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EDITORIAL

EMERGENCE OF TELE-REHABILITATION IN THE FIELD OF PHYSICAL THERAPY

Accessibility of patients/clients towards rehabilitation services, a core area is difficult to approach but not impossible; requiring effective applicability. A number of factors are limiting the availability of health care services not only in Pakistan but throughout the International market, including: physical distance from health facilities, an impairment preventing or restricting attendance at a local service, a lack of clinicians and transportation in any specific area or the inadequate provision of resources in a geographical region. It has almost been 2 decades, when Tele Health (TH) emerged in the field of medicine and other Allied Health Care professions still the implementation is negligible.

The field of Tele Health is still found to be nascent for nearly all the health care professionals where its utilization is insignificant and ambiguous. Tele Rehabilitation (TR) or Tele Physical Therapy are under the umbrella of TH that describes the provision of rehabilitation services at a distance using telecommunication technology as the service delivery medium. Telecommunication technologies are changing ways of thinking, acting, and communicating throughout the world and within healthcare. TR, a new and emerging field in the discipline of Physical Therapy consider the provision of nearly entire health care services, whether clinical or educational via telecommunication. Interestingly, psychologist, speech language therapist, pathologist and occupational therapist are far ahead of holding THs compared to Physical Therapy. Most probably, the implication of patient interview, physical assessment and diagnosis, treatment, maintenance activities, consultation, education and training are demanding to achieve. Also, Physical Therapist have contemplated TR as a new domain rather than determining as an alternate mode of service delivery of TR in the developed countries. The current practices of TR cannot remove or alter any existing responsibilities for the providers. It is essential that providers must adhere to existing ethical codes of conduct, scope of practices, state and federal laws and individual discipline policies and guiding practices of different hospitals.

American Physical Therapy Association (APTA), Chartered Society of Physiotherapy (CSP) and Australian Physiotherapy Association (APA) are all keenly observing the practical implications and its barriers for physical therapist. With the passage of time, concern is increasing for the researchers, educators and health care providers that why are physical therapist way behind in utilizing TH whereas other Allied Health Professions? Although several researches have already been conducted and a number of them are in process that have revealed efficacy with respect to the field of physical therapy. Essential parameters should be taken into account that are required to excel in the field of TR in this profession at the grass-root level. In order to achieve it, the comfort level of client/patient is pre-eminent. The geriatric and pediatric population may not be in the comfort zone of utilizing the TR.

The fascinating part of TR for both the provider and end users is that medical needs are met in their natural environment without visiting the patients especially with chronic ailments. TR can be easily implemented on all genders, ages and type of disabilities either in Cardio-Pulmonary (CPR), Musculo-Skeletal (MSK), Neuro-Muscular Rehabilitation (NMR) and other sub-specialties

Today technology is not only vital part of clinical settings but a requisite for universities; whether it is initiation of registering the patient to a clinic or the assignment given to a student. Several strategies needs to be implemented for educating students to TR today.

As an educator, I believe that our students would easily accommodate towards TH and TR as they are born with iPads and X box. These are the students of next and future generation who are more proactive in not only solving today's problems but also of tomorrow. These students think of technology that have not yet been invented. The most obvious limitations that researchers and health providers in the International market have observed is the reluctance of Physical Therapist in taking up the technology. The most appropriate and wise way to incorporate TR is at the grass root level by making it a part of the curriculum and utilizing its most essential key members that is our students. These students can be familiar with the utilization of technology during their clinical rotations and internships.

As a researcher and educationist I believe clinicians need to work in corporation with the tele health care

providers in order to ensure that implementation process becomes easier, barriers are reduced and strategies are incorporated. Nowadays, collaborated work is required as the therapist would not work in isolation in their respective domains. This would not mean that the ethical standards are ignored.

Imagine how much would it be effective if we have had access to the patients when at work, or travelling or during vacations? The follow-ups would become extremely easier. Although both the comfort and satisfaction of patient is still debatable. Health care providers are still arguing with the clinicians and researchers on payment strategies in the private sectors, provision of TR in the remote areas, preparing the next generation of physical therapist for TH and what strategies be implemented at the grass root level

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LETTER TO THE EDITOR

SCAFFOLDING OF ETHICAL DECISION MAKING

To the Editor,

Ethical guidelines for safeguarding the Human subject were published in 1979 to provide the idealistic groundwork for existing laws prevailing research for human subjects. The guidance and rule in this regards had already been set forth by "Nuremberg Code"¹ and "Helsinki Declaration"² but the Belmont Report has done a yeoman service in developing the three basic fundamental ethical rules which are: respect for person, beneficence and justice. Indeed there are many other principles applied in ethical decision making during research but these rules are providing inclusive scaffolding for ethical decision making in research concerning human subjects³.

The rule of respect of person acknowledges the poise and independence of persons and directs that those with diminished autonomy be given particular safeguard. This rule requires that subject give well-versed consent to partaking in research because of their impending susceptibility; these includes prisoners, human fetuses, children and people with relentless disabilities.

The rule of beneficence requires researchers to protect persons by escalating predictable benefits and plummeting potential harm. The plan of a study and its risk and reimbursement therefore must be examined carefully. In some cases this means that alternative way must be found to obtain the benefits required from the research.

The principles of justice require that subjects be treated fairly. The subjects should vigilantly and justifiably be selected to guarantee that definite persons and classes of persons (e.g. prisoners, the aged or the poor) are neither methodically be selected nor excluded unless scientific or ethically valid reasons exist for doing so.

All these three rules carries sturdy ethical vigor and challenging ethical dilemmas arise when any one of the ethical rules comes in divergence with others. Nevertheless the researchers must understand and apply these principles to help ensure that people who concur to be investigational subjects are treated in a courteous and principled behavior.

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REVIEW REPORT

DEVELOPING SPEECH LANGUAGE THERAPY FOR CLEFT LIP AND PALATE IN PAKISTAN

ABSTRACT

Cleft lip and palate is a congenital craniofacial anomaly of the oral cavity, where in a structural malformation in the upper jaw including the lip, teeth, alveolus, bony hard palate, soft palate and/or uvula, critically interfere with functions of feeding and speech development. The condition is defined according to its presentation, which may be unilateral or bilateral, with a partial or total cleft, having higher incidence in the Indian sub-continent, including Pakistan, as compared to the rest of the developed world.

A cleft lip/palate warrants early intervention through a multidisciplinary team of health care professionals, namely: pediatrician, plastic surgeon, otorhinolaryngologist; maxillofacial surgeon, dentist, orthodontist, prosthodontist, nutritionist, speech language therapist, and psychologist. Appropriate feeding strategies along with specialized tools may be employed soon after birth to ensure good health in preparation of surgery as early as possible. Speech-language therapy is an essential aspect of intervention, which helps the child develop effective verbal communication skills which is crucial for social and emotional well being, as well as for a successful academic career.

Keywords

Cleft lip, Cleft palate, Early Intervention, Phonological Development, Speech-language Development, Metaphonological and Metalinguistic Skills.

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INTRODUCTION

Cleft Lip and /or Palate has high incidence in Pakistan, with a larger prevalence in the lower socioeconomic strata of society. The two conditions may occur in isolation as only cleft lip or only cleft palate in some children, or they may co-occur as cleft lip and palate. It is said that half of the babies born with a cleft lip are likely to have a cleft palate as well. Cleft lip and/or palate is often seen to occur non-syndromically¹. However it could be seen as features of a syndrome, wherein there may be other co-morbid conditions along with the cleft lip/palate. Amongst the most common conditions is said to be Deletion syndrome, also known as the velocardiofacial syndrome^{2,3} which presents with distinct characteristic facial features, with oral structural defects and a cardiac anomaly. In addition the children may also present with a cognitive deficit and unmanageable behavior.

Cleft lip / palate can be classified as partial or total and unilateral or bilateral. Veau's classification divides types of clefts into 4 groups: the first group classifies clefts of the soft palate only, the second group classifies the clefts of the soft and hard palate, the third group classifies clefts according to defects from the soft palate to the alveolus and may involve the lip whilst the group four classifies complete bilateral clefts⁴.

IMPACT OF THE CLEFT LIP/PALATE ON SPEECH & LANGUAGE SKILLS

A baby born with a cleft lip/palate must receive immediate intervention from a speech language therapist who can teach and train the mother to breast feed the baby, so as to prepare him for early surgery. Specialized long teats and spoons may also be used with infants who are unable to suckle at the breast⁵.

Surgical intervention is critical for babies with a cleft palate, and should ideally be performed by the end of the first month or at least within the first three months of life; whilst lip surgeries may also ideally be performed between 2-6 months of age or at least before the first birthday⁶.

The primary outcome of a repaired cleft lip/palate is the baby's intelligible speech or phonological development. Every human baby has a biological predisposition for the acquisition of speech and language skills with the care givers nurturing or stimulating it through their verbal interaction since the baby is born. Speech and language skills feature the development of phonological, semantic, morphological, syntactic and pragmatic skills in human babies. They usually utter their first words around the age of 12-18 months, but have a larger lexical store at this young age, hence their understanding of spoken language precedes their expressive repertoire. The auditory feedback loop

helps the babies match their utterances to those being spoken by people in the surroundings, developing meta-phonological and metalinguistic skills responsible for their adult like speech and language proficiency⁷.

Children with cleft lip/palate, may or may not present with a delay in acquisition of language skills, but are likely to present with a speech disorder. Speech defects are characterized by disorders of resonance, and unclear speech or mis-articulations.

Phonological errors or errors in the production of speech sounds are commonly seen in babies and young children through the first 6 years of life, which usually correct themselves, and are therefore called natural or phonological processes. The predominantly noted natural processes in the speech of children with cleft lip/palate, were the assimilation process (bilabials being assimilated with nasals) and backing of front consonants (/k/, /g/ for the linguodentals, alveolar and palatal stops)⁸.

Misarticulations in the speech of a child with cleft lip/palate are classified into two groups: (1) an obligatory error of articulation occurs when there is a structural malformation resulting from an incompletely repaired cleft and would require further surgical repair prior to speech therapy for establishing intelligible speech, (2) a compensatory error of articulation is said to occur when the mis-articulations persist in the child's speech despite a complete correction of the structural defect. The common errors noted are "pharyngeal and glottal stops, backing to uvular and backing to velar consonants, active nasal fricatives, the absence of pressure consonants, nasal realizations, and weak nasalized consonants". Orthodontic intervention may be required specially to improve the production of fricatives and affricates. Dental correction also facilitates the acquisition of intelligible speech⁹.

In a disorder of resonance, the nasal air stream is more pronounced than the oral air stream causing hyper nasality of voice, which manifests as nasal emission or nasal turbulence on the production of consonants sounds, with or without a nasal or facial grimace, usually caused by a wide velopharyngeal port, manifesting as velopharyngeal insufficiency (VPI). This would require further surgical remediation, or an obturator (such as one given to occlude a fistula or a speech bulb to reduce VPI). Contrarily hypo nasality may be observed when there is an oral air-stream on the production of nasal sound /m/, /n/⁹.

Several different methodologies have been adopted for speech therapy of the young child with cleft lip/palate post surgically. Some are based upon the traditional approaches in articulation therapy, whilst others employed speech correction with

oro-motor exercises. Evidence for any one method being regarded as the best, is yet to be reached, however, all approaches do emphasize that the clinician must have good auditory perceptual skills, who must 'ear train' the patient to identify errors in one's own speech¹⁰. It is here that we see the importance of metaphonological skills, because, every human baby acquires the correct production of speech sounds through his own auditory feedback loop which teaches him to discriminate between the correct versus incorrect production, and finally acquires all speech sounds in conversation with native like proficiency, by the age of 6 years.

The protocols of working with a child having cleft lip/palate include the entire multidisciplinary team. The assessment pre and post therapy includes an analysis of the child's speech using lists of a standardized sample of words, phrases and sentences repeated by the child after the speech language therapist; a nasometry, a nasendoscopy and a video fluoroscopy to assess the VPI, followed by an evaluation of the efficacy of therapy provided to the child¹¹.

CONCLUSION

The College of Speech Language and Hearing Sciences, along with the College of Dentistry and the Medical College, at the Ziauddin University have endeavored to establish a Cleft Lip/Palate (CLP) clinic at their venue, to provide early intervention in speech language therapy through a multidisciplinary team consisting of a plastic surgeon, maxillofacial surgeon, ENT, pediatrician, psychologist and psychiatrist, audiologist, dentist, orthodontist and prosthodontist, speech-language therapist and nutritionist to bring intelligible speech to the cleft lip/palate child, leading to good social adjustment with family, and peers, as well as ensures a healthy and productive academic career¹².

This article aims to increase and enhance awareness about early and complete intervention of cleft lip/palate children and adults, in Pakistan. The author is the Pakistan representative at the 'South Asia Regional Cleft Lip/Palate network.'

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RESEARCH REPORT

PREVALENCE OF PERIPHERAL ARTERIAL DISEASE (PAD) ASSOCIATED WITH FAST FOOD CONSUMPTION, USING ANKLE- BRACHIAL INDEX IN UNIVERSITY STUDENTS

ABSTRACT

OBJECTIVE

The objective of this study is to find out the prevalence of PAD associated with fast food consumptions in university students under the age of 18-25 years.

STUDY DESIGN

Observational study

SAMPLING TECHNIQUE

Convenience random sampling

SAMPLE SIZE

57 students with age range of 18-25 years

OUTCOME MEASURE

Ankle Brachial Index (ABI)

METHODOLOGY

The subjects were recruited from first year to final year students for the study. A one month dietary questionnaire was given to the students. We instructed the students to fill questionnaire on daily basis. The dietary questionnaire contained list of 46 fast food items. After a month, a portable Doppler Ultrasound was used to measure their ABI values.

RESULTS

Fast food consumption highly impacts on peripheral arterial disease ($p < 0.00$) so the association of fast food with PAD predicts the upcoming cardiovascular events in university students. There is no significant relationship of gender with peripheral arterial diseases ($p < 0.335$). Also, there is no significance relation between fast food and gender ($p < 0.153$).

CONCLUSION

In this territory, the PAD is increasing particularly in the ages of 18-25 years and all individuals with an ABI < 1.0 demonstrates as a minimum one classical cardiovascular risk factor, which needs sufficient concentration and an aggressive risk management.

Keywords

Ankle Brachial Pressure Index, Peripheral Arterial Diseases, Fast Food Consumption, University Students, Cardiovascular Disease, Coronary Heart Disease, Atherosclerosis.

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INTRODUCTION

Cardiovascular illness also known as coronary heart disease (CHD) is the most¹ recurrent and major reason for death of adult population globally^{1,2}. The conjecture is that by the year 2020, there is a chance to become a primary reason for mortality and morbidity in all developing countries^{1,3}. The conventional risk factors associated with the degree and seriousness of the atherosclerotic lesions. Similarly, subclinical identification about hardening of great vessels is significantly relevant in observing the modernization of prediction of cardiovascular hazard^{1,4}. Peripheral arterial disease is viewed likely as increase peril for creating coronary heart diseases. People having the illness are treated in the same way regarding secondary prevention^{1,5,6}, as well as to the related mortality developed by CHD⁷, morbidity and mortality transformed toward cardiovascular^{1,8} illness and all-cause mortality^{1,4,9,10}. The recognition of peripheral arterial disease is of individual importance from the time when atherosclerosis is observed as a comprehensive illness, and detection of peripheral arterial diseases commonly signifies hardening in other vessels also^{1,4}. Poor endothelial function is a standout amongst the practically huge precursors for atherosclerosis. The level of expanded arteries is directly connected with their hardening, known as atherosclerosis.

