girls in US who watch 4 or more hours of television each day had greater body fat and had a greater BMI than who watched less than hours per day.[3]

According to NHANES data from 1999-2002,

among children aged between 6-19 years, 31% were at risk for overweight or overweight and 16% were overweight. There is no indication that the prevalence of obesity among children and adults is decreasing (Hedley et al 2004).[7]

The increasing prevalence and severity of obesity in children, together with its most serious complication like type 2 diabetes. Impaired glucose tolerance is highly prevalent among children and adolescent with severe obesity (Sinha et al. 2002).[9]

The relation between BMI and percentage body fat is influenced by age, sex and ethnicity. BMI cuts off are applied to population date to compare rates of overweight and obesity nationally and internationally, develop policy, plan prevention programs, and access the benefit of interventions (Taylor et al. 2010).[4]

Lifestyle modification and weight control in childhood could reduce the risk of developing the insulin resistance syndrome, Type 2 diabetes mellitus and cardiovascular disease (Steinberger et al. 2013).[11]

The rising prevalence of obesity in children has been linked in part to the consumption of sugar sweetened drinks. The odds ratio of becoming obese among children increased 1.6 times for each additional can or glass of sugar sweetened drink that they consumed everyday (Ludwig et al. 2001). [8]

Parental obesity more than doubles the risk of adult obesity among both obese and non obese children under 10 years of age (Whitaker et al. 1997).[2]

Parental obesity and T.V. watching are risk factors for childhood obesity. The effect of parental overweight status on children body mass may have both genetic and environmental links, especially when parents influence their children T.V. viewing habits (Steffen et al. 2009).[13]

The current epidemic of obesity is caused largely by an environment that promotes excessive food intake and discourage physical activity (Hill et al. 1998).[14]

Recent evidence suggests a biological plausibility of the relationship between short sleeping hours and obesity, and inverse association was observed between sleep duration and risk to develop childhood obesity as short sleep duration was associated with decreased leptin levels, increased ghrelin levels and increased hunger appetite (Chaput et al. 2006).[15]

Researchers have identified potential modifiable risk factors that can lead to obesity in childhood. The beverages such as fruit juice consumption may contribute to the development of obesity in childhood through the dietary energy that they provide. Lower intakes of diary products and lower levels of physical activity were also found in obese children. Television watching influence obesity through less physical activity, increased opportunity for snacking and marketing of high energy products. The mother's BMI was also a significant predictor of the obesity status of child. This is likely to be the outcomes of both genetic influences as well as the common environment (Tanasescu et al. 2000).[5]

Overweight and obesity were associated with decrease physical activity participation and increased television viewing time. These observation highlight the importance that leisure time physical activities play in the childhood obesity epidemic. [16]

Excessive T.V. watching and video game use have been identified as a stimulus for excessive eating and sedentary behavior. This behavior pattern increase the risk of being overweight or obese (Tremblay and Willms 2003).[17]

Physical activity and sedentary behaviors are regulated through a complex series of decision making mechanisms and simply restricting television viewing are important independent determinants of body weight, weight gain, and risk of disease such as diabetes mellitus. Therefore, clinical and public health programs should consider television viewing reduction and physical activity promotion in oreder to reduce excess weight gain during adolescence(Taveras et al. 2007).[18]

Playing digital games was not related to overweight, perhaps by virtue of game playing being less sedentary or related to a different lifestyle than viewing television and using computer(Kautiainen et al. 2005).[19]

Television use was not related to children's weight status, videogames use was. Children with higher weight status played moderate amount of electronic games, while children with lower weight status played either very little or a lot of electronic games. Children under age 8(only girls not boys) with higher weight status played more videogames. Children age 9-12 with lower weight status used the computer (non- game) for moderate amount of time, while those with higher weight status used the computer either very little or a lot.

Children with higher weight status spent more time in sedentary activities than those with lower weight status (Vandewaterwt al. 2003).[20]

Watching>2 hours/ day of T.V./ videos in US preschool children was associated with a higher risk of being overweight or at risk for overweight and high adiposity. Computer use was also related to higher adiposity in preschool children, but not weight status (Mendoza et al. 2007).[21]

Adolescents reporting screen times of more than equal to 3h/day were approximately two- to- three fold more likely to have a Metabolic Syndrome than were adolescents with daily screen times levels of 1h or less. (mark and Janssen 2008).[22]

Children who watched more television and were less likely to participate in vigorous activity tended to have higher BMI's (Andersen et al. 1998).[3]

Within 34 countries, physical activity levels were lower and television viewing times were higher in overweight compared to normal weight youth . Regular physical activity contributes to the primary and secondary prevention of several chronic diseases and is associated with a reduced risk of premature death. (Warburton et al. 2006).[23]

Although more research is needed on the association between physical activity and health among young people, evidence shows that physical activity results in some health benefits for children and adolescents. For example. Regular physical activity improves muscular strength and increase physical fitness in obese children.[1]

There is a direct relation between physical inactivity and cardiovascular mortality. Persons who remain sedentary have the highest risk for all- cause and cardiovascular disease mortality(Fletcher et al.1996).[24]

The youth risk Surveillance System (YRBSS) was developed to focus national attention on priority health risk behavior among adolescents that contribute to leading cause of mortality and morbidity among youth and adults. The important role of schools in helping to attain those objectives is increase in nutrition education, tobacco- use prevention education, alcohol and other drug use prevention education.[25]

METHODOLOGY

545 subjects both males and females aged 10-15 years of age volunteered to participate this study. Only those subjects were included who met inclusion criteria .Subjects were explained the methodology and risks involved in the study then they were asked to sign informed consent form.

Procedure

A Questionaire was distributed to the school going children of Hisar aged between 10-15 years. Children were instructed to fill up the Questionaire properly as all the queries regarding questions were cleared. After filling up the Questionaire, it was collected from the students.

After that, measurement of anthropometric variables was done on them like:

WEIGHT was measured by using a digital weighing machine.

HEIGHT was measured by using a measuring tape. The children stood barefoot with the arms at the sides. The heels, buttocks, upper back and head was in contact with the wall. Prior to the measurement, the subject was instructed to look ahead and took a deep breath.

WAIST CIRCUMFERENCE was measured by using a measuring tape at the midpoint between the anterior superior iliac crest and the lower rib in cms.

BODY MASS INDEX (BMI) was calculated using the formula weight (kg)/ height(m^2).

DATA ANALYSIS

The correlation analysis of their BMI, stoutness level, physical activity, T.V. watching and computer use was done using Pearson correlation coefficient. The correlation was seen between BMI and physical activity, BMI and T.V. watching and computer use, stoutness level and physical activity, stoutness level and T.V. watching and computer use.

Table 1: **Table showing Mean, Standard Deviation and Standard Error of different variables**.

NO. OF OBSERVATIONS (N)	VARIABLES	MEAN	STANDARD DEVIATION	STANDARD ERROR
545	AGE	12.165	1.506	0.064
	BMI	18.507	3.255	0.139
	STOUTNESS LEVEL	68.529	8.038	0.344
	PHYSICAL ACTIVITY	11.568	5.395	0.231
	T.V. WATCHING AND COMPUTER USE	2.600	1.483	0.064

Table II: Table showing correlation analysis between Age, BMI, Stoutness level, Physical activity, T.V. watching and computer use.

VARIABLES	AGE	BMI	SLOUTNESS LEVEL	PHYSICAL ACTIVITY	T.V. WATCHHING AND COMPUTER USE
AGE	1.00000 (0.0)	0.28787 (0.0001)	0.41928 (0.0001)	0.04739 (0.2694)	0.17311 (0.0001)
BMI	0.28787 (0.0001)	1.00000 (0.0)	0.64110 (0.0001)	-0.02885 (0.5016)	0.05760 (0.1794)
SLOUTNESS LEVEL	0.41928 (0.0001)	0.64110 (0.0001)	1.00000 (0.0)	0.08612 (0.0445)	0.04772 (0.2661)
PHYSICAL ACTIVITY	0.04739 (0.2694)	-0.02885 (0.5016)	0.08612 (0.0445)	1.00000 (0.0)	0.11946 (0.0052)
T.V. WATCHHING AND COMPUTER USE	0.17311 (0.0001)	0.05760 (0.1794)	0.04772 (0.2662)	0.11946 (0.0052)	1.00000 (0.0)

If $p<0.01$, significant at 1% level.

If $p<0.05$, significant at 5% level

RESULTS

There was negative or no correlation between BMI and physical activity or between BMI and T.V. watching, computer use, stoutness level and physical activity respectively. There was positive correlation was seen between stoutness level and T.V. watching and computer use ($p<0.05$).

DISCUSSION

In our study, BMI is higher in those boys and girls who were less active as compared to those who were highly active or involved in higher physical activity. So our study support the intuitive belief that physical activity provides protection from being overweight and obese.

However, there is no relationship between T.V. watching and computer use and BMI of children.

Our study also shows that the stoutness level increases with increase in physical activity and vice versa. However, there is no relationship of T.V. watching and computer use with the stoutness level of children.

Low levels of physical activity are associated with an increased risk of obesity, and our current environment tends to discourage physical activity. Advances in technology and transportation have reduced the need for physical activity in daily life. Cutbacks in mandatory physical education programs have contributed to overall declines in children's physical activity levels. [14]

According to Hill et al. in 1998, individuals can maintain a relatively low risk of obesity by engaging in high levels of physical activity, by high dietary restraint, or by a combination of moderate activity with some dietary restraint.[14]

According to Janssen et al. 2005, physical inactivity and television viewing are important determinants of overweight in youth.[16]

Physicians and other health care professionals should counsel children and their caregivers on the importance of regular physical activity and decreasing sedentary activities.[3]

CONCLUSION

An inverse association was found between BMI and physical activity among children. Positive correlation was found between stoutness level and physical activity among children. No relationship was found between BMI and stoutness level with T.V. watching and computer use among children.

Conflict of Interest:- There was no conflict of interest.

Source of Funding*:* Nil

Ethical Clearance*:* NA

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DOI Number: 10.5958/0973-5674.2018.00029.1

To Find the Correlation between Internet Addiction and Social Skill Problem Behavior in Adolescents

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ABSTRACT

Background: Nowadays young people are becoming more and more attach to the internet as a means of communicating, learning and seeking new challenges. Attaching to internet is" detaching" adolescent from humanity with consequent increased incidence of adolescent social skill behavior Problems. Adolescent is one of the most sensitive, decisive and determinant stages in human life.

Therefore a correlation study was carried out to see the relationship between internet addiction and social skill problem behavior dimensions(presentation skill, interaction skill, communication skill, social integration, attitude towards other children and adults).

Methodology: A survey was carried out in Angels public school shahdra, New Delhi. Out of 100, 80 subjects were included on the basis of Internet addiction test score greater or equal to 50. Selected Subjects were assessed on Social skill problem behavior checklist.

Result: In our study we found that there positive correlation between internet addiction and social skill problem behavior.

Conclusion: Concluded that adolescents who spend time more than 20hr/week on internet have social skill problem.

Keywords: *Internet Addiction test (IAT).*

INTRODUCTION

The use of the internet has become essential to today's world with the availability of all types of information. For adolescent the internet can help with schoolwork, but it also provides a platform for communication and entertainment with the world. Adolescent can communicate with both people they know and strangers through internet that are not face-to-face. This may have affected the way adolescents behave, particularly those who have had these new interaction methods the entirety of their lives. To them, face-to face communication might not be the norm. The concern is that this may had a detrimental effect on their interpersonal communication abilities .Excessive use of internet lead to internet addiction that is becoming a common in children and adolescent. Internet addiction is defined as the psychological addiction to the internet and characterized as increasing investment to the activities on internet, unpleasant emotions when offline, increasing tolerance to the effect of become online and denial of the problematic behaviors[1].

Internet addiction influences individual's social skills. "Social skills are defined as the ability to interact freely and meaningfully with others both within and outside one's environment without much inhibitions or hindrances"[2]. Social skills are important in many aspects of individual's life, including for social and academic process. It is important in shaping relationships, enhancing the quality of social interaction and even mental health of individuals. These skills can be defined as a perfect model of behaviors exhibited by an individual in interpersonal relations. Social skills encompass a variety of capabilities and capacities including presentation, interaction, conversation, social integration, attitude towards other children and attitude

towards adult. Presentation skill problem is refers to the difficulties of the first impression that the child makes on another. Interaction skill problem refers to difficulties children have in making social contact with others facial expression, bodily distance and others basic social contact which child learn to adopt are misappropriate. Conversation skill is concerned with child's difficulties in making and sustaining conversation. Social integration refers to the degree the child is part of peer group. Attitude towards other children is defined as the skill refers to prominent pattern of behavior towards other children. Attitude towards adult is another social skill that is concerned with the child's dealing with authority figures.

Internet represents the technology which is applied for socialization of a generation in a large Scale. But on the other hand, excessiveness of internet has caused some concerns about the possible side-effects they have on the players. Major concerns about use of internet are due to two main factors; first, the amount of time adolescent spend and second, the nature of internet usage, particularly, when children spend their time on internet to compensate for ignoring other educational-social activities and leisure time. Recent studies showed that excessive use of computer games (more than 20 hours a week) would lead to negative impact on health, negative moods, depressive syndrome and weak social interaction[3]. Internet is an astonishing tool for communications[4] and number of adolescent internet users is increasing. Whatever relationships between adolescent in the virtual world increases, in contrast, range of their relations in real world decreases, especially family and friends[5].

Since Internet connections, unlike face to face communication, are more flexible and individuals can easily remove or edit their negative information, such relationships continue and lead to short comings in social skills. It will affect the psychosocial behavior of individual.

On the whole, currently, by progressing technology we are facing one of its aspects which is internet addiction; besides, the premier and main users are children and adolescent. Therefore, we are all aware that adolescence is one of the most sensitive, decisive and determinant stages in human life. So, it is necessary to emphasize more on the effects and consequences of addiction to internet on adolescents and their world. Thus, in this regard, the present study sought to answer the question that whether there is any relationship between Internet Addiction and social skill problem behavior among adolescent and at what extent Internet Addiction affect the Social skill dimensions (presentation skill, Interaction skill, conversation skill, social integration, attitude towards other children and adult)

MATERIAL AND METHOD

Study Design: Correlation design

Sample size: 80

Source of data collection: Data were collected from Angels Public Senior Secondary school,vishwas nagar,shahdara ,Delhi

Sample design: Convenience sampling

VARIABLES

Independent variable:-

- Internet Addiction

Dependant variable:-

- Social skill problem behavior (Presentation skill, Interaction skill, Conversation skill ,Social Integration, Attitude towards other children, Attitude towards adult)

PARTICIPATION CRITERIA

Inclusion criteria:-

- Subjects need to fall in the age between 12-15years[7].
- Subjects who spend time more than 20hr/week on internet[3].
- Both the genders were included.
- Internet Addiction Test scoring (IAT) 50 above was included.
- (Subjects are screened out as per IAT to find out Internet Addicts)

Exclusion criteria:-

- Subjects who did not have any experience on internet.

- Subjects who spend less than 20 hr/wk.
- IAT score less than 50.

Withdrawal criteria:-

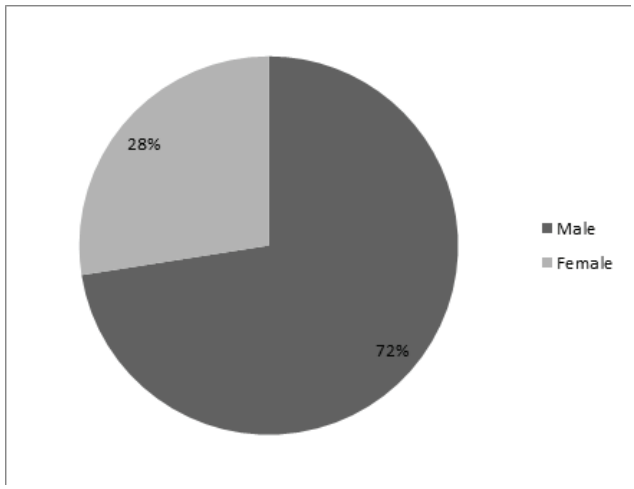
- Subject who was not willing to be participate in Research
- Parents of subject were permitted to withdraw any time during the procedure as per their will.

STUDY PROCEDURE

- Study has been passed through Jamia Hamdard Institutional Ethics Committee
- Permission was taken from Angels public senior secondary school,vishwas nagar,shahdara, Delhi
- Subjects were informed about the nature of the study and Informed Consent were taken by subject's parents.
- Subjects were selected for the study on the basis of inclusion and exclusion criteria.
- 100 Internet addiction test were distributed in Angel public secondary school, Shahdra, Delhi. Out of 100, 80 subjects were included on the basis of IAT score greater or equal to 50. Out of 80 subjects, 58 were male and 22 were female with mean age of 14.2.
- Selected Subjects were assessed on Social skill problem behavior checklist
- Data was collected on Excel sheet & master chart was formulated.
- Then Data was analyzed statistically.

FINDING

This Study was based on the relationship of Internet Addiction and Social skill problem behavior in adolescents. A Sample size of 80 adolescents was selected using Convenience sampling. Graph 1 represent that 72 % of the respondents were Males while 28 % of the respondents were Females.



Graph 1: Percentage of selected subjects

1. Calculation of Mean and Standard deviation of Internet addiction and Social skill problem behavior dimension

Table 1: Descriptive Statistics

	Mean	Standard deviation(S.D)	Number of subjects(N)
IAT	70.55	11.344	80
Presentation skill (A)	13.46	1.993	80
Interaction skill (B)	11.38	1.641	80
Conversation skill (C)	30.06	5.473	80
Social integration (D)	25.68	4.965	80
Attitude towards other children(E)	18.78	4.025	80
Attitude towards adult (F)	24.73	4.600	80
Total	124.65	15.426	80

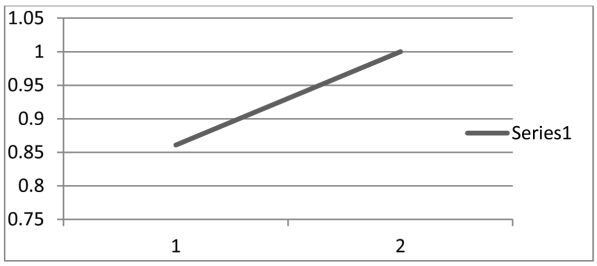
Table 2: Correlation between Internet Addiction and Social skill problem behavior

	Number of subjects (N)	Correlation coefficient (r)	p-value
Internet Addiction	80	1	-
Presentation skill	80	0.35**	.001
Interaction skill	80	.477**	.000
Conversation skill	80	.741**	.000
Social Integration	80	.607**	.000
Attitude towards Other children	80	.475**	.000
Attitude towards Adults	80	.475**	.000
Total	80	.861**	.000

**. Correlation is significant at the 0.01 level (2-tailed).

(I). Correlation between Internet Addiction and Presentation skill

Pearson Correlation Test was applied to determine whether there is a statistically meaningful correlation between Internet Addiction Test and social skill problem behavior checklist. Presentation skill is the first dimension of Social skill problem behavior. It was found that Pearson Correlation Coefficient was (r=0.35) with p-value of .001 which is highly significant as reflected in Table 2 .It was found that the Internet addiction was positively correlated with Presentation skill as shown in graph 2 .

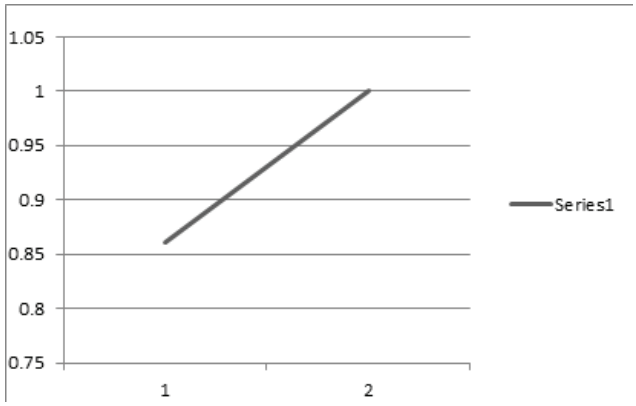


Graph 2. Correlation between Internet Addiction and Presentation skill

(II).Correlation between Internet Addiction and Interaction skill

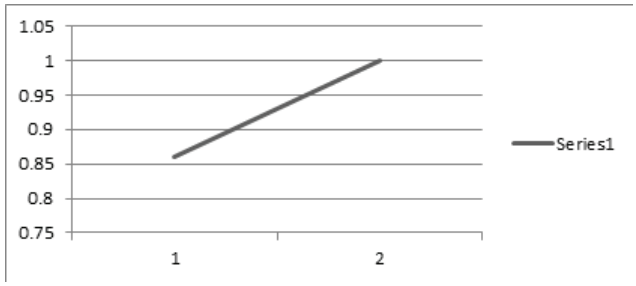
According to Table 2 Pearson correlation coefficient was (r=.477) with p-value of .000 which is significant in level 0.01.This means that Internet addiction is positively correlated with Interaction skill as shown in graph 3.

Graph 3. Correlation between Internet Addiction and Interaction skill



(III). Correlation between Internet Addiction and Conversation skill

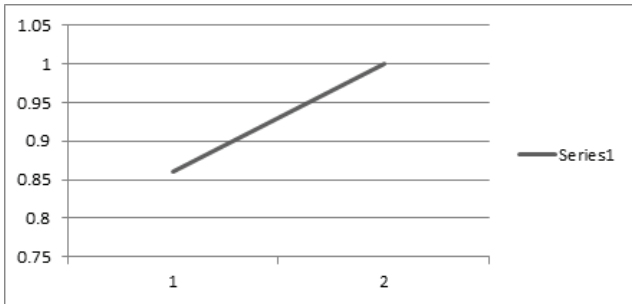
In Table above, amount of Pearson correlation coefficient compared with conversation skill and Internet addiction for adolescents has obtained 0.741.This shows that the two variables have strong correlation as shown in graph 4.



Graph 4. Correlation between Internet Addiction and Conversation skill

(IV). Correlation between Internet addiction and Social integration

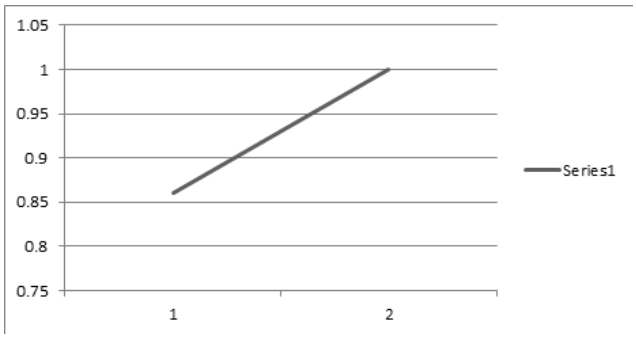
According to Table 2 Pearson correlation coefficient was (r=0.607) with p-value of .000 which is significant in level 0.01.This means that Internet addiction is positively correlated with Social integration skill as shown in graph 5.



Graph 5.Correlation between Internet addiction and Social integration

(V). Correlation between Internet addiction and Attitude towards other Children

According to the correlation coefficient ,that has obtained in Table 2 for two variable Internet addiction and Adolescent's Attitude towards other children (r=0.475) with p-value of 0.0.This means positive correlation between these two variable as shown in graph 6.

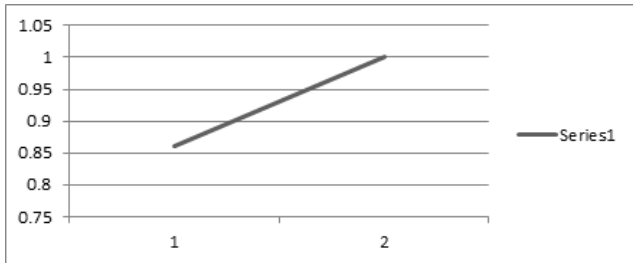


Graph 6. Correlation between Internet addiction and Attitude towards other Children

(VI). Correlation between Internet addiction and Attitude towards adults

Attitude towards adults is the sixth dimension of Social skill problem behavior. It was found that Pearson Correlation Coefficient was (r=0.475) with p-value of 0.0 .There was significant relationship between Internet addiction and Adolescents attitude towards adults .It was found that the Internet addiction was positively correlated with attitude towards adults as shown in graph 7.

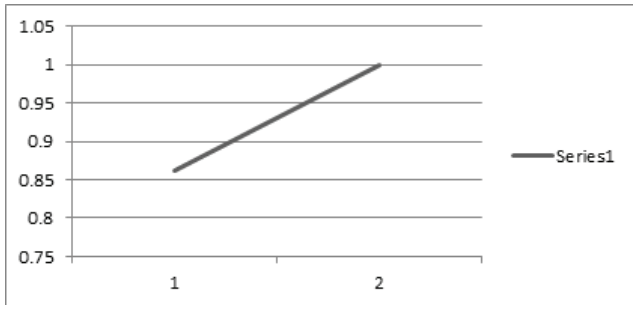
Graph 7.Correlation between Internet addiction and Attitude towards adults



(VII). Correlation of Internet addiction and social skill problem behavior

When Pearson correlation Test is applied to IAT and Total of SSPB it was found that Pearson correlation coefficient was (r=0.861) with p-value 0.0.There was significant difference found between IAT and Total of SSPB as reflected in Table above. In Graph below positive correlation between IAT and Total of SSPB is shown.

Graph 8 .Correlation of Internet addiction and social skill problem behavior



CONCLUSION

The study concluded that adolescents who spend time more than 20hr/week on internet have social skill problem. Result also suggests that with the use of increased internet addiction there is a positive correlation between presentation skill problem, conversation skill problem, interaction skill problem and attitude problem towards other children and adults.

Therefore, in order to reduce the devastating and negative effects of addiction to internet, being an occupational therapist it is necessary to change the pattern of using internet, consider designing instructional and counseling programs for modifying this pattern of using internet, helpful and optimal use for internet, instructing both self – control and self – monitoring in using internet, providing suitable strategies for informing parents on monitoring their children as to the time and manner of using internet, and replacing it with real world activities

to cover the children's free time.

Conflict of Interest: I pooja kaushik declare that there is no conflict of interest

Source of Funding; Self funding

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DOI Number: 10.5958/0973-5674.2018.00030.8

Correlation between Social Networking Users and Social Anxiety among College Going Students

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ABSTRACT

Young generation are growing very fast in the field of social communication resulting development of stress and anxiety. The aim of this study was to find out the relationship between social communication and its cause (anxiety). This study included 116 subjects of professional course's students from the community. Each subject was given a questionnaire , focusing on (1) how many times recharge balance/month (2) how much recharge balance/month (3) frequency of use social networking sites (4) hours of use social networking sites/day and (5) preference to talk. Result was found positive correlation between number of recharge and social interaction anxiety scale (SIAS) which is highly significant, how much recharge with SIAS, frequency of use and SIAS, hours of use and SIAS, where as negative correlation found between preference to talk and SIAS.

Keywords:-*Social networking sites, Social anxiety*

INTRODUCTION AND BACKGROUND

The mobile phone and social networking sites are status symbol of young people and the features of mobile phone appearance and personalized accessories all attest to the phone's status. Indian population are growing very fast and becoming very advance in the entire world by using social networking sites. Users of social networking sites in India are mostly from 18-40 years old and those are most popular in college-age students.

Social media websites are defined as those whose primary function is to provide users with the ability to "remain in contact, communicate, and interact with each other" online .(1)

The purpose of use Social Networking Sites are mainly to remain in social contact with known persons and introduce with unknown persons so that their social number of friends will increase which results as increase quality of life and social interaction skills. It also helps to learn something new and gives some educational information to the online friends.

Social Networking Sites is a member based online community, where users often begin by posting basic information about themselves referred to as "Profile" and then communicate with other members in a variety of ways and on a variety of topics.(2) In addition Social Networking Sites provide users with entertainment opportunities such as watching videos, listening to music, playing online games, and browsing the daily news.(3)

Social anxiety is the fear of social situations that involve interaction with other people. People with social anxiety are many times seen by others as being shy, quiet, backward, withdrawn, inhibited, unfriendly, nervous, aloof and disinterested. Person having social anxiety want to make friends, want to be included in groups, be involved and engaged in social interaction. Person having social anxiety prevents people from being able to do the things they want to do. Although people with social anxiety want to be friendly, open and sociable, it is anxiety that holds them back.

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Communicating online may be considered as such a safety behavior that allows those with social anxiety to communicate with others, while minimizing the potential threat and associated anxiety.[4] Online communication appears to reduce or regulate social anxiety in the short term,[12,13] but, in the long term, confidence to communicate with others beyond the online context may be undermined if successful online interactions are attributed to the unique aspects of the internet, such as anonymity, rather than personal attributes.[14,15,16] For socially anxious individuals, communicating with others on the internet in a text-based manner may allow them to avoid aspects of social situations they fear, while at the same time partially meet their needs for interpersonal contact and relationships.[14]

Internet is the phenomenon that changes human behavior, specially the younger generation's life in the 21th century and excess use of social networking sites are going to effect physical and mental health as well as psychological and social aspects such as impaired concentration, headache, dizziness, fatigue, stress, sleep disturbance, frustration and anxiety etc. this will effect and decrease in social interaction skills and performance [5]. Therefore being occupational therapist, the focus is given on, to find out correlation between social networking users and social anxiety in college going students.

Mostly everybody is using more social media nowadays and being Occupational Therapist we are dealing with treatment of anxiety. Literature emphasizes too much of involvement with internet or social networking sites have an impact on persons psychology leading to anxiety and depression so, there is a need to do a study on correlation between different parameters of social networking sites with anxiety. In this study, aim is to find out the Correlation Between Social Networking Users And Social Anxiety.

So the Alternate hypothesis of this study was that "There will be correlation between social networking users and social anxiety among college going students."

MATERIAL AND METHOD

Research Design: Correlational Design

Sample Size: 116(N)

Sampling: Simple Random Sampling

Sources of Data Collection: Community

Tool Used: Social Interaction Anxiety Scale (SIAS).