Ankle-Brachial Index is a substitute indicator of hardening of vessels and latest research signifies its efficacy as an interpreter of upcoming cardiovascular illness and mortality. Still, this important test is underutilized. The Ankle brachial index is an easy, non-invasive clinical test that must be appropriate to detect PAD, other than this, it also give significant predictive information about upcoming cardiovascular incidents¹¹. This non-invasive investigation has demonstrated that a value of <1.0 can be considered as confirmation of peripheral arterial diseases^{1,4}.

Coronary artery disease, is the widely preponderance recognized structure of coronary illness. It arises as construct atheroma in vessels, which pieces the oxygenated blood arriving from heart, expanding your possibility of a heart attack then ultimately leading to death. Consuming fast food that hold Trans or saturated fats might cause its increment in the total amount of blood and low density lipoprotein (bad cholesterol) and decreases high density lipoprotein (good cholesterol). Consuming large quantity of fats furnishes to the vulnerability of cardiovascular illness, as stated by researchers in the Netherlands Furthermore distributed in "Lancet" in 2001¹¹.

Atherosclerosis is solidifying the great vessels which is generated by accumulation of atheroma. Atheroma can split and result in blood clots that can cause impediment in the similar vessels, and alternately

clot can trek and get lodged in different areas of our body, where it can obstruct the blood from surging and result into heart attack. Solidification of the vessels start with raised blood cholesterol, Trans and saturated fats and high blood pressure. Eventually, cells lined the inner part of our arteries turns swollen and can cause a stroke or heart attack¹¹.

Accidentally, numerous people develop heart disease by poor eating habits, when undiagnosed heart conditions can be lethal. Relinquishing from fast foods is the best way to keep cholesterol levels low and forestall clogged arteries, which can overturn the symptoms of heart disease.

BACKGROUND

Fast food is a worldwide trend for the world economy^{12,13}. The accessibility of fast food and snacks at stumpy costs and advertising schemes alterations by the producers has prompted a worldly evolution, because who needs to prepare a formal meal when buying fast food is so convenient. It seems to have deluged every age; every race, because there is no exemption that concepts, interaction, lifestyle all are transformed to harmonize this new jet age and consumption behavior as well^{13,14}. The latest additions on period are school, college and university going in fastidious¹³.

The four very important factors for a food sale, manufacturing, processing, arrangements and utilization have been highly impacted by globalization and with emergent connotation of pizzas, burgers, snacks and carbonated drinks, individuals are snacking in a modern style. Exploitation of western fashion, food raised as the income level of developing countries is elevated^{15,16,17}. As it has been acknowledged that prerequisite for food is related with the standard living of city areas^{15,16}, flourishing urbanization has consequently led to altered lifestyle and augmented incomes with domination of young people.

According to a literature review, latest researches show that there are numerous elements that contribute to fast food consumption. In 2009, a researcher Wood, executed a study in Houston¹⁸; exemplified that only 3% of children offered foods at a variety of fast food eating places complied nutritional principles explained by National School Lunch Program^{15,18}. Another research in 2009, by MacFarlane et al, figured out that those who ate fast food at home were more likely to be weighty^{15,19}. Similarly, in 2009, a research was carried out by Davis and Carpenter, published in the American Journal of Public Health; to determine the vicinity of fast food eating places to colleges and youngster obesity. Hence, it suggested that those students who go to college located near to fast food eating places were more obese than their neighboring students who go to college not next to a fast food

restaurant^{15, 20}. An additional, Howard et al study supervised in California, inquired about the relationship between school situated close to fast food eating places, expedience shops, supermarkets and the amounts of overweight ninth grade learners^{15, 21}. In conformity to a review by the Institute of Food Technologists, research into fast food has established that there is a direct association between the numbers of fast food restaurant situated inside the locality¹³. Accounted 75% of children are eating their dinners at home, almost half of children meals are fast foods, delivered, or taken out from restaurants or grocery delis¹³.

Consequently, studies provide evidence that marked fundamental is proximity of fast food restaurants to the school or university, because of this rationale; students do not want to prepare a formal food when buying fast food is so simple. Intemperance and prolonged use of fast food can have lots of poor repercussions.

Longitudinal researches have also given confirmation that fast food positively influence on weight and resulting increase in weight among university students^{22, 23}. Previous studies indicate significant relationship between the frequency of fast food consumption and overweight, obesity, gain in body fatness, weight gain^{22, 24-31}, and total energy consumption^{22, 23, 27, 32} among both youngsters and adults.

In University, the majority of students regularly consume fast foods such as, pizza, sandwiches and burgers. They are also accessible in café shops, school canteens and college cafeteria. Shawarma is publically a very well-known fast food amongst young people. Furthermore, chinese, chicken nuggets, chicken fried rice and crispy fried chicken, all types of fast food are being used for the young generation both girls and boys.

Students are usually affectionate of eating fast food not merely for its flavor but also for the university lifestyle. Salted snack foods, candy, desserts, fried food and soft drinks are few of the chief fast foods. Nowadays, era of expediency, fast food requires no introduction. It is tasty, heavy, reasonable, and eagerly obtainable at any time of the day. But it has detrimental effects on health for instance, hypertension, obesity, cardiac problems, cancer, hypercholesteremia, dental caries and various other intimidating health hazards³³.

Internationally fast food trade produced by 4.8% and accomplished a cost of 102.4 billion and a volume of 80.3 billion business deals. In America, young people aged 11-18, visit fast food restaurants probably around two days a week and by 14 years of age, 32% of young girls, 52% of boys drink three or more servings of sugared soft drinks every day. In India fast food business is increasing by 41% a year³⁴.

A research carried out by the All India Institute of Medical Sciences, Department of Science and Technology established that the consumption of fast food is rising among youngsters. The similar review had revealed that this trend and connected lifestyle aspects in the urban youngsters and young adult population in the rise of non-communicable diseases³⁵ for instance, cancer, diabetes, cardiovascular disease and chronic heart diseases.

Unexpectedly, the predicted causes of cancer and cardiovascular mortality and morbidity in the US confirmed that, about 25% can produce cancer and CVD because of fried food and high fat diet^{15, 35}. Numerous people get happiness in consuming fast food every day, even though they might have never endorsed regarding its dreadful outcomes to their health.

In Los Angeles, a research was carried out to identify the association between utilization of fast food and cholesterol levels among 200 students. More than 80% of students consumed higher than suggested values of total and saturated fats. Investigators used ultrasound to determine the thickness of neck artery and compared high risk students with their healthy corresponding. They suggested that thickest artery walls were expected to those, who were obese, and had increased cholesterol and blood pressure levels. A study illustrated that 1/3rd of the students had abnormally high cholesterol levels for their age³⁶.

Another exploratory descriptive study was conducted in India, to find out the non-modifiable and modifiable risk factors of coronary artery disease present among adolescents. 591 students aged between 12-18 years were enrolled by convenient sampling. Data was collected through structured questionnaire regarding modifiable and non-modifiable risk factors. Hence, results proved that 71% students ate fast food daily, 67% students had 3 or more risk factors, while 22% students were found with 2 risk factors and 11% of them had 1 risk factor for coronary artery disease³⁷.

Particularly, students are greatly excited towards fast food and similar to have it regularly at food outlets or arranging on delivery. Besides Pakistani food; Western, Chinese, Italian and Continental cuisines have also increased the Pakistani appetite leading towards passion³⁸. There are various international chains serving fast food in Pakistan such as KFC, Burger King, Domino's Pizza, Dunkin Donuts, Subway, Nandos, McDonalds, Pizza Hut, Hardees, Steak Escape and Gloria Jean's Coffees. Additionally, to the international chains, local cuisine in Pakistan like to have Biryani, Kebab rolls, Bun kebab, Nihari etc as fast food.

The fast food trade, primarily considered in Southern California during the 1940s³⁹, not merely altered the

eating behavior of Americans, but also other numerous countries through worldwide, including Asian countries^{15,39}. Furthermore, fast food exploitation elevated drastically in Pakistan, and characteristics having influence on customers food preferences being; socialization, urbanization, attraction for eating out, convenience for dual-income families in Pakistan, taste for college and university students and many other^{15,40}.

A famous quote by La Rochefoucauld states: "To eat is a necessity, but to eat intelligently is an art"⁴¹. The way in which we eat, and what we eat, is of imperative significance to our health. Through universal increase of sustenance standardization, speedy growth is happening in the developing world. It has completely altered the route people eat all over the globe.

SIGNIFICANCE

There are several studies that have investigated fast food consumption with relationship and comparison of many other factors show positive relationship with fast food. The objective of our research is to identify the peripheral arterial disease in university students under the age of 18-25 years with relation to the fast food consumption. In this research, existence of PAD will be verified by means of Ankle-Brachial Index (ABI). ABI is a substitute indicator of atherosclerosis and lesser than less studies have been used as a forecaster of upcoming cardiovascular illness.

MATERIAL AND METHOD

Study Population

Physiotherapy University students were enrolled in our study between the ages of 18-25 year.

Sample Size

57 students

Inclusion Criteria/ Exclusion Criteria

1. All physiotherapy students under 18-25 years of age.
2. Normal lower extremity pulse (value 3+)
3. No evidence of claudication and ischemic rest pain
4. No history of smoking and diabetes
5. No risk factors of atherosclerosis present for instance, hyperhomocysteinemia, dyslipidemia and hypertension.
6. No Coronary, carotid and renal artery diseases,
7. Except physiotherapy students under the age of 18-25 years
8. Abnormal lower extremity pulse (0 no palpable pulse, +1 faint pulse)
9. Claudication and ischemic rest pain present,
10. Known atherosclerosis risk factors present such as, dyslipidemia, hypertension, hyperhomocysteinemia.
11. Known Coronary, carotid and renal artery diseases,

Study Design

Observational study

Sampling Technique

Convenience sampling.

Study Settings

The study was carried out in reputed Institute of Physical Therapy in Karachi

Outcome Measure

Ankle Brachial Index (ABI).

Ethical Consideration

According to ethical consideration written notified consent was taken from the students and the purpose of the study, objectives and protocols explained before starting the research and assured that data will be kept confidential.

Data Collection

The subjects were recruited from first year to final year students for the study. A one month dietary questionnaire, in which we added almost all type of food that prefers by individual, was given to the students. We instructed the students that they filled a questionnaire on a daily basis whatever they eat. The dietary questionnaire contained list of 46 fast food including, salty snacks (potato chips, corn chips, popcorn, and crackers), sweets (biscuits, cookies, cakes, chocolate, candies, brownies, pastries, ice cream), sweetened beverages (Pepsi, coke, mountain dew, 7up, energy drinks), fast foods (fried meat, burgers, Chinese, steak, fried chicken, rice, pizza) and others food (whole milk, cheese, yogurt, fried egg, pasta). Additionally, vegetables, boiled rice and fruits were also included as healthy food. After one month, students reported how many times they had consumed each item daily. At last, we collected dietary information and recorded the arterial measurements in lower extremity.

Measurement Techniques

The measurement of Ankle Brachial Index involves the pressure in the right ankle of Posterior Tibial or Dorsalis pedis arteries and pressures in the both elbow of brachial artery.

ABI values were recorded by qualified physiotherapist at reputed Institute of Physical Therapy. With the students sitting and feet exposed, upper arm and lower leg pressure was detected with a portable Doppler Ultrasound. Wrap the cuff around leg above ankle for posterior tibial artery, below ankle for dorsalis pedis artery and over arm for brachial artery. Applying gel and placed Doppler knob in the direction of blood flow below, medial malleolus for posterior tibial artery, over metatarsal on medial side for dorsalis pedis and at medial side of cubital fossa for brachial artery. The cuff of the equipment was compressed quickly in each ankle and arm about 150 mmHg of blood pressure followed by a sluggish decline sound until the first echo of the blood pressure became clear. Note the blood pressure by deflating the cuff.

The outcome is recorded as the value of the both arm systolic pressure in the denominator, over the ankle pressure in the numerator; see in the formula. Peripheral arterial disease was suspected if the recorded ABI was <1.0.

ABI = Right ankle systolic pressure/ Both Arm systolic pressures

Interpretation of ABI Results

An ABI value higher than 1.3 is also considered abnormal, indicative of non-compressible or calcified arteries. The ABI value of 1.1-1.2 is considered as normal and healthy individual, if the ABI is between >0.5 - <1.0 is marked as mild to moderate PAD, and an ABI less than 0.5 is suggestive of severe PAD

ABI VALUES	INTERPRETATION
>1.3	Rigid or calcified arteries
1.1-1.2	Normal arteries
>0.5-<1.0	Mild-moderate PAD
>0.25-<0.5	Severe PAD

Figure 1: interpretation of ABI.

RESULTS

Numbers of participants in the study were 57. Table 1a summarizes the ABI measurements explicated as Standard Deviation=1.56 and mean=20.89, with respect to age decade. In table 1b, 57 students in which, 33 detected with mild-moderate PAD=57.9% (between>0.5-<1.0), whereas 21 students considered as normal and healthy=36.8% (ABI value 1.1) and remaining 3 students suggestive (higher than 1.3) abnormal or non-compressible arteries 5.3%.

	AGE
Total no. of students	57
Mean	20.89
Std. Deviation	1.56

Table 1a: Mean and SD with respect to age.

	Frequency	Percent
Clacified Arteries	3	5.3
Normal	21	36.8
Mil-to-Moderate PAD	33	57.9
Total	57	100.0

Table 1b: Prevalence of peripheral arterial diseases in university students.

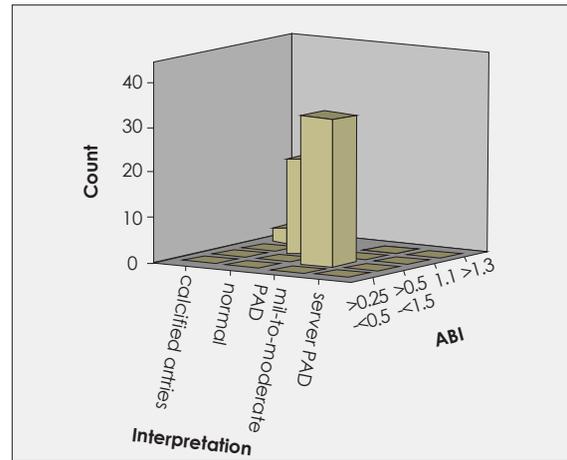


Figure 2: Graphical presentation of ABI values in university students.

Effects of food on gender shows in table 2, out of 57 students, 11 were males and 46 were female. Total 21 students who ate healthy food in which 19 were female and 2 were male while average 36 students consumed fast food wherein 27 were female and 9 were male. Pearson Chi-square tests were used to explore differences in proportions by gender. No significant difference (p0.153) was seen between fast food consumption and gender.

	Male	Female	Total
healthy food	2	19	21
fast food	9	27	36
Total	11	46	57
P-value			0.15

Table 2: Gender association with food.

Effect of food and peripheral arterial disease are presented in table 3, Average 36 students who ate fast food in which 33 were diagnosed with mil-moderate PAD and 3 were considered abnormal or calcified arteries (ABI >1.3). In contrast, 21 students who ate healthy food all were suggested healthy and normal individual (ABI 1.1-1.2). Significant difference (p0.00) was seen between fast food consumption and PAD.

	ABI			Total
	>1.3	1.1-1.2	>0.5-<1.0	
Healthy food	0	21	0	21
Fast food	3	0	33	36
Total	3	21	33	57
P-value				0.000

Table 3: Association between ABI and food

Table 4 summarizes the relation between ABI and gender, Average 57 students, out of 33 students, 8 were male and 25 were female detected with mild-moderate PAD (between >0.5-<1.0), whereas 21 students considered as normal and healthy (ABI value 1.1-1.2) individual in which 2 were male and 19 were female and remaining 3 students suggestive (higher than 1.3) abnormal or non-compressible arteries wherein 1 was male and 2 were female.

ABI	Gender		Total
	Male	Female	
>1.3	1	2	
1.1 - 1.2	2	19	21
>0.5 - <1.0	8	25	33
Total	11	46	57
P- value			0.33

Table 4: Relationship between ABI and gender.

Prevalence of PAD is seen in table 4, associated with gender are females their value of ABI >0.5-<1.0 comes under the category of mil-moderate PAD. No significant difference of gender was observed with peripheral arterial diseases (p0.335).

DISCUSSION

We calculated the prevalence of peripheral arterial diseases in university students in table 1a. Total 57 students 33 are detected with mild-moderate PAD, 21 students considered as normal and healthy individual while remaining 3 students' suggestive abnormal or non-compressible arteries. Hence, it is suggested that prevalence of PAD is seen in the student their value of ABI >0.5-<1.0 comes under the category of mil-moderate PAD.

Effect of Food on Gender

Pearson Chi-square tests were used to explore differences in proportions by gender. No significant difference (p0.153) was seen between fast food consumption and gender. This result is related to the research by Donald C in 2013, conducted at the University of Central Florida, the purpose of the research is to identify the relationship of fast food consumption within the perspective of gender and correlation with BMI. Data concerning about fast food consumption were collected via survey (n=49 males, n=116 females). Through data analysis, no gender based food preference is established, while significance relation with Body Mass Index has been proved⁴². But in our research, Body Mass Index was not included. Similarly, another study was carried out at Grand Valley State University, showed same results to investigate the variations in fast food between males and females between the ages of 18-24. It is proved that no significance difference was seen between genders as relation to the fast

food⁴³.

According to evidence, it indicates that effect of food does not highly impact on gender; students have been enthusiastic for going fast food outlets for enjoyment and transform.

Effect of Food on Peripheral Arterial Disease

Effects of fast food highly impact on peripheral arterial disease and association with fast food in university students aged 18-25 years that predicts the upcoming cardiovascular events in university students.

A sufficient, balanced and healthy diet is important to sustain health for individual's life time. To attain such a high level of healthy intake, fast food consumption should be restricted. Therefore, nutritional education sessions are essential to improve the nutritional patterns and food preferences of university going students. A survey conducted in India in which they revealed that overabundant eating of fast food would lead to increase large variety of health disorders. The intent of the survey was to identify the nutritive value and their impact on human health, their ingredients and eating habits of students. Results concluded that severe health consequences might occur upon continuous consumption of fast food⁴⁴.

According to Farzan Yahya et al, a research was carried out at Lahore, Pakistan, illustrated the trend of fast food consumption and its effect on Pakistani society. Researchers evaluated that the poor outcome of fast food and the possible risk that it possess by its usually inappropriate eating. Rise in cholesterol, nutritional deficiencies, stroke, hypertension, sexual dysfunction, respiratory diseases, type II diabetes mellitus, cancer (breast, oesophagus, colon, kidney uterus/prostrate), coronary artery disease, and liver diseases can all be caused by eating fast food on a regular basis¹⁵.

Interestingly, in our research we have figure out that there are 6 students who ate vegetables, boiled rice and fruits on daily basis come under the mild-moderate PAD. It might be possible that relationship with heredity and physical inactivity or may be that students were not willing to fill the dietary information and inconsistency in follow-up.

Effect of Peripheral Arterial Disease on Gender

In table 4, 25 female detected with mild-moderate PAD. Hence, it is revealed that prevalence of PAD is seen but not associated with gender though more females have their values of ABI >0.5-<1.0 so they comes under the category of mil-moderate PAD as compared to male. Therefore, no significance relation of PAD with gender was observed (p0.335). Amazingly, a previous study^{1, 45} shows that mean value of ABI decline in males as compared to females in relation with age. Some studies show

there is normal relationship in both males and females. In future, Prevalence of PAD is doubled up to the age of 60-70 in both genders.

There are three main factors in our research contributing for increased eating behaviour of fast food such as, first and foremost, students approved the reality of getting addicted towards fast food. Secondly, there are many commercials which play a major role to fascinates the college and university students towards fast food and thirdly, a defiant need for the youngster to recognize that the nutrient facts and different chemical additives are included to boost fast food behaviour because the knowledge of individuals about restricting nutrient levels in junk foods has to be dispersed.

The above data exposed that prevalence of peripheral arterial diseases highly impact on university students, so there is an immediate attention to teach the students concerning health perils of fast food. Therefore, researcher felt the need to provide information and give awareness regarding health hazards of fast food among university students.

CONCLUSION

There are numerous health hazards of fast food eating and individuals are unacquainted of its sick effects. It can be predisposed to many injurious illnesses. Significance of fast food consumption highly impact on peripheral arterial disease and associated risk factor that predicts the upcoming cardiovascular events in university students.

In this territory, the PAD is increasing particularly in the ages 18-25 years and of all individuals with an ABI <1.0 demonstrates as a minimum one standard risk factor of coronary heart diseases, which needs to adequate concentration and an aggressive risk management

RECOMMENDATION

Excessive eating of fast food can have many ill effects so; it is recommended that media should disseminate knowledge among young generation about the detrimental effects of fast food. Strategy manufacturers should restrict or ban the unhealthy fast food restaurants. Additionally, fast food restaurants ought to utilize healthy nutrients in making of food.

We are so much busy in our lives that nobody actually believe what we are eating is right. It must be keep in minded that infatuation to fast food is great for industries. It is all in our hands to decide fast food or healthy food.

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RESEARCH REPORT

THERAPEUTIC EFFECTS OF ANKLE JOINT TAPING COMBINED WITH FUNCTIONAL ELECTRICAL STIMULATION FOR THE CORRECTION OF POST STROKE FOOT DROP

ABSTRACT

OBJECTIVE

Post stroke foot is inability to lift foot at ankle joint due to paralysis of ankle dorsiflexor muscles. It is a common problem faced by stroke survivors. To determine the effect of ankle joint taping combined with functional electrical stimulation on post stroke foot drop.

METHODS

It was an experimental study. 10 stroke patients with foot drop were enlisted for the study by convenience sampling and randomized into two groups. The group A or treatment group (n-5) received kinesiotaping of ankle joint and functional electrical stimulation while group B or control group (n-5) received functional electrical stimulation only. Clinical assessment was done before and after study. Outcome measures were Manual Muscle Testing, active ankle dorsiflexion and time up and go test.

RESULTS

Improvement was recorded in both kinesiotaping of ankle joint with functional electrical stimulation and functional electrical stimulation groups for MMT and active range of ankle dorsiflexion and there was no significant improvement in time up and go test. But statistically non-significant difference between both groups is observed ($Z=-2.000$, $p=0.46$).

CONCLUSIONS

These results indicate that there is no clear benefit of ankle joint taping combined with functional electrical stimulation for correction of post stroke foot drop.

Keywords

Foot Drop, Functional Electrical Stimulation, Ankle Joint Taping, Kinesiotaping, Dorsiflexion, Manual Muscle Testing.

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INTRODUCTION

Whenever there is lack of blood supply to the brain it results in loss of neuronal functions, it is called stroke. There are two major forms of stroke named as hemorrhagic stroke and ischemic stroke. Hemorrhagic stroke occur whenever the vessels which are supplying blood to brain gets ruptured and blood present in these vessels flows out causing compression on neural structures¹. The other most common type of stroke is ischemic stroke which takes place as a consequence of clot, blockage or disruption in blood flow. About 80% of individuals suffer from this type of stroke. This type of stroke has severe impact on the life of survivor. Three out of four patients face difficulty in executing activities of daily living (ADLs)². Such a stroke usually leads to impaired balance and incomplete control. It is linked with high incidents of falls which leads to reduced interest in independent walking and further reduces overall activities of the sufferer. One of the consequences of stroke is the paralysis which is the inability of a muscle or group of muscles to move on their own. After suffering a stroke, signals from the brain to different muscles fail to work properly. As a result of this harm one side of body become paralyzed and as time passes it become spastic. Spasticity is a failure of muscle to stretch. Indeed it does have an impact on the patient's fingers, arms and/or legs. It further leads to a stiff knee, a tight fist or an arm being pushed against the chest or a pointed foot or foot drop that interferes with walking. Concurrently, it may cause occurrence of painful muscle spasm. In clinical terms, the basic principle of rehabilitation of hemiplegic patients faced with stroke is the revival of individual's balance and gait capacity³. The stroke patients also face a general problem in ankle dorsiflexion, which leads to foot drop, since dorsiflexion is not easily controllable because it frequently enhances the muscle tone of triceps surai⁴. Spastic foot drop is a functional disfigurement which usually leads to extensive morbidity by impairment in patient's walk. It limits ones day to day activities due to ankle dorsiflexion during the gait cycle because it is dangerous for foot clearance; patient may fall down due to foot drop and face severe injury. Another cause for existence of spastic foot drop is the combination of weak ankle dorsiflexors and hyper activity of planter flexors (primarily gastrocnemius and soleus)^{5,6}. Apart from the problems with patient's walking restrictions, critical patients with severe problem due to spastic foot drop may limit their movement even in the presence of supporters due to unstable contact on the ground. Moreover, when ankle posture becomes uneven it may cause severe aching points within the shoe (or against the mattress) which can further lead to breakdown of the patient's skin⁷. The most important consideration of the rehabilitation is improving the way a patient's walks. Even after the recovery of patient's ambulatory function to a few degrees, the remaining gait defects also lead to sluggish walk movements, lead-

ing to high energy costs⁸.

According to the results of conventional assessment about 20% stroke patients experience spastic foot drop⁹. The topic that deals with the impact of ankle stabilizers on proprioception is quite controversial. A number of researchers have strong faith in taping and stimulating proprioceptive activity due to enhanced motivation of cutaneous mechanoreceptors¹⁰. Jerosch et al reported that when proprioception was analyzed utilizing angle reproduction tests, mistakes in proprioception diminished in a bunch of patients with ankle harm to which taping was connected¹¹. While some others have unfavorable activity due to tape and support^{12,13}. According to a study of Raymond et al who conducted meta-analysis, the ankle brace or ankle tape have no significant impact on proprioceptive activity in participants having functional ankle instability¹⁴.

Despite of the fact Kinesiotape is being extensively used for the purpose of rehabilitation protocols and also to prevent sports injuries in the healthcare field i.e. by physical therapists and athletic trainers. Evidence for the efficacy of Kinesiotape is yet limited¹⁵. According to SzczeGielniak J, et al who have assessed the effect of corrective foot positioning using KT application on gait velocity in patients after stroke by making using of a 100 meter walk test; the benefit of KT's corrective application in supporting neurological physiotherapy in patients after cerebrovascular stroke is quite significant. The use of KT is different for different conditions according to nature of tape or the muscle¹⁶. According to the Callaghan et al. that taping fundamentally enhanced the proprioception in those with generally poor proprioception in spite of the fact that it had little impact on those with abnormal proprioception¹⁷. Taping is known to enhance proprioception and by coming into contact with the skin, give increased skin proprioceptor signals¹⁸. Many interventions are used in the physical therapy hospitals for the treatment of foot drop. The most widely recognized treatment for foot drop has been the utilization of a lower leg foot orthosis (AFO). An AFO is an orthosis put on the paralyzed leg which latently holds the foot at around 90° from the shaft of the tibia which allows the foot to clear ground during the swing phase of the gait cycle. Studies examining the use of an AFO for the treatment of foot drop have reported reduced energy consumption during ambulation, enhanced postural sway, expanded standing symmetry, and an enhanced gait patten, particularly changes in step length and walking speed¹⁹. The disadvantage of using an AFO cause limitation in foot movement, contractures of planter flexors inability to ambulate over uneven surfaces, and the distress of wearing the orthosis²⁰. Functional Electrical Stimulation (FES) is another intervention for the treatment of foot drop post-stroke. FES utilizes electrical incitement to enhance the lower leg dorsiflexior muscles and

produce a muscle contraction during the swing period of gait. A typical FES unit found in the writing is the Walk Aide. The most common placement of the active electrode is over the common peroneal nerve, simply distal and dorsal to the head of the fibula allowing a combination of ankle movements, specifically ankle dorsiflexion and eversion²¹. Disadvantages to an electrical stimulator unit incorporate the high cost, which may not be secured under protection, vague position of terminals, discontinuous substitution of electrodes, and necessity of a starting set-up and re-adjustment all through the utilization of the unit¹⁹. Stroke patients generally experience a problem in ankle dorsiflexion due to paralysis of ankle dorsiflexors which result in foot drop. Improvement of walking pattern in the stroke patients is the most important factor. For the treatment of foot drop many physical therapy interventions are used. This study may help in understanding the role of ankle joint taping combined FES for the foot drop correction.

METHODOLOGY

Research Design and Sample Size

The present study is an experimental study. The participants of this study were ten stroke patients (n=10) including males and females with foot drop were included by their convenience from different hospitals in Karachi. The subjects were divided into two groups A and B for the purpose.

Inclusion Criteria

- Patients with post stroke foot drop more than 90 days.
- Age 40-80 years.
- Unilateral hemiplegia.
- Medically stable.
- Ankle dorsiflexors of no more than 3/5 on Manual Muscle Testing.
- If patient is using an AFO willing to remove it and comply with study needs.

Exclusion Criteria

- Requires KAFO to maintain knee in stable extended position during stance phase of gait.
- Pedal edema of affected lower extremity which interferes with the effective use of kinesiotape and FES.
- Known skin allergies and breakdown of skin of affected limb.
- Absent sensation.
- Severely impaired cognition and communication skills.
- Fixed planter flexor contractures

Procedure

The study period consisted of 3 months from August-September and general characteristics of subjects were surveyed before applying kinesiotape and functional electrical stimulation. Kinesiotape was applied to the foot using spring-assist technique also known as functional correction for ankle joint taping. This technique works while providing sensorimotor and mechanical stimuli to

promote dorsiflexion. Affected foot was shaved before applying kinesiotape to increase contact area. Firstly, the affected foot was positioned in full dorsiflexion passively then tape was applied from mid shaft of tibia to heads of metatarsals with 50-70% tension then foot was positioned in full plantar flexion passively and tape was rubbed to activate the adhesive power of tape. Because of this technique when the ankle moves in more plantar flexion it will increase tension in tape and provide more stimulus to dorsiflexors. Ankle joint taping was done for four weeks and tape was changed after 5 days of application.