"It was developed and published by Mattick and Clarke in 1998 and has been used to assess prevalence, severity, and treatment out-comes of social phobia and social anxiety disorders".[6] Document is in the public domain. Duplicating this material for personal or group use is permissible

Inclusion criteria:-

Age range: 19-25 years

Both Genders

Undergraduate and Postgraduate Students

Only single (unmarried)

Using Social Networking Site more than 30 minutes

Using Any Type of Mobile Phone/Computer

Professional Course's Students

Exclusion criteria:-

School Going Students

12th class and below

Non-Professional Course's Students

Married

Procedure:-

Firstly general assessment Performa was formulated, focused on Social Networking Sites having special emphasis on five components those are following,

i. How Many Times Recharger Balance/Month

ii. How Much Recharge Balance/Month

iii. Frequency of Use Social Networking Sites

iv. Hours of Use Social Networking Sites/Day

v. Preference to Talk

Study population comprised of 116 subjects, undergraduate(86) and postgraduate(30) students in which the total number of female were 76 and total number of male were 40. All the subjects were chosen from community on the basis of simple random sampling

and selected on the basis of inclusion and exclusion criteria. After taking a consent form from selected subjects, they were given general assessment Performa focused on social networking sites and Social Interaction Anxiety Scale..

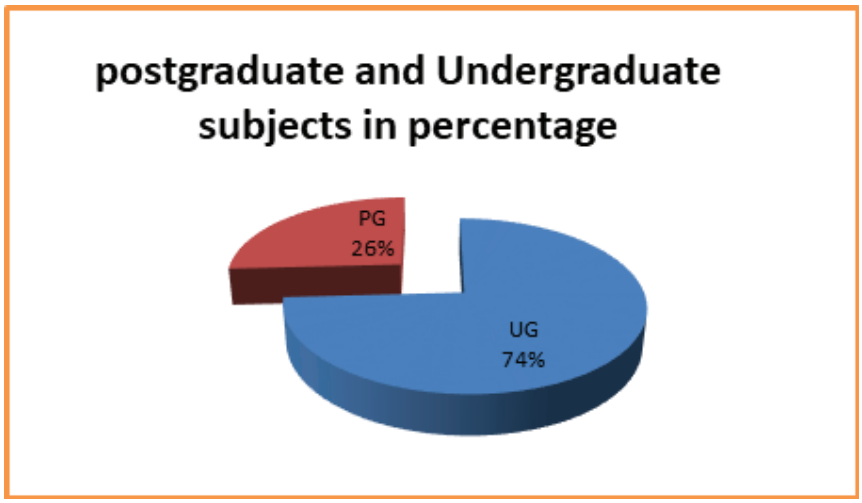
RESULTS

Filled Performa was placed on Excel Sheet to prepare a Master Chart and analysed statistically using SPSS-16.

Pearson Correlation Test was applied. Pearson correlation coefficient were calculated for number of recharge/month, how much recharge balance/month, frequency of use of social networking sites, hours of use social networking sites, and preference to talk.

The results were categorized into two category

I. Basic Characteristics: Total of 116 subjects were taken for the study, and were divided in to two groups, Undergraduate (86) and Postgraduate (30) as reflected in pie chart, Graph 1.



Graph .1

II. Results focused on Correlation Between Social Networking Users with Social Anxiety:

In this five main parameters were taken that is, (1) How Many Times Recharge Balance/Month, (2) How Much Recharge Balance/Month, (3) Frequency of Use of Social Networking Sites, (4) Hours of Use Social Networking Sites/Day, (5) Preference to Talk and correlated with SAIS.

1. Correlation between Number of Recharge Balance/Month with SIAS

Correlation was analysed using Pearson correlation test in which the r value is 0.35 and p value is 0.00 which is less than 0.05. It is highly significant and there is positive correlated between them. It means if the number of recharge in a month is more then social anxiety will also increase. It is shown in Table 1 and Graph 2.

2. Correlation between How Much Recharge Balance per Month and SIAS

Correlation was analysed between Recharge Balance per Month and SIAS, using Pearson Correlation Test. It was found that recharge balance/month and SIAS has a positive correlation between two i.e. the person is using more recharge balance/month then the person will have more anxiety as reflected in Table 1 and Graph 2, having r value 0.07 and p value of 0.2 which is not significant.

3. Correlation between Frequency of Use Social Networking Sites and SIAS

Pearson Correlation was applied which is reflected in Table 1 and Graph 2 with r value 0.00 and p value 0.49 that is more than 0.05. Result says if frequency of use of social networking sites increases the social anxiety also increases.

4. Correlation between Hours of Use of Social Networking Sites VS SIAS

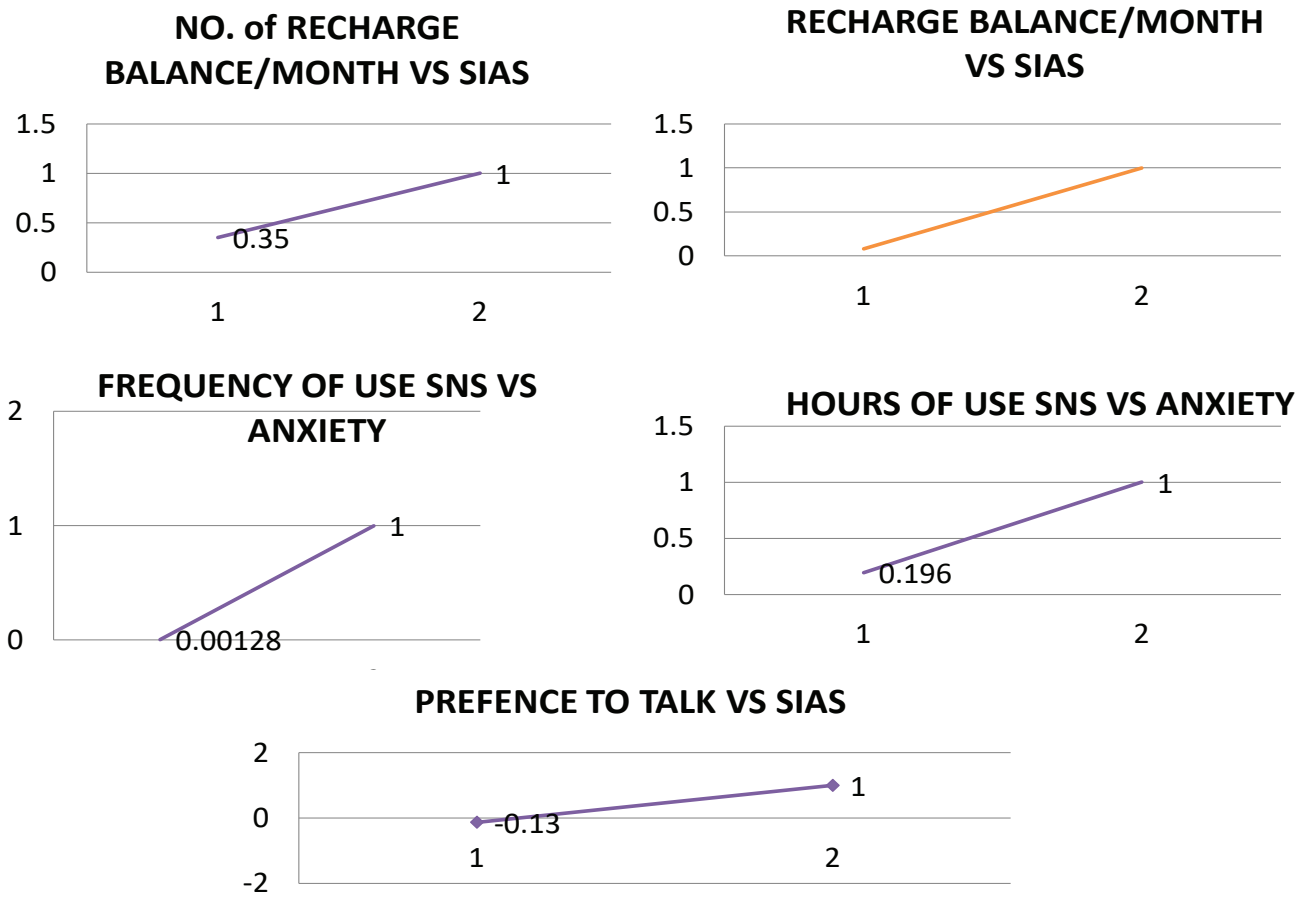
After applying Pearson Correlation Test it was found that r value 0.19 and p value 0.03.It is reflected in Table 1 and Graph 2 that show positive correlation as number of hours of talking or social networking sites are increasing then there will be more anxiety.

5. Correlation between Preference to Talk and SIAS

Pearson Correlation Test was applied to the data. There is negative correlation between two with Pearson coefficient r value of -0.13. Those who are prefer to talk by both media and directly, they have lesser social anxiety compare than those who preferred one either media or directly. It is shown in Table 1 and Graph 2. The p value was calculated and found to be 0.07 which more than 0.05.

Table 1: Reflecting different variables along with person correlation coefficient and p value

Variables	Total No. of Subjects	r value(Pearson correlation co-efficient)	p value
How Many Times Recharge Balance/ Month with SIAS	116	0.35	0.00 (highly significant: two tailed)
Recharge balance/month with SIAS	116	0.07	0.2
Frequency of Use Social Networking Sites and SIAS	116	0.00	0.4
Hours of Use of Social Networking Sites VS SIAS	116	0.19	0.03
Preference to talk and SIAS	116	**-0.13**	0.07



Graph 2-Showing graph between No. of Recharge Balance/Month, How Much Recharge Balance/Month, Frequency of Use SNS, Hours of Use SNS and SIAS.

DISCUSSION AND CONCLUSION

As the food is most essential for growth and maintain of a living body, same the social networking sites are becoming the most important to remain in contact and making new contact among unknown person for entertainment and improve social and academic knowledge that sometimes develops social anxiety.

Social networking is very important specially for professional college students for their future contact among themselves. There are many social networking sites which nowadays are available globally. Some sites are looking in India specially on college going students those are Face book, What's App, Snap Chat, Twitter, Instagram etc. Professional students are using different media according to need to full-fill life goals.

In this study, 116 subjects, undergraduate 86 and postgraduate 30 were selected.. It was found that there is positive correlation between number of recharge balance/month and social anxiety, recharge balance and social anxiety, social networking sites and social anxiety, frequency of use and social anxiety whereas negative correlation was found between preference to talk and social anxiety which include media, direct interaction and both.

It was supported by Jambulingam M, Sorooshianin 2013 where majority of the students were possessing smart phones along with internet facility, and the frequently used it for taking pictures, recording videos, playing games, listening to music and internet surfing as was also found in another study.[7] This was also supported by, Valkenburg and Peter ,2007 found that teenager who spend more time instant messaging scored higher on friendship quality than those who spent less time at this activity.[10] Alison Bryant, Sanders-Jackson, and Smallwood,2006 found online communication stimulates users' well-being.[11]

Social media sites empower users to take an active role in their own socialization process and in constructing their own self-identity.[8] On average, more than 250 million photos are uploaded every day. Nearly 70% of the students spend more than 2 hours on internet. 65% of the students access to social networking sites for more than 4 hours a day in Northern Cyprus.[9]

It was concluded that there is positive correlation between numbers of the recharge/month with social anxiety which is highly significant. Having a positive correlation between two parameters whereas for other parameters such as recharge balance/month, frequency of use, hours giving for the usage were also have positive correlation with SIAS whereas, negative correlation was found between preference to talk and social anxiety. Being an Occupational Therapist we can analyze the different components of being effected on day to day basis due to over use of social networking sites. Students using social networking sites having the anxiety can be taken into consideration for the treatment goals.

Conflict of Interest:- Nil

Source of Funding:-Self

Ethical Clearance:-The written consent were taken from all subject to participate in this study.

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DOI Number: 10.5958/0973-5674.2018.00031.X

Prevalence of Sacroiliac Joint Dysfunction among Indian Low Back Pain Patients- A Cross Sectional Study

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ABSTRACT

Background: The Sacroiliac joint dysfunction (SIJD) is one of the major causes of nonspecific low back pain but it is often overlooked during the diagnosing process. The prevalence of SIJD has been found to be between 15% and 30% which corresponds to a huge population with disability.

Objective: To find out the prevalence of sacroiliac joint dysfunction in patients with low back pain in Indian population.

Methodology: Study design was a cross-sectional study. One hundred and sixty patients were screened. Patients having two out of four pain provocation test and three out of four static palpation tests were considered to have sacroiliac joint dysfunction.

Results: Out of total 160 patients screened 28 patients were diagnosed to have SIJD which accounts for 17.5% prevalence. Out of the 28 SIJD positive patients 17 were males and 11 were females with age being 18-65 maximum and a mean age of 44.58(± 12.3).

Conclusion: The prevalence of SIJD in Mangalore is estimated to be 17.5% which is similar to the global prevalence.

Keywords: *Prevalence, epidemiology, sacroiliac joint dysfunction, Low back pain.*

INTRODUCTION

Low back pain is the most disabling health problem worldwide, with a point prevalence of 15-50% and a lifetime prevalence of 60-80%. It is second most common health problems after a headache.[1,2] The prevalence of LBP in India ranges between 6.2% to 92%.[3]

Approximately 80% of the population experiences LBP at some point in their entire lifetime.[4]Sacroiliac joint is the most plausible but neglected cause of Low back pain. It is suspected to be a constitutional source of 10-27% of mechanical low back pain.[5,6] The literature suggests the prevalence of SIJD be between 15-30% this account for a huge population with disability.[7]

Sacroiliac joint dysfunction (SIJD) is produced by the combination of pelvic rotation/ pelvic asymmetry, joint locking, hypo/ hypermobility and muscular imbalances.[8, 2] No radiologic or laboratory investigation procedure helps in diagnosis of SIJD.[9] The diagnosis is built from manual or physical examination which comprises of pelvic alignment and mobility tests and provocation tests which recreates patient's pain and symptoms.[8] Pain around the PSIS is considered to be an important sign in the diagnosis of SIJD.[7,10,11] There are quite a few studies done on prevalence in SIJ in Indian pregnant females[12-14], even though a larger population is affected due to SIJD, its prevalence in general Indian population is not yet known.

MATERIAL AND METHOD

It is a cross- sectional study which was conducted at a tertiary hospital in Southern India for a period of six

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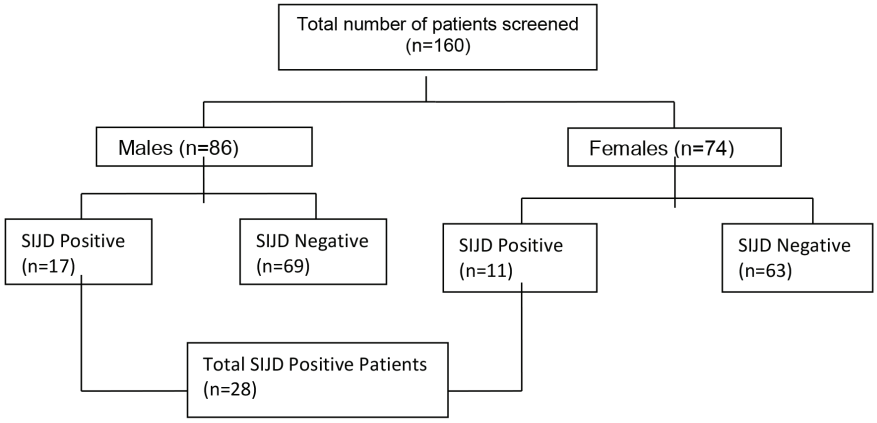
months from December 2015 to May 2016. The study was approved by the institutional ethical committee of department of physiotherapy, Nitte University, Mangalore. At 95% of confidence interval the expected proportion (p) was 0.25, absolute precision (d) was 0.05, the sample required to screen patients for sacroiliac joint (SIJ) dysfunction was 160. Sub- acute unilateral low back pain patients, with or without radiating pain, between the age group of 18-65 years were included in the study. A written informed consent was obtained from all the patients. A trained manual physiotherapist with an experience of five years in the field of back pain assessed the patients for inclusion and exclusion criteria. Patients were diagnosed with SIJ dysfunction if they pointed finger at PSIS for pain[10], 2 out of 4 positive pain provocation tests (compression, distraction, sacral thrust and femoral thrust[15] and three out of four positive tests of symmetry and movement: heights of PSIS, Standing flexion test, Prone flexion test and Supine long sitting test.[16] A cluster or composite of tests were used as it has found to have excellent inter- rater reliability. Patients were screened by using Mckenzie assessment of the lumbar spine and were excluded if they had midline or bilateral symptoms, centralization or peripheralization of symptoms, pain above L5 vertebral level, nerve root signs, pregnancy related SIJ dysfunction, sacroilitis in inflammatory spondyloarthropathies, rheumatoid arthritis and ankylosing spondylitis, previous back or hip surgery or pathology, lumbar spine stenosis or fracture.



Methodology Flow Chart

RESULTS

A total number of 160 low back pain patients (86 males and 74 females) with the mean age of 44.58 (±12.3) were screened for SIJD, out of which 28 patients (17 males and 11 females) were diagnosed to have SIJD.

Table 1: Represents the prevalence of SIJD in %.

Prevalence of the Sacroiliac joint dysfunction in patient's chronic low back in Mangalore was found to be 17.5%

SIJD POSITIVE	Frequency	Percentage
No	132	82.5
Yes	28	17.5

DISCUSSION

Clinically, SIJD is illustrated as pelvic obliquity and has been defined as an asymmetry between the anatomic landmarks of the right and left innominate bones, classically the anterior and the posterior superior iliac spines.[17]

The purpose of this study was to determine the prevalence of Sacroiliac joint dysfunction in the Indian population with chronic low back pain. The global prevalence of SIJD is stated to be between 15%-30%.[7] The prevalence which we found in Mangalore is 17.5% which is similar to the global prevalence. Since there was no previous study done to find out the prevalence of SIJD in India it was essential to carry out this study.

A study done on elite rowers found 54.1% prevalence of SIJD. Several authors have hypothesized that SIJD can occur as a result of lower extremity muscle imbalances, which disrupt the normal equilibrium of muscle actions about the sacroiliac joints and cause the anatomic asymmetry of pelvic.[17]

A study was previously done on Hamburg construction workers found prevalence 29% of type I sacroiliac joint dysfunction and 6.3% type II sacroiliac joint dysfunction.[9]

Ghodke et al found prevalence of 26% sacroiliac joint dysfunction in postpartum women.[18] Gupta et al found prevalence of 29.9% SIJ dysfunction or pelvic girdle pain in pregnant females.[13]

Preetha Ramachandra et al demonstrated a prevalence of 37% of pelvic girdle pain due to sacroiliac joint dysfunction in pregnant women in India.[12] Mahishale et al found pelvic girdle pain in 75% of urban pregnant women and 25% in rural pregnant females.[14] The literature stated above reveals that the prevalence studies on sacroiliac joint dysfunction done in India focussed mainly on pregnancy related sacroiliac joint dysfunction. The present study included general population with low back pain and excluded pregnancy related low back pain. We used cluster of tests to diagnose SIJ dysfunction. Previous studies have found poor diagnostic utility of single pain provocation test or static palpation test. However when composite or cluster of tests are used the specificity and likelihood ratio increases.[15,16]

This is a cross- sectional study which solely depends upon the number of patients visiting the hospital leading to a biased selection of the study population, this is a limitation of this study and so future studies can be conducted as a community based study which can overcome the limitation.

Funding: Self

Conflicts of Interest: None

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DOI Number: 10.5958/0973-5674.2018.00032.1

Compare the Effect of Jacobson Relaxation Technique and Mental Imagery Technique on Sleep Quality in Students of Adesh Univerasity, Bathinda

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ABSTRACT

Introduction: Sleep plays fundamental role in the lives of human beings and is thought to effect the competence of their customary activities. Any disturbances in sleep leads to poor performs, stress and other health related issues. So for optimal functioning of the body, minimum of 7 hour sleep per night is required.

Objective: Study to compare the effect of relaxation technique i.e Jacobson relaxation technique and mental imagery technique, on sleep quality of students of Adesh University, Bathinda.

Method and material: Total 40 subjects of age group 18 to 25 years were selected and informed consent was taken. The subjects were divided into two groups i.e group A and group B, each group consisting of 20 subjects. The subjects were screened with sleep less than 7 hours and PSQI score of 5 or more than 5. Group A was incorporated Jacobson Relaxation Technique and Group B underwent Mental Imagery Technique. The protocol consisted of 6 days. Following which, PSQI Questionnaire readings were taken and result was compiled.

Result: The post values of both the techniques were compared using unpaired‘t’ test and the result was significant for Jacobson Relaxation Technique.

Conclusion: Although, both the techniques were effective but Jacobson Relaxation Technique was proved to be significant.

Keyword: *Jacobson Relaxation Technique, Mental Imagery Technique, PSQI (Pittsburgh Sleep Quality* Index).

INTRODUCTION

“Sleep is that golden chain that ties health and our bodies together”

Sleep was long considered just a block of time when your brain and body shut down. Your brain and body functions stay active throughout sleep and each stage of sleep is linked to a specific type of brain waves.[1]

Sleep plays a fundamental role in the lives of human beings, which is thought to affect the competence of their customary activities. Human beings, like other species, frame their routine according to a 24-hour cycle and this organization depends upon endogenous and environmental factors. The pattern of sleep and wakefulness in different subjects is known to vary with their age, the demands of their occupation, their physiological and Psychosocial characteristics, psychiatric illness and some type of physical illness.[2]

Sleep is very essential for optimal health. Healthy sleep requires adequate duration, good quality, appropriate timing and regularity,absences of sleep disturbance or disorders.[3] Healthy sleep habits can be defined in a number of ways for example, Peters, Joireman, and Ridgeway have described “sleep patterns” in terms of four different factors: “self-rated satisfaction with sleep”, “sleeping during the day”, “difficulty sleeping at night”, and “oversleeping”.[4]

Sleep duration was included as part of sleep quality most of the time surprisingly sleep onset latency played a subordinate role in sleep quality measurement.[5] It is

well known that as children get older they need less sleep. Different people have different sleep needs. According to the National Sleep Foundation requirement of the sleep for different age group are:

AGE	RECOMMENDED
Newborn 0-3 months	14 to 17 hours
Infants 4-11 months	12 to 15 hours
Toddlers 1-2 years	11 to 14 hours
Preschoolers 3-5 years	10 to 13 hours
School Children 6-13 years	9 to 11 hours
Teenagers 14-17 years	8 to 10 hours
young adults 18-25 years	7 to 9 hours
Adults 26-64 years	7 to 9 hours
Older adults more than 65 years	7 to 8 hours

FIG 1.1 Based on National Sleep Foundation published in 2015 Journal Sleep

Sleep requirements stabilize in early adult life, around the age of twenty. Individuals vary in their sleep needs but most adults require between 7 and 9 hours a night to feel properly refreshed and function at their best the next day.[6]

Most sleep specialists agree that, although adults require 8 hours of sleep per day, sleep patterns of young adults differ from those of their adult counterparts in several ways, including a need for increased sleep. However, some people need more than 9 hours of sleep (long sleepers) while others feel well with less than 6 hours of sleep (short sleepers).[2]

Benefits for getting enough sleep, namely for improved learning and memory, maintenance of metabolism and weight, increased safety, enhance mood, cardiovascular health and boosting up the immune system. Sleep is the period in which the basic metabolic rate decreases, soft tissue and muscles are relaxed and revitalized, and the brain is able to process things that have been learnt during the day.[7]

Researches shows that university students not getting enough sleep to function properlybecause university life is accompanied by many new stressful challenges, with increase freedom, self-responsibility, disorganized lifestyle, variable schedules, repeated deadlines, dormitory living and social and academic obligations. In order to able to cope with these challenges students voluntarily alter their sleeping habits.[7,8]

Sleep in younger adolescents (ages 12–17) has been extensively documented because of a multitude of intrinsic and environmental factors, younger adolescents are particularly vulnerable to disturbed sleep, and are one of the most sleep deprived age groups in the country. These age groups are divided into three categories:

FIRST- Pubertal adolescent experience a biologically based phase change in their circadian rhythm that delays sleep and wake onset, making it physically harder to maintain earlier bed times.

SECOND-External factors like increasing caffeine consumption and late night use of electronics further delay sleep onset.

THIRD-Early start times for middle schools and high schools demand earlier weekday rise times. Finally even with sufficient sleep times, adolescents have increased daytime sleepiness and a greater physiological need for sleep compared to pre pubertal children, which may result from maturational changes in neuronal connectivity .[9]

Sleep is clearly an important aspect of successful academic and personal life in college, yet very little attention has been given to finding an appropriate sleeping pattern. The quality of sleep of college students is quite a widespread theme in global scientific.[2]

Sleep disturbance is defined as sleep deprivation resulting from inadequate total sleep time or sleep disruption resulting from fragmented sleep during the night, which leads to adverse health outcomes. Sleep disturbances can also cause daytime sleepiness, which can lead to poor performance. Sleep disturbances are common among college students. These sleep disturbances could be associated with stress derived from their academic challenges and daily life. Stress and its effects on health are areas of concern for many health care providers.[10]

When sleep is restricted to four hours per night in healthy young adults, abnormal endocrine responses(increased evening cortisol levels, increased sympathetic activation, decreased thyrotropin activity, and decreased glucose tolerance) and altered secretory patterns of appetite-regulating hormones (decreased

leptin and increased ghrelin secretion) are observed. The latter effect is likely to increase appetite, which may promote weight gain and obesity.

Chronic sleep deprivation has also been associated with alteration of immune system function, the potential consequences being increased susceptibility to illness due to impaired host defenses and activation of systemic inflammatory immune responses involved in the pathogenesis of insulin resistance and cardiovascular disease.[7]

Complication of sleep deprivation are-: concentration difficulties , mentally 'drifting off' in class, shortened attention span, memory impairment, poor decision making, lack of enthusiasm, moodiness and aggression, depression, risk taking behavior, slower physical reflexes, reduced sporting performance, reduced academic performance.[11] It can also impair the metabolic, endocrine, and immune system along with other deleterious effects.[12] Sleeping less than 7 hours per night on a regular basis is associated with adverse health outcomes, including weight gain and obesity, diabetes, hypertension, heart disease and stroke, depression and increased risk of death. Sleeping less than 7 hours per night is also associated with impaired immune function, increased tendency of pain, impaired performance, increased errors and greater risk of accidents. Sleeping more than 9 hours per night on a regular basis may be appropriate for young adults, individuals recovering from sleep debt, and individuals with illnesses. For others, it is uncertain whether sleeping more than 9 hours per night is associated with health risk.[3]

The prevalence of sleep deprivation appears to be of significant magnitude affecting about one third of adults ranging from 10-48%. Sleep disturbance is a considerable issue among adolescents and adults and is associated with age, gender, living conditions, doing exercise and workload. Students and educators typically do not realize that sleep habits may affect academic performance.[13]

We know very little about the sleep habits of college students. One group of studies conducted on college students measured the average number of hours of sleep a night from 1969 to 1989. These studies found that the average number of hours of sleep declined from 7.75 hours in 1969 to 6.74hours in 1989. Researchers say young adult students in this age-group should be getting 9–9.24hours of sleep a night, so it is possible these students are being chronically sleep deprived. Another study found that 4.2% of college students reported having insomnia and 1%reported using sleep medication. In a general adult population, about 15% of people report suffering from chronic insomnia.[14]

Various drugs are widely used for the treatment of sleep problems. Nevertheless, their adverse effects, such as next day hangover, dependence and impairment of memory make them unsuitable for long term treatment. Melatonin has also been used successfully for the treatment of sleep problems related to perturbations of the circadian time keeping system like those caused by jetlag, shift work disorder or delayed sleep phase syndrome. Researchers found that pharmacological treatment appears to be an effective treatment for disturbed sleep.[15]

Several systemic reviews have reported that hypnotics improve the sleep latency, total sleep time, total sleep quality as well as decreasing the number of episodes of awakening during sleep. The most common therapeutic method for sleep disorders are pharmaceutical treatments in which by the suppression of the central nerves system, anxiety and stress levels decrease and the person become hypnotic and relaxed. Exercise programs are also recommended to help prevent and treat sleep disorders as well as the depression.[12]

Several studies have concluded that participation in a Cognitive Behavioral Therapy program could reduce the sleep latency.(12) Methods such as JRT, deep breathing techniques, Mental Imagery, massage and self-hypnosis may help to overcome from sleep disorders.[16]

JRT is a method that is designed to reduce stress and anxiety. The purpose of implementing this method is to create awareness of the tension, relax muscles, and train a way to relax all the muscles. Muscle relaxation means muscle loosening. JRT is derived from the theory which states that a Psychic-biological state name Nervous Muscle Pressure increase is a basis for emotional negative states and psychosomatic diseases.

Jacobson stated that muscle relaxation causes peace of mind because an emotional state will not happen in the presence of complete relaxation of the body limbs. In other words, relaxation prevents creation of negative thoughts and emotions such as anxiety and tension and neutralizes the effects of muscle pressure increase on the

body. Progressive muscle relaxation is a non-invasive, low-cost technique without complications that can be done independently by patients themselves.[17]

Mental imagery Technique used in Cognitive Behavioral Therapies and mind. The main goal of these techniques is to replace negative stress reaction with more relaxed response. According to Psychologist mental imagery is a product of mental activity. When this product presents high levels of creativity and originality, it is usually referred to as "fantasy" or "imagination". On the other side, when this mental product concern mainly the recall and production of events or objects that are very close to their actual perception, then the term of "Mental Imagery" is used.[18]

METHODOLOGY

Research Design- Comparative study

Research setting- Adesh University **,** Bathinda

Sample Size- 40 subjects were selected through simple random sampling and were divided into two groups i.e. group A and group B, each consisting of 20 subjects

Inclusion criteria- Age 18 to 25 years, both genders are included, screening was done for subject with sleep less than 7 hours and PSQI score of 5 or greater than 5.

Exclusion criteria- Subjects suffering from neurological disorder, pregnancy, musculoskeletal injuries and subjects on medication for sleep were excluded.

Outcome measures- Pittsburgh Sleep Quality Index (PSQI) was used and readings were taken pre intervention and post intervention.

Procedure- After approval from the Ethical committee, the subjects were selected after taking informed consent. The population was divided into two groups i.e Group A and Group B, each consisting of 20 subjects. Group A was incorporated with Jacobson Relaxation Technique and Group B was given Mental Imagery Technique. The treatment protocol was of 6 days duration. After the completion of the protocol, the pre intervention readings and post intervention reading of both the techniques were evaluated.