Four electrodes of FES unit were applied on the motor points of dorsiflexors of affected foot using 300pps, ramp up time 3 seconds and ramp off time 6 seconds. After application of FES, participants were asked to walk 20 meters with their normal speed 5 days a week for four weeks. They were allowed to use assistive device during walk.

Outcome Measures

The outcome measures included Manual Muscle testing primarily, Goniometry of ankle dorsiflexion and Time Up and Go test secondarily.

Data Analysis

Data was entered and analyzed on SPSS version 20 for windows. All quantitative variables such as age were presented in frequency and percentage. To check the significance of the treatment, Wilcoxon ranked sum test was applied with p value less than 0.05 considered as significant.

Ethical Consideration

As a part of this study protocols, written consent was taken from all the participants after reading participants information sheets. They were allowed to withdraw at any time. Confidentiality of participant's personal information was maintained. Physical risks, psychological harms were minimized and patient privacy hygienic factors were given due importance.

RESULT

All participants completed the study. At the fourth week, results were extracted from the data collected from 10 patients (5 in kinesiotaping combined with FES group and 5 in FES group). No serious side effect was seen in any of the patient during the study.

There were 5 males and 5 females in our study. And 5 participants had left sided paralysis while 5 had paralysis of right side.

The level of function of participants of study was; two out of 10 patients were independent and they exercise regularly while 8 out of 10 were independent before stroke but they do not perform regular exercise.

Table 1 shows walking patterns of patients. Most of patients drag their foot during walk, few patients

adopted compensatory gait pattern that is; 2 patients hike hip during walk and 3 patients walk with hip circumduction to clear ground. Half of the participants present with unstable foot contact.

Table 1

Walking pattern	Hip hiking	Hip circumduction	Foot drag	Unstable foot contact
Yes	2	3	9	5
No	2	7	1	5
Total	2	10	10	10

Table 2 shows data of pre and posts treatment scores of MMT, range of active dorsiflexion, and TUG test of both case and control group.

Table 2

INTERVENTION		N	Mean Rank	Sum of Ranks
MMT P2- MMT P1	Negative Ranks	0 ^a	0.00	0.00
	Positive Ranks	4 ^b	2.50	10.00
	Ties	1 ^c		
	Total	5		
kt+fes GDP2 - GDP1	Negative Ranks	0 ^a	0.00	0.00
	Positive Ranks	4 ^b	2.50	10.00
	Ties	1 ^c		
	Total	5		
TUGP2-TUGP1	Negative Ranks	0 ^a	0.00	0.00
	Positive Ranks	0 ^b	0.00	0.00
	Ties	5 ^c		
	Total	5		
MMT P2- MMT P1	Negative Ranks	0 ^a	0.00	0.00
	Positive Ranks	4 ^b	2.50	10.00
	Ties	1 ^c		
	Total	5		
fes GDP2 - GDP1	Negative Ranks	0 ^a	0.00	0.00
	Positive Ranks	4 ^b	2.50	10.00
	Ties	1 ^c		
	Total	5		
TUGP2-TUGP1	Negative Ranks	0 ^a	0.00	0.00
	Positive Ranks	0 ^b	0.00	0.00
	Ties	5 ^c		
	Total	5		

A Wilcoxon Rank sum test shows that 4 week of treatment with ankle joint taping combined with FES and FES only elicit a statistically non-significant difference in correction of foot drop in individuals. (Z.-2.000, p=0.46) both group shows similar results as shown in the table 3.

Table 3 Test Statistics

INTERVENTION	MMTP2- MMTP1	GDP2-GDP1	TUGP2- TUGP1
KT+FES Z Asymp.Sig. (2-tailed)	-2.00 ^b 0.046	-2.00 ^b 0.046	0.00 ^f 1.00
FES Z Asymp.Sig. (2-tailed)	-2.00 ^b 0.046	-2.00 ^b 0.046	0.00 ^f 1.00

DISCUSSION

The survivor of stroke who are managed with rehabilitation have fewer complications and they achieve a greater level of independence as compared to those who do not follow any rehabilitation program, if the natural recovery process do not occur rehabilitation is expensive but only appropriate therapy program can be justified. Only variety of rehabilitation techniques and protocols prove good quality of the rehabilitation in terms of expen-

diture and psychological advantages.

This study assessed the therapeutic effects of ankle joint taping combined with FES on muscle strength, ankle dorsiflexion and TUG test and compared it with the control group who receive FES only in patients with post stroke foot drop. No significant difference in results was found between both groups. Different methods are used to increase the strength of ankle dorsiflexors and to improve active range of ankle dorsiflexion including PNF techniques, strengthening exercises, electrical stimulation or implantable FES. Although combined FES with rehabilitative treatment is accepted, but it cannot be said which treatment is more effective. Effectiveness of tapping has been mentioned in some studies, frequency of tape application and technique. So further studies are needed in future just as kinesiotope group without FES to identify clear role of ankle joint taping with kinesiotope.

The person suffering from this stroke have gait problems which is one of the leading impairments. It is recommended in our review that the FES therapy can be used with kinesiotope in the post-stroke rehabilitation process of patient with foot drop. The results of the study suggest, the combination of FES and the spring-assist kinesiotope contain a positive therapeutic effect on the activation, recovery of strength, functional mobility and gait but there was minimal increase in the amount of ankle dorsiflexors strength, being only a half grade increase. Even though a gain in strength is minimal but depicts a sign of a positive prognostic which results in gaining functional strength. No significant result was obtained within the required period of TUG test. To be comparative to initial trials the times taken by the subject to complete the test were same or increase in many of the subjects. Therefore in this study, no specific measures concerning gait parameters were performed. At the end of the study, request was made to the patients with the kinesiotope complaint to continue the treatment. The patient or subject did not complain of discomfort or any type of diverse skin reaction at taping side. FES is an acceptable treatment of foot drop despite of its many drawbacks. High coast, placement and replacement of electrodes and requirement of initial setup of FES unit are included in the treatment through FES. The patient or subject did not complain of discomfort or any type of adverse skin reaction at taping site. FES is an acceptable treatment of foot drop despite of its many drawbacks. High coast, placement and replacement of electrodes and requirement of initial setup of FES unit are included in the treatment through FES. Those subjects who were trialed with both FES and kinesiotope are said to have an improved ability for the movement of their ankle with comfort and can walk comfortably in a normal way. Patient also reported that decreased energy expenditure was required during ambulation.

Although TUG score showed no improvement on the basis of normative data still high risk of falling is present in the patient as a number of movement activities like sitting standing and moving ahead and turning around 180 degrees is involved.

Research investigation to increase muscle strength, function and mobility by kinesiotape and FES therapy seems to be quit less and inconsistent as there are no articles in the literature on combined therapy concerning lower extremity. A single reported case found in the literature documenting the use of kinesiotape for the intervention of shoulder subluxation in a post stroke patient. The report says that kinesiotape may contribute to decrease pain better than glenohemural joint alignment and enhanced neuromuscular recruitment of the rotator cuff muscles²².

Marmara University School of medicine, Istanbul examined the combine effect of kinesiotaping with botulinum toxin to improve spasticity of ankle plantar flexors and find no significant decrease in spasticity.

Studies that examine the therapeutic application of kinesiotape to a population with prior muscle weakness report positive results. This trend shows that kinesiotape give more subtle muscular effect which centers more on increasing neuromuscular recruitment rather than increasing healthy muscle strength.

Cheng J.S et al. studied the therapeutic effect of combined electrical stimulation with active ankle dorsiflexion while standing on rocker board with spastic foot drop and their results suggest that ankle spasticity can decrease with repeated electrical stimulation plus ankle movement in stroke. Whereas another study compared the conventional therapy and multifunction FES and find improvement in MFES combined with conventional therapy as compared with conventional therapy alone and these better results were achieved by enhancement of motor learning by MFES.

A study was conducted in Republic of Korea on effects of lower leg kinesiotaping on balance abilities of stroke patients with foot drop in which they use kinesiotape to shaft of tibia and ankle and supportive anchors were applied for stability. They use BBS for assessment of balance ability and concluded that temporary kinesiotape application have good effect on stationary balance however, in our study we use kinesiotape for 5 days per week for four weeks and assessed the strength of dorsiflexors²³⁻²⁵.

Therefore to quantify the treatment effects and to examine the degrees in which the kinesiotape and FES facilitated improvements longer studies are

required. Research should also investigate the influence of kinesiotape and FES therapy on specific gait parameters.

CONCLUSION

Application of kinesiotape and FES seems to be an effective addition to stroke rehabilitation. After periods of FES training and kinesiotope application patients show carry over effects. The results indicate that the combined treatment of kinesiotape and FES effectively improved function, muscle strength and walking ability in the management of foot drop with stroke patients, however further research is needed and encouraged, especially with FES systems.

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RESEARCH REPORT

COMPARING THE EFFECTS OF CERVICAL TRACTION AND CERVICAL MOBILIZATION IN THE TREATMENT OF CERVICOGENIC HEADACHE

ABSTRACT

OBJECTIVES

The purpose of this study is to ferret out the immediate results of traction or mobilization in neck pain patients and to determine which one is more effective.

STUDY DESIGN

An Experimental study.

STUDY SETTINGS & PARTICIPANTS

The study was conducted in outpatient departments of tertiary care hospitals and clinics having well developed physiotherapy center. The participants include individuals having upper extremity pain and numbness and have three out of four cervical nerve compression test positive.

INTERVENTIONS

Treatment was given for three days in a week for a consecutive period of two weeks which includes traction and cervical mobilization techniques of Mulligan.

OUTCOME MEASURES

The outcome was measure using VAS and Neck Disability index scale. The data was analyzed by using SPSS version 20

RESULTS

Patients (N=50) were screened out of which 30 were found eligible. The effect of traction and mobilization in the treatment of cervical radiculopathy patient was same. Both the interventions were found to be equally effective in reducing the disability and pain of the patient.

CONCLUSIONS

This study has concluded that the effects of traction and mobilization in the treatment of cervical radiculopathy patient were same. Both the interventions were found to be equally effective in reducing the disability and pain of the patient.

Keywords

Cervical Spine, Neck Disability Index (NDI), Visual Analog Scale (VAS), Natural Apophyseal Glides (NAGS), Sustained Natural Apiphysal Glides (SNAGS), Manual Traction.

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INTRODUCTION

In cervical spine, the most common symptoms are pain and discomfort that may occur due to reduce disc spaces between the cervical vertebrae, muscular weakness or trauma¹, often caused by damage in the vicinity of the root of a spinal nerve. The medical term for this cervical condition is known as cervical radiculopathy. Cervical nerves leave the cervical spine (neck) at each level, excluding the last one (C₇) and then branch out to offer muscles of upper limb that enables the shoulders, upper arms, arm, muscle of hands and fingers to function. These nerves bring sensory and motor fibers to the skin and muscles that provide consciousness. When any nerve root in the cervical spine is irritated through firmness or inflammation, the symptoms can radiate along that nerves pathway into the arm, forearm, hand and fingers. The patient's specific cervical radiculopathy symptoms depend on nerve which is definitely be affected. The most common causes include; cervical herniated disc, cervical spinal stenosis and cervical degenerative disc disease.

It may also occur due to heavy manual works, seated and sedentary life style and may also be due to improper posture. The symptoms of cervical pain often last for prolonged periods of time or in some cases, over the entire life. The symptoms include neck pain, headache, parasthesia, numbness and scapular pain²⁻⁵. Neck disorders are difficult to cure and sometimes it become worse, therefore emphasis on the primary prevention is necessary.

There are three main reasons for neck disorders; the load on the neck structures is maintained for prolonged periods of time, and the need of stabilization of the neck-shoulder region when working with the arms, Jobs that required high concentration which induces an increased activity in neck muscles and degenerative changes that occur in vertebrae due to the process of aging which causes an increase in pressure on nerve due to the reduction of spaces between vertebrae leading to radiculopathy⁶. It is also likely that the rate of degeneration increases as a result of physical demands of the job.

The cervical vertebrae provide a bony covering to the spinal cord from which the cervical nerves arises on both the sides. These nerves leave the cervical spine from an opening known as foramen and travel down to neck, upper back and arm.

Cervical radiculopathy is a compression of the cervical nerve due to the reduction of spaces between the cervical vertebrae that causes pain and uneven sensation at the areas of the upper extremity depending on where the broken roots are supplying^{2,7}. The nerve travels into neck, upper limbs

and arm. It is a painful condition due to the pinching of nerve as it leaves the spinal cord. The pinching of the nerve is caused either by the degenerative bony spurs arising from the neck or by herniated disc material.

In Cervical radiculopathy, pain travels down the arm in the area of the nerve supply. Pain is usually sharp in nature. Individual can also suffer "pins and needles" sensation or even some time may be complete numbness. In addition, there may be muscular weakness with certain activities.

Treatment of cervical radiculopathy includes; pain medications, corticosteroids (powerful anti-inflammatory drugs) or non-steroidal pain medication like ibuprofen.

Physiotherapy interventions include; traction and cervical mobilization, and other modalities that are heat and cold to reduce pain.

Mobilization also known as non thrust manipulation is a commonly used treatment for patients with a variety of neuro-musculoskeletal disorders as explained by Maitland 1985. It is passive, skilled manual therapy technique applied to joints and related soft tissues at varying speeds and amplitudes using physiologic and accessory motions for therapeutic purposes⁸. It is used to detect and treat soft tissues and joint structures for the reason of modulating pain, increasing range of motion (ROM), plummeting or eliminating soft tissue inflammation; inducing relaxation, improving contractile and non-contractile tissue repair, stability, facilitating movement, and improving joint function.

Joint mobilization of the neck includes stabilizing one bone of the joint while the other bone is moved into the realm of the joint play. Joint mobilization of the cervical spine is a very delicate technique that requires great skills as the range of the joint play is very small. It is important to perform the joint play very carefully and attentively. Joint mobilization plays a pivotal role in the treatment of both hypomobility and pain which is evident from various research studies.

Mulligan techniques are modern techniques and are very much effective in the treatment of cervicogenic headache. Nowadays, these techniques are precisely used to mobilize the spine of a patient having vertebral joint problem⁸. Mulligan provided three best techniques that are NAGS, SNAGS and Reverse NAGs to treat the patient with cervicogenic headache⁹⁻¹⁰. Numbers of studies have provided the evidence that these techniques are providing beneficial support in improving the pain and neck disability of a patient with cervical vertebrae problems. The effect of Mulligan's technique and traction along with other conventional Physical Therapy modalities like Trans-Cutaneous Electrical

Nerve Stimulation with Hot Packs and Ultrasound Therapy are found to be effective in the treatment of cervical patient but the effectiveness of Mulligan's techniques and Traction alone along with the conventional Physical Therapy modalities are the subject which was untouched by the researchers yet and it is for this reason, the current study is based on the comparison of these two intervention strategies that is Traction and Mulligan's Techniques in the treatment of cervicogenic headache.

Traction of spine is a technique through which a pressure from the spinal nerves can be relieved by pulling the vertebrae a part from each other thereby causes the stretching of nerve, ligaments and muscle and also reduces adhesion in the dural space¹⁰⁻¹³. At low intensity it is used to stretch the spinal muscles as well. Normally a force of 20-30 pounds is required. It can be done either manually or mechanically. Mechanically it is done via using a large range of machineries whereas manually it is usually done by medical or rehabilitation expert.

Traction allows the facet joints to slides thus causes increase in blood supply and relieves pressure on the spinal cord, its vessels and nerve roots^{11,14}. The increase in blood supply allows the drainage of chemical substance that cause inflammation and pain whereas it also decreases the nervous excitability which is also a cause of pain.

METHODOLOGY

This was an experimental study design. Subjects were randomly selected and were distributed into two groups, for Group-1 subjects were treated with manual mobilization at cervical level while the other Group-2 was treated by manual traction program. Mulligan techniques; NAGs, SNAGs and Reverse NAGs were used as an intervention technique for patients from Group 1. The effectiveness of the treatment given was measured by using two different kinds of scales. The first was Visual Analog Scale and the second was the Neck Disability Index Questionnaire. A pain diagram was also used to locate the area of pain. All these forms were to be filled by the participants after the treatment session and the result were measured to find out the effectiveness of the treatment. The intervention was given for three days in a week for a consecutive period of two weeks, the participants were also be intervened by other pain relieving modalities like TENS and Ultrasound which remained the same for both the groups in order to extract out the effectiveness of traction and mobilization alone the other therapeutic interventions were kept same for both the groups. The patients from both the group also performed stretching and the strengthening exercises of the neck muscles in order to provide long term benefit of Physical Therapy interventions.

Sample Size and Selection of Data

30 patients were selected and randomly divided into two equal groups depending on the inclusion and exclusion criteria

Inclusion and Exclusion Criteria

Inclusion criteria includes; patients having upper extremity pain and numbness and 3 out of 4 clinical prediction rule positive i.e spurling test, distraction test, upper limb tension test and ipsilateral cervical rotation < 60. Exclusion criteria include cervical spine surgery, upper motor neuron disease, red flags like tumor, fracture and intake of medication like steroids.

Collection of Data

Assessment forms were used for data collection. The participants were required to fill the questionnaire in which their demographic information and past and present medical and surgical history were recorded. The participants were assessed according to the data provided by them and recruited randomly in one of the two groups for intervention strategies and then those participants were selected who met the inclusion criteria and who agreed to participate in the study with their informed consent.

Data Analysis Strategies

The outcome measures were VAS and NDI scale. The Data gathered was than analyzed by using VAS and NDI scale through SPSS version 16.

Ethics and Human Subject Issues

Ethical issues considered in my studies are following
1-Confidentiality statement was issued to all as an important aspect of personal security.

2- Beneficence of the study was identified before the conduction of the study and it was noted that the study does not have any such thing which could be harmful for the participants or have such thing which can overshadow its effectiveness and its patient-centered approach.

3-Consent from participants was taken as it is a legal procedure to ensure that a patient or client knows all of the risks and costs involved in treatment.

4- Participants had the right to with draw from study at any time.

5- Data collection and intervention in the hospital were done after taking permission from Head of department of Physiotherapy.

RESULTS

Patients (N=50) were screened, out of which 30 were found eligible having the mean age in years 34.36 ± 8.244 gave their consent to participate in the study. This included 14 male and 16 female participants. The mean age of male patients were 36.57 ± 8.32 and the mean age of female patients was 32.43 ± 7.92 .

The result of the study has shown that in both groups the outcome of intervention was same, the mean VAS is reduced by 37% and mean NDI is reduced by 44% respectively by traction intervention and mean VAS is reduced by 38% and NDI is reduced by 46%

respectively by mobilization intervention. The effect of traction in the handling of cervical radiculopathy patients as observed in the neck disability index questionnaire and on visual analog scale before and after the treatment is shown in table 1, which clearly indicated that the traction alone has a beneficial effect in reducing the disability and the pain of the patient, as before the intervention to group 1 the mean disability in patients due to cervical radiculopathy was 37.33% which reduced to 16.8% after the treatment.

Intervention Traction			
	N	NDI	VAS
		Mean ± SD	Mean ± SD
Before	15	37.33 ± 19.21	6.46 ± 1.6
After	15	16.60 ± 11.88	2.4 ± 1.8

Similar effects were also seen in the intervention from mobilization, where the mean neck disability of the patients according to the neck disability questionnaire was 36.8% which reduced to the mean of 17.2% after the treatment of two weeks and the pain is reduced from 6.26 ± 1.27 to 2.40 ± 1.54 as shown in the table 2

Intervention Mobilization			
	N	NDI	VAS
		Mean ± SD	Mean ± SD
Before	15	36.8 ± 15.76	6.26 ± 1.27
After	15	17.2 ± 8.99	2.40 ± 1.54

DISCUSSION

This Randomized Controlled Trial was done on patients having Cervical Radiculopathy to investigate the effect of Traction and Mobilization in the treatment of Cervical Radiculopathy. The subjects were divided into two groups. Group 1 was given traction and group 2 was treated by mobilization. The results were taken on Neck disability Index Questionnaire and on Visual Analog Scale which were filled by the patient after the treatment. The treatment was given for two weeks, three days per week and the results of treatment given were compared from day 1 and day 6. Although, results obtained show significant effect of reducing disability and pain in patients having Cervical Radiculopathy. There was no significant effect noticed to ferret out which one of the two treatments was more

effective for Cervical Radiculopathy. The Neck Disability Index Questionnaire and the Visual Analog Questionnaire were filled by the patient each day after the treatment and the data of each day of treatment was obtained and calculated. The techniques used for cervical mobilization were NAGS, SNAGS and Reverse NAGS and traction. We used Manual Traction and teach the patients to perform self traction at the level of cervical vertebrae. The patients from both the groups were also intervened by neck strengthening exercises and the pain relieving modalities like TENS and Ultrasound. Studies have also shown that restoration of normal biomechanics of Thoracic Spine may also have effect on lowering the stress on Cervical Spine¹⁵. No effect of manipulation technique has been studied under this study and no intervention regarding Cervical manipulation were given to the patients under this study as considerable amount of care is required to give manipulation at the level of Cervical Spine¹⁶⁻¹⁸. Strengthening of the scapulothoracic, deep neck flexors, cervical retraction as well as extension exercises were used for the treatment of Cervical Radiculopathy¹⁹⁻²⁰. Cervical retraction exercises were found effective in the treatment of neck pain and to improve the resting neck posture of the patient²¹, the exercise was also found effective in reducing the compression at cervical vertebrae²².

This study has supported the previous study regarding the conservative treatment of Cervical Radiculopathy and cervicobrachial pain²³⁻²⁵.

CONCLUSION

This study has concluded that the effect of traction and mobilization in the treatment of cervical radiculopathy patient was same. Both the interventions were found to be equally effective in reducing the disability and pain of the patient. The disability of the patients was measured by neck disability index questionnaire and pain was assessed by Visual Analog Scale. The other conventional intervention that were used TENS, ultrasound and exercises were kept the same for both the group. The neck strengthening exercises including strengthening of scapulothoracic, deep neck flexors and scapular retraction were taught to both the groups and were asked to perform at home as a home rehabilitation programmed.

Indeed the effect of Cervical Radiculopathy is disabling and it is vital to carry out more researches on this topic

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RESEARCH REPORT

ASSESSMENT OF KNOWLEDGE ABOUT VITAMIN-D DEFICIENCY AMONG UNDERGRADUATE STUDENTS IN PRIVATE SECTOR UNIVERSITY

ABSTRACT

BACKGROUND

Vitamin-D commonly known as Ergocalciferol (vitamin D2) & Cholecalciferol (vitamin D3) promotes the absorption and metabolism of calcium. Among children scarcity of vitamin D may cause rickets whereas osteomalacia both in adults and children having relevance with less circulating concentrations of 25OHD that is less than 20 nmol/L.

OBJECTIVE

To assess knowledge of undergraduate students about vitamin-D deficiency in various private sector universities of Karachi.

STUDY DESIGN

A cross-sectional study was conducted where structured questionnaire were distributed

STUDY SETTINGS & PARTICIPANTS

The targeted population was 100 subjects currently enrolled in medical universities.

RESULTS

According to the descriptive analysis, 100% students were aware of the importance of Vitamin D. However, only 38% of them knew that the deficiency of Vitamin D can cause tiredness, low mood, muscle and bone pain. 64% knew the beneficence of exposure of 10-15% of sunlight.

CONCLUSION

Students of private medical universities are aware of Vitamin D deficiency and its importance but its implementation is absent.

Keywords

Osteomalacia, Rickets, Vitamin D deficiency, Osteoid, Trabecular Bone, Cholecalciferol, Ergocalciferol

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INTRODUCTION

Among children Vitamin D deficiency may cause rickets as well as osteomalacia both in adults and children. Rickets is illustrated as a delay or stoppage in the bone formation of long bones that inculcate the demolition and elimination of cartilage and the formation of osseous tissue in area that was previously filled with cartilages at their developmental ends¹. In Osteomalacia, the demineralization of osteoid on the cortical surfaces occur and trabecular of the bone is coupled with broadened osteoid closure and existence of looser zones². Altogether the fore-mentioned stipulations may be in confederation with hypocalcaemic fits, pain and paresis in the upper and lower extremities, respiratory, and cardio vascular structures. Reduced vitamin D, is also coupled with augmented menace of other diseases, as mainly osteoporosis, ailment of cardiovascular complex and various cancerous growth². Quantifiable vitamin D insufficiency remained typical within various countries till the mid of previous century. Programs like strength training and upturns in the eminence of natural air have greatly repudiated osteomalacia and rickets from wide-ranging populace of Europe and North America³. Prevalence of rickets, on the other hand, remains despicably far above the ground in numerous regions of Asia, Middle East, and Africa^{3,4}. The worldwide osteomalacia's prevalence in adults is not so easy to measure for the reason that at present there are just a very few literatures available carrying relevant reports and chances that they remained nonspecific and set off unnoticed. Still, it is logical to presuppose that in areas wherever rickets is common in children, there are more chances of osteomalacia in adults, in-particular pregnant women and the elderly.

The long-lasting blood stream substance of vitamin D, 25-hydroxyvitamin D (25OHD), is an essential indicator of vitamin D inadequacy. The formation of this specific vitamin occurs in liver, imitates the vitamin D dispensing from integument and diet. There is a relationship of low circulating concentrations of 25OHD, usually less than 20 nmol/L (8 ng/mL; 2.5 nmol/L = 1 ng/mL) with rickets and osteomalacia. The congregation of 25OHD in plasma is benefited to soft peculiar person at stake of vitamin D insufficiency disease, based upon the populace with speculated sufficiency of vitamin D supply⁵.

There were notarization in recent past to classify vitamin D adequacy as blood stream 25OHD concentration >50 nmol/L (20 ng/mL), >75 nmol/L (30 ng/mL), >80 nmo/L (32 ng/mL) and >100 nmol/L (40 ng/mL)⁵. Additionally, there were entitlements to a tolerated level by recent safety data, as for the purpose of recapitulation in the recent upper intake level (UL) for cholecalciferol 50 µg/day, to be acceptable in blood stream it can be gained by all nutritional resources⁵.

Maintenance of normal blood pressure is the prime and important domain of Vitamin D as well as the maintenance of normal blood levels of calcium and phosphorous. Assimilation of calcium is also augmented by Vitamin D, which helps in the preservation and modulation of stronger bone. It is utilized, unaided or in addition with calcium, to boost bone mineral density and minimize the causes of fractures. In children, insufficiency of vitamin D ends up in rickets that causes skeletal deformities. While In adults osteomalacia is the main hallmark of its insufficiency which does not end up in bones weakness but of muscles too.

According to one study conducted across the community in Karachi, in 2012, the prevalence of Vitamin D deficiency and its correlates. A cross sectional study among randomly selected communities was done for the determination of occurrence and risk factor of Vitamin D deficiency among females. Data was collected on the variables like housing construction, nutritional intake and sunlight exposure. Serum Vitamin D3 levels were calculated, along with its mean and SD values were also calculated. ANOVA and Chi-square were also used for auxiliary analyses of data. Out of 305 premenopausal females most of the females were vitamin D deficient. This was such a high prevalence observed in females in that specific community it was found out that for the incidence of conditions associated with the in appropriate levels of vitamin D there is always a requirement of an immediate action in regards of supplement intake³.

Another local study was done at Agha Khan University Hospital Karachi in 2012 about correlation of Vitamin D with sunlight exposure duration the advancement and validation of sunlight exposure measurement questionnaire (SEM-Q) which was used in grown-up populace dwelling in Pakistan.

This study was developed to evaluate exposure to sunlight in healthy adults in Karachi. Fifty four healthy individuals were included according to their exposure to sunlight (high=17, moderate=18, low=19). The individuals who were the research subjects were asked to put on a dosimeter and spent time in the sunlight. The samples of the blood were taken for serum vitamin D. The coalition between the levels of vitamin D and average score was found to be 0.36 (p= 0.01). It was concluded that the questionnaires about sunlight exposure measurement were efficient tools to make the most of in great epidemiological studies to calculate sunlight exposure⁴.

As per one international survey based study conducted at Hong Kong in 2006 on the subject of the knowledge of vitamin D and perceptions and attitudes towards sunlight among Chinese middle-aged and elderly women. The rationale of this study was to evaluate awareness about Vitamin

D among 547 middle-aged and aged women who were Chinese in origin but dwelling in Hong Kong, an interview survey through phone was done in which Computer Assisted telephone technique was used. A random sampling was done in the study to evaluate understanding of vitamin D amongst inhabitants by the side of marked threat of impaired vitamin D status, bones of poor health, and osteoporosis. The results revealed that most of the females were unaware regarding the function of sunlight in the production of vitamin D. There were little understanding about the function and sources of vitamin D. Most of the younger females were trying to avoid sunlight, although they had sufficient knowledge of vitamin D⁵.

One study was done through qualitative survey at Riyadh, Saudi Arabia with the topic knowledge, attitude and practice regarding vitamin D deficiency among female students in Saudi Arabia. Eight comprehensively one-to-one and one focused group semi-structured interviews carried out, evaluated and analysed. Contestants had inadequate knowledge in relation to vitamin D and its scarcity. They reported imperfect sun exposure because of severe heat, edifying grounds for covering the body, and the cultural issues as well due to which there was difficulty in getting sunlight exposure⁶.

Another cross-sectional descriptive study was done at a hospital in Oslo, Norway, with a population of multiple ethnicities with the subject to inspect vitamin D gradients in patients with headache, pain in soft and hard tissues, and tiredness in the absence of any obvious cause. A general practitioner (GP) referred 572 patients who came up with the complain of muscular and bone pain, headache, or tiredness, for assessment of hypo vitaminosis D. Inclusion criteria was both male and females from all age groups, the patients' inhabitant countries were: South-East Asia, America and Europe (n = 83), Norway (n = 249), and the Middle East, South Asia and Africa (n = 240) since the actual conclusion was Vitamin D levels (25-hydroxyvitamin D) in nmol/L. and it was found out the diagnosed hypo vitaminosis D (25-hydroxyl vitamin D <50 nmol/L) recognized in 58% of patients whereas rest of the other were with negligible seasonal differentiation of levels. Every second women from these countries had vitamin D level below 25 nmol/L. vitamin D levels were lower in patients who had headaches with comparison to the sufferers with other signs and symptoms. 15% of the person with the vitamin D levels < 50 nmol/L reported headaches, in comparison to 5% of individuals with normal vitamin D levels. Therefore, the study revealed a high incidence of hypo vitaminosis D in patients with non-specific muscles and bone pain, or tiredness or headaches for whom the general physician inferred a low

vitamin D level⁷.