RESULT

The collected data was statistically analyzed by using Paired 't' test in pre and post values within the group A and B. Post and post values were compared between group A and Group B by using unpaired 't' test. The probability error was checked at ($p<0.001$) for all test.

Table 1. Pre and post protocol PSQI score of Group A (Jacobson Relaxation Technique). Which is significant.

	Mean	SD	S.E	t-value	p-value
Pre	7.50	2.26	0.320	6.09	0.0001
Post	5.55	1.05			

Table 2. Pre and post protocol PSQI score of Group B (mental imagery technique). Which is significant.

	Mean	SD	S.E	t-value	p-value
Pre	7.70	1.42	0.185	5.69	0.0001
Post	6.65	1.14			

Table 3. Post and post protocol PSQI score comparison of Group A and B (Jacobson Relaxation Technique and mental imagery technique). Which is significant.

	Mean	SD	S.E	t-value	p-value
Pre	5.55	1.05	0.346	3.18	0.01
Post	6.65	1.14			

DISCUSSION

The current study was conducted with an aim to compare the effect of Jacobson Relaxation Technique and Mental Imagery Technique on sleep quality in students of Adesh University, Bathinda. In this study, forty subjects were selected through convenient random sampling. From selected population, twenty subjects were assigned to Group A which underwent Jacobson Relaxation Technique and twenty subjects selected for Mental imagery Technique. Six days treatment protocol was followed.

The collected data was statistically analyzed by using unpaired 't' test in post post values between Group

A and Group B. mean of group A was 5.55 and mean of group B was 6.65. p value <0.01, which was significant. According to result, although both relaxation techniques were beneficial for improvement of sleep quality, but Jacobson Relaxation Technique was more effective for improvement of sleep in students.

CONCLUSION

The study is statistically significant with difference between both the techniques. However, more improvement in the quality of sleep was seen after incorporation of Jacobson Relaxation Technique.

Conflict of Interest: None

Ethical Clearance: we certify that the study was approved by Ethical Committee of Adesh University, Bathinda.

Source of Funding: Self.

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DOI Number: 10.5958/0973-5674.2018.00033.3

Gravitational Insecurity in Children: A Survey of Occupational Therapists' Observations

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ABSTRACT

Aims: To 1) quantify aspects of gravitational insecurity (GrI) including prevalence in Occupational Therapy (OT) clinics, age/sex profiles, identifying observations/tests, presenting signs/co-morbidities, therapeutic interventions, 2) Test specific hypotheses about vestibular dysfunction, non-comorbid cases and outcome profiles.

Method: A mail/online survey of pediatric OTs

Results: Responses of 109 OTs suggest GrI occurs in 0-5% of most pediatric OT populations. Children's climbing was most typically assessed. GrI may be more prevalent in girls than boys and in 3-6 year olds. GrI is associated with vestibular dysfunction signs more than with signs of other chronic childhood illnesses. Most frequent GrI comorbidities were Developmental Coordination Disorder and anxiety. GrI is treated with gradual linear-to-rotational movement and/or the Astronaut Training Program. Outcomes conform to a typical medical "rule of thirds"; about a third of children show little or no change, a third improve somewhat, a third improve greatly. About 26% of these children show post-treatment "craving" for previously avoided movements.

Conclusions: Validated GrI diagnostic tests are underused. Signs associated with GrI indicate vestibular dysfunction. GrI presents without co-morbidity in 6.5% of cases suggesting it is not a nosological artefact resulting from multiple combined comorbidities. Results provide hypotheses for future direct testing of children with GrI.

Keywords: *anxiety balance post-rotary nystagmus vestibular function.*

INTRODUCTION

"Gravitationally insecure" describes children with exaggerated emotional responses to changes in head position and movement[1]. They dislike walking on soft or uneven surfaces; they do not skate, bike or swing on swings. They do not want their heads tilted back and dislike bending over. They become distressed when picked up, even more so if turned upside down. They dislike heights and want their feet on solid ground; threats to this stance elicit intense fear[2].

Although identified and treated by OTs trained in Sensory Integration theory and practice, gravitational insecurity (GrI) is unrecognized in the greater health-provider community. Consequently, symptoms of GrI may be missed or misinterpreted by pediatricians and child psychologists who might otherwise recommend appropriate treatment. A major obstacle in presenting the case for GrI is that basic information about its characteristics are lacking. This survey provides information about:

Diagnosis and prevalence Diagnostic tests for GrI identified by May-Benson & Koomar[3] for 5-10 yr olds have been validated and extended to younger children[4],

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but we do not know how frequently these tests are actually used. May-Benson et al[5] reported a 3.7% prevalence of GrI as a major problem in children presenting in the Koomar Center; with greater prevalence in girls. We assessed GrI prevalence in other clinical settings and vulnerability as a function of age, about which nothing has been known.

Vestibular function and anxiety Ayres[1] and May-Benson and Koomar[3] proposed that GrI involves vestibular deficiency. In view of the importance of vision and proprioception in maintaining posture and balance, frequent comorbidities of GrI noted below, and the lack of direct evidence of vestibular dysfunction, this proposal seems premature. We tested the hypothesis that the number of classical vestibular symptoms recalled by OTs would approximate those of standard GrI indicators and, for comparison, be greater than recalled signs of unrelated health problems. Because individuals with known vestibular problems are highly anxious while those with clinical levels of anxiety are likely to experience vestibular dysfunction[6], we assessed reported anxiety in children with GrI.

Comorbidities Hypotonia, weak core strength, gross and fine motor difficulties, together indicating Development Coordination Disorder (DCD), are frequent GrI comorbidities[7]. Perhaps GrI is not a distinct nosological entity, but just the consequence of such multiple co-occurring conditions. We assessed actual frequencies of comorbidity and of GrI presenting alone, which would reduce concern about its being a nosological artefact.

Interventions GrI is treated by gradual desensitization to progressively more vigorous movement[8]; alternatively by the Astronaut Training Program[9]. We assessed how frequently each is used. We compared intervention outcomes to the medical "rule of thirds" heuristic: Following various treatments, about a third of patients stay the same or get worse, a third improve somewhat, a third improve greatly or are cured[10]. We also assessed for "craving" for previously feared movements that some children develop following successful treatment.

METHOD

Survey Development

Based on initial input from 6 OTs familiar with GrI the closed questions of this cross-sectional survey were logically ordered[11] to guide participants through GrI prevalence in clinic, demographics, identifying signs, co-morbidities, interventions and outcomes. Questions were refined through four rounds of survey completion and interviews with practicing pediatric OTs, clarifying how items were interpreted and answers formulated. The final 33 item survey was converted into online format via University of Minnesota's Research Electronic Data Capture (REDCap) software.

Participant recruitment

Participants were recruited in local, statewide, then national waves. Local contacts included OTs outside the University of Minnesota who were known to faculty. Statewide recruitment was through emails to OTs listing a Pediatrics specialty with the Minnesota Occupational Therapy Association. Nationally, postcards were sent to 500 American Occupational Therapy Association (AOTA) members listing a Sensory Integration specialty [90-99% of pediatric OTs use a Sensory Integration framework[12, 13]]. Because we wanted to learn about the unrestricted breadth of OTs' clinical observations, no formal definition of GrI was provided. Instead, OTs agreeing with at least 1 of the following 3 screening statements were asked to complete the survey. 1) "I have assessed for gravitational insecurity or have considered it as a possibility in conceptualizing cases and/or have worked with children with this condition. 2) I have identified children whose issues include gravitational insecurity as a substantial or major problem. 3) I have recognized that the following problems often go together: A child always wants to have his feet on the ground, refuses to skate or bicycle, and refuses to climb or to get on playground equipment like swings." OTs disagreeing with all 3 statements were asked to notify the first author with "No" in the email subject line. To increase return rates, email solicitations were sent three times on different weekdays; we also offered a $5 Starbucks gift card and short summary of results.

Prevalence estimation

Some questions asked participants to select behaviors or conditions that they recalled as occurring "often" or "typically." For issues requiring greater precision, participants chose from a range of numerical options. They directly estimated percentages of children presenting in clinic with GrI as a major problem in the last year, selecting from roughly geometric ranges of

0-5%, 6-10%, 11- 20%, 21- 40%, 41-60%, 61-75%, or 76-100%, consistent with people's natural parcellation of the number line[15]. To check reliability, direct estimates were compared to calculated percentages of children with GrI from the ratio of participant's separately estimated:

Number of children presenting with GrI / total number of children seen in clinic

(Ranges for children with GrI: 0, 1-2, 3-5, 6-10,…, 51-100, >100; total numbers: 0-5, 6-10, 11- 20,.., 200-400, >400).

GrI Prevalence: Sex/age

To assess sex differences, participants reported relative numbers of boys and girls that they 1) saw overall and 2) who had GrI by choosing among three simple alternatives: More boys than girls, about the same number of boys and girls, more girls than boys. Age effects in GrI prevalence were assessed from participants' recall of age ranges of children that they 1) typically saw in clinic and 2) in which GrI presented most frequently; ranges were 1-2, 3-6, 7-10, 11-14 and 15-18 yrs.

Observational/test criteria for identifying GrI

Participants reported which of five different behaviors they looked for and 11 different tests they used to identify GrI. The tests included three validated GrI indicators[3].

Signs and symptoms

If GrI is associated with vestibular dysfunction, children with GrI should show some classic vestibular signs, and more of them than of unrelated disorders. This hypothesis was tested by having participants report which of 12 GrI-associated signs, 13 vestibular dysfunction signs and 9 unrelated signs they recalled as being typical of children with GrI. The GrI items were drawn from the literature and OT reports during survey development. Childhood vestibular dysfunction signs were drawn from[15,16]: prevalence of paroxysmal vertigo is 2%[17] and dizziness 5.7%[18] although identifiable vestibular disorder is estimated at 0.45%[19]. However, headache associated with vestibular disorder is elevated 16 fold over childhood baseline rates and hearing impairment is elevated 43 fold. Most unrelated comparison signs/disorders have higher childhood prevalence than vestibular dysfunction: dermatitis/ excema, 6%[20]; asthma, 9%[21]; night terrors/sleepwalking, 13.4%[22]; obesity, 8.4% - 19.1%[23].

Co-morbidity vs. isolated GrI

Participants chose from among 12 conditions all they had "often" observed in children with GrI. These included general anxiety[6]; tactile defensiveness[7, 24], five others associated with GrI [autism, DCD, dyspraxia, hypotonia, other sensory processing disorders] and four unrelated conditions. A subsequent question asked which of 4 functional areas were "typically" problematic for these children: Gross or fine motor skills, social/ emotional function, speech/language. To answer, "How often does GrI appear a major issue by itself, without other major conditions", participants selected among 6 ranges: "Never (0% of cases)" through "Half the time (36-65% of cases)" to "Almost always/always (91-100% of cases)."

Interventions and outcomes

From 5 ranges, participants selected frequencies with which (1) they introduced gentle linear movement, then moved to rotation and/or (2) used the Astronaut Training Program[9]. Ranges included "Never or rarely (0-10% of cases)" thru "half the time (36-65% of cases)" to "Almost always/always (91-100% of cases)". Participants used these ranges to report different outcomes, choosing among: (1) "Increased reluctance or fear in response to balance or movement challenges", (2) "Little or no change in emotional response to balance or movement challenges", (3) "Some change in emotional response, from fear and avoidance to acceptance or willingness to try", or (4) "Great change in emotional response, from fear and avoidance to pleasure, enthusiasm or excitement." Planned analyses included nonparametric comparisons of frequencies and proportions.

RESULTS

Participant characteristics

A total of 109 surveys were returned; Table 1 shows return rates by source and work settings. Participants had worked as OTs for 15.5 ± 11.5 yrs.

Table 1: Response rates

Recruitment source	Initial contacts	Surveys completed	Return rate	No GrI
University of Minnesota Program in Occupational Therapy contacts	170	60	35.9%	5
Minnesota (MOTA)	185	10	5.4%	6
National (AOTA)	500	39	7.8%	1

"No GrI" is the number who responded negatively to all 3 screening questions

Estimated prevalence of GI

Work settings The median and mode for GrI prevalence among children seen by OTs were 0-5% in university/hospital outpatient clinics, independent clinics and school settings. The mode was also 0-5% in private practice, but median prevalence was higher, at 11-20%. Zero is within the lowest prevalence range, making it possible that this range could overestimate observed prevalence due to a hidden bias toward 0. However, 49 of 58 respondents choosing 0-5% saw at least 1 child with GrI in the last year, suggesting little hidden bias toward 0 in selecting this range. Correlation of direct vs. calculated prevalence estimates, outlier-adjusted by a 95% confidence ellipse[25], was $r = 0.64$, $p < .0001$.

Sex and age differences If GrI prevalence were unrelated to sex or age, the proportion of children with GrI to children seen in clinic would be roughly the same for both sexes and all ages. Fig. 1 shows neither is so. Sixty two percent of respondents reported seeing more boys than girls, but only half that reported more boys presenting with GrI than girls. Conversely, 33% reported seeing equal numbers of boys than girls but twice that number reported seeing as many girls as boys with GrI (Fig 1A). These proportions differ significantly [$\chi^2(2) = 16.2$, $p < 0.0003$]. Given the preponderance of boys with DCD, autism and other male-biased conditions seen in OT clinics[26], these proportions, and numerical simulations of how they might arise, suggest that GrI may be more prevalent in girls than boys.

Proportions of OTs reporting that GrI appears frequently also differ significantly across age [$\chi^2(4) = 20.6$, $p < 0.0004$]. About as many participants report that GrI most frequently appears in 3-6 yr olds as report that they commonly see children in this age range (Fig 1B). Progressively smaller proportions of children with GrI reported at younger and older ages suggests that GrI appears most prevalent in 3-6 yr olds.

White bars: Percent of participants who reported seeing more boys than girls in clinic (left bar), about the same numbers of boys and girls (middle bar), and more girls than boys (right bar)

Black bars: Percent of participants who reported seeing more boys than girls with GrI (left bar), about the same numbers of boys and girls with GrI (middle bar), and more girls than boys with GrI (right bar)

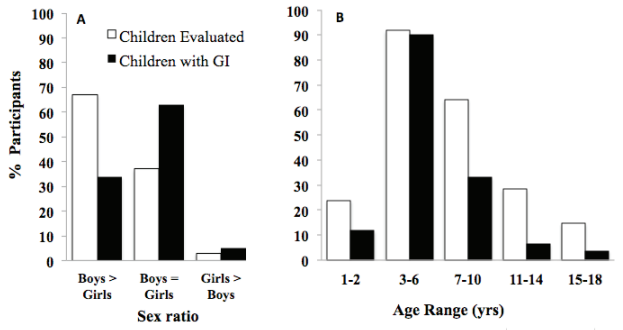

Fig. 1A (left graph) **1B (right graph)**

White bars: Percent of participants who reported "frequently" seeing children in each age range

Black bars: Percent of participants who reported that GrI was "frequent" in children in each age range

Observations/tests for GrI identification

The two most frequently reported observational criteria were children (not) getting on playground equipment (85.3% of participants) and (not) exploring new spaces (83.5%). Correspondingly, the most frequently used tests were asking children to climb up (79.8% of participants) or on (77.1%) elevated surfaces. Eye movement testing was among the next most frequently used identifier (56% of participants). Two May-Benson & Koomar[3] criteria, rising from supine lying on therapy balls and stepping on/off tiltboards,

were used by 56% and 54.1%, respectively. The third criterion, jumping off chairs with eyes closed, was used by only 11.9%. A mean 30.2% of children were assessed for postrotary nystagmus.

Co-morbid/non co-morbid GrI

Anxiety and DCD were most frequently endorsed as comorbid with GrI, 69.7% and 67%, respectively. These levels are consistent with gross motor skills and social/emotional function being rated as most frequently deficient, per 94.5% and 70.6% of participants, respectively. Tactile defensiveness, at a rate of 40.4% comorbidity, was endorsed slightly less frequently than "other sensory processing disorders" at 47.7%. Three of 4 presumptive unrelated conditions, cognitive problems, ADHD and seizures, were endorsed at the lowest rates, 6.4% – 27.5%, as expected. GrI was endorsed as occurring by itself in a mean of 6.5% of GrI cases, appropriately less than the ≥ 30% of GrI cases that are not comorbid with anxiety or DCD.

Vestibular dysfunction

Means of 65.0% of GrI signs, 42.1% of vestibular signs, and 9.9% of unrelated signs were endorsed as frequent in children with GI. This difference in proportions was statistically significant by Page's L test [$L = 1467$, $\chi_L^2(1) = 115.9$, $p << 0.001$], which assesses rank orders of different variables within each subject[27]. The most frequently endorsed vestibular signs were unsteady balance (78%), walking more slowly/with feet wider apart than peers (59%) and gets dizzy/has vertigo (59%). Fifty percent of participants reported frequent difficulty with eye/head tracking among children with GrI; 42% reported abnormal eye movements. Abnormal eye movements and visual tracking are characteristic of vestibular dysfunction. Notably, 65% of respondents reported children's problems with lying supine; only 17% reported problems with lying prone ($p < .0002$).

Interventions and outcomes

Participants reported using a gradual linear-to-rotational movement approach with a mean 64% of children they treat, and Astronaut Training[9] with 38.2%. Altogether, 90% of participants reported using one or both approaches.

Percentages assigned to the four outcome possibilities by some participants did not total to 100% and were proportionately adjusted to total 100% before being pooled for analysis. For comparison to the rule of thirds, percentages in the two lower categories of "Increased reluctance or fear…." and "Little or no change in emotional response to balance or movement challenges" were combined into an "unimproved" category. Mean proportions of outcomes in the "unimproved", "some improvement…." and "great improvement …." categories were 28%, 39% and 33%, respectively. These proportions are not significantly different from rule of thirds predictions [$\chi^2(2) = 0.74$, NS]. A mean 25.9% of children were reported to develop cravings for movement, which is appropriately less than the 33% who were reported to show great improvement.

DISCUSSION

Results provide both confirmatory and new information about GrI. Median and modal 0-5% prevalences across most OT settings accords with the 3.7% reported by May-Benson et al[5]. The moderately high correlation between direct and calculated estimates of prevalence indicate consistency. Low overall GrI prevalence implies that direct studies with these children will require multi-year/multi-clinic recruitment. Observations/tests used most frequently to assess GrI were behaviors in play areas and on playground equipment and asking children to climb elevated surfaces. Unfortunately, validated May-Benson & Koomar[3] tests for identifying GrI are underused.

Greater numbers of boys are seen in clinic but numbers of girls and boys identified with GrI are closer to equal, suggesting that it is more prevalent among girls, per[5]. In contrast to this confirmatory result, finding greatest GrI prevalence among 3-6 yr olds appears novel. If replicated, it may be that deficits in balance/ gross motor skills associated with GrI bring affected 3-6 yr olds into clinic; younger children are not expected to display these skills while older ones accommodate to or avoid these challenges. This interpretation is supported by progressive reductions in prevalence with age in Fig 1B and by May-Benson et al's[28] report of lower GrI prevalence in adolescent/adult patients (2.2%) than in child patients (3.7%).

The percentage of recalled symptoms dropped very significantly from GrI indicators to classical vestibular signs to unrelated signs, suggesting real differences that are robust against any "negative halos" around dysfunction that can inflate numbers of adverse

symptoms reported[29]. Endorsement rates for classic vestibular signs were significantly higher than for unrelated signs; this is noteworthy given the deliberate bias against such findings introduced by selecting highly prevalent health disorders as unrelated signs. Dizziness/ vertigo was reported as frequent among children with GrI by 59% of respondents. Although eye movement and visual tracking abnormalities are not included in classic GrI symptomatology, pediatric OTs do attend to them as shown by the 42-50% of participants reporting these signs. Such abnormalities are highly characteristic of vestibular dysfunction. Significantly lower endorsement rates for classic vestibular signs than for GrI signs suggest that, if GrI does result from central vestibular dysfunction, it may have a unique profile. A clue to this profile may be the striking difference between rates of reported difficulties with lying supine vs. lying prone, given that otolith organ effects on brainstem circuits controlling vestibular function are greater in the supine position[30].

Multiple high comorbidities with GrI were reported with anxiety being the most common, consistent with known connections between anxiety and imbalance[6]. Tactile defensiveness, had no special relationship with GrI[7] being endorsed at rates not different from "other sensory processing disorders."

About 90% of children with GrI are treated with gradual movement desensitization and/or Astronaut Training. Conforming to the rule of thirds[10], about a third of children are estimated to show little or no change, a third improve somewhat, and a third improve greatly. A mean 26% of children were estimated to show post-treatment craving for previously feared movements. This figure is comfortably within the 33% reported to show great improvement. Such cravings probably reflect the pleasure in unaccustomed, newly enjoyable movement. Survey limitations include a low return rate, with possibly unrepresentative results.

CONCLUSIONS

GrI may be more prevalent among girls than boys and in 3-6 yr olds than in younger or older ages. Validated tests for identifying GrI should be used more frequently[3]. GrI's high co-morbidity with anxiety requires building extra trust with these children. The estimated 6% of GrI cases that occur more-or-less alone reassures that it is not a nosological artefact due to multiple comorbidities. Overlaps of GrI with classic signs of vestibular disorder do suggest central vestibular dysfunction. Use of established vestibular rehabilitation techniques might improve outcomes beyond the "rule of thirds".

Data and conclusions presented here derive from OTs' recall of their experiences with children with GrI. Results must be confirmed and extended by direct observation of these children. Doing so will not only improve OTs' understanding and practice but can also help introduce GrI to the larger health-provider community.

The authors declare there are no **Conflicts of Interest**

This survey was self-funded

The University of Minnesota Institutional Review Board classified this survey as exempt from review (IRB Study Number 1504E69501, 5/15/2015.)

Acknowledgement: We thank Chantal Cleveland, Carlee Ham, Nikki Marson, and Megan Mattson for the initial interviews with OTs outside the U of M program and for their work in survey formulation and transformation into REDCap format. Emma Grund and Hannah Swanson helped design the postcard sent to American Occupational Therapy Association (AOTA) members and enter and analyze data. Jacquie Durant, Executive Director of MOTA, facilitated distribution of email notices to members.

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DOI Number: 10.5958/0973-5674.2018.00034.5

Effect of Combined Integrated Learning Programme (CILP) for Learning Disability in Adolescence- A Case Report

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ABSTRACT

This paper reports the benefits of combined integrated learning programme (CILP) in the early rehabilitation of learning disability child. Learning disability is coined by Samuel kirk in 1963 to describe children who have significant difficulties in understanding various language, reading, writing and other mathematical problems. An intervention of 60 days (6 days per week for 10 weeks) was given to the child and prognosis was observed on various outcome variables like Eye hand coordination (EHC), Figure ground perception (FGP), Figure constancy (FC) and Position in space (PIS) before and after the interventions. Considerable improvement was seen by applying CILP programme in child with learning disability.

Keywords- *LD, CILP programme, Dysgraphia, Dyslexia or Dyscalculia.*

INTRODUCTION

The term 'Learning disability' is Coined by Samuel Kirk in 1963 to describe children who have significant difficulties in understanding various language, reading, writing and other mathematical problems. Learning disabilities is a heterogenous group of disorders defined by the unexpected failure of the individual to adopt new things, retrieve and use information competently (Kaur and Arumugam, 2011)[2].

Learning disabilities are specific not global impairments and as such are distinct from intellectual disabilities. These disabilities are specific subtypes of neuropsychological disorders that affects in academic and social learning problems and leading to the specific patterns of psychosocial disturbances (Rourke, 2005)[4]. These disorders result from impairments in one or more psychological processes related to learning, in combination with otherwise average abilities essential for thinking and reasoning. It is a life long condition and generally occurs due to either central nervous system dysfunction and congential problems or its range vary from mild to severe with increasing age (Smith *et al*., 2001)[5].

The reported prevalence of LD (of any severity) varies substantially across studies and may be influenced by factors such as heterogeneity of definitions, clinical assessment tools, study design and population demographics. The prevalence of learning disabilities in school going children were 42% and 18% in American public school between year of 2002 and 2011 and also proved that black and hispanic students are more suffered from learning disabilities as compared to White and Asian students (Karande and Kulkarni, 2005)[1].

Learning disabilities are classified on the basis of Diagnostic Statistical Manual of Mental disorders (DSM) and the World Health Organization (WHO) into two types. Verbal learning impairments is a disorder in which child unable to spell or write certain words and also difficulities in performing some mathematics calculations (Umphered, 2001)[7] and Non-Verbal Learning Disability (NVD or NVLD), is a disorder which is usually characterized by a significant discrepancy between higher verbal skills and weaker motor, visual-spatial and social skills (LDAA, 2002)[3]. Verbal learning impairments are classified into three categories- Dyslexia

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(inability to learn), Dysgraphia (inability to write) and Dyscalculia (difficulty in arithmetical calculations) (Umphered, 2001)[7].

CASE REPORT

A 16 year old child presented with complaint of difficulty in writing, reading and mathematical calculations or also having difficulty in drawing activities. His parents noticed these from last 11 years back. Then patient consults a neurologist in nearby hospital, where some investigations was done like MRI brain, and Spiral CT scan was done.

MRI brain shows parallel orientation of bilateral lateral ventricles can be due to partial corpus callosum dysgenesis with slight colpocephaly and spiral CT scan findings reveal significant thinning/ atrophy of the body and splenium of the corpus callosum, coupled with focal area of gliosis/ demyelination / dysmyelination seen involving frontoparietal and parietal white matter bilaterally along with slight irregularity of the ventricular margins and highly suggestive of hypoxic- ischaemic encephalopathy (peri-ventricular leukomalacia). Child was diagnosed as a case of Learning Disability. (The source of history was Child's parents and medical history was recorded from the investigatory reports carried by child's parents).

Patient had been taking speech therapy since 8 years back. No any genetic/ family history was found. Family members are cooperative and supported in the treatment of patient. Child was able to perform ADL's independently. He was a student of 10th class and taken a exams in the schools and able to drive bicycle or two wheeler vehicle. Yet, no restriction of any activity was seen.

On observation, bulit was mesomorphic and posture in all views was normal. Ear, Eye, Hand or fascial expressions on observation were symmetrical. The pattern of respiration was symmetrical and type of respiration was thoraco- abdominal.

On examination, the handwriting skills, Attention, Perception and Comprehension was assessed by using Eyehand coordination, Figure ground perception, Figure constancy and Position in space and show grade was 3 in (Eye hand coordination), 5 in (Figure ground perception), 5.5 in (Figure constancy) and 2.5 in (Position in space) (Swarup & Mehta, 2011)[6]. After assessing the main problem the area identified were difficulties in reading, writing, calculating or drawing activities.

THE MAIN GOALS OF THE PHYSIOTHERAPY TREATMENT IS

To increase Handwriting and attention skills.

To increase Perception about subjects and ability to identify symbols, figures, shapes and changes in size, direction, position and also increase the recognition of pictures, shapes, graphics, letters and figures.

To increase the comprehension words designation position in space when he reads or hears it, for adequate comprehension.

The treatment protocol followed according to problem list and goals were described in following table.

Problem solving approach and spatial orientation	Arranging blocks
Physical activity and motor skills	Dart game
Hand functions and fine motor activity	Spinning tops, Painting and Drawing activities
Abstract thinking and reasoning	Making face's outline with macaroni/ beans.
	Numero- puzzle, fun- puzzle and colour prediction.

PROGNOSIS

After giving above mentioned Physiotherapy for 60 days (6 days/ week for 10 weeks). Child was reassessed and following prognosis is observerd in child . Now the grade of eye hand coordination is 5, Figure ground perception is 10, Figure constancy is 7 and Position in space is 8.5 (Swarup & Mehta, 2011)[6]. The child was now able to write one complete sentence, Reading one or two paragraph without pause and calculate mathematical problems and also able to draw certain things like Draw a hut, apple and glass tumbler**.**

DISCUSSION

Learning Disability (LD) are specific patterns (subtypes) of neuropsychological assets and deficits that eventuate in specific patterns of formal (e.g academic) and informal (e.g social) learning assets and deficits. LD may also lead to specific patterns of psychosocial functioning (Rourke, 2005)[4]. A number of interventions have been suggested for children with LD. Some seem particularly exciting from a neuropsychological

perspective, perhaps most intriguing is the evidence that brain changes in a normalizing direction are observed after the application of intensive phonological training of children with deficits in phonology ((Rourke, 2005)[4].

So, Combined integrated learning programme (CILP) was an effective treatment protocol in case of learning disabled children. Various gross and fine motor activities like drawing a line or circle on blackboard and joining the dots and abstract mazes and puzzles for Eye hand coordination. Dart board and other game activities like Funpuzzle, Numero puzzle effect on increasing attention and enhance problem solving skills or decrease reaction time as well as Perception. Comprehending text requires readers such as making and checking predictions, asking and answering questions which will help in comprehension.

CONCLUSION

Considerable Progress has been made in developing Combined integrated learning programme (CILP) for improving Handwriting, Attention, Perception or Comprehension skills. The improvement in child depends on CILP protocol formulated for child with learning disabilities, which include activities like Problem solving approach, Spatial orientation, Physical activity and Motor skill training or Hand functions as well as abstract thinking and reasoning has found to be an effective tool in enhancing the learning outcomes than Focused on limited activities and observed by the Parents. In this program, with therapist's guidance, feedback and appropriate input, the child performed the activity in graded fashion and in a correct way, which may not be possible by parents.

Conflict of Interest-Nil

Source of Funding- Self

Ethical Clearance-Nil

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DOI Number: 10.5958/0973-5674.2018.00035.7

Relationship between Anthropometric Parameters and Throwing Velocity among Male Undergraduate College Students: A Pilot Study

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ABSTRACT

Background: For individuals to have an effective throw, the highest velocity at which the ball is released as well as aiming accuracy is necessary. Body types of the individual and throwing velocity may have a correlation which can be estimated by anthropometric measurements and comparing it with that individuals throw velocity

Method: The Study was conducted among male undergraduate college students of age group ranging from 18 to 25 years. BUSHNELL radar device was used for evaluation of throwing velocity. The Radar gun was placed behind the throwers crease. The participants were asked to perform overhead throws with their maximum velocity. The Average of three throws was analysed. International Society for Advancement of Kineanthropometry (ISAK) protocol was used to evaluate the participant's anthropometric parameters. Twenty four parameters were chosen from the ISAK protocol.

Results: Out of the 24 parameters, skinfold thickness showed statistically significant correlation with throwing velocity with P-value less than 0.05.