One of the study that was conducted by the Occupational and Social Medicine unit at University of Gottingen, Germany that was published in 2010, 294 patients were included through a randomized double blind trials of supplements of vitamin D with compare to the placebo for the treating chronic pain conditions in adults. Two authors, who were reviewing, autonomously chose the studies for inclusion, evaluated procedural quality, and hauled out data. Analysis in a group was not done due to scarcity of data with the previous knowledge of that Vitamin D is formed in the dermis after its exposure to sun-light and can also be attained all the way through food. The deficiency of Vitamin D has recently been associated with variety of diseases together with chronic pain. Circumstantial and observational evidence recommends that in the etiology of chronic pain conditions there may be a role of vitamin D deficiency⁸.

METHODOLOGY

Study Participants & Settings

Respondents from undergraduate program of pharmacy and physiotherapy domains were selected.

Study Design

Cross-Sectional study.

Sampling Technique

Randomized sampling technique was used.

Sample Size

100 subjects were selected from Private Universities in Karachi. The prepared questionnaire regarding the awareness on the topic of deficiency of vitamin D and the role of sunlight exposure in vitamin D deficiency is provided to respective students including Pharmacy and physiotherapy program.

Inclusion Criteria

1st, 2nd, 3rd and final year students of their respective graduate programs were included in this study.

Exclusion Criteria

Teachers, Medical professionals and general public were not included in this study.

Data Collection Procedure

Randomized survey after distributing the questionnaire

Ethical Aspect

Ethical research committee has approved.

Data Analysis Procedure

The collected data is analyzed to conclude the knowledge level of these students in relation to the awareness of vitamin D deficiency and sunlight exposure. To analyze the results SPSS was used

Data Collection Tools

The selected subjects were guided properly to fill the questionnaire according to the academic knowledge provided in their respective universities or the information they acquire from other

academic sources.

RESULTS

Figure 1: Vitamin D deficiency causes

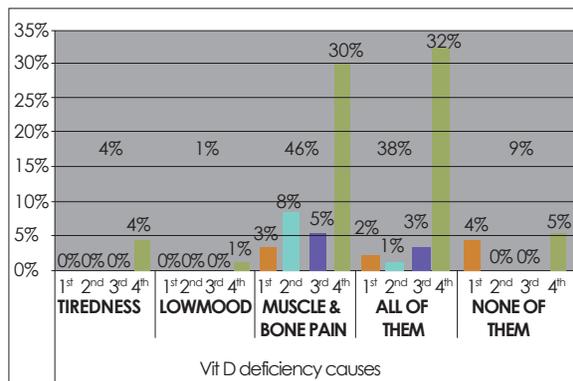
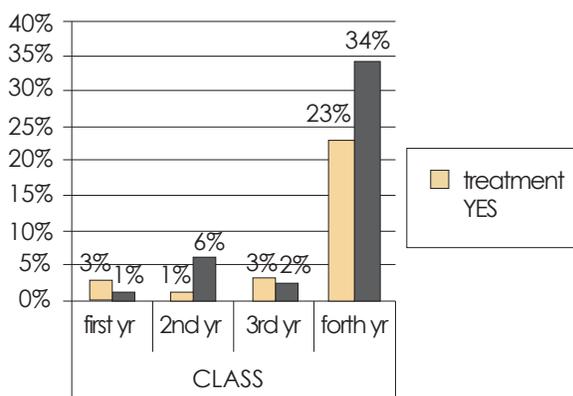


Figure 2: Ever taken any treatment



The mean age of the Respondents was 21.67 years + 1.393. 36% students know that Vitamin D is important for health and is required for calcium absorption while 3% had no knowledge about what Vitamin D does as shown in table 1. 38% of the students had the knowledge that deficiency of vitamin D causes tiredness, muscle pain and low mood as shown in Figure 1. 18% took Vitamin D supplements, 84% took vitamin D enriched foods like milk, fish, oil, egg and so many. 36% experienced muscle pain and fatigue for more than a week. 43% took treatment for pains and fatigue figure 2, 11% took analgesics, 7% took physiotherapy treatment, 6% took vitamin D supplements and 6% took sun exposure. 4% said vitamin D deficiency can cause tiredness, 1% said low mood, 46% said it causes muscle pain and fatigue while 38% said that its deficiency causes all of them figure 2. About 42% liked to go into the sun, 51% took sunlight exposure in the afternoon while 44% took in the morning, 64% know that early morning sunlight

exposure for 10-15 is beneficial for health.

Table 1: importance of Vitamin D:

Responses	Percentages
Yes	36%
No	61%
No response	3%
Total	100%

DISCUSSION

Luminosity of the sun rays radically inflict to diurnal yielding of vitamin D, not only that just 10 minutes of sunlight exposure is considered as sufficient to put off deficiencies. Two formulations of vitamin D: ergocalciferol (vitamin D2) and cholecalciferol (vitamin D3). Vitamin D3 is engineered in epidermis of human skins after its exposure to ultraviolet B (UVB) rays from solar resources^{6,8}.

One of the principal nutrients of the human body is Vitamin D. This study's contemplation is to embed many health benefits of vitamin D, part that the deficiency of vitamin D plays in increasing peril of many general and severe diseases, together with few commonly occurring cancers, adult onset diabetes, cardiovascular disease, and osteoporosis⁹⁻¹¹. This important nutrient has the contribution to healthy bones and to control amount of calcium in the blood. But it is really very difficult to obtain the regular prescribed amount of vitamin D¹²⁻¹³. Therefore vitamin D deficiency cases are increasing day by day. It is important to aware the people about Vitamin D sources and deficiencies causing severe outcome^{14,15}. First of all, low cost far and wide vitamin D supplementation availability should be made possible. Secondly, genuine urges to identify some important resources of Vitamin D and implementing it in the daily diet^{7,16}. Unfortunately in today's modern era still the health care professionals are not well trained¹⁷.

From the sample size out of 100 every student regardless of his class had the knowledge about Vitamin D, all of them knew that Vitamin D is required for calcium absorption while the study conducted at Prince Sultan University Riyadh the students were not aware of Vitamin D and its importance^{3,6,18,19}.

Our study revealed that very lesser amount of students i.e. 38% had the awareness that Vitamin D deficiency can cause low mood, tiredness, muscle pain and fatigue while the interventional study conducted at Oslo, Norway and it had been found out that Vitamin D deficiency can cause low mood, tiredness, myalgia and fatigue^{7,20,21}.

In this study only 6 % students responded that for muscle pain and fatigue they took Vitamin D supplements or sunlight exposure while the study conducted at Occupational and Social Medicine unit, University of Gottingen Germany with the purpose of demonstrating the association of vitamin D supplements and sunlight exposure with myalgia and fatigue^{9,22}.

Students had the knowledge that early morning sunlight exposure for 10-15 minutes is essential for body's daily vitamin D requirement which had already been proven by the study conducted by Agha Khan university hospital, but this duration is for maximum body exposure if people are going in sun with just hands, feet and face exposed than this duration is very less²³⁻²⁵.

CONCLUSION

Students of pharmacy and physiotherapy of Pakistani universities are more aware of Vitamin D and its importance that it causes low mood, tiredness, myalgia and fatigue and one can overcome it by taking vitamin D supplements and sun exposure but knowledge about the proper timings and duration is still lacking.

RECOMMENDATION

Since students are aware of importance of vitamin D and the effects that its deficiency can cause so they can run a campaign initially on a small scale and later on a larger scale that initially instead of taking analgesics for muscle and bone pains people should start taking vitamin D through the natural resources.

And as the lab tests for Vitamin D levels are so expensive so, if it will be the first line of remedy, people get benefit out of it than it may be cost effective.

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RESEARCH REPORT

DETERMINE THE RELATIONSHIP BETWEEN LOW (LIGHT) PHYSICAL ACTIVITY AND ACADEMIC PERFORMANCE IN UNIVERSITY STUDENTS

ABSTRACT

BACKGROUND

Sedentary lifestyle has widely increased in people of all ages; in present era due to vast development in science and technology, mostly students prefer indoor activities which negatively influences their health. Sedentary lifestyle is not only a risk factor for non-communicable diseases but it also causes several mental and psychological disorders which negatively affect the academic performance of students.

PURPOSE

To determine the relationship between light physical activity and academic performance in university students

STUDY DESIGN AND SAMPLE SIZE

Observational study and it consists of 178 participants.

METHOD

Closed ended Questionnaires were distributed among all participants, then the data was entered in SPSS 16 software and results were analyzed

RESULTS

Pearson Chi- Square test was applied to determine the co-relation between physical activity and academic performance. Correlation between light physical activity and academic performance showed non-significant results ($p = 0.39$).

CONCLUSION

Correlation found between both variables was non-significant. However, physical activity has various helpful effects on mood and other fatal diseases.

Keywords

Physical Activity, Academic Performance, CGPA, University going students, Sedentary Lifestyle, Exercise, Age.

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INTRODUCTION

Physical activity is defined as any movement performed by skeletal muscles that require energy¹. Physical inactivity is the 4th leading mortality risk factor that accounts for 3.2 million deaths worldwide¹. Academics are related to education² whereas achievement is something which is accomplished or have been done through hard work; accomplishment is something that is expressed as a condition keeping in mind the end goal to fulfill something².

Physical activity and sports are commonly promoted for their constructive effect on children physical health. Furthermore, strenuous exercise among adolescence results in a decline in cardiovascular risk. Moreover, it is also suggested that physical activity has valuable psychological effects on well-being, including health-related quality of life and improved mood states³. It is remarkably believed that by involving in regular physical activity, cognition level and brain function has been improved, which is associated with positive physical and psychological health⁴. According to Sharon book of fitness and wellness, people having sedentary lifestyle, walk less than 5000 steps in a single day whereas low physical active people are those who take 5000-7499 steps per day⁵.

Physically active and fit Individuals have a tendency to perform better in academic examinations⁶. Continuous assessment or examinations are the tools commonly used to measure academic achievements⁷. The accessible confirmation demonstrates that youngsters who are physically active and fit have a tendency to execute better in classroom so giving time to physical activity does not negatively impact their grades in examinations⁶.

We believe that light physically active students are more active academically and perform better than students with sedentary life style. Furthermore, improved cerebellar functions, energy levels, understanding, self-worth, and actions have been attributed to physical activity hence it improves academic performance⁸. Physical activity and academic performance shows a constructive relationship with each other⁸. Whereas, the perception about non-academic activities is that it has negative impact on academic performance⁹.

Physical education and other physical activity programs are significantly important in secular education as budgetary constrained physical education program had been neglected⁶. Today's most prevailing issue about health in our children is obesity⁶. Approximately 25 million children are obese and have low physical activity level which is a contributing factor to the epidemic that accounts for more than one third of kids and adolescence⁶. Children who have sedentary or inactive life style

during childhood are at greater risk for developing obesity and cardiovascular diseases in adulthood⁹. Physical inactivity is an important element which leads obesity in population. Stationary position for long time, for example, continuously watching television, PC use, playing computer games and cell phone usage have to be discouraged¹⁰. However, there are some studies addressing this issue that either physical activity have effect or not and these studies have mixed results⁹. Furthermore, in some cases there is a total decline in school based physical activity program worldwide and time for physical education has been decreased in some educational institutions⁶.

Academic performance is never affected by daily physical education. Moreover, children perform better in class rooms that are physically active⁶. Moreover through physical education, outstanding learning environment can be provided in school which leads to the improvement in health of the children⁶. At least, an hour of moderate physical activities is being prescribed by most specialists, almost five days in a week for physical action, but only 3.8% of elementary schools provide daily physical activity education that is very disappointing which results in the lack of physical activity among children⁶.

In kids, there is a positive association between physical activity and cognitive performance¹¹. Improved mind function in addition to its nourishment, higher strength, absorption level, changes in body build, increased confidence and better behavior, and these all leads to improvement in cognitive level in youth that are giving extra time to physical activity⁸. Regular Physical activity enhance brain functions, likewise, it increases blood flow to cerebral cortex, which results in greater nutrient intake, greater arousal and change in hormonal levels in the body¹².

Similarly associated neuro-hormonal balance which all leads to the improvement in nutritional status and promotes the growth of inter neuronal connection. All these significant improvements are achieved by regular physical activity¹³. Whereas, there is no positive or negative relation found between physical activity and academic achievement in a study⁶.

Fit and healthy students perform higher on attention tasks which involve higher cognitive power, it includes goal oriented, self-regulatory process which includes preparation, organization, abstract problem solving, running memory, motor control and inhibitory control¹⁴. Physiological mechanisms have proposed the relationship between physical movement, and wellness.¹ Physical Activity may enhance cerebral blood flow which increases the supply of nutrients such as glucose and oxygen to the cerebrum². Both acute as well as chronic exercise may influence neurotransmitter levels

along with potential effects on memory and psychosomatic state³. Physical Activity may promote angiogenesis in the cerebral cortex¹⁵.

Higher scholastic accomplishment was identified most significantly in those individuals, who are more physically active and have higher levels of wellness⁸. On several test scores⁶, students who spent more time in physical activity performed better than those students who spent less time in physical activity. One more study⁸ showed that physical wellness has more remarkable effect on the test score of science than in reading. Also, they found that females who have higher wellness level exhibited higher scholastic accomplishment than males. In few studies⁶ positive relationship was found among physical action support and scholastic execution. However, none of these studies surveyed scholarly execution with institutionalized instructive test.

In 2001, more than 200 students of sixth grade were included in a study, in which the results showed that there were no differences of standardized test score existed among the physically active and physically inactive students¹⁶. Similarly, in a study conducted on primary school students, same results were found.

In South Eastern Massachusetts, students receiving more than 56 hours of physical education during their school per year showed significant increase in standardized test scores of English and language arts as compared to students who are receiving only 28 hours of physical activity during school year.⁶ The advantages of physical activity are recognized, however, in state funded schools physical training is seen as an extracurricular movement and physical training instructors have encountered many problem at the time when school budget is less or when there is more time required for the studies to enhance test scores than physical training is one of the first thing to be excluded or compromised¹⁷.

On the other hand, it proved that physical training has an immediate beneficial outcome on critical instructive areas, for example, reading and arithmetic, it should be accepted that physical training is not extracurricular; maybe, it is a basic segment in the scholarly achievement of understudies¹⁷. Furthermore, in United States the data was obtained from almost twelve thousand adolescents to check the correlation between physical teaching or learning and academic performance, their report showed that adolescence who take part in school based physical activity such as physical learning, group activities or sports performance with their parents, achieved 20% more Score in Math's or English than their sedentary mates⁶.