Conclusion: This study concludes that except skinfold thickness, none of the other anthropometric parameters had a significant relationship with the throwing velocity among male undergraduate college students.

Keywords: *Throwing velocity, anthropometric parameters, radar gun.*

INTRODUCTION

In many sports events throwing is a necessary action, for e.g. cricket, baseball, throw ball etc. Throwing consists of launching an object in to flight by the use of one or both arms. There are different types of throwing and it is not the same in all the sports. There is side arm throwing and overhead throwing. Throwing is considered as one of the most important technical skills in competitive team handball.[1] Throwing performance can be measured in several ways, but most common measures for throwers are throwing velocity. Maximal voluntary velocity is necessary for proper execution of throw.[2,3] So throwing velocity is an important factor which can be modified. It has an influence on successes of the game. A player should throw a ball with his maximum velocity. This velocity is an important aspect for success, because the faster the ball is thrown, at the goal, the lesser time the defenders and keepers have to save the shot.[4]

Throwing involves the sequential action of body segments progressing from the larger, slower moving trunk action to the faster, distal actions of the relatively smaller arm and hand segments. For an effective throw, the highest velocity at ball release in combination with aiming accuracy is required, so there may be some effect of body type of the player to throwing velocity.[5] This correlation of body type with throwing velocity can be estimated by anthropometric parameters. Anthropometry is the science of measuring human body

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and its parts.[6] International society for advancement of kineanthropometry (ISAK) protocol is used to measure anthropometric parameters. It can be measured by using a measuring tape, stadiometer, weighing machine and skin fold caliper.

The throwing velocity can be evaluated by a radar gun, which works with Doppler's principle; the radar gun emits radio waves, which move at the speed of light, and bounces back to the radar devices when it encounters an object. It measures the change in radio wave frequency of the returned signal. When dealing with radar gun there should be proper positioning as it has cosine effect, which is if the target is in a direct line with the radar gun, the measured speed will be exact. As the angle of incidence increases, the accuracy decreases.[7] For measuring the velocity of a ball the distance range is of 90 feet. Beyond that, the radar device cannot detect the velocity. So one should be aware of all these factors before using radar device to minimize or avoid the measurer error and instrumental error.

There are limited studies on this topic. Those available are done on goal specific and sports specific events. If the studies are done by fixing a target then the subjects will be more focused on attaining the target. So there are chances that they may manipulate their throwing velocity in response to the demand for accuracy. This may not give a chance for recording the subjects' maximum throwing velocity. When it comes to studies done in specific sports, the subjects may be trained, which may influence the throwing velocity thereby it is not sure whether the increase in velocity is because of training or their difference in anthropometrics. Unlike the past studies, the present study will be of a non-targeted study which does not demand on accuracy rather it demands maximum throwing velocity from the subject.

MATERIALS AND METHOD

This study was conducted among undergraduate males aged between 18 to 25 years with a sample size of 30. Prior to participation, the participants were explained about the study and an informed consent was obtained from them. Ethical clearance was obtained from University ethics committee. Participants were screened based on the inclusion and exclusion criteria. Inclusion criteria were: Male undergraduate college students aged between 18 – 25 years. Exclusion criteria were: Presence of any musculoskeletal, neurological and cardiovascular condition or any other pathological condition contraindicating exercise participation and those who actively participated in sports in last 6 months.

Evaluation of throwing velocity: BUSHNELL[7] radar device was used. Radar device was placed perpendicular in direction to player. The Throw took place in a length of normal cricket pitch i.e.; 66 feet. The Radar gun was placed behind the throwers crease. The participants were wearing sleeveless t-shirt. They were asked to perform overhead throw with their maximum velocity. All the participants were using the same tennis ball for the trail. Prior to the throw a 10-minute standardized warm up was given. The general warm up consisted of jogging. The specific warm up comprised of Arm Circles, Dynamic T-Arm Swings, Overhead Shoulder Stretch, Walk Standing, Overhead throw with medicine ball, Standing Ankle Mobilization, Wide-Legged Squat and One-Legged Lunges.[8] For better results, 3 throws were given to each participant. There was 20 second rest between each throw. Average of three throws was analyzed.[9] Anthropometry evaluation was done by using ISAK protocol.[10] The following 24 parameters were chosen. Basic parameter: Height (measured by a measuring tape in cm), Weight (measured by a weighing scale in kg); Skin folds (Measured using skin fold caliper) – Biceps, Triceps, Subscapularis, Forearm, Iliac crest, Abdominal, Front thigh, Medial calf; Girths – Arm (relaxed), Arm (flexed and tensed), Forearm, Wrist, Chest (mesosternal), Thigh, Calf; Length – Acromione – radiale, Radiale – stylion, Distylion – dactylion, Trochanterion – tibiallaterale, Tibia laterale – sphyriontibiale; Breadth – Humerus, Femur; Manual Muscle Testing: Evaluated by handheld dynamometer; Range of Motion: Using goniometry; Grip strength: Using hand grip dynamometer

Statistical analysis: Data was expressed in terms of Mean and SD. Pearson's correlation was used to correlate between the parameters. $P<0.05$ is considered statistically significant.

RESULTS

Out of the 24 parameters, skinfold thickness showed statistically significant correlation with throwing velocity with P-value less than 0.05. (Table.2).

Table 1. Descriptive statistics of baseline data.		
Baseline data	**Mean**	**SD**
Age (years)	21.80	1.22
Height (cm)	172.13	6.08
Weight (kg)	63.43	10.59
BMI (kg/m2)	21.36	3.07
Arm span (cm)	172.43	5.92
Grip strength (kg)	37.53	4.66
Throwing velocity	87.92	11.91

Table 2. Descriptive statistics of skin fold thickness				
Skin fold thickness (in mm)	**Mean**	**SD**	**Pearson Correlation**	**P Value**
Biceps	4.22	3.63	-.419*	.021
Triceps	9.39	5.81	-.363*	.049
Subscapularis	10.56	5.82	-.577*	.001
Forearm	5.12	4.11	-.400*	.029
Illiac crest	15.02	9.14	-.533*	.002
Abdomen	20.04	10.42	-.480*	.007
Front thigh	13.70	8.86	-.501*	.005
Medial calf	7.84	5.76	-.267	.154
* Statistically significant (<0.05)				

DISCUSSION

The present study was done to find the relationship between anthropometric parameters and throwing velocity among male undergraduate college students by correlating 24 anthropometric parameters to the throwing velocity. It was done on 30 healthy male undergraduate college students aged between 18 to 25 years. We followed ISAK protocol for measuring anthropometric parameters, and throwing velocity was measured using a radar gun.

Most of the current literatures regarding this topic were concentrated either on specific sports or specific goals. So in this study we took individuals who were not active in any sports and we did not give them any goal as giving a goal would result in manipulation of speed by the participants in attaining the specific target which may hinder in attaining to record their maximum velocity. Bayios I[11] has suggested that there is negative correlation between speed and accuracy, i.e. if a goal is set, then it demands more accuracy then velocity which may cause the individual to manipulate the throwing velocity.

The result of this study shows that there is no relationship between any of the parameters except skin fold thickness, that is, for an individual with minimal skinfold thickness has more throwing velocity and vice versa. The skinfold thickness of biceps, triceps, forearm, subscapularis, iliac-crest, abdomen, front thigh, and medical calf showed Pearsons correlation of -0.419, -0.363, -0.400, -0.577, -0.533, -0.480, and-0.501 respectively with a significance value less than 0.05 whereas medical calf showed Pearsons correlation of0.267 with a significance value more than 0.05 (Table 2). From the above results we can easily make out that there is significant correlation between biceps, triceps, forearm, abdomens, subscapularis, iliac crest, and front thigh skinfold thickness and throwing velocity than the medial calf. These findings may be useful for bowlers as they can throw well if their body has less fat deposit. This may be achieved by planning a diet by a sports individual which includes food items containing less amount of fat. A training programme of a player who wants to improve their throwing velocity may set exercises concentrating more on core muscles, front thigh workouts as these skinfold thickness showed a significant correlation to throwing velocity.

A study by Ferragut C et al. concluded that body mass aspects are not related to throwing velocity and they could only find significant correlation with throwing velocity for some breadths that are not modifiable with training and they found maximal hand grip is related in throwing with goal keeper situations. But the present study could not find any relation between these i.e. breadth and hand grip strength. The difference might be due to smaller sample size. Ferragut C et al. took all parameters from ISAK protocol except skinfold. But in present study skinfold was included along with ISAK protocol which showed a significant correlation with throwing velocity.[9]

A study by Pyne DB et al. found that bowlers with larger physical structure and greater strength generally have a higher velocity and they also found that the total arm length is an important factor for bowling speed.[12] In the present study we could not find any relation between muscle strength and throwing velocity, also no relation between any of the length parameters and throwing velocity was found. This difference may be because Pyne DB et al. have done the study on the junior and senior fast bowlers and they all were highly trained which may have influenced the results. However the study done by Mathavan SB had a result which state that arm length is not related with throwing velocity.[6] With regard to the segment length, in the present study the arm length was not correlated to the throwing velocity and this is in agreement with the result of a previous study by Skoufas D et al.[13]

The BMI and throwing velocity showed no significant correlation which has an agreement with the study by Zapartidis I et al.[1] But this study disagrees with our result of correlation between body height, body weight and arm length. They found these parameters have a positive correlation with throwing velocity whereas the present study showed no significant correlation.

As a part of trial we tried measuring the throwing velocity both outdoor and indoor, and there was a difference noted in the results of throwing velocity. The outdoor throwing velocity was less compared to that of indoor. This might be because of the environmental factors such as moisture, wind; etc. so from this it is clear that environmental factors have an influence on throwing velocity and one must keep this in mind whenever the velocity has to be measured for research or for rehabilitation purpose.

In conclusion, the present study shows a significant correlation between skin fold thickness and throwing velocity. None of the other parameters have a relation to the throwing velocity. This was a done as a pilot study. The result may be used for further study with a large sample size among students participating in different sports activities. The current study gives a highlight for coaches and players to include training session that are helpful for reducing the skin fold particularly at abdomen and front of thigh as well as by setting a diet plan with lesser fat content for the player to maintain or improve their throwing performance.

Limitation: This study was done as a pilot study in male non-sports individuals. The manual muscle testing done for wrist and ankle were using grading system (0-5) where as other areas was measured by using hand held dynamometer.

CONCLUSION

This study concludes that except in skin fold thickness none of the other anthropometric parameters had a significant relationship with the throwing velocity among male undergraduate college students.

Conflict of Interest: There is no conflict of interest.

Source of Funding: Self

Ethical Clearance: Yenepoya University Ethics Committee

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DOI Number: 10.5958/0973-5674.2018.00036.9

Effect of C2 SNAG and Reverse SNAG in Cervicogenic Headache using Headache Disability Index

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ABSTRACT

Objective: To find the effect of C2 SNAG and Reverse SNAG in age group of 18-29 years and to compare C2 SNAG and Reverse SNAG in cervicogenic headache using headache disability index **Method**: Design- Randomised, controlled trial. Participants- 45 subjects diagnosed with cervicogenic headache. Intervention- Group A received C2 SNAG and conventional treatment, group B Reverse SNAG and conventional treatment and group C conventional treatment, for 7 consecutive days. Outcome measures were Headache disability Index, and Numerical Pain Rating Scale, assessed and documented pre and post treatment. **Results**: Pre-post analysis of HDI values of group A and group B was decreased to 42 (95% CI 33.79 to 50.21) and 52 (95% CI 41to 63) respectively, and NPRS values was reduced to 3.4 (95%CI 2.42 to 4.38) and 4.6 (95%CI 3.18 to 6.02) respectively. Between the group analysis of HDI by Dunn's multiple comparisons test showed no significant difference ($p>0.05$) between all three groups. Between the group analysis of NPRS by Dunn's multiple comparisons test showed significant difference ($p<0.01$) only between group A and C. **Conclusion**: C2 SNAG and Reverse SNAG technique were effective in reducing functional disability and headache intensity. Also C2 SNAG was found to be more effective in reducing headache intensity when compared with other group.

***Keywords**: C2 SNAG, Reverse SNAG, Cervicogenic headache*

INTRODUCTION

Headache is one of the most common human ailment with a point prevalence of 16% in the general population. It has been estimated that a headache in some form will be experienced by at least 90% of the population at some stage during their lives[1]. Individuals with cervicogenic headache experience considerable restriction of daily function, limitation of social participation and emotional distress[2].

The International Headache Society (IHS) defines Cervicogenic headache (CGH) as pain referred from a source in the neck and perceived in or more regions of head and/or face[3]. Approximately 47% of the global population suffers from headache[4] and 15-20% of those headaches are cervicogenic.

IHS has classified headaches into: Primary and Secondary headaches. Primary headaches include migraine headache, tension-type headache, cluster headache and additional trigeminal autonomic cephalalgias. The cause of Secondary headaches are another source such inflammation, brain tumours, infection, stroke, spinal cord pathology and many more.

Ottar Sjaastad in 1983 coined the term, "cervicogenic headache" and classified as secondary headaches. It arises primarily from musculoskeletal dysfunction in the upper three segments of cervical spine[5]. The pathway by which pain originating in the neck can be referred to the head is the trigeminocervical nucleus, which descends in the spinal cord to the level of C3-C4, and is in anatomical and functional continuity with the dorsal gray columns of these spinal segments. In this region sensory nerve fibres in the descending tract of the trigeminal nerve are believed to interact with sensory fibres from the upper cervical roots. This functional convergence allows the bidirectional referral of painful sensations between the neck and trigeminal sensory receptive fields on the face and head[6].

CGH is often misdiagnosed or go unrecognized. Early and accurate diagnosis and treatment is thus the

key to reduce the disability associated with it. CGH are unilateral, starting from posterior head and neck, migrating to the front, occasionally ipsilateral arm discomfort. Patients with CGH often have altered neck posture which is triggered or reproduced by active neck movement or passive neck positioning. Radiological examination is of limited value in diagnoses of CGH.

The most important clinical finding to diagnose CGH is cervical flexion-rotation test (FRT) . It is a simplified form of manual examination developed to identify C1-C2 dysfunction[7].

Treatment of CGH is multifaceted including Pharmacotherapy, Physiotherapy, Anaesthetic blockade and occasionally surgical interventions. Various manual therapy approaches are Mulligan and Maitland's mobilization, muscle energy technique, thrust manipulation and post- isometric muscle relaxation. Mulligan mobilization is a novel concept developed by Brian Mulligan in which sustained natural apophyseal glides (SNAG) are accessory apophyseal joint gliding applied to the spine to restore normal range of C1-C2 rotation alleviate pain and functional disability[8] SNAG techniques are sustained at the end of available pain-free range and follow the plane of the apophyseal joints under treatment.

The present study was intended to evaluate the effectiveness of C2 SNAG and Reverse SNAG in subjects of age group 18-29 years using headache disability index (HDI) and Numerical pain rating scale (NPRS). This study is expected to aid physiotherapists in planning an effective treatment for the patients of CGH.

MATERIALS AND METHODOLOGY

Materials used in this study are towel, hot moist pack, data collection sheet and headache disability index form

Methodology

- Study design: Experimental study
- Sampling method: Convenience Sampling
- Duration of Study: 6 months
- Place for study: Department of Physiotherapy, Krishna hospital, Karad
- Sample size: 45

Ethical Clearance Committee

The study protocol was started after being approved by Institutional ethical committee of Krishna institute of medical sciences for the use of human subjects in research. Informed consent was taken from all participants

Inclusion criteria: Participants of age 18-29 years, both male and female, Positive Cervical Flexion rotation test and fulfilling all the below diagnostic criteria were included.

a) Precipitation of head pain by neck movement and/ or sustained, awkward head positioning or by external pressure over the upper cervical or occipital region on the symptomatic side.

b) Ipsilateral neck, shoulder or arm pain of a rather vague, non-radicular nature, or occasionally arm pain of a radicular nature.

c) Unilateral headache, without side shift.

d) Headache: Moderate-severe, non-throbbing pain, usually starting in the neck.

Exclusion criteria: Patients with traumatic history, neurological deficit of upper limb, autonomic involvement or on Analgesics were excluded from the study.

Outcome Measures: Functional Disability measured by Headache Disability Index[9] and Headache intensity measured by Numerical pain rating scale[10] .

Procedure: 45 subjects who fulfilled the selection criteria were recruited and informed consent was obtained. Randomization was done by lottery method and 15 subjects were allocated to each group. Group A was treated with C2 SNAG and conventional treatment, Group B with Reverse SNAG and conventional treatment and Group C with Conventional treatment only.

Group A: With patient in sitting position on a chair with back supported and head/neck in neutral, physiotherapist stands at the front and side towards the patient and stabilizes the patient head against her body. The therapist middle phalange of the little finger contacts the posterior aspect of patients C2 spinous process. The therapist's thenar eminence of non contact hand presses anteriorly in the horizontal plane against the little finger of opposite hand, sustaining the force for ten seconds.

Group B: Position same as group A. The physiotherapist stabilises the patient's neck by fixing the C2 vertebra with her thumb and middle finger tip with the transverse process. The physiotherapist's other hand cups around the posterior aspect of occiput and gently pulls the head anteriorly in horizontal plane sustaining the force for 10 seconds. There should be no movement of the head. Gentle force is required for effective treatment.

Group C: Control group subjects were given deep cervical flexor exercise, scapular stabilisation exercises and hot moist pack.

a) Deep cervical flexor Exercise: Patient in supine lying with the cervical spine in neutral and a folded towel placed under the cervical lordosis, ask to slowly nod the head, hold for 30 seconds and relax.

b) Scapular Stabilisation exercise:

1. Patient lays prone with head in neutral and forehead supported on plinth and arms raised overhead with 130^0-140^0 of shoulder abduction and external rotation. Then patient was asked to raise the arm above the head, hold for 30 seconds and relax.
2. Patient lay in prone position with head in neutral and forehead supported on plinth. With 90^0 abduction and external rotation of the shoulder, the subject is asked to adduct the scapula and lift the arm off the plinth, hold for 30 seconds and relax.
3. In prone position head in neutral and forehead was supported on plinth and arms by the side in neutral position. The subject was asked to lift the arm off the plinth with the shoulders in neutral position, hold for 30 seconds and relax.

c) Moist heat therapy: Patient was positioned in supine lying on a treatment couch. The patient was asked to expose the area to be treated. Hydro-collator pack was wrapped in a Makin tosh, and then placed under the cervical region for 15 minute.

Treatment session: Mobilisations (10 second hold × 3 sets), Exercises (each 10 repetitions × 3 sets) and Hot Moist Pack for 15 minutes. Home Programme: Scapular stabilisation exercises, deep cervical flexor exercise (each 10 repetitions × twice a day) and hot water fomentation or 10 minutes (once in a day). Duration of treatment for each group was 7 days on continual basis. Outcome measures were assessed at baseline and after 1 week.

RESULTS

Data was analyzed using Instat software. Wilcoxon matched pair test was used for comparison within the group and Kruskal Wallis test was used for comparison between the groups.

Age wise distribution: 19 participants in age group of 22-25 years

Gender distribution: female 53% and male 47%

Table 1: Pre Post Comparisons of HDI within Group

Sr. No	Groups	Mean ± SD		p value
		Pre treatment	Post treatment	
1	Group A	60 ± 13.15	42 ± 8.21	<0.001
2	Group B	60.13 ± 12.86	52 ± 11.0	<0.001
3	Group C	61.86 ± 11.45	48.93 ± 8.03	<0.001

Table 2 – Pre Post Comparisons of NPRS within Group

Sr. No	Groups	Mean ± SD		p value
		Pre-treatment	Post-treatment	
1	Group A	5.83 ± 1.35	3.4 ± 0.98	<0.001
2	Group B	6.0 ± 1.3	4.6 ± 1.42	<0.001
3	Group C	5.86 ± 1.18	5.133± 1.18	0.002

Table 3- Comparisons of pre and post HDI values between the groups.

	Pre		Post	
Groups	**Mean ± SD**	**SEM**	**Mean ± SD**	**SEM**
A	60 ±13.15	3.39	42 ± 8.2	2.12
B	60.13± 12.86	3.32	52 ± 11.00	2.84
C	61.86 ± 11.45	2.95	48.93 ± 8.03	1.98
P	0.760		0.046	
KW	0.546		6.33	

Comparisons	**Mean difference**	**p value**
Column A vs. Column B	-11.26	Ns p>0.05
Column A vs. Column C	-9.4	Ns p>0.05
Column B vs. Column C	1.8	Ns p>0.05

Post interventional analysis by Dunn's multiple comparisons test showed no significant difference (p>0.05) between the group A and B, group A and c and group B and C. Difference in medians between the groups might be the reason for no significant difference.

Table 4 - Comparisons of pre-pre and post-post NPRS values between the groups

	Pre		Post	
Groups	**Mean ± SD**	**SEM**	**Mean ± SD**	**SEM**
A	5.86 ±1.35	0.35	3.4 ± 0.98	0.25
B	6 ± 1.3	0.33	4.6 ± 1.4	0.36
C	5.86 ± 1.187	0.30	5.13 ± 1.187	0.30
P	0.799		0.025	
KW	0.10		12.10	

Comparisons	**Mean difference**	**p value**
Column A vs. Column B	-10	Ns p>0.05
Column A vs. Column C	-16	** p<0.01
Column B vs. Column C	-5.2	Ns p>0.05

Post interventional analysis by Dunn's multiple comparisons test showed significant difference (p<0.01) between the group A and C. ** means very significant

DISCUSSION

The term Cervicogenic headache was introduced by Sjaastad et al. to describe a distinct headache syndrome which accounts for 15% to 20% of all chronic and recurrent headaches. The present study was undertaken to determine the effect of C2 SNAG and Reverse SNAG in CGH. 45 subjects with age group between 18-29 years of both gender were included.

Mitul Thakur, Mritunjay Kumar[11] studied the prevalence of CGH in General Population in India and

concluded to be relatively common form of headache in age group 18- 30 years. However there are fewer studies conducted on effect of Mulligan mobilisation with emphasis on this particular age group.

As the pre and post values of HDI and NPRS within the group A analysis were statistically significant, treatment given in group A was effective. In accordance with present study, a study conducted by Eui-Ju Shin, Byoung-Hee Lee[12] to investigate the effect of mulligan C2 SNAG on headache intensity, duration and cervical function showed positive effect SNAG treatment and found that SNAGs group showed significantly greater improvement, compared to the control group, in which only the SNAGS placebo technique was applied ($p<0.05$).

Jull et al studied the effect of mobilization and specific exercise in three groups, an experimental group managed with manual therapy, an experimental group with exercise treatment, and an experimental group managed with both. Combined treatment group did not produce a significantly better effect than only mobilisation group but there was 10% better response for the participants who received the combined therapy, which was thought to be clinically relevant though not statistically significant.

This study is in contrast to the present study which shows that mulligan C2 SNAG mobilisation along with deep cervical flexor and scapular stabilisation exercises statistically reduces headache intensity ($p<0.001$) and functional disability ($p<0.001$).

One possible mechanism by which the C2 SNAG reduces headache symptoms is by the neuro-modulation effect of joint mobilization. In addition, descending pain-inhibitory systems may be activated, mediated by areas such as the periaqueductal gray of the midbrain. Mobilization is thought to break down adhesions and stretch surrounding tissues.

The pre and post values of HDI and NPRS for within group B analysis were statistically significant, thus treatment given in group B was effective.

However there is less evidence to support the effect of reverse headache in management of CGH [13]. Mobilisation has been shown to produce a non-opioid mechanical hypoalgesia[14] which is regarded as evidence of central nervous system involvement. Through the mechanical perturbations at the treated joint, an instant trigger processes starts within the central nervous system, which might be responsible for bringing about the clinical improvements.

The pre and post values of HDI and NPRS for within the group analysis of group C were statistically significant, thus treatment given in group C was effective. Shannon M. Petersen[15] in their study provided evidence that deep cervical flexor exercise was effective in CGH. Benson et al[16] suggested that as a consequence of mild heating skin mechanoreceptor pathways are influenced which, in turn, may contribute to pain modulation. Lehman and Delateur[17] suggested that heating the secondary afferent muscle spindle nerve ending and Golgi tendon organs could be a way in which an inhibitory influence is applied to the motor neuron pool to diminish muscle excitation and thereby reduce pain.

Comparison of post values of NPRS showed no significant difference in group A and B, and group B and C ($p>0.05$) but significant difference was found between A and C ($p<0.001$). Thus mulligan C2 SNAG along with conventional therapy proves to be better than only conventional therapy in reducing headache intensity.

As CGH is a musculoskeletal disorder involving articular and muscular component, management should be focused exploring both the aspect. Muscle dysfunction is an important characteristic of CGH and impairment in endurance of deep neck flexors appear to be one of the defining features. C2 SNAG and Reverse SNAG deals with the articular component and helps in reducing pain and functional disability associated with it. Thus this study suggests the application of C2 SNAG along with conventional treatment in management of CGH.

CONCLUSION

C2 SNAG and Reverse SNAG groups was not more effective in reducing functional disability when compared with control group using Headache Disability Index. However C2 SNAG was found to be more effective in reducing headache intensity than Reverse SNAG and conventional therapy when measured using Numerical Pain Rating Scale

Conflicts of Interests: No conflict of interest

Source of Funding: Self

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DOI Number: 10.5958/0973-5674.2018.00037.0

Efficacy of Rotator Cuff Muscles Strengthening to Improve Rom and Strength after Arthoscopic Bankart's Repair in Individuals with Anterior Shoulder Dislocation

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ABSTRACT

Background: Shoulder dislocation mainly occurs due to glenohumeral joint instability. Glenohumeral joint instability mainly seen in athletes who do over head movement. Surgical treatment for BANKART'S lesion of glenohumeral capsular ligament injury can be treating by using an open and arthoscopic surgical approach to repair the detached glenoid labrum and capsular placation. Successful outcomes have been reported to arthoscopic surgical procedure with respect to restoring stability to the glenohumeral joint. Often, however full functional range of motion is sacrificed due to the degree of tissue morbidity and necessary postoperative immobilisation. Efficacy of rotator cuff muscles strengthening to improve range of motion and strength after arthoscopic bankart's repair in individuals with anterior shoulder dislocation. **Method:** 30 samples were taken with simple random sampling with symptoms of anterior shoulder dislocation. All subjects were assessed post operatively and after 6 weeks of follow up for Range of motion with goniometer and strength with digital spring balance. All the subjects were received strengthening exercise for rotator cuff muscle post operatively for 6 weeks. **Results: Range of motion** Shoulder flexion, extension, abduction, medial rotation and lateral rotation at zero degree abduction on 4thpost operative day and 90° abduction on 6th week follow up showed increased in all measured ROM ($P < 0.05$). **Strength** Shoulder flexion, extension, abduction, medial rotation, and lateral rotation strength measurements are from 4th post operative day to 6 weeks follow up revealed interaction in all measured strength. **Conclusion:** we conclude from this study that physiotherapy interventions will result in improvement of ROM and strength in 6 weeks of follow up.

Keywords: *Anterior shoulder dislocation, bankart's lesion, shoulder ROM, shoulder strength.*

INTRODUCTION

In the shoulder joint, the head of the humerus (upper arm bone) sits in the glenoid fossa, an extension of the scapula, or shoulder blade. Because the glenoid fossa (fossa = shallow depression) is so shallow, other structures within and surrounding the shoulder joint are needed to maintain its stability. Within the joint, the labrum (a fibrous ring of cartilage) extends from the glenoid fossa and provides a deeper receptacle for the humeral head. The capsule tissue that surrounds the joint also helps maintain stability. The rotator cuff muscles and the tendons that move the shoulder provide a significant amount of protection and stability for the shoulder joint. Dislocations of the shoulder occur when the head of the humerus is forcibly removed from its socket in the glenoid fossa. It's possible to dislocate the shoulder in many different directions, and a dislocated shoulder is described by the location where the humeral head ends up after it has been dislocated. 95% or more of shoulder dislocations are anterior dislocations, meaning that the humeral head has been moved to a position in front of the joint. Violent external rotation in abduction levers the head of the humerus out of the glenoid socket, avulsing anterior bony and soft tissue structures in the process (the Bankart lesion).[1]

First, the large spherical head of the humerus articulates against the small shallow glenoid fossa of the

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scapula (only 25–30% of the humeral head is covered by the glenoid surface). Second, the bony surfaces of the joint are largely incongruent (flat glenoid and round humerus). However, the congruence is greatly restored by the difference in cartilage thickness: glenoid cartilage is found to be the thickest at the periphery and thinnest centrally, whereas humeral articular cartilage is thickest centrally and thinnest peripherally. This leads to a uniform contact between humeral head and glenoid surface throughout shoulder motion.[2]

The labrum functions to deepen the glenoid, from 2.5 to approximately 5 mm. The labrum may function in combination with joint compression forces to stabilize the joint within the midrange of glenohumeral motion where the ligamentous capsular structures are lax. Biomechanical studies have indicated that resection of the labrum can reduce the effectiveness of the compression stabilization by 20%. The labrum appears to serve as a buttress assisting in controlling glenohumeral translation, similar to a chock-block, which would prevent the wheel of a tractor from rolling downhill.[2,3]

Bankart lesion repair was performed with a procedure described by Snyder, with the patient in the lateral decubitus position (repositioned after diagnostic arthroscopy in beach-chair position). An arthroscopic suture passer (Suture Punch or Spectrum; Linvatec, Largo, FL) was used to suture the labrum around the edge of the glenoid cavity with 4 ×13 ×2-mm metal anchors loaded with No.2 Ethibond from 5 mm of the edgr of the glenoid cavity. All patients were advised to wear a sling.[4]

Hence in this study we aimed to improve ROM and strength of shoulder joint after post-operative bankart's lesion a 6 weeks follow up study.

METHODOLOGY

The materials used in the study are high couch, goniometer, digital spring balance and rope. The subjects who were diagnosed anterior dislocation of the shoulder, traumatic dislocation of the shoulder and unilateral BANKART's lesion, subjects of 20-60 years of age, both male and female were included for the study. Subjects with fracture around the shoulder joint and rotator cuff tear and patients undergone steroid therapy were excluded.

The study setting was in BIRRD hospital, Tirupathi. All subjects received physiotherapy pre operatively in the hospital & were provided postop rehabilitation and discharged home with home exercises following 6 to 8 days of hospital stay. After 8 days of hospital stay patients discharged and were performing home exercise program for 6 weeks.

This rehabilitation program involved ROM & isometric strengthening exercises for the shoulder musculature. Patient attended postoperative sessions 6 times/week for 8 days then encouraged to perform home exercise daily.

Patient instructed

1. At the day of surgery to avoid over head activities, avoid external rotation of upper extremity, avoid weight lifting, to wear shoulder sling for 1 week, perform only active movements in limiting range.
2. On day 1st to 3rd all shoulder isometrics, abduction isometrics.
3. From 3 to 7 days all isometrics & ROM exercises.
4. From 2-6 week's active shoulder movements in limiting range.
5. From 6-12 weeks home exercises program will start.

OUTCOMES: ROM & strength has been checked postoperatively on 4thpost operative day and again on the follow up day.

EVALUATION: Subjects were evaluated post operatively; six weeks post operatively and at 4 to 12 months (advance phase).The evaluation done by using goniometer to measure ROM and digital spring balance to measure strength.

PROCEDURE

33 subjects were selected. All subjects were screened for inclusion and exclusion criteria, 3 subjects were excluded according to exclusion criteria. Out of 30 patients 24 were right side affected and 6 were affected on left side.

DIGITAL SPRING BALANCE MEASUREMENT OF SHOULDER;

FLEXION- Position of the subject is in standing position, one end of the digital spring balance is given to the subject's affected hand and other end of the digital spring balance is tied with rope and ask the patient to stand on the rope and pull the digital spring balance forward and hold it for or 2 secs then strength is measured.

EXTENSION - Position of the subject is in standing position, one end of the digital spring balance is given to the subject affected hand and other end of the digital spring balance is tied with rope and ask the patient to stand on the rope and pull the digital spring balance backward and hold it for 1 or 2 secs then strength is measured.

ABDUCTION- Position of the subject is in standing position, one end of the digital spring balance is given to the subject affected hand and other end of the digital spring balance is tied with rope and ask the patient to stand on the rope and pull the digital spring balance sideways and hold it for 1 or 2 secs then strength is measured.

EXTERNAL ROTATION - Position of the subject is in standing position, one end of the digital spring balance is given to the subject affected hand and other end of the digital spring balance is tied with rope to a window and pull the digital spring balance outwards and hold it for 3 to 4 secs and then strength is measured.

INTERNAL ROTATION - Position of the subject is in standing position, one end of the digital spring balance is given to the subject affected hand and other end of the digital spring balance is tied with rope to a window and pull the digital spring balance inwards and hold it for 3 to 4 secs then strength is measured.

PROTOCOL- This protocol based on S. Brent Brotzman, Kevin E. wilk's protocol.[5]

- Exercises that were performed by the patients till 8th post operative day
- No active external rotation.
- Elbow and hand ROM exs.
- Hand gripping exs.
- Passive and gentle active assisted ROM exercise.
- Flexion to 60 degrees.
- Elevation in scapular plane to 60 degrees.
- External rotation and internal rotation with arm in 20 degrees of abduction.
- Passive External rotation to 5-10 degrees.
- Internal rotation to 45 degrees.
- Submaximal isometrics for shoulder muscles.
- Cryotherapy.

ACTIVITIES AFTER GOING HOME:

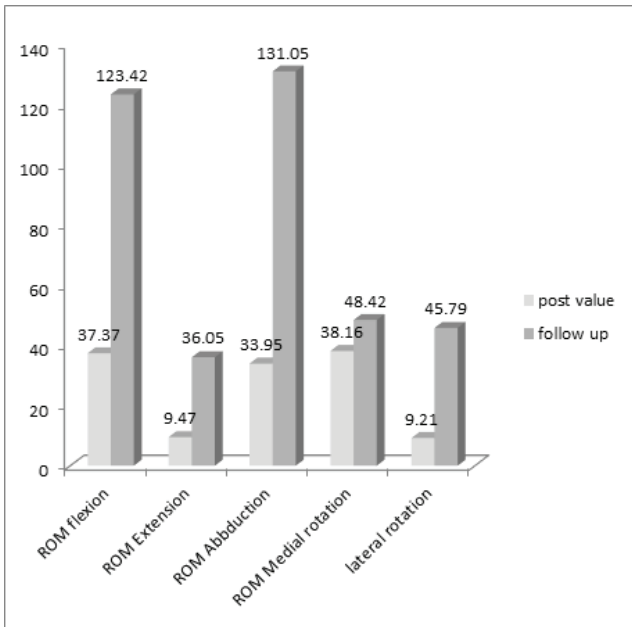
1. Apply ice to the shoulder as tolerated, to reduce pain and swelling. You can change the dressing to a smaller one to allow the cold therapy to reach the shoulder.
2. Remove the sling on the first day after surgery. Move your elbow, fingers and hand several times a day.
3. Begin the pendulum exercise several times a day: Pendulum exercise - Bend over at the waist and let the arm hang down. Using your body to initiate movement, swing the arm gently forward and backward and in a circular motion. Repeat for 2 to 3 minutes at a time with in pain free limit.

- Sling for 2 weeks.
- Sleep in immobiliser for 2-4 weeks.

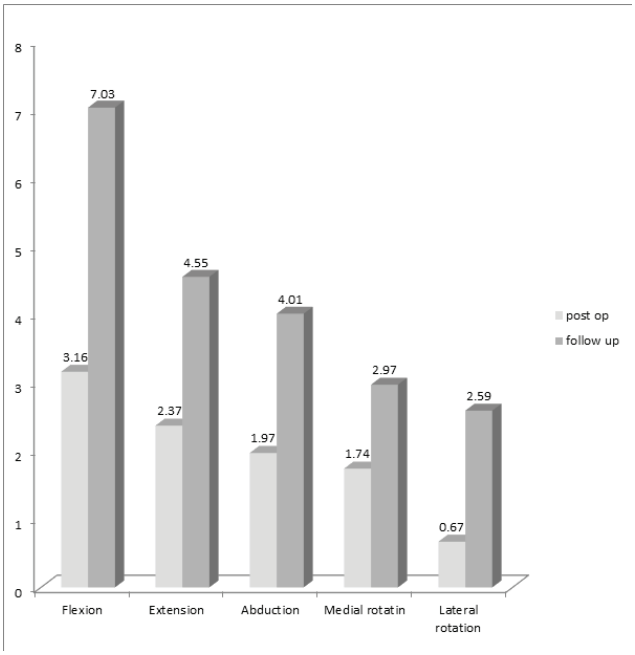
DATA ANALYSIS

The statistical analysis was done by using the statistical software SPSS 20.0 version, the statistical analysis was conducted to meet the objectives framed for under the study. The variables considered under study are shoulder ROM and strength. These two variables are measured post-operatively at 4th day and 6 weeks after surgery respectively. The main objective of the study is to observe whether there exists any difference between the post op and 6 weeks after surgery values of the shoulder ROM and post op and 6 weeks after surgery for shoulder strength. To achieve this information the suitable statistical technique is paired t-test. The graphs

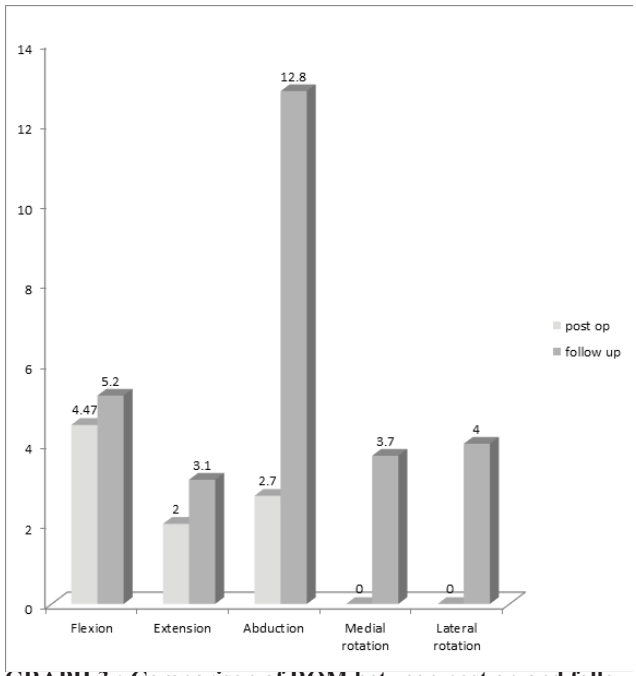
below shows the comparison of results obtained for post surgical and 6 weeks after surgery for variable i.e., ROM and strength. These results executed the fact that there exists a statistical significance in the parameters i.e., there is high significant difference between the post surgical and 6 weeks after surgery values (p-value <0.05).



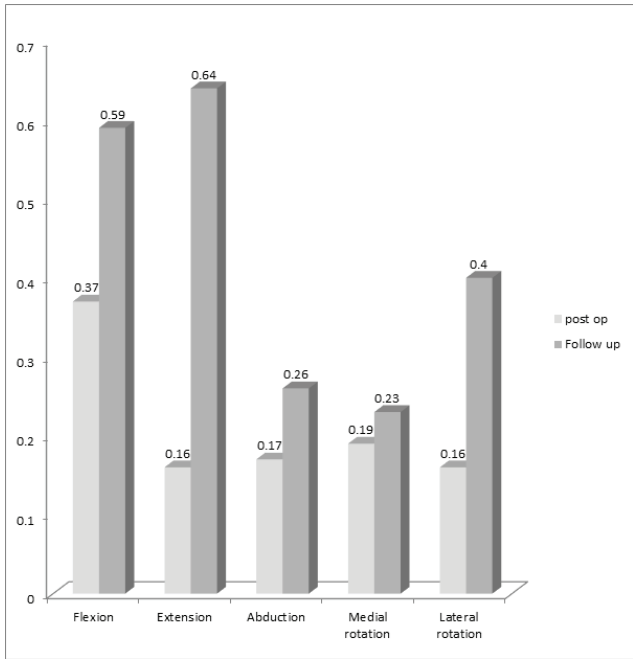
GRAPH 1: Comparison of ROM between post op and follow up values of right affected shoulder



GRAPH2: Comparison of Strength between post op and follow up values of right affected shoulder using paired t-test



GRAPH 3 : Comparison of ROM between post op and follow up values of left affected shoulder using paired t-test



GRAPH 4: Comparison of Strength between post and follow up values on left affected shoulder using paired t-test

DISCUSSION

M.M. Ismail, K.M. El Shorbagy did a study on Motions and functional performance after supervised physical therapy program versus home-based program after arthroscopic anterior shoulder stabilization. This study aimed at evaluating the effects of a supervised physical therapy program versus controlled home-based program on the rate of shoulder motions and

function recovery after arthroscopic anterior shoulder stabilization.[6]

The continuous improvement of all ROM throughout the rehabilitation period was attributed by different exercises in the rehabilitation program. Exercises used to regain forward elevation included stick-assisted elevation in supine and table step-back exercise. To regain external rotation, the therapist performed passive external rotation to the advised range and stick-assisted exercises. Gradual increase of passive stretching was introduced for all ROM from the 6 to 12 weeks postoperative. And finally they concluded that supervised physical therapy and controlled home-based programs progressively improve ROM and function after arthroscopic anterior shoulder stabilization. [6]

Todd S. Ellenbecker, Angelo. Mattalino did a study on Glenohumeral Joint Range of Motion and Rotator Cuff Strength following Arthroscopic Anterior Stabilization with Thermal capsuloraphy in this study twenty patients diagnosed with unidirectional shoulder instability and underwent a postoperative rehabilitation program following unilateral arthroscopic shoulder stabilization with thermal capsulorraphy.[7]

Postoperative rehabilitation emphasizing progressive ROM and rotator cuff and scapular strengthening has produced favourable results in patients 12 weeks postoperatively with respect to glenohumeral joint ROM and IR and ER strength.[7]

Robert C. Grumet, Bernard R. Bach, et al did a study on Arthroscopic Stabilization for First-Time Versus Recurrent Shoulder Instability and they found that there were no differences in recurrence or complication rate among patients undergoing surgery after the primary dislocation when compared with those undergoing surgery after multiple recurrent episodes.[8]

In our study we examined the influence of post-operative physiotherapy education and exercise on postoperative shoulder Range of motion and strength after arthoscopic bankart's repair. All subjects received a postoperative PT assessment with followed physical therapy exercises. Results of this focused on improvement in shoulder Range of motion and strength at postoperatively and 6 weeks after surgery. After surgery all five Range of motion i.e., flexion, extension, abduction, medial rotation and lateral rotation were measured. It was found that there was significant improvement of Range of motion and strength in all subjects from postoperative to 6 weeks ($p< 0.05$) follow up.

CONCLUSION

In this study we proposed about physiotherapy intervention in increasing Range of motion and strength after arthoscopic bankart's repair. Hence we conclude from this study that physiotherapy interventions will result in improvement of ROM and strength in 6 weeks of follow up. This can be included in the rehabilitation program in the bankart's lesion postoperative strength and Range of motion

Limitations of this study are:

Sample size is very small.

Heterogeneous study.

Conflict of Interest: Nil

Source of Funding: Self

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DOI Number: 10.5958/0973-5674.2018.00038.2

Prevalence of Leg Length Discrepancy in Persons with Non-Specific Low Back Pain

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ABSTRACT

Background: Low Back Pain(LBP) is estimated to affect around one-third of the adults in any month. Mild Leg Length Discrepancies(LLD's) are common and usually not felt by the patient and often neglected during the routine assessment of LBP. There are no studies reporting the prevalence of LLD in patients with LBP.

Materials & Methodology: 245 participants (125males and 120females) with non-specific LBP were included in the study. Two readings of the true leg length measurements were taken using the tape measurement method(TMM). Average of the two readings was used for data analysis.

Results: Results showed a 17% prevalence of LLD in patients with LBP. The highest number of patients with LBP, were found in the age group of 25-35 years. Gender did not significantly influence the prevalence of either LBP or LLD. All the patients with were found to have mild (<3cm) LLD's.

Conclusion: 41(17%) persons had LLD indicating that a considerable number of patients with LBP had LLD. Measurement of LLD should be included as a routine in the initial assessment for LBP patients, as simple corrective methods and modifications can help in devising better interventional strategies.

Keywords: *Low Back Pain, Non-specific, Leg Length Measurement.*

INTRODUCTION

Low back pain(LBP) is defined as pain localized between the 12th rib and the inferior gluteal folds, with or without leg pain.[1] LBP is the commonest musculoskeletal problem. It ranks 2nd to respiratory illness, as a reason, for visit to physicians.[2] It's a symptom not a disease.[3] LBP is considered the most common cause of disability in younger patients less than 45 years of age.[4]

An episode of LBP is estimated to affect around one-third of the adults. Most improve over subsequent 3 months. In some the symptoms persist. The predictors of the likelihood of sustained symptoms include clinical factors, gender, age, poor general health, distress, and fear avoidance beliefs.[5]

In India almost 60% of the population has back pain at some-time or the other, in their lives.[6] LBP for >3 months affects activities of daily living, thus directly affecting quality of life.[7] 50% episodes of LBP resolve completely within 2 weeks and 80% by 6 weeks. 30% individuals experience recurrent or develop persistent pain in future.[8] The cause for LBP can be specific and non-specific. A specific cause is identified in only in 5–10% of cases.[9,1] Specific causes include congenital disorders; trauma; referred pain; metabolic bone disease; pain of psychogenic origin; or inflammatory, degenerative, infective or neoplastic conditions.[1]

Non-specific LBP is defined as LBP not attributable to a recognizable, known specific pathology.[10] In non-specific LBP the underlying pathology is unknown.[6,1] Mechanical causes include pelvic tilt; lumbar lordosis;

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leg length discrepancy; muscle tightnesses, foot pronation etc.[11]

LBP can be categorized into acute(<6 weeks), subacute(6–12 weeks) and chronic(>12 weeks) on the basis of the duration of the episode. Most patients with acute LBP recover reasonably quickly and only 10-15% of patients with acute LBP develop chronic symptoms.[10]

Limb length discrepancy, is defined as a condition in which paired limbs are noticeably unequal. It is known as leg length discrepancy(LLD) when the discrepancy is in the lower extremities.[12]

LLD can structural or functional on the basis of etiology. LLD can be further classified into three categories based on the magnitude of the discrepancy, viz. mild(<3cm), moderate(≥3-≤6cm), and severe(>6cm).[13] Small LLD (nearly 1cm), is seen in about 3–15% of the population. In 95% cases the reason for such occurrences is unknown.[14] LLD leads to pelvic tilt, which further results in functional scoliosis with concavity to the longer side limb. The degree of scoliosis is proportional to the magnitude of LLD.[13] It is hypothesized that LLD induced scoliosis may be responsible for the development of LBP of non-specific origin and sciatica.[13]

There have been very few studies concerning small discrepancies in the current review of literature. LLD although being one of the mechanical causes for LBP, is the least assessed and most neglected and least managed factor during the management of LBP by all health care professionals. Considering the small percentage of people who develop chronic LBP with disabling effects, the need to identify the prevalence of LLD in patients with LBP, as no studies evaluating one of the cause of mechanical alterations i.e. LLD that can lead to back pain were found.

METHODOLOGY

Ethical clearance was obtained from the Institutional Ethical Committee. All patients diagnosed with non-specific LBP by the orthopaedic surgeon were screened for inclusion and exclusion criteria.

INCLUSION CRITERIA:

Patients diagnosed with non-specific LBP by the Orthopaedic surgeon in the age group of 25-50 years[15,16] were included in the study.

EXCLUSION CRITERIA

Patients with history or presence of systemic causes of LBP, Gynecological and obstetric conditions, and Structural scoliosis were excluded from the study. Patients with history of fractures and pathologies of the lower limb, abdominal surgeries 6 months prior to data collection and Traumatic LBP were excluded from the study.

PROCEDURE

Majority of the patients who came to the physiotherapy OPD during the study period were referred by the orthopaedic surgeon. Self-referred and those referred by other medical professionals were screened for presence of any systemic disease by the orthopaedic surgeon. All patients who met the inclusion and exclusion criteria and agreed to participate were included in the study. A written informed consent was obtained from them. Demographic data including height, weight, etc. was collected and leg length assessments done and recorded.

Assessment of leg length was done using tape measurement method(TMM). Subjects were positioned in supine lying with the appropriate clothing. The ASIS's and the base of the medial malleoli were marked bilaterally using a marker. Squaring of the pelvis was done following the marking of the points. True leg length was measured from ASIS to the medial malleolus. Two measurements each from the ipsilateral ASIS to the medial malleolus were measured bilaterally. Average of the two readings was used for data analysis for better validity and reliability of the TMM. Data thus collected was subjected to appropriate statistical analyses.

Sample: Convenient sample

RESULT

Statistical analysis was done using SPSS(Statistical Package for the Social Sciences) version20.0. The investigator firstly evaluated the descriptive statistics for the baseline characteristics. Data is presented as mean(±SD) and percentage(%). P-value <0.05 was considered as statistically significant.

Table 1: Distribution of Participants by Age Groups

Age Group	No. of Participants	% of Participants
>25 - ≤35	131	53.5
>35 - ≤45	77	31.4
>45 - 50	37	15.1
Total	245	100
Mean Age(SD)	35.8(±8.55)	

Table 1 illustrates the frequency distribution of participants by age. Totally 245 subjects with a mean age of 35.8yrs.(SD±8.55) participated in the study. The age groups were classifiedinto 3 classes viz. >25–≤35yrs., >35–≤45yrs. and >45–≤50yrs. and the frequency of the subjects was found to be 131(53.5%), 77(31.4%) and 37(15.1%) respectively. The Z-Score for population proportion between the age groups >25–≤35 yrs. and >35–≤45yrs.; >35–≤45yrs. and >45–≤50yrs.; and >25–≤35yrs. and >45–≤50yrs. was 4.94, 4.28 and 8.95 respectively. The p-value for all was 0 and the result is significant at $p < 0.05$.

The participants included 125(51.02%) and 120(48.98%) men and women with mean age of and 36(±8.57)yrs. and 35.55(±8.56)yrs. respectively. There was no significant difference in the sample size and mean ages of the male and female patients included in the study.

The frequency distribution of the participants with discrepancy and without discrepancy demonstrated that 204(83.27%) participants did not have any discrepancy while 41(16.73%) subjects had LLD. The prevalence of LLD in patients with LBP was found to be 16.73% in our study. The mean LLD for the 41 patients was found to be 0.71cm (SD±0.47).

The 41 participants with LLD, consisted of 24(58.54%) males and 17(41.46%) females, with a mean LLD of 0.14(±0.34) and 0.10(±0.31)cms. respectively. No significant differences the population proportion and mean LLD was noted on analysis with Z-score and t-test respectively.

Table 2: Frequency Distribution of Persons as per the LLD

LLD(mm)	Frequency	%(n=41)
1 to ≤10	27	65.85
>10 to ≤20	12	29.27
>20 to ≤30	2	4.88
>30	0	0

Table 2 illustrates the frequency of the LLD's observed in the sample size. It was observed that all the patients had mild LLD. Patients classified into classes of 1 to <10mm, >10 to <20mm, >20 to <30 and >30, showed the frequency of 27(65.85%), 12(29.27%), 2(4.88%) and 0(zero) respectively.

DISCUSSION

Numerous attempts have been made to discover the various causative factors associated with LBP. The existence of persistent LBP is determined by the clinical factors associated with pain and also the various premorbid states such as, poor self-rated health, high levels of psychological distress, smoking, low levels of physical activity, dissatisfaction with employment and other factors related to the event of LBP such as the duration of symptoms, restriction in spinal mobility and radiation of pain to the leg.[17]

50% of the episodes of LBP resolve completely within 2 weeks and 80% by 6 weeks. However 30% of the individuals experience recurrent pain or develop persistent pain in future.[8]

During the study period 342 out of 683 patients visiting the physiotherapy OPD, met the age criteria while the remaining patients were either less than or above age limits. 48 patients of the 342 had history of either of the conditions enlisted as exclusion criterias, hence were excluded. Patients meeting the criteria were explained the purpose and importance of the study. Finally 245 patients were included as another 49 patients did not agree for participation due to personal reasons.

The frequency distribution of participants by age classes showed a highest frequency of patients with LBP in the age group of 25–35 years. This could be possibly because most of the patients in the study reported with the first incidence of LBP. This result is supported by

studies which have reported that the first episode of LBP usually occurs between 20–40 years of age.[18] It is also reported that the incidence of first episodes of LBP are high in early adulthood and the symptoms tend to recur over time.[19] A study done on 1500 backache cases reported that the symptoms began in late twenties and the incidence of pain was highest between the ages 30 and 50 years.[15]

Men and women of all ages could be affected by back pain. Various differences in the two genders like the work profiles and hormonal changes could possibly result in increased rate of LBP in females, as reported in several studies that have suggested higher prevalence of LBP in women as compared to men.[20,21] However, no significant differences were noted in the prevalence of LBP in males and females in our study. This result is supported by a study in 2012, which states there was no significant difference in the rates of LBP in the two genders.[22] Other studies have also reported an equal incidence of backache in men and women.[15]

The prevalence of LLD in patients with LBP was found to be 16.73% in our study, with a mean LLD of 0.71(±0.47)cm. All the patients diagnosed with LLD were found to have mild LLD i.e. <3cm. Studies have reported that LLD's of 10mm or larger were found significantly more often in a group of patients with chronic LBP.[15] Milder LLD's less than 10mm have been reported to cause biomechanical compensations in the spine and changes in the angle of lumbar facets.[23] LLD is a problem found in as many as 40 to 70% of the population.[12] LLD of 3mm and 6mm can cause injury to the runners, 5mm leads to the biomechanical compensation in spine, 9mm changes the angle of lumbar facets, 10mm cause back pain, 15mm can cause compensatory scoliosis, 20mm requires lower extremity compensation and 22mm causes significant scoliosis.[24] Unilateral lower limb shortening and excessive medial rotation of the limb might produce anterior pelvic tilt and an increased lumbar lordosis, thus resulting in LBP. Variations in pelvic inclination alter the lumbar lordosis and could be a potential cause of LBP.[11] Structure can thus be the effect of a function and function can be an effect of the structure.[15] Also the percentage of chronic LBP patients and controls having LLD has been reported as 18.3 % and 8% respectively.[15]

Gender-wise distribution of the patients with LLD showed no significant differences in either proportion or the mean LLD among the two genders. Our results suggest that LLD is not influenced by gender and incidence was equal in men and women. Many studies with radiographic analysis LLD showed no significant difference between the two genders. This suggests that gender has very little role of in the extent of LLD.[25]

It was observed that all the patients in the study had mild LLD i.e.<3cm. Highest frequency of patients was noted in the mild category of LLD and no patients in moderate or severe category of LLD. None of the patients had a LLD >3cms. Majority of the patients had a LLD of <1cm. A study on LLD in LBP patients, reported 43% and 81% in patients studied, at 10mm and 4mm cut-off for LLD respectively. Their results showed a higher prevalence of smaller LLD's in patients with LBP.[26]

CONCLUSION

Taking into account the high prevalence of LBP and its social, psychological and financial burden, it is important that the condition is dealt with, with enormous consideration. The prevalence of LLD though small in patients with LBP should be a concern during treatment and management of patients with LBP as correction of the discrepancy using external supports like augmented footwear is simple. Small magnitude LLD's which are not sensed by individuals are neglected by the examiner. A very small discrepancy can causes adaptations resulting in asymmetry of spine, asymmetry of static and dynamic loads. We would thus support the measurement of leg length in all patients with LBP in order to have better therapy outcomes.

Conflict of Interest – The authors have no conflicts of interest to disclose.

Source of Funding – None

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DOI Number: 10.5958/0973-5674.2018.00039.4

Measurement of Walking Speed in Indian Community Dwelling Chronic Stroke Patients with 3D Motion Analyser: A Descriptive Study

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ABSTRACT

Background: Stroke is one of the primary cause of adult disability which leads to locomotor impairment. Although, stroke survivors are able to walk but the deficit in temporal and spatial parameters of walking in combination with fear of falling and lack of confidence have repercussion on the ability for walking independently in the community. Hence the study is undertaken to measure the walking speed of chronic stroke patients with 3D motion analyser.

Aim: To measure the walking speed of Indian community dwelling stroke patients with 3D motion analyser

Methodology: A descriptive study on 22 chronic stroke patients aged 24 to 72 years with mean age of 50 years were assessed for walking speed, step length and cadence by subjecting them to walk on force platform. 3 D motion analyser with a camera and sensors was utilised for assessment of parameters.

Results: The mean walking speed was 0.52m/s ± 0.14, Bipedal support was 18.25 ± 3.21. The mean step length was 0.37± 0.07 and 0.38 ± 0.09, weight bearing was 0.45 ± 0.17 and 0.48 ± 0.12 for right and left side respectively.

Conclusions: The obtained values were less than the minimum required speed for community movement & functional activity and hence gait component should also be included in stroke rehabilitation.

Keywords: *walking speed, chronic stroke, community dwelling ,3D motion analyser*

INTRODUCTION

Bipedal locomotion is a unique phenomenon noted in human functioning and impacts patient participation in civil society.one of the reasons for patients utilising the rehabilitation services are for impairments of gait. One of the common neurological pathology which impairs gait and has pronounced effect on gait is stroke.

Stroke is one among the primary causes leading to adult disability. It is a known fact that stroke leads to locomotor impairment.[1] Although most of the stroke survivors are able to walk within six months of duration but the deficit in temporal and spatial parameters of walking in combination with fear of falling and lack of confidence have repercussion on the ability to walk independently in the community. [2, 3]

Studies prove that ninety percent of stroke survivors suffer from functional disability and mobility impairment but their rehabilitation programme is not extended beyond one year. [4] Inadequate duration of rehabilitation programme may attribute to muscle weakness, spasticity, pain, poor balance, reduced tolerance to activities and sedentary lifestyle. Therefore, community dwelling stroke survivors may undertake extremely low level of physical activity. [4, 5]

Gait abnormalities like walking, endurance, gait speed, remain the striking area of difficulty when

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rehabilitating chronic stroke survivors. Moreover, studies have suggested that one of the best indicators of recovery in motor system of stroke patients can be found out by walking speed. Hence the current study has been undertaken for analysing walking speed and related parameters with 3D motion analyser in community dwelling stroke patients.

Aim: To measure the walking speed of Indian community dwelling stroke patients with 3D motion analyser

OBJECTIVE

1.Determining the walking speed of community dwelling stroke patients when walking on sensory platform with 3D motion analyser.

2. Determining the bipedal support & step length of community dwelling stroke patients when walking on sensory platform with 3D motion analyser

Method: Descriptive study was carried out at out- patient department. The study was targeted on the chronic hemiplegics for measuring the walking speed with 3D motion analyser with a camera.

Subjects: The subjects who volunteered to participate in the study were Twenty-two chronic hemiplegics who were undergoing their rehabilitation at out -patient department of V.S.P.M.'s College of Physiotherapy, Nagpur, Maharashtra, India

Sampling technique: Convenient sampling was utilised for the study.

Inclusion criteria: 1. Pre - diagnosed stroke patients 2. Chronic stroke survivors 3. Adult hemiplegics of both genders 4. Ability to walk 10 m independently without out any assistive device

Exclusion criteria:1. Less than 6 months stroke duration 2. Perceptual dysfunctions 3. Any recent injury to lower extremity.

Instrumentation: Assessment of gait parameters were carried out with the instrument 3D motion gait analyser with a camera. It consisted of four sensors for recording the gait parameters. The analyser also had 1.5m of sensory platform where the subjects were asked to walk with sensors placed on them. The walking hallway was L shaped and were having the bars on both sides for patient's safety so that the patients could hold the bars.

General procedure: Requisite permissions and approvals of institutional ethical committee was obtained. chronic stroke patients who consented to be the part of the study were provided proper instructions in regards to walking. Later on, they were asked to walk forward on the walking hallway as follows 2 meters before the sensory platform and continue walking on the sensory platform which was 1.5 meters and further continue to walk for 4 meters. In all subjects had to walk for a distance of 7.5 meters. Sensors were placed on the patient's body before the commencement of walking. But recordings were only possible only when patients were on the sensory platform.

Practice session: Initially Patients were asked to walk completely on the walkway barefooted and without sensors. They were asked to walk for two rounds so that they get acquainted to walk on the hallway. Rest between trails was also allowed according to patient's requirements.