Leslee J. et al concluded that improved level of brain activity, perception, body weight, self-es-

teem, behavioral improvement and improved energy level are thought to have motivated effects towards physical activity. Hence, it leads to improved academic performance⁸. Social and moral enhancement as well as academic performance of children is significantly improved by the physical activity¹⁶. However, huge increment in the scores of arithmetic and perusing among those understudies who were enlisted in physical movement for 70 or more minutes¹⁰.

For improvement of academic achievement scores, we must have to add physical active educational lessons which should be cost effective, and does not require extra teacher training time. Furthermore, this must be an enjoyable experience for the teachers as well as for the students¹⁸. Youth must have to take part regularly even for an hour in moderate and lively physical activities¹⁰.

The correlation between physical activity, academic success, and fitness provides a unique opportunity for improvement of health and academic performance by the physical activity programs¹⁸. Moreover, the relationship between activity level and cognition performance including perceptual skills, brainpower proportion, academic performance, oral tests, math's tests, developmental level and academics willingness in school going children (aged 4-18 years) are found positive, students who are involved in strenuous outdoor physical activity had drastically better grades than those who were not involved in strenuous activity⁹. Likewise, it was also found that large amount of physical activity enhances academic achievement in kids and youngsters⁶. There is significant improvement in self-esteem in those who took part in physical activity¹⁹. The correlation among activity level, cognition and school performance is being supported by many literature¹⁸. Cognitive ability and school performance in children have appeared to be associated with both fitness and the level of body fats^{20, 21}. Lower academic achievements was related with higher body mass index²². Shepherd has proposed that prolonged physical activity in the middle of the school day may stimulate excitement and diminish fatigue, which can promote prolong focus during classes¹³. Significant relationships were found among school performance and both activeness and involvement in sports¹⁷. The components by which understudies might enhance scholastic accomplishment includes expanded physical action through physical instructions, level of and decreased fatigue, which may rapidly lengthen consideration, scope and fixation¹⁷. Longitudinal evaluation of physical tutoring classes, physical action support, and scholastic accomplishment may give more furnished data of their actual connections²³⁻²⁵. Their examination was aimed to evaluate the effect of physical training, class enlistment and wide-ranging physical movement on academic completion in center school youngsters

through the span of a scholarly year¹⁷. Students selected in physical training would have increased academic accomplishment over those not enlisted in physical training due to prolonged duration of physical activity among class time¹⁷.

However, looking for the link between academic performance and physical activity is the concerned problem and more studies are needed on this subject. Another most important considerable component which is still unresolved is the connection of physical activity and academic achievement with age or gender¹⁶. There is a decline in self-esteem, especially in females during adolescence but it is also evident that involving in physical activity; particularly vigorous activities are helpful for some youth to negotiate this difficult period¹⁹.

Another report concluded that there exists fruitful correlation between academic performance and physical activity as mentioned in National Representative Sample of Australian School children aged between 7-15 years¹⁶. It concluded that physical activity has potential to improve health and obesity which directly impacts on the academic performance of students¹⁸.

METHODOLOGY

Population and Study Sample

Physiotherapy students (18-25 years) who were enrolled in DPT (Doctor of Physical Therapy) at Ziauddin College of Physical Therapy were involved in our study population.

Sample Size and Selection of Sample

Sample size: 178

Sample was selected randomly on the basis of inclusion criteria.

Study Design

Observational study

Sampling Technique

Probability sampling (Simple Random Sampling)

Study Setting

The study was conducted at Ziauddin College of Physical Therapy North Nazimabad, Karachi, Pakistan

Inclusion Criteria

Students enrolled in DPT program aged between 18-25 years.

Both genders (Male and Female)

Exclusion Criteria

Students aged more than 25 years or less than 18 years.

Students with reading and writing disability

Students with any physical disability

Students with any neurological deficit

Variables of Study

Age, gender, year of study, Cumulative grade point average (CGPA), physical activity level, academic performance

Collection of Data

Data was collected through questionnaire which comprised of 13 questions, based on daily physical activities and academic performance of the participating students.

After collecting the data from questionnaire, the data was analyzed to check the correlation of academic performance with physical activity in order to find the relationship between them.

Ethical Considerations

The Research is approved by the Ethical Committee of Ziauddin University. Participant's demographic information was kept confidential and is only accessed by the authorized personal.

RESULT

The primary objective of the study was to find the effect of light physical activity on academic performance in university students;

Effect of physical activity level on academic performance

Value of p is 0.42 which shows non-significant effect of light physical activity on academic performance. Analysis of the data shows that there is no significant relationship among physical activity level and students performance. Cross tabulation shows, out of 178 samples, 65 participants have sedentary life style. CGPA of these participants (table.1) are as, one participant has CGPA <2.0, 13 participants have CGPA between 2.0-2.4, 19 participants have CGPA between 2.5-2.9, whereas 26 participants have their CGPA between 3.0-3.5 and the remaining 6 participants have their CGPA >3.5 as shown in Fig.1. 30 participants are lightly active, CGPA of these participants are as follows, 8 participants have CGPA between 2.0-2.4, 10 participants have between CGPA 2.5-2.9, 9 participants have between 3.0-3.5 and only 3 participants have their CGPA >3.5,

In the somewhat active category there were 25 students, CGPA of these students are: 10 participants have their CGPA lie between 2.5-2.9, 8 participants have between 3.0-3.5, 4 participants have CGPA >3.5, only 2 participants (8%) have 2.0-2.4 whereas only 1 participant have CGPA <2.0

23 participants, are active in nature, academic performances of these students were: 10 participants have CGPA between 2.5-2.9, 5 participants have 3.0-3.5, 3 participants have >3.5 and 3 have 2.0-2.4 whereas only 2 have their CGPA <2.0

Remaining 35 participants are categorized as with very active lifestyle, the academic performance is as follows: 12 participants have CGPA 2.5-2.9 likewise 12 participants have 3.0-3.5, 6 participants

have >3.5, 3 participants have <2.0 and interestingly only 2 participants have their CGPA between 2.0-2.4

Fig.1

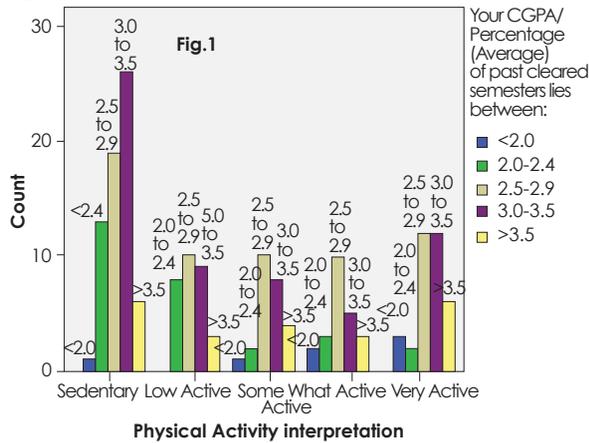


Table 1 Physical Activity interpretation* Your CGPA/ Percentage(Average) of past cleared semesters lies between: Cross tabulation

		Your CGPA/ Percentage(Average) of past cleared semesters lies between:					
		<2.0	2.0-2.4	2.5-2.9	3.0-3.5	>3.5	Total
Physical Activity Sedentary interpretation	Count	1	13	19	26	6	65
	% within Physical Activity interpretation	1.5%	20.0%	29.9%	40.0%	9.2%	100.0%
Low Active	Count	0	8	10	9	3	30
	% within Physical Activity interpretation	.0%	26.7%	33.3%	30.0%	10.0%	100.0%
Some What Active	Count	1	2	10	8	4	25
	% within Physical Activity interpretation	4.0%	8.0%	40.0%	32.0%	16.0%	100.0%
Active	Count	2	3	10	5	3	23
	% within Physical Activity interpretation	8.7%	13.0%	43.5%	21.7%	13.0%	100.0%
Very Active	Count	1	13	19	26	6	65
	% within Physical Activity interpretation	8.6%	5.7%	34.3%	34.3%	17.2%	100.0%
Total	Count	1	13	19	26	6	65
	% within Physical Activity interpretation	3.9%	15.7%	34.3%	33.7%	12.4%	100.0%

Chi-square test was applied in order to find the co-relation between academic performance and physical activity. The results indicated non-significant relation between these two variables (p=0.42) as shown in table 2.

Table 2 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided)		
				95% Confidence Interval		
				Sig.	Lower Bound	Upper Bound
Pearson Chi-Square	16.45*	16	0.42	0.41 ^b	0.34	0.48
Likelihood Ratio	17.61	16	0.35	0.44 ^b	0.37	0.51
Fisher's Exact Test	16.10			0.39 ^b	0.32	0.47
N of Valid Cases	178					

DISCUSSION

Multiple studies^{6, 13, 10, 18} have been done in past which were done to find the relationship between physical activity and academic achievements, almost all focused on the school going individuals.

So we conducted our study on university going student's aged between 18 - 25 years. We took the physical therapy students. 178 participants were included in the study on the basis of inclusion criteria. The main focus of the study was to find the effect among activity level on school performance. Past studies^{2,3,4,8,9} showed that school going students who are involved in physical activities are academically brighter as compared to those children who have sedentary life style. But our findings mismatch their findings because we took university going student aged between 18-25 years. However, in universities, study methods are different as well as the psychology of university going students is also different. Precisely in university, study level are much harder than the school level, the duration of classes are also double as compare to school. Therefore, very less time is available for the university going students to take part in physical activities.

It was seen that in every age group from 18 to 25 years the majority of participants were sedentary in nature, which was also seen in a graphical representation. Importantly most of the students were sedentary in nature. Hence it is an alarming sign for us because sedentary lifestyle is one of the risk factor for obesity which will cause several fatal diseases like hypertension, myocardial infarction, stroke and cancer.

The main aim of the study was to find the effect among activity level and school performance.

CONCLUSION

There is non-significant effect of physical activity level on academic performance among university students, Physical activity should be encouraged in order to achieve other health benefits. In a nut shell, physical activity may have other systemic health benefits but it shows no significant effect on academic achievement.

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RESEARCH REPORT

COMPARING THE EFFECTS OF INSPIRATORY RESERVE VOLUME IN CIGARETTE AND SHISHA SMOKERS BY USING SPIROMETER

ABSTRACT

BACKGROUND

Shisha and cigarette are the two most common type of tobacco smoking. Cigarette and shisha smoking have grown fast in different ages globally. Shisha and cigarette both contain chemicals that affect health badly and can cause common diseases such as cough and some life threatening diseases like cancer, emphysema and bronchitis also affect bones causing osteoporosis and decrease functional capacities of lung. There are no proper guidelines for the awareness of the public about the hazards of shisha smoking as they are present for cigarette smoking but it's a fact that shisha smoking is as harmful as cigarette smoking

OBJECTIVES

To compare the effect of Inspiratory Reserve Volume (IRV) on shisha and cigarette smokers by using spirometer.

STUDY DESIGN AND SAMPLING TECHNIQUE

Cross-sectional survey was steered, convenient sampling was used.

STUDY SETTINGS & PARTICIPANTS

The study was conducted on 50 participants of Ziauddin College of Nursing and Ziauddin College of Physical Therapy

RESULTS

IRV is more compromised in shisha smokers than in cigarette smokers. As far as deciding between health concerning effects of shisha and cigarette smokers, the shisha smoking effects are same as cigarette smoking.

CONCLUSION

Shisha smokers have more exposure to tobacco than cigarette smokers. IRV is disturbed by both means of smoking but shisha smoking has more potential risks.

Keywords

Inspiratory Reserve Volume, Spirometer, Cigarette, Smokers, Shisha, Emphysema, Bronchitis.

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INTRODUCTION

Smoking has global health risk and cigarette smoking has been recognized to boost the morbidity and fatality rate in both genders. It is a common thinking that tobacco associated hazards can be diminished by altering the way tobacco is used including the use of cigar, pipes or using other classic modes. Younger representative of our society even women boost up to adopt smoking methods¹.

Shisha is a traditional way of tobacco use in developing countries about 400 years ago. Shisha is also known as Hookah, Ghoza, Narghile, And Waterpipe and Hubble Bubble Smoking² is used by the people of Middle Eastern or Asian countries³. Tobacco implanted in pot at the top of apparatus which is linked to the water filled base by a duct. The pot is then closed by a porous material. Flaming charcoal is then situated on the top; the smoke from the charcoal is dragged through the tobacco descending into the duct towards the water. After bubbling over the water the chilled smoke surfaces and is stained through the hose and inhaled. Mostly water pipe has a choke to restrict the quantity of smoke puff in. Electrical jet is also feasible nowadays, which offers abrupt smoke than the initial charcoal⁴.

In recent years the hookah has been modernized and become socially acceptable³. It is more common in U.K nowadays. In Middle East in young adult the prevalence rate is 19% -54%, in males ratio is about 31% to 63% and in females it is 23% to 69%⁵⁻⁷.

In Pakistan 75% to 80% adolescents smoke shisha⁸⁻⁹. Male's ratio is higher in cigarette smoking that is 60% but in shisha smoking female ratio is more than males that is 62%¹⁰.

Use of tobacco with sweetened fruits and molasses sugar makes the shisha smoke more aromatic and attractive³. Shisha smoke contains toxins because shisha has same contents as cigarette, such as nicotine, tar, carbon monoxide and heavy metals like arsenic and lead³.

It is a very false approach that herbal shisha is safer than any other kind of smoking. This is because containing fruit or herbal aromas does not make the shisha healthy. Even if the shisha is tobacco free, it still contains carbon monoxide or charcoal that is used to burn shisha³.

Meanwhile some people think that shisha smoking is not addictive because water which is used in pipe can absorb nicotine. However, not whole nicotine is absorbed by water, only a small amount of nicotine is absorbed but the amount which is not absorbed is enough to cause addiction of shisha³. Nicotine reaches the brain just after being inhaled and this is the reason due to which shisha becomes addictive even after its few sessions. Another reason of addic-

tion is the unpleasant withdrawal feelings such as headache, fatigue or depression¹¹.

Shisha smokers are prone to health hazards as compared to cigarette smoking. One session of shisha inhaled is same as the person who inhales 100 cigarettes per day. One puff of shisha smoke is equal to the whole cigarette. Shisha smoking causes many diseases such as respiratory diseases, heart diseases and cancer³. It is proved by research that people who are shisha smokers have high percentage of chronic Bronchitis than cigarette smokers. The heavy volume of smoke can cause chemical irritation leading to the irritation or inflammation in the lining of nasal passages and may cause asthma¹¹. Shisha smoking in pregnant female can cause problems to fetus¹². Shisha is harmful for active smokers as well as for passive smokers. Both are at high risk of health problems.

A study conducted by Al-Fayez et al in Saudi Arabia on both shisha and cigarette smokers, showed in both genders, significant decrease in the mean value of FVC when FEV₁ compared with controls, regardless of gender, and support our results, the risk was in both genders higher for shisha smokers. That could be justified by the reality that the exact measurement of the increased amount smoked in our study was due to more subgroups. The Saudi study divided shisha smokers into mild if they smoked 2 sessions/day and heavy if they smoked more. They were unsuccessful to examine those who smoke shisha only a few times per week¹³.