Rest period: patients were given rest period of 10mins after the practice session which was followed by the final testing.

Placement of sensors: During the rest period of 10 minutes the sensors were placed on the patient's body. 4 sensors were placed. One sensor each at PSIS, Mid - thigh, Tibial shin, and the dorsum of the foot on the affected side of the lower extremity.

Test protocol: patients were asked to complete the walkway as shown in figure 4 without the foot ware once. The parameters which were recorded were speed in meter per second, speed in kilometres per hour, bipedal support, step length, on one leg support, length of cycle and walking rhythm.

Data handling: Unique identity codes were assigned to each patient. On completion of the test protocol by each patient the data was saved and stored according to unique identity code in computer and was later retrieved for studying the walking parameters which included walking speed, step length, stride length, cycle length and bipedal support. Data cleaning was also undertaken so that ambiguities in analysis and results could be nullified.

Statistical analysis: The raw data obtained from the study was entered in Microsoft excel sheet 2010 and was

analysed by Epi info software. The results of the study were expressed as means, standard deviations, minimum values and maximum values.

RESULTS

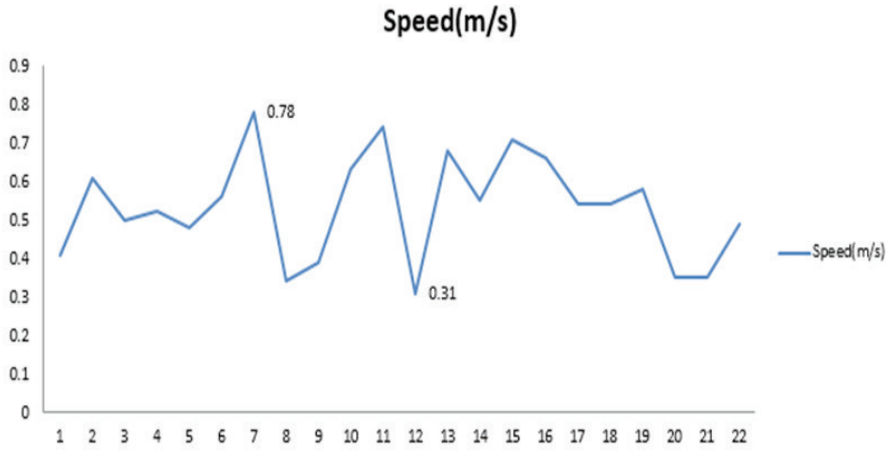
The results of the study which was undertaken on 22 chronic stroke patients aged 24 to 72 years with mean age of 50 years were subjected to walk on the walking hallway so as to measure the walking parameters. Among the 22 subjects studied 17 were males and 5 were females.15 of the patients were right sided hemiplegics and 7 were left sided hemiplegics. The mean duration of hemiplegia was 20 months.

The mean values of the study variables along with standard deviations, maximum value and minimum value is as shown in table 1.

Table 1: Variables of walking:

S.no	Variables	Mean value	± S.D.	Max value	Min value
1	Speed m/s	0.52	± 0.14	0.78	0.25
2	Speed km/hr	1.90	± 0.51	2.82	0.92
3	Bipedal support	18.25	± 3.21	26.33	12.62
4	Length of left step	0.38	± 0.09	0.52	0.11
5	Length of right step	0.37	± 0.07	0.49	0.26
6	On one leg support left	0.48	± 0.12	0.66	0.19
7	On one leg support right	0.45	± 0.17	1.17	0.3
8	Length of cycle	0.75	± 0.14	1.02	0.43
9	Walking rhythm (cadence)	84.10	± 14.63	111.12	47.06

It was also observed from the study that 2 patients had diabetes with hypertension, one patient had diabetes, 18 patients had hypertension and one patient had neither diabetes nor hypertension.



Graph 1: walking speed of 22 patients with maximum and minimum speed

The walking speed of the all the 22 patients were varying and the mean value was found to be 0.52 ± S.D. of 0.14. per second as shown in graph 1 along with minimum and maximum values.

Bipedal support was found to be 18.25 ±3.21. The mean step length was 0.37±0.07 and 0.38 ±0.09, weight bearing was 0.45±0.17 and 0.48±0.12 for right and left respectively. Walking rhythm was found to be 84.10 ± 14.63 with minimum value of 111.12 and minimum value of 47.06.

DISCUSSION

The study was focused to detect the walking speed of chronic stroke survivors by 3D motion gait analyser.

The mean obtained walking speed in current descriptive study was found to be 0.52 ± 0.14 meter per second fulfilling the first objective of the study. The value obtained was found to be much lesser than the estimated mean speed for individuals who are physiologically fit. The preferred walking speed by which individuals tend to walk is about 1.4 m/s [6]

Walking velocity has been considered as one of the important measures of functional ambulation, moreover it is to note that to lead a good quality of life and for improvement of functional activities, walking speed plays a vital role. The walking speed should be more than 0.8m/s as stated by Perry [3,7] and also walking speed of 0.8m/s provides protective effects against secondary complications like osteoporosis and heart diseases but in the current scenario the mean value obtained was only 0.52. Moreover, it is to note that the speed required for community ambulation is 0.8m/s (80cm/s).

The reason for reduced walking speed can be attributed to the fact that the patients with hemiplegia usually have a slower gait speed and shorter stride length than others. The limitation in gait speed and stride length is associated with the efficiency of advancing paretic limb in swing and shifting weight to paretic limb. The gait speed is decided by efficient limb swing or single limb swing balance and mid stance is compromised on affected side.

Matar Alzahrani, Catherine Dean, reported walking performance is poor after stroke activities at home and in the community so stroke survivors may become housebound and isolated from society. Matar Alzahrani, Catherine Dean had also undertaken gait analysis on 42 chronic stroke patients and noticed 0.5 m/s as mean speed for participants [8] which is almost similar in value with the current study. In earlier study the stroke duration was 1-5 years and in the current scenario mean duration of stroke was 20 months.

In normal healthy adults' gait cycle, walking speed is between 3 to 4 miles per hour but in current scenario the value obtained is 1.90 km/hr (1.18 miles per hour) which is found to be much lesser as the studied population were chronic stroke patients thereby providing the evidence that gait is impaired in these patients.

It is also to note that walking speed is contributed by both cadence (steps/min) and step length. In this study the mean cadence obtained was 84.10 ± 14.63 and the mean step length was 0.37±0.07 and 0.38 ±0.09, but the normal values obtained from the literature is ranging between 100 to 131 [for] cadence [9] and 0.70 to 0.81 for step length [9]. These values help in understanding the short fall so that rehab can be planned out accordingly.

Based on the cadence values that is 84 steps / min the study population are falling under the category of very inactive level i.e. level 1(which is 80-100 steps/ min) according to James Sundquest [10]

In this study as the step length is reduced therefore the length of gait cycle is also reduced therefore the mean value of 0.75 ± 0.14.was obtained.

A decrease in weight bearing time and increase in double limb support period of a hemiplegic patient slows the gait cycle and stride that could the reason behind why double limb support yielded the value of 18.25 ±3.21.

Although 3D motion analyser is a very useful tool for calculating the gait parameters as it is not only simple to handle but able to provide the readings at short interval of time but utilising these objective measures for rehabilitating the stroke patients will definitely add to more literature for evidence based research.

CONCLUSION

It is concluded from this study the walking speed of chronic stroke survivors was reduced and the average walking speed was less than the minimum required speed for community movement & functional activity. Therefore, objective gait components should also be taken into consideration for holistic approach of stroke rehab in community dwelling adults so as to enhance easy movement in community.

Conflict of Interest: There are no conflict of interests

Finance: It was a self-financed study

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DOI Number: 10.5958/0973-5674.2018.00040.0

The Impact of Musculoskeletal Injury on Sports Specific Skills in Volleyball Players

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ABSTRACT

Introduction: Volleyball is one of the games which are spread worldwide. Its players can be divided into 3 main groups i.e. libro, setter and attacker. These positions are entirely connected with the strength, power, attention and specific skills of individual player. It is a sport involving horizontal and vertical, brisk and vigorous movements of the body. It is believed that every contact as well as non contact sport needs physical and psychological fitness with specific skills.

Objective: To evaluate the impact of the musculoskeletal injuries on sports specific skills of volleyball players, prevalence of musculoskeletal injuries of volleyball players & discover Incidence rate of musculoskeletal injuries of volleyball players during specific period of time.

Method and material: 30 National male volleyball players of Punjabi University, Patiala meeting inclusion and exclusion criteria were recruited. The players that participated voluntarily as the sample of the study were explained about the need and objectives of the study after taking the written informed consent. Injury prevalence forms were filled by the investigator for previous injuries in past 1 year of the period. After taking previous data and completion of 6 months duration post-season test data collected with SAI volleyball skill test.

Result: Present study is providing us useful indication about 83% of prevalence rate, 66% of incidence rate, 21% of absolute incidence rate of injuries and 1.32% of relative incidence rate of injuries during competition period.

Conclusion: Study concludes that there are significant reductions in the scores of sports specific skills of the volleyball players with or without injury status; hence, it cannot be potentially viable to explain that these reductions in the specific skills are only due to the musculoskeletal injuries. Other psychological factors might also be responsible for reduction in the specific skills.

Keyword: *Musculoskeletal Injury, Sports Specific Skills, Volley Ball Players.*

INTRODUCTION

A physically energetic routine is essential for all age groups. Since ancient times, different cultures and their associations to the sports activities has been broadcast. Millions of people throughout the world are performing physical exercise and play sports. Physical activity is probably the most important determinant of an overall population's health. Being engaged in sports and physical activities has many reasons, such as pleasure and relaxation, competition, socialisation, maintenance and improvement of fitness and health.[1] People show their interest in the sports like ball game i.e. soccer, basketball, and volleyball. In the past few decades, sports or participation in the sports has turned towards professional field so that it is displayed through the rise in the training schedule, volume or duration and elite conditioning among players. Youth sports have become more professionalised as reflected in the training volume. Engaging with sports so potentially, also encourage sports specific injuries. As a consequence, association of these injuries are responsible for the short and long term consequences for the young athlete's health. Volleyball is one of the games which are spread worldwide. It is

the game that can be played by all ages and both sexes indoors and outdoors.[2]

International Volleyball Federation represents about 150 million players in approximately 170 countries. [3] Due to dynamic sport, it includes rapid and high intensity movement with a strong motivation to win. These variations in the movements and behaviour can lead to injuries to the players. These injuries are divided into contacted and non-contacted mechanism. An injury may be categorized as either being an acute injury or an overuse injury depending on the mechanism of injury and the onset of symptoms. It may extract a cost in the form of sports -related injury as the physical activity increases; activity-related injuries are also significantly higher. As a number of player increases, chances of injury also equals to that. Incidence rate of the injuries in sports activity has been recorded within 0.5 to 34 injuries/1000 hours. Musculoskeletal injuries and illness is the cause of time loss for the period of the participation.[4]

A study was conducted on the prevalence, type and the probable causes of sports injuries in Iranian Super League Male Volleyball Players' in 2009 which suggests that during training and competition session, there was prevalence of 44% lower limb injuries, 46.1% prevalence of joint injuries and 43.5% prevalent muscle injuries were the most common kind of the injuries. It was also concluded that injuries in fingers with 42.8% prevalence were the most vulnerable injury in upper limb. During training or competition, lumbar spine with 68.6% prevalence was the most vulnerable organ among the trunk, head and neck to be injured. The study also revealed that the bodybuilding, ground surface, condition and quality of personal equipment could be the important factor to be associated with the injuries in these sports.[5] This result provides a useful insight into nature, incidence, causes and sites of injuries in volleyball players.

Nevertheless, there is a lack of studies examining the consequences of the injuries on the performance or sports-specific skills of players particularly volleyball players. Therefore, the present study will be conducted with an aim to investigate the impact of musculoskeletal Injuries on Sports Specific Skills in Volleyball players. Apart from that, this study will focus on the prevalence, incidence rate, absolute incidence rate, and relative incidence rate of musculoskeletal injuries during the specific period of time.

METHODOLOGY

Nature of the study

The present study is descriptive in nature. The method of collecting data was observation.

Research setting

This study was performed in the Volleyball sports field, Punjabi University Patiala and Sports Out Patient Department, Department of Physiotherapy, Punjabi University Patiala.

Population

This study targeted the National volleyball male players of Punjabi University Patiala.

Sample Design

The Convenient Random Sampling method

Sample Size

The sample size constituted 30 National players of Punjabi University volleyball Team.

Inclusion Criteria

National player of volleyball team of Punjabi University Patiala with age group of 20 to 30-year practiced regularly for minimum 2 years and who will be Convenient, co-operative and participate voluntarily for study.

Exclusion Criteria

Age less than 20 to more than 30 year old players of volleyball, Female players of volleyball team, Non - cooperative player, Practiced more than 10 years.

Research tools/Outcome tools:

Injury surveillance questionnaire form, SAI volleyball skill test

PROCEDURE

30 National male volleyball players of Punjabi University, Patiala were recruited. The players that participated voluntarily as the sample of the study were explained about the need and objectives of the study after taking the written informed consent. Injury prevalence forms were filled by the investigator for previous injuries in past 1 year of the period. After taking previous data

performance based sports, specific skill tests were conducted for each subject, according to the Sports Authority of India skill test for volleyball in the month of September 2015. From the month of September, onwards musculoskeletal injuries/illness and total time loss in a practice session of the individual subject were observed and documented by investigator till February 2016. During this period of time, performance-based skill tests conducted before post-season tests data. After completion of 6 months duration post-season test data collected with SAI volleyball skill test. Preseason and postseason data were analyzed for the result for this study.

RESULT

Table 1: Shows the prevalence rate in the population during the competitive period.

Prevalence Rate	**No of existing injured case**	**Total population at risk at given point time**	**% Rate**
	25	30	83.33%

Table 2 shows relative incident rate in the population during the competitive period of 6 months.

Incident rate	**No of new case over a period time**	**No of population at risk**	**% Rate**
	20	30	66.66%
Relative Incident Rate	**No of new cases**	**Population time**	**% Rate**
	15	1136 hr	1.32%
Absolute Incident Rate	**No of injuries recorded**	**No of event or game**	**% Rate**
	20	95	21.05%

This indicates the relative incident rate was 1.32% in population time, absolute Incident Rate in the population was 21% in total 95 events or game during the competitive period of 6 months and shows incident rate in the population during the competitive period

Table3 Analysis of the mean value between before participation skills and after participation skills of players

Level of skills	**mean**	**Standard deviation**	**t-test with equal variance**	**t-test one tail critical value**	**p-value one tail value**
Before participating skills	2.166	0.746	3.04	1.671	0.002
after participating skills	1.666	0.546			

Table 4 Analysis of the mean value between before participation skills of injured players

Level of skills	**Mean**	**Standard deviation**	**t-test with unequal variance**	**t-test one tail critical value**	**p-value one tail value**
Before participation skills of injured players	2	0.755	1.709	1.701	0.049
After participation skills of injured players	1.6	0.507			

Table 5 Analysis of the mean value between before participation skills of uninjured players with after participation skills of uninjured players

Level of skills	mean	Standard deviation	t-test equal variance	t-test one tail critical value	p value one tail value
Before participation skills of uninjured players	2.33	0.723	2.521	1.701	0.009
After participation skills of uninjured players	1.73	0.593			

DISCUSSION

This current study evaluates the prevalence rate of the musculoskeletal injuries of volleyball players. During this competitive period a total of 95 events were covered and total 1136 hours of the game were played including competitive matches and training sessions. In the period of 6 months 15 players out of 30 were injured. A total of 20 injuries and 3 illnesses were observed and recorded. Before competition and after competition skills evaluation was taken by performing SAI skills test for volleyball players.

A total of 20 injuries were reported out of the population at risk 30. Thus prevalence rate of 83% was recorded during the competitive period of 6 months. This shows the prevalence rate of injuries is higher in the volleyball players. A survey study on injuries prevalence in varsity volleyball players suggests that injury occurrence during competition was 67.33% and during training was 32.22 %. This higher rate of injuries was probably due to bad technique, low fitness and competitive temperament by the players.[2]

This present study also narrates the incidence rate which was recorded as 66% during the competition period. This information provided us with an absolute incidence rate of 21% and relative incidence rate of 1.32%. This shows the occurrence rate of the injuries is higher in the volleyball players. A one season prospective cohort study of volleyball injuries supports that overall incident rate of volleyball injuries was 2.6 per 1000 playing hours and acute injuries was 2.0 per 1000 hours of playing.[15]

In this present study on the basis of affected body part, injuries were distributed which signifies that ankle and lower back injuries are most prevalent injuries with 15.7% and the least injured body parts are shoulder, arm, hip, thigh and heel. This study also reveals that the most commonly involved structure in volleyball injuries is muscles with prevalence of 50% and ligaments with prevalence of 26.31%.

The primary aim of the current study was to evaluate the impact of the musculoskeletal injuries on sports specific skills of volleyball players. The sports specific skills of volleyball players were evaluated by using the skill test battery of the Sports Authority of India for volleyball. The comparison of pre-participation and post participation skill evaluation was done to evaluate the influence of the musculoskeletal injuries on the sports specific skills.

The mean value of skills performance before competition and after competition of all players was compared. The mean of the skills performance before competition was 2.166 and after competition was 1.666. It means that before competition average skills of the players were 2.16 and after competition average skills were 1.66. The mean difference of skills recorded in this session was 0.5. This mean difference was lower in after competition than before competition which suggests that the overall skills were reduced after participation in the competition. Statistically t-test calculated value was 3.04 which was higher than the critical value of the t-test (1.671) with a p-value of 0.002. This signifies that there was the reduction in the skills of the players after the competition. This result can be due to musculoskeletal injuries to the players during competition. (As per table no 4.7) 50% of players were injured, so that it can be the reason of the reduction in the skills of the players after competition.

This study reports that after competition there was a reduction in the specific skills of players, but it cannot be concluded that there was any reduction in the skills of injured players during competition. To evaluate this

before competition and after competition skills of the injured players were compared. Before competition mean value of 2 was recorded prior to an injury to the players and after competition mean value of 1.6 was recorded among injured players. The mean difference 0.4 was found. It means after competition the skills of injured players were decreased. Statically, t-test calculated value was 1.709 which is higher than the critical value of the t-test (1.701) with a p-value of 0.049. This signifies that there was reduction in the specific skills of injured players. This shows the significant result for this study that there was a decrease in the level of the skills after an injury in the period of 6 months of the tournament. This hypothetically proves that there is an impact of the injuries on specific skills.

To find out whether there was any change in specific skills of the uninjured players, before competition skills and after competition skills of the uninjured players were compared. Before the competition, mean value of 2.33 was recorded and a mean value of 1.73 was recorded after competition of the uninjured players. The mean difference 0.6 shows that there was a reduction in the skills of the players during the tournament. Statistically, the calculated value of t-test was 2.521 which are higher than the critical value of t-test (1.701) with p-value 0.009. This signifies that there was a reduction in the skills of the uninjured players after participation in the tournament. This shows that after competition a reduction in the specific skills was recorded among injured as well as uninjured players. Specific skills of overall players were reduced. So that, there is no significant result found that injuries had an impact on the sports specific skills. The decrease in the skills of uninjured players presumes that there are also other psychological factors apart from musculoskeletal injuries that influence specific skills of players during competition. The musculoskeletal injuries are not only the cause of the reduction of sports specific skills during competition. There can also be other factors such as psychological factors might also be responsible for reduction in the specific skills.

CONCLUSION

There is statistically significant reduction in the scores of specific skills of the players with or without injury but it cannot be feasible to elucidate that these reductions in the specific skills are only due to the musculoskeletal injuries. Apart from musculoskeletal injuries some psychological factors (i.e. lack of motivation, attention and concentration) might also be responsible for reduction in the specific skills and hence, a study on these factors can be carried out as the future scope.

Conflict of Interest: None

Ethical Clearance: We certify that the study was approved by Ethical Committee of department of Physiotherapy, Punjabi University, Patiala.

Source of Funding: Self.

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DOI Number: 10.5958/0973-5674.2018.00041.2

Knowledge About Role of Physiotherapy and Practice of Exercise among Hypertensive Patients

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ABSTRACT

Introduction: Lifestyle modifications in the present era had led to increase in various health problems like diabetes, hypertension, obesity etc. Hypertension is the most widespread cardiovascular disease and is affecting a large group of population.

Objective: Knowledge about hypertension, role of physiotherapy and practice of exercise among hypertensive patients.

Method and material: Hypertensive male and female subjects (N=100) meeting the inclusion criteria were taken from urban and rural area adjoining the Punjabi university, Patiala. After obtaining a written consent, information regarding the demographic profile was recorded on the data collection form. A self structured questionnaire, 'Knowledge of hypertension, role of physiotherapy and practice of exercise' was developed to conduct a study.

Result: 88% urban and 78% rural of hypertensive patients believed that hypertension is related to excessive thinking, worries and stress, smoking, alcoholism and obesity. 14% urban and 10% rural were aware about the role of physiotherapy treatment in the management of hypertension and had consulted physiotherapists for exercise prescription for hypertension. A large proportion of subjects were involved in some kind of exercise for controlling blood pressure. However, only a small portion followed prescribed exercises, but most of the hypertensive patients performed exercises without any prescription of duration and dosage of exercises.

Conclusion: Knowledge and awareness regarding hypertension and role of physiotherapy was inadequate among the population in relation to locality and it varied with the level of education. The population neither prescribed exercise from Physician nor Physiotherapist for management of hypertension

Keyword: *Hypertension, Exercise, Physiotherapy.*

INTRODUCTION

Hypertension exhibits an iceberg phenomenon where unidentified morbidity exceeds the identified morbidity.[1] It is defined arbitrarily 'the level of blood pressure at which the benefits of treatment outweigh the cost and hazards.[2] It is a chronic medical condition in which resting arterial blood pressure in the arteries is elevated.[3]

Australian guidelines for the definitions and classifications of blood pressure, as shown in table 1, provides a comprehensive review of clinical considerations concerning to the detection and management of hypertension.[4]

Table 1. Classification of blood pressure levels according to Australian guidelines.[5]

Category	Systolic BP(mmHg)	Diastolic BP (mmHg)
Normal	<120	<80
High- normal	120-139	80-89
Grade 1 hypertension(mild)	140-159	90-99
Grade 2 hypertension (moderate)	160-179	100-109
Grade 3 hypertension (severe)	≥180	≥110
Isolated systolic hypertension	≥140	<90
Isolated systolic hypertension with widened pulse pressure	≥160	≤70

Hypertension, also known as "silent killer" because it does not have specific symptom related to their elevated blood pressure.[6,7] The organs commonly damaged in hypertension are blood vessel, heart, kidney, CNS, retina, renal organs.[2,3]

Hypertension is the most widespread cardiovascular diseases and major challenge of the 21st century. On the basis of its prevalence, hypertension is ranked fourth top most disease in India.[8,9] Indian studies have revealed that the prevalence of hypertension has increased by 30 times among the urban population over a period of 55 years and about 10 times among the rural population over a period of 36 years. So prevention and control of high blood pressure have become an important health concern.[10,11] The WHO rates hypertension as one of the most important cause of premature death worldwide. 57% deaths occur due to stroke and 24% due to coronary heart disease in India.[12]

There is substantial evidence that to control or prevent target organ damage in patient with hypertension pharmacological therapy found to be effective but the success rate of treatment of hypertension is still below the optimal level.[13]World Health Organization (2003) has recommended use of non-pharmacological approaches in the treatment of hypertension.

Physiotherapy plays an important role in controlling the blood pressure and overall improvement in the fitness and health of the hypertensive patients. Aerobic exercise such as a brisk walking, running and cycling can effectively reduce the high blood pressure. Regular aerobic exercise is one of the cost effective treatment for hypertension.[8,14]

Epidemiological studies, to assess the perception and knowledge toward non-pharmacological treatment, are urgently needed in developing countries like India. [1] In this direction of thought, the current study was designed to determine awareness regarding the role of Physiotherapy and practice of exercise among the rural and urban population groups.

METHOD AND MATERIAL

Research Design- Survey Study

Research Setting–Hypertensive (N=100) population in the urban and rural areas adjoining the Punjabi University, Patiala.

Inclusion criteria- Patient between the age group 40 – 60, both male and females, patients with a history of Hypertension, Diagnosed case from an expert and confirmed by medical history review, ability to fill the questionnaires.

Exclusion Criteria- Patients with neurological condition, Non cooperative patients and any major disease like cancer, renal failure, tumours, any history of cardiac illness.

Outcome measures- Self Structured Questionnaire divided into Knowledge of hypertension, role of physiotherapy and practice of exercise for blood pressure control in Hypertensive patients.

Procedure- Hypertensive male and female patients (N=100) meeting the inclusion criteria and willing to participate in present study were taken from urban and rural area adjoining the Punjabi university, Patiala. After obtaining a written consent, information regarding the demographic profile was recorded on the data collection form. Subjects were assured for confidentiality of their response. Self Structured Questionnaire divided into Knowledge of hypertension, role of physiotherapy and practice of exercise for blood pressure control in Hypertensive patients.

RESULT

Knowledge about the hypertension and role of Physiotherapy in urban and rural population.

Table 2. Respondents' knowledge about the Hypertension.

Variables	Yes N (%)	No N (%)	I Don't Know N (%)	Total N (%)
1. Respondent answer to question do you know hypertension means high blood pressure				
Urban	41(82%)	8 (16%)	1(2%)	50 (100%)
Rural	34 (68%)	11(22%)	5 (10%)	50 (100%)
2. Respondent answer to question do you think hypertension is related to excessive thinking, worries, stress etc				
Urban	44(88%)	4(8%)	2(4%)	50 (100%)
Rural	39(78%)	10(20%)	1(2%)	50 (100%)

Cont... **Table 2. Respondents' knowledge about the Hypertension.**

3. Respondent answer to question hypertension is caused by certain drugs or condiments				
Urban	28(56%)	20(40%)	2(4%)	50 (100%)
Rural	26(52%)	21(42%)	3(6%)	50 (100%)
4. Respondent answer to question hypertension has dangerous complication for example stroke				
Urban	27(54%)	20(40%)	3(6%)	50 (100%)
Rural	28(56%)	21(42%)	1(2%)	50 (100%)
5. Respondent answer to question do you know smoking, alcoholism, obesity increase risk of hypertension				
Urban	38(76%)	12(24%)	0(0%)	50 (100%)
Rural	33(66%)	16(32%)	1(2%)	50 (100%)

Table 3. Respondents' knowledge about the role of Physiotherapy.

Variables	Yes N (%)	No N (%)	I Don't Know N (%)	Total N (%)
1) Respondent answer to question do you know what is Physiotherapy.				
Urban	31(62%)	17(34%)	2(4%)	50 (100%)
Rural	10(20%)	27(54%)	13(26%)	50 (100%)
2) Respondent answer to question exercise is useful to reduce high blood pressure.				
Urban	26(52%)	17(34%)	7(14%)	50 (100%)
Rural	28(56%)	18(36%)	4(8%)	50 (100%)
3) Respondent answer to question is there is any role of Physiotherapy in treatment of Hypertension.				
Urban	7(14%)	30(60%)	13(26%)	50 (100%)
Rural	5(10%)	29(58%)	16(32%)	50 (100%)
4) Respondent answer to question any exercise prescribed by health care professional physiotherapist.				
Urban	5(10%)	45(90%)	0(0%)	50 (100%)
Rural	2(4%)	47(94%)	1(2%)	50 (100%)
5) Respondent answer to question is combination of exercise and medication is more effective in treatment of Hypertension.				
Urban	26(52%)	17(34%)	7(14%)	50 (100%)
Rural	27(54%)	19(38%)	4(8%)	50 (100%)

Questions regarding Practice of exercise for blood pressure control in Hypertensive patients of urban and Rural Population.

Table 4. Respondents' response towards practice of exercise for Blood Pressure control.

1) Are you engaged in exercise presently for Hypertension.			
Variable	**YesN (%)**	**No N (%)**	**Total N (%)**
Urban	31 (62%)	19 (38%)	50 (100%)
Rural	23 (46%)	27 (54%)	50 (100%)

62% and 46 % of urban and rural population responded "yes" for the questions "Are you presently engaged in exercise for hypertension" and were further administered for the questions regarding practice of exercise.

Table 5. Respondents' Response for the prescription of exercise by Physician or Physiotherapist

Variable	Yes N (%)	No N (%)	Total N (%)
2) Is exercise prescribed by Physician			
Urban	5 (16%)	26 (84%)	31 (100%)
Rural	1(4%)	22 (96%)	23 (100%)
3) Have you ever consult Physiotherapist for Hypertensions			
Urban	4 (12%)	27 (88%)	31(100%)
Rural	1(4%)	22 (96%)	23 (100%)

Table 6: Type of exercise prescribed by Physician or Physiotherapist and type of exercise respondent practice without prescription

Variable	Urban N (%)	Rural N (%)
4) If yes, what type of exercise prescribed by Physician or Physiotherapist		
Deep breathing, Walk	1 (3.2%)	1 (4.3%)
Walk, Yoga	1 (3.2%)	0 (0%)
Jogging, Stretching	1 (3.2%)	0 (0%)
Walk	3 (9.6%)	1 (4.3%)
Yoga	3 (9.6%)	0 (0%)
5) What form of workout you prefer to control blood pressure		
Walk	25 (80.6%)	20 (86.9%)
Running	0 (0%)	1 (4.34%)

Cont... **Table 6: Type of exercise prescribed by Physician or Physiotherapist and type of exercise respondent practice without prescription**

Cycling	3 (9.6%)	1 (4.34%)
Strength	1 (3.2%)	0 (0%)
Swimming	0 (%)	0 (0%)
Stretching	2 (6.4%)	1(4.34%)
Jogging	5 (16.12%)	0 (0%)
Yoga	11 (35.4%)	4 (17.39%)

Table 7: Respondents' response towards location, participation, duration of the exercise.

Variable	**Urban N (%)**	**Rural N (%)**
Which place you prefer for exercise		
Indoor	3 (9%)	3 (13%)
Outdoor	28 (91%)	20 (87%)
How many days you participate in exercise		
Once a week	5 (10%)	1 (2%)
Twice a week	5 (10%)	4 (8%)
Thrice a week≥ more	16 (32%)	17 (34%)
Once a month	5 (10%)	1 (2%)
How long do you workout		
10 min	13 (26%)	4 (8%)
20 min	7 (14%)	9 (18%)
30 min	6 (12%)	8 (16%)
1 hour	5 (10%)	2 (4%)

Table 8: Respondents' response towards difficulty in adherence in an exercise

9) Do you have any Difficulty in adherence in an exercise			
Variable	**Yes N (%)**	**No N (%)**	**Total N (%)**
Urban	7 (22%)	24 (78%)	31 (100%)
Rural	4 (17%)	19 (83%)	23 (100%)

DISCUSSION

The current study was conducted with an aim to find the knowledge of hypertensive patients in context to hypertension and role of physiotherapy and to investigate practice of exercise among the hypertensive patients residing in the urban and rural areas adjoining the Punjabi university, Patiala, with a mean age of 52.22 ± 6.86 (urban), 51.28 ± 6.95(rural). A self structured questionnaire was developed which consisted of information on knowledge of hypertension, role of Physiotherapy and practice of exercise among hypertensive patients. In context to the knowledge of hypertension, a total of 5 questions were asked. The response indicated that 82% urban and 68% rural population was familiar with the word hypertension. Further, three questions were asked to seek information regarding causative and risk factors for hypertension. A wide group of hypertensive patients (88% urban and 78% rural) knew and believed that hypertension is related to excessive thinking, worries and stress. When asked about the risk factors, 76% urban and 66% rural population was well aware about smoking, alcoholism and obesity as risk factors for hypertension. However, 56% urban and 52% rural population were aware about the role of excessive usage of certain drugs as a risk factor for hypertension. Regarding complication of uncontrolled hypertension, 54% urban and 56% rural population was found to be aware. Around 62% urban and 20% rural population were familiar with Physiotherapy, which was linked to the education level. These findings of the study were in accordance with the study done by Kusuma et al, 2009, in which awareness regarding risks and complications among neo and migrants were assessed and suggested that respondents did not believe that hypertension could lead to complications.

Further the study analyzed the respondents' belief regarding role of Physiotherapy in management of hypertension. To a surprise, a negligible number of participants (14% urban and 10% rural), despite of their location, were aware about role of physiotherapy treatment in the management of hypertension. Only 10% of urban and 4% of rural participants had ever consulted Physiotherapists for guidance regarding management of hypertension through exercise. The findings clearly revealed that hypertensive patients were not aware about the role of physiotherapy in the management of hypertension. This could be linked to inadequate public enlightenment and health education.

Progressing towards its second aim, Questionnaire was structured which consisted of 9 questions. The observations indicated that 62% urban and 46% rural population were engaged in some kind of exercise for blood pressure control like walking, running, cycling,

strength exercises, swimming, stretching, jogging and yoga. Among these, 28% urban and 8% rural population were practicing exercises with proper prescriptions from either physician or physiotherapist. These findings of the study were in accordance with the study done by Awotidebe et al, 2013. They assessed knowledge, attitude and practice of exercise for blood pressure control among hypertensive patients of the Nigeria and suggested that Nigerian patients have poor knowledge and negative attitude towards the practice of exercise for blood pressure control.

CONCLUSION

The study was of the conclusion that knowledge and awareness regarding hypertension and role of physiotherapy was inadequate. The population was neither prescribed exercises by a Physician nor by a Physiotherapist, for the management of hypertension. To avoid complication, proper counselling and requirement of team work of Physician as well as Physiotherapist is necessary.

Conflict of Interest: None

Ethical Clearance: We certify that the study was approved by Ethical Committee of department of Physiotherapy, Punjabi University, Patiala.

Source of Funding: Self.

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DOI Number: 10.5958/0973-5674.2018.00042.4

Comparison between the Effects of Reciprocal Inhibition Technique Versus Mulligan's Straight Leg Raise with Distraction in Hamstring Tightness on Subjects with Chronic Mechanical Low Back Pain

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ABSTRACT

Objectives: To compare the effect of reciprocal inhibition technique and Mulligan's straight leg raise with distraction in hamstring tightness on subjects with chronic mechanical low back pain.

Method: An experimental study was done in Krishna college of physiotherapy, KIMSDU, Karad. A total of 60 subjects were taken and was divided into 2 groups by using simple random sampling method(Group A and Group B). Group A was given Reciprocal Inhibition technique along with hot moist packs and conventional exercises while Group B was given Mulligan's straight leg raise with distraction along with hot moist packs and conventional exercises.

Result: Results were revealed using paired t-test and unpaired t-test. During pre intervention, it showed no significant difference for VAS, lumbar range of motion, manual muscle testing and ODI, while during post intervention, it showed extremely significant difference for VAS, lumbar flexors(MMT) and ODI while very significant for lumbar flexion(ROM) and lumbar extensors(MMT) and not significant for lumbar extension(ROM).

Conclusion: The study concluded that Reciprocal Inhibition technique was more effective in reducing hamstring tightness along with back pain as compare to Mulligan's straight leg raise with distraction technique.

Keywords: *Reciprocal Inhibition, Mulligan's SLR with distraction, Hamstring tightness, Chronic mechanical LBP, Visual Analogue Scale(VAS), Oswestry disability index(ODI).*

INTRODUCTION

Low back pain is one of the major health problem affecting the general population and affecting both male and female population equally. This increases the number of sick leaves and cause disability[1,2]. Incidence for occurance of low back pain is about 23.09% among the Indian population[6]. Chronic low back pain is a pain which lasts for more than 3 weeks and can change psychosocial, physiological and sleep behaviours[8,9].

There are various risk factors responsible for low back pain like increase lumbar lordosis, decrease in abdominal muscle strength and reduction in abdominal muscle length, decrease in back muscle endurance, flexibility, length of iliosoas and increase tightness of hamstring muscle[10]. Non specific low back pain or mechanical low back pain is termed as the pain which is not due to any pathology i.e. fracture , disc pathology, tumour, spinal injuries[11].

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Greenman, defined MET as a" manual medicine treatment procedure that involves the voluntary contraction of the subject's muscle in precisely control direction at varying level of intensity, against a distinctly executed counterforce applied by the therapist"[13]. Muscle energy technique is used for lengthening the shortened muscles, mobilizing the restricted joint and reducing odema[14].

Mulligan's straight leg raise with distraction is used to improve the range of straight leg raise in low back pain patients[16]. The straight leg raise test is commonly used for assessing patients with lumbar spine dysfunction as it indicates a various degree of impairment due to low back pain[17]. Improving range of straight leg raise has good effect in restoring normal movement and reducing impairment due to low back pain[18].

METHOD

This experimental study was done in Krishna college of Physiotherapy, KIMSDU, Karad after obtaining the Ethical permission from Institutional Ethical Committee, KIMSDU, Karad. The study included 60 subjects which were divided into two groups by using simple random sampling method (Group A and B). The duration for the study was 6 months. The subjects were assessed before giving the treatment. For Group A, the subjects were given reciprocal inhibition technique with hot moist packs and conventional exercises, while for Group B, the subjects were given mulligan's straight leg raise with distraction with hot moist packs and conventional exercises. Subjects were selected as per the inclusion and exclusion criteria. Inclusion criteria was: 1) Subjects between age group 25-40 years 2) Both male and female population 3) Subjects with chronic low back pain(more than 3 months) 4) Subjects with hamstring tightness. Exclusion criteria was: 1) Subjects with disc pathologies 2) Subjects with any fracture of spine 3) Subjects with any infection or tumors in spine 4) Subjects with spinal cord injury. The subjects were briefed about the study and informed consent was taken from the subjects.

Group A: Hot moist pack for 15 minutes, reciprocal inhibition technique with 75% of isometric contraction for 5 second hold and 3 second relax, 3 times, with interval of 20 seconds for alternate days for 3 weeks and conventional exercises (core stabilization exercises)

Group B: Hot moist pack for 15 minutes, mulligan's straight leg raise with distraction for 3 times with 7 second hold and 5 second relax and conventional exercises (core stabilization exercises)

Table 1: Visual analogue scale (VAS)

Groups	**Pre-intervention Mean ± SD**	**Post-intervention Mean ± SD**	**Paired t-test P value**
A	6.73 ± 1.41	2.2 ± 1.09	<0.0001
B	6.4±1.49	3.26 ±1.202	<0.0001
Unpaired t-test P value	0.3791	0.0007	

Table 2: Range of motion (Lumbar flexion)

Groups	**Pre-intervention Mean ± SD**	**Post- intervention Mean ± SD**	**Paired t- test P value**
A	3.80 ± 0.47	4.97 ± 0.44	<0.0001
B	3.77± 0.509	4.59 ± 0.56	<0.0001
Unpaired t-test P value	0.7950	0.0049	

Table 3: Range of motion (Lumbar extension)

Groups	**Pre-intervention Mean ± SD**	**Post-intervention Mean ± SD**	**Paired t-test P value**
A	1.073 ± 0.17	1.313 ± 0.11	<0.0001
B	1.086 ± 0.13	1.28 ± 0.12	<0.0001
Unpaired t-test P value	0.7437	0.3050	

Table 4: Manual muscle testing (Lumbar flexors)

Groups	Pre-intervention **Mean ± SD**	**Post-intervention Mean ± SD**	**Paired t- test P value**
A	2.6 ± 0.49	4.13 ± 0.57	<0.0001
B	2.53 ± 0.50	3.16 ± 0.59	<0.0001
Unpaired t-test P value	0.6096	<0.0001	

Table 5: Manual muscle testing (Lumbar extensors)

Groups	**Pre-intervention Mean ± SD**	**Post-intervention Mean ± SD**	**Paired t-test P value**
A	3.16 ± 0.79	4.4 ± 0.67	<0.0001
B	3.13 ± 0.157	3.8 ± 0.168	<0.0001
Unpaired t-test P value	0.8764	0.0057	

Table 6: Oswestry Disability Index (ODI)

Groups	**Pre-intervention Mean ± SD**	**Post-intervention Mean ± SD**	**Paired t-test P value**
A	39.63 ± 10.14	14.33 ± 6.49	<0.0001
B	39.13 ± 10.78	19.93 ± 6.46	<0.0001
Unpaired t-test P value	0.8539	0.0009	

OUTCOME MEASURE

VAS: During pre-intervention, the score was 6.73±1.41 in group A while 6.4±1.49 in group B. During post-intervention, the score was 2.2±1.09 in group A while 3.26±1.20 in group B. It showed statistically extremely significant difference with p values <0.0001 in both the groups by using paired t-test whereas during pre-intervention, the score between both the groups was statistically not significant difference with p values 0.3791 while during post-intervention, the score between both the groups was statistically extremely significant difference with p values 0.0007 using unpaired t-test.

ROM (Lumbar flexion): During pre-intervention, the score was 3.80±0.47 in group A while 3.77±0.50 in group B. During post-intervention, the score was 4.97±0.44 in group A while 4.59±0.56 in group B. It showed statistically extremely significant difference with p values <0.0001 in both the groups by using paired t-test whereas during pre-intervention, the score between both the groups was statistically not significant difference with p values 0.7950 while during post-intervention, the score between both the groups was statistically very significant difference with p values 0.0049 using unpaired t-test.

ROM (Lumbar extension): During pre-intervention, the score was 1.07±0.17 in group A while 1.08±0.13 in group B. During post-intervention, the score was 1.31±0.11 in group A while 1.28±0.12 in group B. It showed statistically extremely significant difference with p values <0.0001 in both the groups by using paired t-test whereas during pre-intervention, the score between both the groups was statistically not significant difference with p values 0.7437 while during post-intervention, the score between both the groups was statistically not significant difference with p values 0.3050 using unpaired t-test.

MMT (Lumbar flexors): During pre-intervention, the score was 2.6±0.49 in group A while 2.53±0.50 in group B. During post-intervention, the score was 4.13±0.57 in group A while 3.16 ±0.59 in group B. It showed statistically extremely significant difference with p values <0.0001 in both the groups by using paired t-test whereas during pre-intervention, the score between both the groups was statistically not significant difference with p values 0.6096 while during post-intervention, the score between both the groups was statistically extremely significant difference with p values <0.0001 using unpaired t-test.

MMT (Lumbar extensors): During pre-intervention, the score was 3.16±0.79 in group A while 3.13±0.15 in group B. During post-intervention, the score was 4.4±0.67 in group A while 3.8±0.16 in group B. It showed statistically extremely significant difference with p values <0.0001 in both the groups by using paired t-test whereas during pre-intervention, the score between both the groups was statistically not significant difference with p values 0.8764 while during post-intervention, the score between both the groups was statistically very significant difference with p values 0.0057 using unpaired t-test.

ODI (Oswestry Disability Index): During pre-intervention, the score was 39.63±10.14 in group A while 39.13±10.78 in group B. During post-intervention, the score was 14.33±6.49 in group A while 19.93±6.46 in group B. It showed statistically extremely significant difference with p values <0.0001 in both the groups by using paired t-test whereas during pre-intervention, the score between both the groups was statistically not significant difference with p values 0.8539 while during post-intervention, the score between both the groups was statistically extremely significant difference with p values 0.0009 using unpaired t-test.

DISCUSSION

Low back pain is pain experienced in lumbar region above the gluteal fold that can be or cannot be radiated to thigh[3].Many researches were done on the prevalence of low back pain in medical profession[4,5]. Low back pain occurs at least once in a lifetime in about 15% of adults[7].

Prior, study was done on hamstring tightness which can be due to reduced pelvic tilting, so there is correlation of hamstring tightness with low back pain[19].

According to research done by kuchera for low back pain using muscle energy technique, MET is effective for inhibitory golgi tendon reflex and helps in relaxation of muscle. So, MET in effective in reducing the back pain[15].

There was increase in the range of motion of hip flexion and stretching for hamstrings after application of Mulligan's SLR with distraction in my study which supports the study of Toby Hall where this technique

was used to see effect in range of motion in low back pain patients[16].

Oswestry disability index is one of the more reliable , valid and specific tool for assessing the chronic low back pain patients. Scoring can be well understood by the patient. The sexual life section in the questionnaire can be removed without any change in questionnaire and scoring can be adjusted[20,21].

60 subjects were assessed clinically for chronic mechanical low back pain with hamstring tightness and who were fulfilling the inclusion and exclusion criteria. The subjects were then divided into 2 groups (Group A and Group B) with 30 subjects in each group by simple random sampling method.

Group A was given hot moist packs for 15 minutes, reciprocal inhibition technique with 75% of isometric contraction for 5 seconds hold and 3 seconds hold, repeated 3 times with interval of 20 seconds, for alternate days for 3 weeks and core stabilization exercises.VAS, lumbar range of motion, lumbar manual muscle testing and ODI as outcome measure.

Group B was given hot moist packs for 15 minutes, Mulligan's straight leg raise with distraction for 3 times with 7 seconds hold and 5 seconds relax and core stabilization exercises.

Out of 60 subjects, 19 were males and 11 were females in Group A and 15 males and 15 females in Group B. The subjects with age group between 25-40 years were included with mean age of 31.86 ± 5.92 for Group A and 30.4 ± 6.02 for Group B which is statistically not significant in both the groups.

VAS, lumbar range of motion for flexion and extension, manual muscle testing for flexors and extensors and ODI showed extremely significant difference with P value <0.0001 by using Paired t- test which is used to find the effect in reducing the pain and improving the functional mobility of lumbar spine.

By using unpaired t-test, the outcome measures were compared between both the groups to find out the effect of both the techniques. Results are:

VAS, the statistical analysis showed that there is extremely significant difference (P value 0.0007). Group A showed effectiveness in reducing pain than Group B. Lumbar range of motion (flexion), the statistical analysis showed very significant difference (P value 0.0049). Group A showed effectiveness in improving lumbar flexion than Group B. Lumbar range of motion (extension), the statistical analysis showed no significant difference (P value 0.3050). MMT for lumbar flexors, the statistical analysis showed extremely significant difference (P value <0.0001). Group A showed effectiveness in improving the strength of core muscles than Group B. MMT for lumbar extensors, the statistical analysis showed very significant difference(P value 0.0057). Group A showed effect in improving the strength of core muscles than Group B. ODI, the statistical analysis showed that there is extremely significant difference (P value 0.0009). Group A showed effectiveness in reducing pain than Group B.

During lumbar flexion, there is anterior tilting of pelvis. But if hamstrings are tight, this anterior tilting is reduced, which hence decreases the lumbar flexion and therefore tightening of back muscles causing pain and reducing in functional mobility of the spine[12]. So, this can be the reason that lumbar flexion is improved much than lumbar extension in this present study.

In this study, alternative hypothesis states that there is effect of reciprocal inhibition technique and Mulligan's SLR with distraction in reducing pain and increasing hamstring flexibility and hence results shows that reciprocal inhibition technique is more effective in increasing hamstring flexibility and reducing pain as compared to Mulligan's SLR with distraction.

CONCLUSION

The study shows that reciprocal inhibition technique is more effective in increasing hamstring flexibility, reducing pain and improving range of lumbar spine rather than Mulligan's SLR with distraction.

Source of Funding: The source of funding for study is KIMSDU,Karad.

Conflict of Interest: There is no conflict of interest.

Ethical Clearance: Ethical clearance was taken from institutional ethical committee of KIMSDU.

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DOI Number: 10.5958/0973-5674.2018.00043.6

Comparison of Effects of Neck Stretching and Neck Stabilisation Exercises on Pain and Disability in Non Specific Chronic Neck Pain

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ABSTRACT

Background: Mechanical Neck Pain is very common condition in general population.It still constitutes a major burden on patients in terms of pain, disability,loss of income and on society in terms of health care costs and time of work.A wide variety of tratment protocol for mechanical Neck pain are availabale, However the most effective management remains the arae of Debate.

Objective: Aim of the study is to comapre the effectiveness of Neck Stretching and Neck Stabilisation exercises on pain and disability in Non specific Chronic Neck Pain.

Methodology: 30 subjects according to inclusion and exclusion criteria were randomly dividedin to two groups for study, Neck Stretching exercise group and Neck Stabilisation group.

Results: The results were calculatd by simple airthmetic mean and standard deviation formula and disability was calculated using Neck Disability Index and Pain byaverage VAS score.Both goups showed almost equal effectiveness butNeck stabilisation ecercises group showed bit improvements in pain and disability as compared to Neck Stretching ecercise group.

Conclusion: The study showed an improvement in non specific chronic neck pain with the intervention of neck stabilization exercises. Thus the experimental hypothesis "Neck stabilization exercises are more effective than stretching exercises on pain and disability in non specific chronic neck pain for the study holds true.

Keywords; *Mechanical Neck Pain,Non specific Neck Pain,Neck Stabilisation Exercise,Neck Stretching Exercise, VAS, NDI, ROM*

INTRODUCTION

Neck pain is among the most common pain problems, with a reported prevelence ranging

from 22% to 30%9 [1-3]. It is usually accompanied by substantial effect on daily life that results in extensive use of health care resources [3-5]. Neck pain typically affects posterior aspect of neck and frequently radiates to shoulder blades and deltoid muscle even in the absence of nerve root and spinal cord involvement.[6]

Neck pain is a common musculoskeletal disorder in general population. Although not as frequent and disabling as low back pain, neck pain still constitutes a major burden on patients in terms of pain, disability and time off work. It has been found that certain muscles in the cervical spine tend to weaken in neck pain:the most of these being the deep and the anterior cervical flexors. [7-10]. Structures that are likely to cause neck pain are cervical disc, apophyseal joints, the ligaments and the muscles of neck and the neural structures.[11]

Other traumatic injuries can cause damage to the joint or disc, but do not cause an instability of the

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cervical spine. Direct blows to the head or neck, lifting injuries or overuse type injuries and poor postures can cause this type of injury. In addition, flexion/extension injuries, such as the "whiplash" injury to the cervical spine, are known to cause significant pain syndromes. Another category would be inflammatory conditions of the spine.

MUSCLE OF THE NECK REGION

1. Neck flexor muscles: longus coli,scalenus medius,scalenus anterior,scalenus posterior(to look up at the ceiling)
2. Neck extensor muscles: splenius cervicis, semispilanis cervicis, longissimus cervicis, levator scapulae, iliocostalis cervicis, multifidus,interspinalis cervicis, trapezius, rectus capitus (bringing head towards the chest)
3. Side flexors of neck: levator scapulae, splenius cervicis, scalene, sternocleidomastoid, longus coli.
4. Rotators of neck: levator scapulae, splenius cervicis, scalene, scm, multifidus [12]

Cervical stabilization training is a method of exercise which, like its counterpart in the lumbar spine maintains a stable, injury- free state. [14-18]

Neck stabilization exercises were introduced in the rehabilitation program to limit pain, maximize function and prevent further injury. [19-21]

Stabilization training, series of strengthening exercises is a way to get better balance in the muscles which helps in maintaining proper position while you are working or doing other daily activities.

A progression of stability exercise can increase flexibility, ease pain and can also reduce chances of re-injury. These exercises helps to keep the spine in healthy position and to hold the spine steady as you perform a routine activity.

METHODOLOGY

Design

Pre test – post test experimental type of design.

Study centre

Surya Ortho and Trauma Centre, Faridabad Institute of Technology and Physiotherapy Clinics in and around faridabad.

Sample

A Sample of 14 subjects was taken which was divided into two groups (group A and group B) with each group comprising of 7 subjects.

Inclusion criteria

a. Sex: both males and females

b. Age group: 18 to 45years

c. Subjects with chronic neck pain(pain persisting for more than 3 months).

d. Subjects with non specific neck pain(without any etiology like infection or inflammation

e. Subjects in which neck pain is reproduced through neck movements

f. Subjects with minimum to moderate disability score(0-30%)on NDI questionnaire

Exclusion Criteria

a. Diagnosed hypertensive patients.

b. Subjects with any cervical spine injury(sudden trauma or whiplash injury)

c. Subjects with cervical spine surgery

d. Neck pain is secondary to other condition like neoplasm ,vascular or neurological disease

e. Infection or inflammatory arthritis condition of cervical spine

f. Subject taking any medical treatment for any other disease condition.Exclusion criteria is verified by history, physical examination and x rays

Variables

Independent variables

a. Neck stabilization exercises

b. Neck stretching exercises

Dependent variables

a. Neck pain.

b. Disability

PROCEDURE

a. 14 subjects were selected belonging to age group 18 to 45 years. Both males and females were selected who were having non specific chronic neck pain.

b. Subjects were suffering from pain for more than 3 months and there is pain without any identifiable etiology i.e, infection or inflammation.

c. All the subjects were assessed by taking history, doing physical examination, and investigations(x rays and mri)

d. Physical examination includes testing the movements. Both the active and passive movement s of the neck were done prior to treatment to check for neck initial ROM using goniometer. These movements include: neck flexion, extension, side flexion and rotation.

e. X rays were taken to diagnose any arthritic condition or any pathology of the cervical spine. After assessments the subjects who meets the inclusion criteria were be divided into two groups ; group a and group b comprising of seven subjects each keeping into mind the subject's age gender and degree of pain and disability which is measured prior to the treatment using vas scale for pain and

f. NDI for disability. Group A and Group B both comprised of males and females of age group 18-45 years.

g. Subjects were then informed about the treatment protocol. A consent form signed by the subject was taken first along with the assessment form and then the subjects were informed about the treatment protocol

INTERVENTION

Group A (stretching exercises which will include only flexion ,extension and rotation exercises of the neck i.e, neck stretching exercises only)

Group B (Neck stabilization exercises)

DATA COLLECTION

Data was collected in the data collection form and it included pre and post intervention VAS and NDI score of group A and group B respectively

STATISTICAL ANALYSIS

Arithmetic mean = $\sum X/N$

Where, $\sum$ = total or sum of all variables

X= the individual score

N = total number of variables.

Standard deviation

Standard deviation = v $\sum(X-X)\ 2/N$

Where, v = square root of all the calculations under this symbol

X= the individual score

X= the mean score

$\sum$= total, or sum of all variables

N= the total number of scores

RESULTS

Table 1: Result of group performing Stretching exercise

S no	Pre-test measurements	Post-test measurements
1	5	2
2	7	4
3	8	4
4	7	3
5	5	2
6	4	2
7	6	3
Mean and St.dev	6±1.41	2.857±0.89

Pre and post test vas scores of seven subjects in group A (Stretching exercise group)

Table 2: **Result of group performing Stabilization exercises**

S. no	Pre-test measurements	Post test measurements
1	5	1
2	7	3
3	5	1
4	6	1
5	6	2
6	6	2
7	7	3
Mean and St.dev	6±0.81	1.857±0.89

Pre and post test vas scores of seven subjects in group B (Stabilization exercise group)

Table 3: **Result of group performing Stretching exercise**

S. no	Pre test NDI score	Post test NDI score
1	18	12
2	23	15
3	21	10
4	21	9
5	19	11
6	21	10
7	23	14
Mean and St.dev	20.857±1.86	11.571±2.22

Pre and post test NDI scores of seven subjects in group A (Stretching exercise group)

Table 4: Result of group performing Stabilization exercise

S.NO.	Pre test NDI score	Post test NDI score
1	19	11
2	22	12
3	17	8
4	25	10
5	16	7
6	19	10
7	18	9
Mean and St.dev	19.428±3.10	9.571±1.71

Pre and post test NDI scores of seven subjects in group B (Stabilization exercise group)

DISCUSSION

The neck stabilization exercises were introduced as a rehabilitation program to limit pain, maximize function and prevent further injury [19-20] It is a method of exercise which is designed to improve the inborn mechanism by which the cervical spine maintains a stable Injury- free state [14-18]. Despite of popularity of stabilization training in treatment of back and pelvic pain, [26-30] there is a lack of well designed randomized controlled trails to investigate the efficacy its efficacy for management of neck pain. When reviewing the literature there were not much studies ,comparing the effect of stabilization and stretching exercises on decreasing non specific chronic neck pain and also the studies showing individual effect of stabilization (i.e, when these exercises are not given with any therapeutic modality) exercises on the group muscles of the neck in reducing non specific chronic neck pain. According to an experiment by Dusunceli et al.(2009) determine the efficacy of neck stabilization exercises in the management of neck pain reviews that patients with neck stabilization exercises demonstrates superior results in the pain and disability outcome when compared to stretching exercises in combination with TENS,US and IRR treatment group.Another study by Cihat Ozturk, Journal of Rehabilitation Medicine 2009,41:626-631 explains the superiority of neck stabilization exercises ,with some advantages in pain and disability outcomes ,compared with stretching exercises in combination with physical therapy agents for the management of neck pain.The results of this studies shows the superiority of neck stabilization exercises when compared to stretching exercises in reducing non specific chronic neck pain.

The results of this study demonstrated that neck stabilization exercises are more effective than stretching exercises if also not given in combination with physical therapy agent or any other electrotherapeutic modality showing the isolated effect of neck stabilization exercises when compared with stretching exercises in reducing non specific chronic neck pain.Stabilization exercises in this study are considered better over stretching in reducing non specific chronic neck pain because stretching improves flexibility of the muscle, releases tension on the muscle fibres and hence reduces pain while stabilization exercises improves flexibily also and at the

same time strengthens muscles of the neck and hence help in maintaining neck in a healthy neutral position. These stabilization exercises helps in maintaining neck in neutral position, helps in reducing stress on neck muscles and hence reduces pain and disability.

The study has certain limitations which are:

The present study included only 14 subjects which is a smaller number for the result to be authentic in these types of studies. But the unavailability of time and the subjects compelled to have a small sample size.

The quantification of intensity of manual passive stretching and stabilization exercises cannot be measured so, the force with which the exercises were done (stretching and stabilization)varies from subject to subject.

The study was conducted only for 3 weeks and thus for much better results further studies can be done for longer duration and on larger population.

Goniometer was not used as an outcome measure to measure range of motion after intervention and hence can be used in future studies to check for neck range of motion at the end of the intervention.post intervention posture assessment was not done in the study hence it can be done in future studies to look for any post intervention posture improvements.

CONCLUSION

The study showed an improvement in non specific chronic neck pain with the intervention of neck stabilization exercises. Thus the experimental hypothesis "Neck stabilization exercises are more effective than stretching exercises on pain and disability in non specific chronic neck pain for the study holds true

Conflicts of Intrest: Nil

Source of Funding: Self

Ethicaal Clerance: Not Required

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DOI Number: 10.5958/0973-5674.2018.00044.8

Effect of Cryotherapy on Proprioception of Knee Joint in Healthy Individuals

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ABSTRACT

Background: Sherrington defined proprioception includes joint position sense, awareness of active and passive movements and force reproduction. It is mediated by afferent signals arising from cutaneous receptors in the skin and proprioceptors in muscles(muscle spindles), tendon(Golgi tendon organ), ligament and joints(Ruffini and Pacini receptors), as well as visual and vestibular inputs. These inputs can be used on a conscious and unconscious level (reflexive pathway) so that motor tasks are performed smoothly

Method: 40 healthy subjects were randomly selected and divided into 2 groups- control group and experimental group. Joint reposition error was measured using CPM at 3 predetermined joint angles (25, 50, 75 degrees). Cryotherapy was given to experimental group for 15 minutes with the help of cold packs applied around the knee joint.

Result: 15 minutes of cryotherapy reduces the joint position sense because there was a significant difference on comparing the joint reposition error score before and after cryotherapy at 3 angles (25, 50, 75 degrees).

Conclusion: Cryotherapy results in reduction in knee joint proprioception.

Keywords: *Proprioception, Joint position sense, Kinesthesia*

INTRODUCTION

Sherrington first defined proprioception in 1906 and credited some landmark proprioception experiments[1]. Since then, many researchers have continued his work in an attempt to determine peripheral control mechanisms. Sherrington originally defined proprioception as afferent information travelling to the central nervous system (CNS). More recently, the term proprioception has evolved to include joint position sense, awareness of active and passive movements and force reproduction[2,3].

It is mediated by afferent signals arising from cutaneous receptors in the skin and proprioceptors in muscles(muscle spindles), tendon(Golgi tendon organ), ligament and joints(Ruffini and Pacini receptors), as well as visual and vestibular inputs. These inputs can be used on a conscious and unconscious level (reflexive pathway) so that motor tasks are performed smoothly. Conscious proprioception is essential for proper joint function in sports activity and activities of daily living. Unconscious proprioception modulates muscle function and initiates reflex stabilization[4].

The muscle spindle is one type of proprioceptor that provides information about changes in muscle length and in parallel with the extrafusal fibers and are enclosed within a capsule. In a muscle spindle, there are several small, specialized muscle fibres known as intrafusal fibers, which are innervated by efferent neuron known as gamma motor neuron. The central region of intrafusal fiber is wrapped by the sensory dendrites of the muscle spindle afferent. When the muscle lengthens and the muscle spindle is stretched, this triggers action potential in muscle spindle afferents. The role of gamma motor neuron is to maintain muscle spindle sensitivity, regardless of the muscle length. They stimulate the contraction of the intrafusal fibers, readjusting its length

and keeping the central region taut, which is necessary to keep the muscle spindle afferents responsive[27].

Second type of proprioceptor is the Golgi tendon organ, which are located in tendon in series with the muscle fibers. The sensory dendrites of the Golgi tendon organ afferents are interwoven with collagen fibrils in the tendon. When the muscle contracts, the collagen fibres are pulled tight, and this activates the Golgi tendon organ afferents. Because changes in the muscle tension will provide different degrees of pull on the tendon, the Golgi tendon organ provides information about muscle tension[27].

Joint receptors have been identified in the joint capsules, ligaments, menisci, labrum and fat pads. The sensory end organs include the Pacinian corpuscle like receptors, Ruffini end organ like receptors and free nerve endings. Joint receptors found in the fibrous joint capsule are sensitive to stretching or compression of the capsule, as well as to an increase in internal pressure due to increased production of synovial fluid. Most of the joint receptors in the knee are located in the synovial layer of the capsule in close proximity to the insertions of the anterior cruciate ligament (ACL). Mechanoreceptors (predominately Ruffini receptors) in the sub synovial capsule and ACL respond primarily to the stretch involved in the terminal extension rather than the compression involved in the movement toward flexion in the partially extended knee. Pacini receptors are reported less frequently and are thought to be activated by compression. Free nerve endings function as nocioceptors that react to inflammation and pain stimuli[9].

Rupture of ACL is associated with poor sense of joint position. This indicates that vulnerability to injury of knees deficient in ACL maybe due to the loss of proprioceptive inputs as well as decreased mechanical stability. Exercise to fatigue level appears to decrease joint position appreciation in the knee. This sensory feedback controls the dynamic component of joint stability provided by muscle reflex as well as joint position sensibility.

Proprioception is central in maintaining posture, balance, joint position sense and coordination of multi joint movements. Proprioception is central in performing physical skill correctly and safely. Decreased proprioception ability causes injury and accounts for increased fall in elderly[8,10]. Therefore, proprioception exercises must be done in controlled environment for affected joints[27].

The most common method used to quantify proprioception attempt to alter or perturb the afferent information during joint motion. The resultant change in motor output is then used to infer control process[13]. The goal of modification technique is to affect the afferent information while not disturbing the mechanical properties of muscle being tested. Cryotherapy has become common tool for disrupting afferents signals and modifies neuromuscular control while measuring proprioception[5].

Cryotherapy is the application of cold for therapeutic purposes. Cryotherapy is used in the treatment of various musculoskeletal and neurological disorders. Cryotherapy is used to reduce temperature, metabolism, inflammation, pain, circulation, tissue stiffness, muscle spasm and symptoms of delayed onset muscle soreness[11]. Both physiological and clinical evidence suggest that cold application in various forms can be valuable in reducing musculoskeletal pain, muscle spasm, connective tissue distensibility, nerve conduction velocity, hemorrhage, edema, inflammation and intramuscular temperature. Evidence also exists that cold can be used as an aid to neuromuscular facilitation[5].

Cryotherapy has been used for the treatment of acute soft tissue injuries in the knee joint. It decreases tissue damage, muscle spasm, swelling pain and allow faster rehabilitation after injury. Cryotherapy is also commonly used as a post acute adjunct to rehabilitation, particularly because of its analgesic, anti spastic and anti- inflammatory properties[29].

Recurrent studies have shown that the combination of exercise and cryotherapy is affective in the rehabilitationof soft tissue injuries. However, no report has shown the effectiveness and safety of cryotherapy for knee joint before exercise. Cryotherapy before exercise may result in inadequate peripheral feedback for the position sense and may change biomechanic properties of the knee joint, resulting in the knee injury when exercise is resumed[2]

METHODOLOGY

This is an experimental study consisted of 40 healthy subjects both males (35) and females (5) aged

18-25 years old were recruited from guru jambheshwar university of science and technology, Hisar. Only those subjects were included who met inclusion criteria .Subjects were explained the methodology and risks involved in the study then they were asked to sign informed consent form.

Selection criteria:

- Healthy young males and females of age 18-25 years.
- Right leg dominant.
- Free from pain and discomfort in and around their knee.
- No pathological condition affecting the musculoskeletal or neuromuscular systems.

Exclusion criteria

- History of hip, knee, or ankle injury, surgery of pathology.
- Subjects having any contraindications to cryotherapy including area of decreased sensation, area of decreased blood flow, Raynaud's disease or previous cold allergies or reactions.
- Systemic involvement

Protocol:

Subjects were divided into two groups, group A (control group) and group B (experimental group). Joint reposition error was measured at three pre-determined joint angles (25, 50, 75 degrees). Cryotherapy was given to experimental group for 15 minutes with the help of cold packs applied around the knee joint. Joint reposition error was measured again at 25^0,50^0 and 75^0 and data was analysed using SPSS.

Procedure:

Position of the subject: subjects were made to lie supine with right leg on CPM machine. All subjects were asked to wear shorts extending not below midthigh. Subjects were blind-folded for preventing any visual input to joint position sense.

Preparation of CPM: CPM machine was adjusted so that the axis of machine was in line with that of subject's knee joint, defined using lateral femoral epicondyle[13]. Timing for flexion delay and extension delay was set for 5 sec. Speed for passive movements was 120^0 per minute.

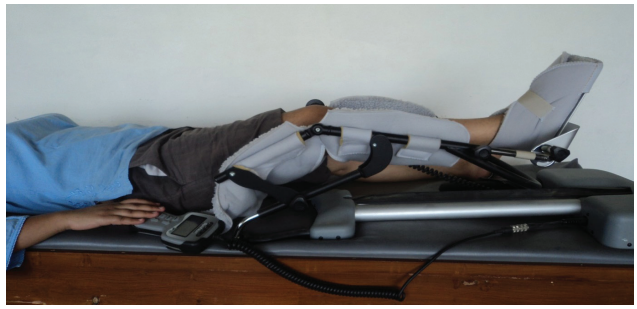

Figure 1.1 Measurement of joint reposition error using CPM.

Subjects were instructed verbally about the procedure. After fixing straps, the joint was passively moved from its starting position (0 degree) to one of the three pre-determined joint angles, that is target angles (25, 50, 75 degrees). The knee joint was rested at target angle for five seconds and subject was instructed to remember the position of the knee joint[13]. The knee joint was brought back to the starting position and subject instructed to stop the machine with hand held remote to replicate the target angle. Similar procedure was repeated for other angles and the reading was noted for every pre-determined angle. Again, the readings were taken immediately after 15 minutes of cryotherapy. In control group, subjects were asked to lie supine on plinth for 15 minutes and no cryotherapy was given to them. The absolute difference between preset angle and perceived angle that is angle reproduced was noted. Joint reposition error was calculated.

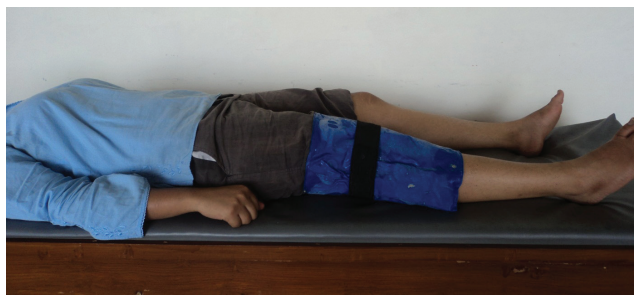

Figure 1.2 Application of cold pack around the knee joint.

DATA ANALYSIS

Data was analysed using statistical package for social sciences (SPSS version 10.0 for window evaluation version).

Mean of Joint Reposition Error initially (pre intervention) was 3.86 whereas post intervention was

6.78.

Joint reposition error was presented as mean± standard deviation (mean± SD) which is depicted in table 1.1 .

Table 1.1 Comparison of pretest and posttest mean of joint reposition error in control group

Angle	Pre intervention	Post intervention
25^0	3.05±2.18	4.1±2.40
50^0	5.45±3.94	7.7±4.60
75^0	5.9±4.27	8.4±5.31

Table 1.2 Comparison of pretest and posttest mean of joint reposition error in experimental group

Angle	Pre intervention	Post intervention
25^o	1.65±1.95	4.5±1.39
50^o	4.05±3.84	7.5±4.35
75^0	3.1±3.66	8.5±5.24

Paired t-test was used for comparision between pre and post interventions within control and experimental group. Data was analysed at a significant level of P≤0.05.

Table 1.3 Comparison of mean difference of joint position error in control and experimental groups using related t-test

Group	Angles	Mean difference	t-value	Prob (P)
Control	25^0	1.05	1.51	0.1467
	50^0	2.25	1.59	0.1271
	75^0	2.50	1.99	0.0606
Experi-mental	25^0	2.85	6.04	0.0001
	50^0	3.45	7.96	0.0079
	75^0	5.40	4.15	0.0005

Unpaired t-test was used to analyze for comparison between groups. Data was significant at level of P≤0.05.

t-value for 25^0 is depicted in table 1.4.

Table 1.4 Comparison of mean difference of joint reposition error for 25^0 in two groups using unrelated t-test

Group	Mean of difference	SD	Standard error	t-value
Control	1.05	3.10	0.69	-2.14
Experimental	2.85	2.10	0.47	

t-value for 50^0 is depicted in table 1.5.

Table 1.5 Comparison of mean difference of joint reposition errorfor 50^0 in two groups using unrelated t-test

Group	Mean of difference	SD	Standard error	t-value
Control	2.25	6.30	1.41	-0.65
Experimental	3.45	5.19	1.16	

t-value for 75^0 is depicted in table 1.6.

Table 1.6 Comparison of mean difference of joint reposition errorfor 75^0 in two groups using unrelated t-test

Group	Mean of difference	SD	Standard error	t-value
Control	2.50	5.60	1.25	-1.60
Experi-mental	5.40	5.81	1.30	

RESULT

Joint position sense deteriorated after application of 15 minutes of cryotherapy as there was a statistical significant increase (p=0.0005) in joint reposition error at 25^0, 50^0 and 75^0 in experimental group. Mean of difference in joint reposition error at 25^0,50^0 and 75^0 of control group was 1.05, 2.25 and 2.50 respectively. The mean difference of joint reposition error for 25^0, 50^0 and 75^0 was 2.85, 3.45 and 5.40 respectively in both groups.

There was a statistical insignificant increase (p≥0.001) in the joint reposition error in control group. The mean difference pretest score for 25^0, 50^0 and 75^0 was 1.05, 2.25 and 2.50 respectively. On comparing

control and experimental group, there was a statistical significant difference at 25^0 but relatively insignificant at $50^0$and 75^0.

DISCUSSION

The primary findings of this study indicates that 15 minutes of cryotherapy reduces the joint position sense because there was a significant difference on comparing the joint reposition error score before and after cryotherapy at three angles (25^0, 50^0 and 75^0). There was a significant deterioration in joint position sense at all target angles after application of cryotherapy and slightly reduced between the groups. These effects can be attributed to neurophysiological changes like reduction of nerve conduction velocity (NCV) and eventual blocking of conduction with decrease in tissue temperature[13]. Uchio et al identified that decrease in NCV is reason for reduced joint position sense due to cryotherapy[18].

The change in biomechanical properties of the knee joint might be attributed to the impairement of the position sense[13]. B S Hassan et al (2010), Yi-Chung Pai et al and many other researchers reported that knee osteoarthritis reduces static postural control, knee proprioceptive acuity[14]. Comparing the mean joint reposition error at baseline and post intervention at all three angles in experimental group, revealed that there was a significant reduction in joint position score; whereas in control group there was no significant change in post-test conditions at all three angles. These results are supported by a study of MeghaArora(2009) who have shown significant increase in joint reposition error at 25^0, 45^0 and 60^0 for 20 minutes of cryotherapy[13]. Also joint reposition error was significantly reduced at 25^0 on comparison between the two groups and insignificant but slightly reduced at 50^0 and 75^0.

In the present study, the measurement of joint position sense has been done using CPM. Tsang et al reported that the passive knee joint repositioning test produces highly repeatable data, with intra class o-relation of 0.90[24]. OzgurSurenkok et al, M J Barlett et al, and many other researchers have used CPM machine to measure joint position sense of knee joint[20,23,25]. The reason for using a passive and non-weight bearing protocol in joint repositioning test was to minimize the motor contribution, which has been found to aid proprioceptive acuity[26].

The present findings conflict with the report of two previous studies that investigated cryotherapy and proprioception in knee and shoulder joints. Heather et al reported that cooling does not affect knee proprioception. In this study, proprioceptive accuracy and timing were measured by passively moving the knee, then comparing the subject's active reproduction of passive movements[8]. Geoffrey Dover et al reported that 30 minutes of cryotherapy does not impair shoulder joint position sense[5].

CONCLUSION

Cryotherapy results in reduction in knee joint proprioception.

Conflict of Interest:- There was no conflict of interest.

Source of Funding*:* Nil

Ethical Clearance*:* NA

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DOI Number: 10.5958/0973-5674.2018.00045.X

To Study the Prevalence of Musculoskeletal Disorders and its Influence on Quality of Life in Geriatric Population

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ABSTRACT

The study focuses on understanding the Quality of life amongst the geriatric population. The parameters studied are musculoskeletal problems and its impact on quality of life. The study included willing participant of age 60 and above. Elderly people unwilling to participate or unable to give interview for various reasons were excluded from the study. The study focused on 5 villages adopted by Adesh University and total 350 subjects were directly interviewed by door to door visits. The musculoskeletal disorders were evaluated using Nordic score while quality of life was assessed by SF-36 questionnaire. The mean values of Nordic Questionnaire shows that females were more affected as compared to the males. Similarly, the mean values from SF-36 scores indicated that physical as well as mental health problems and social functioning were more affected in Geriatric Population. The overall observations of the study indicate that increasing age results in poor Quality of Life. Nordic Questionnaire and SF-36 scores are negatively correlated with respect to the understudy population.

Keywords*: SF-36, Nordic Questionnaire, Geriatric/ Elderly Population.*

INTRODUCTION

According to world health organization, the period from 1975 to 2025 will be of aging world population [(1)]. United Nations consider 60 years to be dividing line between old age and middle and younger age group. Aging is a biological phenomenon occurring throughout the world, more rapidly in developing countries [(3)].

There are presently 740 million individuals in the world aged 60 years or over, and that number is expected to rise to 1 billion by the end of the present decade and possibly to 2 billion by midcentury. In India proportion of older person has raised 5.5% in 1951 to 6.5% in 1991, 7.7% in 2001 and projected 12% in 2025. According to 2011 census the size of elderly population (aged 60 and above) was 7.1 million in Uttar Pradesh and expected to reach 12.17% of the overall population by 2026 [(3)].

While aging is correlated with decline in various physical attributes of a person that actual process and onset age may vary for each individual. However, the onset of some of the geriatric health problems of older individuals may occur as soon as they enter their early 50s while in athletes the onset may be as early as age of 40. The elderly have been classified into three groups, young-old which consists of a population between 65-75 years of age, they have a minimum level of disability. The Second group is middle-old which includes 75-85 years of age, they exhibit the occurrence of chronic diseases in which Physiotherapy is directed at the improvement of functional status in the finite remaining years. The Third group is old-old which consists of the population older than 85 years of age, with the average additional life expectancy of 5-6 years, the old-old have the limited survival benefits from screening tests or therapeutic interventions where physical therapist have goals to achieve human comfort [(5)].

Aging entails a range of biopsychic transformations in human beings, as people's health, lifestyle, and perspectives are modified and require attention over the years[(3)].There is an abundance of literature available regarding the incidence of diseases and disorders in the geriatric population. As per the literature reviewed the types of problems faced in geriatric population can be grouped into different categories, for example, a patient having sedentary lifestyle increases the rate of age-related functional decline and reduces capacity for exercise

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sustainability to regain physiological following an injury or illness [1]. Another category is Neurological such as stroke which leads to weakness, locomotor disability, coordination defect, neuropathies etc. Similarly, there are other musculoskeletal problems such as osteoarthritis, osteoporosis which require special attention in concern to Physiotherapy. Many other medical conditions such as cardiovascular diseases are also associated with aging. Others are confusions, depression, falls, loss of mobility and day to day functioning. It has been seen that the socio-economic factor of elderly is of utmost importance as poverty and dependency increase with age. Loss of spouse and distance of family often result in loneliness and may result in depression [7].

With age, musculoskeletal tissues show increased bone fragility, loss of cartilage resilience, reduced ligament elasticity, loss of muscular strength, and fat redistribution decreasing the ability of the tissues to carry out their normal functions. The loss of mobility and physical independence resulting from arthropathies and fractures can be particularly devastating in this population, not just physically and psychologically, but also in terms of increased mortality rates[6]. Researchers have revealed that the occurrence of falls is higher among older women, older aged widowed individuals with low education and those who use many medications. Elderly people with visual alterations, gait, and balance disorders, as well as those having a higher number of associated diseases, are also most affected by falls [1].

The WHO definition of QOL has a broad meaning it includes physical health, mental state, level of independence, social relationships, personal beliefs and their relationship to salient features in the environment. Total QOL in an urban area is significantly better than rural. But as per our assumption, in rural areas, the elderly work till their body permits they experience prestige in family, social life and economic independence while in urban areas, the elderly work for certain age limit as per their jobs, after which they suffer from economic insecurity, loss of power leading to low quality of life [1]. The increase of healthy life years and quality of life is currently considered one of the main challenges for health promotion for elderly. Thus, it is necessary to know the impact of health problems on the functional ability, in the social life and in the well-being of the elderly. Quality of life for an older person has become increasingly important as an outcome in public health research[1].

There is a strong need to conduct the study to know about musculoskeletal symptoms that affect the Quality of life of the Geriatric population and such studies will be helpful in fermentation of planning and policy for old age people. The various structured Physiotherapy interventions like pain relief, specific muscle strengthening, aerobic exercises, stretching techniques, group therapy, balance training and cognitive therapy can be introduced to improve the quality of life as a target for the next years.

MATERIALS & METHOD

This is prevalence; a community based cross-sectional study of the Geriatric population of 5 villages of Bathinda, adopted by Adesh University.

Inclusion Criteria: People of age 60 years and above and who were willing to participate in the study.

Exclusion Criteria: Those who were unwilling to participate, who refused to give written consent & who were unable to give interview due to various morbidity conditions.

After getting the ethical approval from Institutional Research Committee & Institutional Ethical Committee of College of Physiotherapy, Adesh University, the study was conducted in 5 villages of Bathinda (BhuchoKhurd, BhuchoKalana, Tungwali, Kahan Singh Wala & LehraMohabbat). The Whole population was screened for an elderly person with age 60 years or above. Total 500 subjects had been screened and out of these 150 subjects had refused to participate in the study. From the first village Tungwali- 137, BhuchoKalan-83, Bhucho Khurd-50, Kahan Singh Wala-40 and LehraMohabbat- 40 subjects had been approached. Data of 350 subjects were collected by a door to door visit & by direct interview method. After taking verbal as well as written consent, clearing the doubts & explaining the benefits of the study to the subject, the subject was personally interviewed on the basis of SF-36 and Nordic Questionnaires. Questions of SF-36 & Nordic Questionnaire were asked in subject's native language i.e. Punjabi/Hindi.

36-ItemShort-Form Health Survey (SF-36): An important instrument for measuring the health-related quality of life (HRQL) much used internationally, comprises of 8 domains that further included 36 questions. The 8 domains are physical functioning (PF),

Role limitations due to physical problems (RP), Bodily pain (BP), General health (GH), Vitality or Energy/ fatigue (VT), Social functioning (SF), Role-emotional (RE), Mental health/Emotional well being (MH)[22].

Nordic Questionnaire: The Questionnaire consists of structured or multiple choice variants and can be used as a self-administered questionnaire or in interviews. There are two types of Questionnaire: a general questionnaire and specific ones focusing on the low back and neck/shoulders. The purpose of the general questionnaire is simple surveying, while the specific ones permit a somewhat more profound analysis. A Questionnaire was constructed in which the human body (viewed from the back) is divided into 9 anatomical regions. Completion is aided by a body map to indicate nine symptom sites being the neck, shoulders, elbows, wrists/hands, upper back, low back, hips/thighs, knees and ankles/feet. Respondents were asked if they had any musculoskeletal trouble in the last 12 months and have been prevented from normal activities during last 12 months[23].

Statistical Analysis: Mean Percentages of Nordic Questionnaire Scores &QoL Scores and Correlation between these variableswas calculated. Correlation of mean scores of quality of life and Nordic questionnaire scores were calculated by Pearson Coefficient using SPSS.Statistical significance was set as a p value $\leq$ 0.05 (two-tailed) & r value with Pearson correlation coefficient at 5% significance level with df =348 & table value = 0.05

RESULTS & DISCUSSION

Out of 350 elderly people, 301 were males and 49 were females. The calculated Mean ± SD of an age of Males is 64.67 ± 3.655 &females is 66.24 ± 4.863.

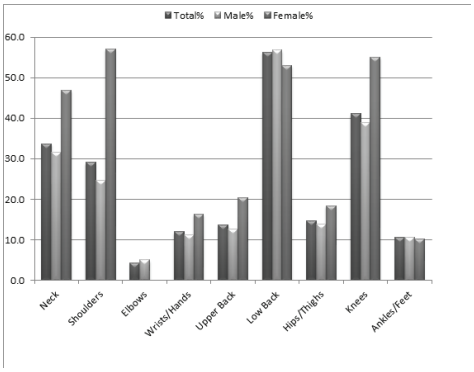

Figure 1: Presenting mean percentages of Nordic Questionnaire Score. It can be observed that low back pain is the most prominent problem among the elderly.

The results of present study revealed that the average of each of 9 sites of Nordic Questionnaire for low Back is 56.8% in Males and 53.1% in females. A result depicting the average score of lower limb for males is 14% (hip), 38.9% (knee), and 10.6% (ankle) 44.50% upper limb & for females is 18.4% (hip), 55.1% (knee), and 10.2% (ankle).

For Upper limb an average score of Nordic questionnaire for males is 31.6% (neck), 21.6% (shoulder), 5% (elbow), 11.3% (wrist), 12.6% (upper back) & for females is 46.9% (neck), 57.1% (shoulder), 0% (elbow), 16.3% (wrist), 20.4% (upper back).

As for the musculoskeletal disorders, high scores were found for low back indicates that physiological and morphological changes due to aging affect the lower spine more as compare to other sites. The majority population i.e.197 was having musculoskeletal disorders in the low back. However, the prevalence of lower limb depicts that weight-bearing areas like hips, knees, and ankles due to degeneration may get affected frequently because majority population was farmers or laborers. The other common sites were knee, neck, and shoulder that affected the majority of the population. The least involved sites were the elbow, wrist, upper back, ankle, and hip. The values of mean ± SD are relatively high in female population as compare to the male population.

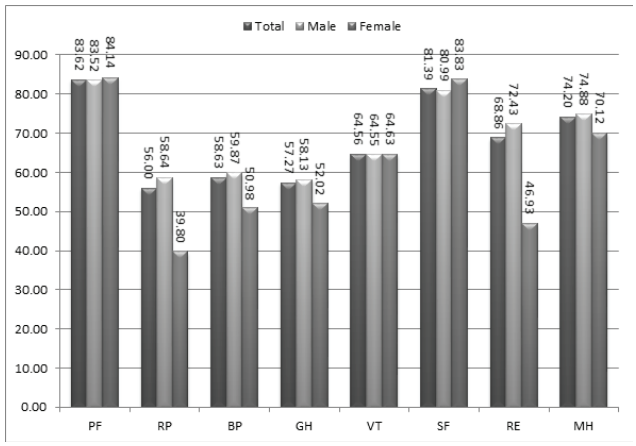

Figure 2: Presenting the Mean percentage of 8 domains of SF-36 questionnaire (QoL) scores of the elderly population of the male and female population.

The results of 8 domains of SF-36 Questionnaire revealed that average for SF was 81.39%, PF- 83.62%, RE - 68.86%, RP - 56%, MH - 74.20%, VT -64.56%, BF - 83.62%, and GH - 57.27% respectively. The mean percentage of PF, SF & MH component indicates that physical functioning, social functioning & mental health

were most affected components in QoL as compare to RE, VT, BP, GH and RP in case of an elderly population.

The study shows that elderly having physical health problems and mental health problems during the past 4 weeks were having the strong impact on their social functioning as compared to other problems.

Correlation of QoL With Nordic Scores	r value
PF	-.314**
RP	-.111*
BP	-.165**
GH	-0.098
VT	-.224**
SF	-.172**
RE	-0.061
MH	-0.032

Table: Showing the Pearson correlation coefficient at 5% significance level with of =348 table value = 0.05

**. Correlation is significant at the 0.01 level (2-tailed).

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

The r values presented the co-relation of Nordic questionnaire scores with SF-36 QoL questionnaire scores. The calculated r values indicated that there was the strong and negative effect of musculoskeletal disorders on PF, BP, VT, SF and RP domains of QOL of an elderly population

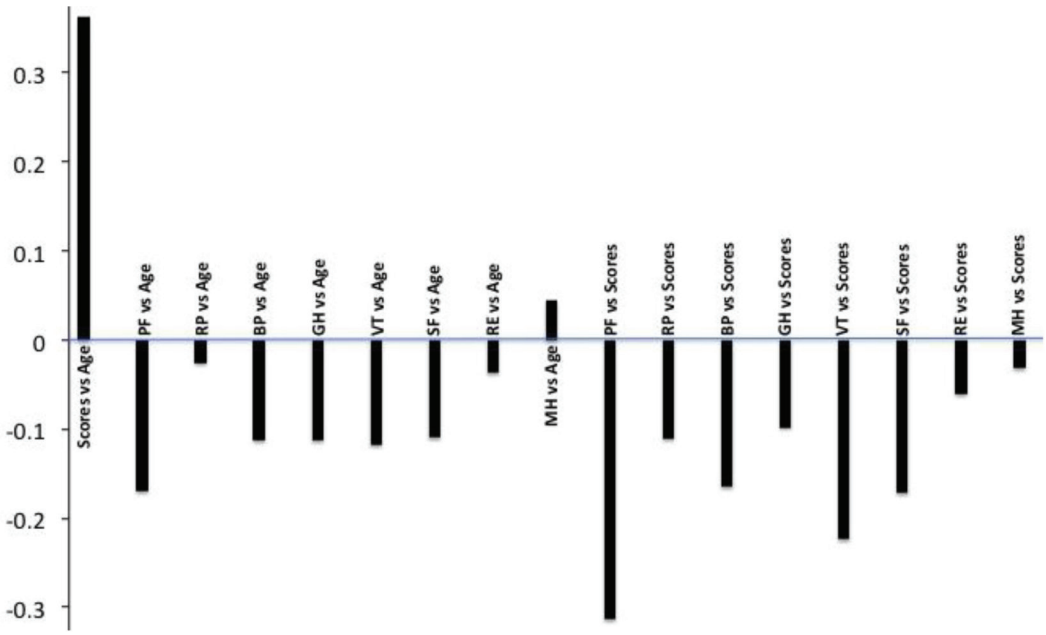

Figure 3: Representation of correlation between various parameters versus age and scores as per Nordic score calculations.

From the results, it can be observed that as the age of elderly people is increasing the mean score of QoL is slightly decreasing.

The findings of the study Laura L Laslett et. al. are in accordance of the present study that revealed that pain at the back, hip and knees was associated with quality of life over time in ethnic Chinese. Total 1098 subjects between the age of 50-80 years were included in the study. Pain in the shoulders and back, knees, hips, hands, and feet were analyzed and researcher found that pain was significant in the back (44%), hip (44%) and knees (41%) that was having the strong impact on Quality of life[8].

A Similar study was done by Gabriel U P et.al. "Burden of limitations of activities of daily living among geriatric Nigerians with musculoskeletal disorders in a resource-limited Nigerian primary care clinic in Eastern Nigeria" A cross-sectional study carried out on 894

geriatric patients who were screened for MSDs and 130 of them who had diagnoses of MSDs (musculoskeletal disorders) were studied. Data was collected using a pretested, structured and interviewer-administered questionnaire. Results revealed the prevalence of MSDs was 14.5%. Three most common musculoskeletal disorders were the low back pain (36.9%), osteoarthritis of weight-bearing joints (30.0%) and spine curvature disorders (17.7%). Physical activity was most commonly affected (89.2%) and spiritual activity was least affected (8.5%)[11].

On the contrary, a study performed by Abhay M et.al. Results are in contrast with the present study. The Researcher concluded that the QOL of the rural elderly population was better in physical and psychological domains[2]. In a present study physical functioning, social functioning, mental health, and role emotional domains of QOL are more affected.

In reference to results of this study, the health professionals should take steps to plan health program for the elderly who are residing in rural areas and treatment should be focused to improve the Physical Functioning, Social Functioning, mental health & Emotional role.

Lifelong health education and awareness of physiotherapy treatment can be incorporated into the prevention & management of musculoskeletal disorders of elderly through medical camps.

CONCLUSION

This study highlights the burden of musculoskeletal problems and quality of life among elderly population of 5 villages of Bathinda district. From the results, it is concluded that there is strong negative correlation exists between Independent Variable (Nordic Scores) & Dependent Variable (SF-36 QoL Scores). Thus an author accepts the Alternative Hypothesis that states; there is the influence of musculoskeletal disorders on QOL of the geriatric population of 5 sponsored villages by Adesh University.

Conflict of Interest: The authors declare no conflict of interest.

Source of Funding: The study was sponsored by College of Physiotherapy, Adesh University, Bathinda.

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Registered with Registrar of Newspapers for India
(Regd. No. DELENG/2007/20988)

Published, Printed and Owned : Dr. R.K. Sharma
Printed : Printpack Electrostat G-2, Eros Apartment, 56, Nehru Place, New Delhi-110019
Published at: Institute of Medico Legal Publications Pvt. Ltd. 501, Manisha Building, Nehru Place, New Delhi-110019 ,
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