The shisha smoking in women causes greatly extra CBH than cigarettes for the same amount or period (p value < 0.001). At most progressive the phlegm and cough during comparatively three months is defined as chronic bronchitis. The CBH is only critical definition. FEV₁ and FEV₁/FVC could be normal and their variation means the incident of COPD¹³.

Shisha smoking conveys respiratory infections, particularly tuberculosis, by passing the tube from person to person, however it has a less carcinogenic effect.

Shisha is now commonly a new tobacco universally and severely damaging the indoor air quality and includes severe health risks¹⁰. Shisha smoking hold equivalent similar health risks as smoking cigarettes because it generates large amount of toxic ultrafine particles⁷. In the advance study, we resolved the outcome of Shisha smoking on lung functions and Fractional Exhaled Nitric Oxide (FeNO). In the advance study between Saudi young adults, we constitute a notable decline in lung function parameters FEV₁, FEV₁/FVC%, FEF-25%, FEF-50%, FEF-75%, FEF-75-85% in Shisha smokers comparable to their similar control group. In Shisha smokers compared to control group there was also a notable

decline in the Fractional Exhaled Nitric Oxide (FeNO)¹⁴.

Shisha smoking causes natural alteration in place causing obvious health problems. Likewise, Hawari et al. performed a study on shisha tobacco smokers, they originate that forced expiratory flow above the middle half of the forced vital capacity (FEF50%) decreased between shisha tobacco smokers with mean age 20.4 years in shisha smokers comparable to their matched group, we create a notable decline in lung function parameters FEV1, FEF-25%, FEF-50%, FEF-75% and FEF-75-85% as similarly shown in the present study¹⁵.

The decline of FEV1 coupled with shisha smoking is critically proportional. A notable decline in FEV1 offers its indication as a risk factor for obstructive disease relevant with shisha smoking. This is invariable with the conclusion of a direction toward decline in FVC and FEV1/FVC between shisha smokers. These conclusions indicate possible role of shisha smoking in the progress of COPD¹⁵.

Tobacco has been used for smoking for centuries. Tobacco plant was first grown in America in 17th century and from that day tobacco has been used in various forms. One form of tobacco used in cigarette. In 1885 Washington Duke from North Carolina invented cigarette. Cigarette is a form of tobacco leaves rolled in fine paper. In 1883 James Bonsack invented a cigarette manufacturing machine and started his own business naming "The American Tobacco Company". This company was first to produce cigarette mechanically¹⁶.

In U.S, prevalence of cigarette smoking is 20.5% in men and in women it is 15.6% among which 18- 24 years adult age person the rate is 17.3%. In 25-44 years old people, the prevalence rate is 21.6%. In age 45-64 rate is 19.5% and 65 years above is 8.9%¹⁷.

According to WHO prevalence of cigarette smoking in Pakistan is greater in males than females. It was 17.2% in male and 1.5% in female. Among youth it is 9.9% in male and 1.0% in female¹⁸.

Cigarette and other mode of tobacco- counting cigar, pipe tobacco and chewing tobacco all these consist of obsessive drug nicotine. A classic smoker will take 10 puff on a cigarette over a cycle of about 5 minutes that a cigarette is lit. Therefore a person who smokes about 1 packet that is 25 cigarettes regularly receives 250 "hits" of nicotine¹.

Smoking tobacco contains more than 60 known cancer causing chemicals. The components used in tobacco smoking are Tar, Carbon monoxide, hydrogen cyanide and other free radicals. These components are the most health damaging components. Tar is brown colored sticky substance that is deposited on teeth, nails or lung that can further

result in cancer. Tobacco cigarette also contain metals that are very hazardous to health e.g. Arsenic, Cadmium and zinc. Smoking can cause damage to any organ of body as well as system of body. It affects musculoskeletal system of the body by reducing bone density and tightening of muscles. It affects sexual organs of both male and female. In females there are menstrual irregularities and the risk of cancer in cervix is increased whereas in males it causes damage and this damage results in low sperm production, impotence or damage to vessels of penis. In pregnant females smoking causes low body weight of fetus which can further effect the growth of the baby¹⁸.

Smoking also damages the cardiovascular system of the body by causing stroke and coronary heart diseases, narrowing of vessels. Smoking also affects the respiratory system of the body by causing lung cancer and COPD. 80% to 90% of people dying with COPD are those having COPD due to smoking. If a person is already suffering from asthma, smoking can trigger effects of attack or make a worse attack¹⁸. Smoking can cause cancer all over the body. Prolong use of smoking can cause fractures, osteoporosis, gangrene which may result in amputation¹⁸.

Cigarette smoking causes a number of chemicals enter in the lungs. Smoking influences the lungs and airways significantly. Cigarette smokers have several breathing problems. These problems may be disturbing as cough or may be life threatening as emphysema and cancer¹⁹.

Damage to the lung by smoking doesn't depend on age. Cigarette smoking destroys the lung of people of every age. Function of lungs gets worse as long as person smokes. The major health problem caused by smoking affects the nicotine delivery system, airways, blood vessels and lungs in the human respiratory system. Cigarette smoking upsets this balanced process due to damage of the respiratory system²⁰.

Expecting women who smoke cigarette have an elevated risk of miscarriage, stillborn and immature infants or a child with low birth weight. Maternal smoking also affects child's learning and behavior problem. Study shows that if the pregnant women smoke more than 1 packet of cigarettes doubles the danger that the concerned child will become obsessed to tobacco if he starts smoking¹.

In 19th century first Spirometer was invented by a London surgeon, John Hutchinson. Spirometer is used for evaluating exhaled and inhaled lung volumes, and shows how effectively lungs can work²¹. It is adopted for airflow hurdle for patients having respiratory manifestations but cannot be used for any respiratory problems. On the other hand another purpose for Spirometer is monitoring

disease furtherance as well as readjustment and treatment progression. Despite of the fact that Spirometer explains nature, pattern along with hardness of lung disease. It fails to give any long term prognosis or life quality²¹. Spirometer test is commonly protective for all subjects but at times the subject may struggle with a sense of lightheadedness or fainting²².

There are two types of Spirometer: 1) those that record the amount of air exhaled or inhaled within a certain time (volume) 2) Those that measure how fast the air flows in or out as the volume of air inhaled or exhaled increases (flow)²².

In this study we aim to use incentive Spirometer to calculate inspiratory reserve volume which is defined as "the amount of that you inhale and exhale during normal breath". Tri-balls incentive Spirometer is a flow-oriented device, provided with a ball that indicates patient's inspired volume. It is used to help strengthen respiratory musculature and to help restore and maintain lung capacity by encouraging a slow, deep breathing.

Three color-coded balls in each chamber provide a visual incentive for the patient. Air flows into single channel, when it passes through the chamber; it raises each of the three balls depending on the flow inhaled per second²³.

It was said that hazards of shisha is less than cigarette smoking but it was the misleading concept. Dr. Ahmed Al Mullah, Consultant physician and Head of smoking cessation clinic claimed that smoking shisha can be harmful more than ten times than cigarette smoking, according to a report in Peninsula²³.

Eventually the shisha smokers are at more risk than cigarette smokers. As shisha contains approx. 36 times more tar than cigarette¹³. So, it resulted as lung volume specifically inspiratory reserve vol. is more decreased in shisha smokers than in cigarette smoker.

METHODOLOGY

Study Settings

The study will be organized in Ziauddin College of Physical Therapy, Ziauddin College of Nursing, Ziauddin Hospital (North Nazaimabad) Karachi, Pakistan.

Study Design

Cross sectional study design.

Sampling Technique

Probability sampling (stratified)

Inclusion Criteria

1. People who precisely smoke cigarette.
2. People who specifically smoke shisha (water

pipe).

3. Both genders are counted (male and female).

Exclusion Criteria

1. Subjects with the history of anemia, bronchial asthma, diabetes mellitus, chronic obstructive pulmonary diseases, drug addiction, and malignancy.
2. People who perform vibrant exercises frequently.

Procedure

50 participants were included in this study they were given an assessment form to be filled after taking an informed consent.

After that, one by one all subjects performed Spirometer test (Pulmonary function test) in which researcher asked the participants achieve sitting position which is more comfortable for patient than lying down on bed or standing position. Do not bend your head forward or backward. Firstly, place Spirometer pipe into the mouth. Then the patient is advised to take wide breath as much as they can through their mouth, while their nose is closed by nose clip and when the person is not able to hold further more than ask him to remove mouthpiece and then exhale. We noted the Inspiratory volume by the level of ball raised (600, 900, 1200cc) and as well as no. of second's patient hold the ball or balls. Test was immediately stopped if person felt any kind of dizziness, headache, shortness of breath, chest pain. When the test was completed, researcher calculated tidal vol. through the formula that is "inspiratory reserve vol. = levels of ball raised X no of seconds hold".

Data Collection

Data is collected through questionnaire which includes 8 questions based on effects of shisha and cigarette smoking on lung capacities specifically inspiratory reserve volume by using spirometer. After collecting the data through questionnaire lung capacity was measured by the help of spirometer.

Data Analysis Strategies

The Data was analyzed through SPSS.16, in a cross tabulation and value of p was obtained by t table.

Ethical Consideration

The Research is approved by the ethical committee of Ziauddin University. Participant's demographic information was kept confidential and is only accessed by the authorized person. In consonance with ethical consideration all information related to attendant was also kept confidential.

RESULTS

The total no of respondents was 50 in which 25 were shisha smokers and 25 were cigarette smokers. Result was obtained by the help of SPSS 16 through "independent variable T- test".

Group Statistics					
	What do you smoke?	N	Mean	Std. Deviation	Std. Error Mean
hold time in seconds	cigarette smoker	25	2.47	1.28	0.25
	shisha smoker	25	1.69	0.70	0.14
inspiratory reserve volume	cigarette smoker	25	864.00	199.74	39.94
	shisha smoker	25	816.00	162.48	32.49

The mean holding time of cigarette smokers was 2.4728 and of shisha smokers was 1.6992. This shows that the mean holding time of shisha smoker is less than cigarette smokers.

Similarly, the mean inspiratory reserve volume of cigarette smoker was 864 and of shisha smoker was 816 which means inspiratory reserve volume is more in cigarette smokers as shown in table 1.

Hence, according to table 2, IRV has shown a significant decline in shisha smokers than in cigarette smokers.

		Levene's Test for Equality of Variances		t-Test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% confidence interval of the Difference	
									Lower	Upper
hold time in seconds	Equal variances assumed	3.34	0.07	2.63	48	0.01	0.77	0.29	0.18	1.36
	Equal variances not assumed			2.63	37.07	0.01	0.77	0.29	0.17	1.36
inspiratory reserve volume	Equal variances assumed	0.09	0.75	0.93	48	0.35	48.00	51.49	-55.54	151.54
	Equal variances not assumed			0.93	46.08	0.35	48.00	51.49	-55.54	151.65

DISCUSSION

Incentive spirometer is a device that is used to evaluate air that is normally inhaled and exhaled by the person. In our study we use 3 balls incentive spirometer which is used to evaluate and assess lung volume; we concisely focused on to measure "inspiratory reserve volume (IRV) "which is defined as the complementary air that is inhaled after a normal inspiration¹⁸.

Spirometer consist of 3 chambers, a color coded balls, plastic tube with 12mm OD with connector and a mouth piece. Color coded balls indicate flow rate which is 600cc/sec, 900cc/sec and 1200cc/sec that helps to find out IRV through a formula which is level of ball raised and no of sec hold¹⁸.

Tobacco smoking is very harmful to health but it's common in every society. Content of cigarette can cause dangerous diseases that can be fatal such as cancer. Smoking can really take your breath aside within second's causing two to three times gain in airway resistance. Cigarette smoke content (tar) will count airway resistance as it covers the lung reducing recoiling capacity of airway sac that leads to reduced amount of oxygen consumption²². One study reveals marked deterioration in pulmonary function values in advanced age that was more noticeable than in non- smoker¹³.

A study was conducted in Saudi Arabia 49.7% people disclosed that Shisha is less harmful than

cigarette, 60.5% people suppose that unhealthy substance was cleared by filtration through water whereas 67.8% people think that shisha is not addictive²³. People suppose that shisha has herbal ingredients and so it is less dangerous than cigarette contrary to this perception tar nicotine and other toxic materials are present in shisha as they are in cigarettes. It's a myth that shisha smoking is not harmful to the lungs but actually it is violent to the lungs because even its filter contain carcinogen causing destruction in the lung. Commonly shisha smokers believe that shisha is less toxic in comparison to cigarette. As compared to cigarette, shisha is acceptable in our society and is considered as less harmful than cigarette but actually it is more dangerous than cigarette smoking²⁴.

A study was carried out to separate meta-analysis in which the effect of shisha smoking was compared with non-smokers and cigarette smokers resulting in significant reduction of FEV1/FVC between shisha smokers and non-smokers but there was no convincing difference amount in shisha smokers¹⁶.

Person who exercises to gain peak achievement their heart, lungs and muscle need copious amount of oxygen. But when the person smokes tobacco carbon monoxide attached to red blood cells replaces oxygen and prevent from reaching a sufficient amount of oxygen to the muscles. Reduced quantity of oxygen will reduce their physical capacity. People think that if they take exercise the tobacco smoking will not harm however it is wrong people who do exercise are less exposed to the damage of lungs and airways by tobacco smoking. On the other hand the person who exercises daily has less compromised lung capacities then that of person who exercises occasionally. In addition to this our study also show the same result as there is significant reduction in inspiratory reserve volume in the person who don't exercise than that of person who are involved in extra physical activities than the normal lifestyle²⁴.

The purpose of the study was to yield the comparison virulent exposure related to both kinds of smoking. Related to cigarette smoking shisha smoking was having same chemicals in addition with more exposure to smoke therefore smoking related health risks are similar or slightly more in shisha smokers²⁵.

Another study was carried out using questionnaire and spirometry conducting that risk of COPD is markedly higher in shisha smokers than in cigarette smokers. 11.75% identified as shisha smokers and 95% cigarette smokers were prone to chronic bronchitis²⁶.

Shisha smoker as well as cigarette smoking will give same effects on the ventilatory function in both genders male and female elevating the exposure

of developing obstructive air passage disorder with shisha smokers being at more advanced hazards¹³.

Shisha smoking is a worldwide health problem. According to the survey, it will kill 10 million people yearly in the next 20-30 years. It is estimated that 70% among these deaths will occur in the developing countries. Mostly the research, awareness program and policies are being focused on cigarette smoking whereas public in developing regions smoke tobacco by water pipe method. Almost 75% of the water pipe smokers are from secondary schools, colleges and universities. A study conducted in Lebanon showed 82.7% of the shisha smokers were from intermediate or higher education group. Stress is one of the causes of smoking. In a study, it is revealed that low education and low incomes was a great factor of early start and prolong smoking²⁷.

Out of the studies shows that the pulmonary function deterioration was serious in water pipe plus cigarette smoker which composed of 52%, at the same time in water pipe smoking it composed of 48%. Water pipe smoking leads to compelling decline in lung readiness as well as elevation in respiratory symptoms among male adult water pipe smokers. Lung function test guidelines had serious decline in water pipe smoker as well as cigarette smoker immediate water pipe and tobacco smoking cessation push is greatly recommended^{28,29}.

The study we conducted concede that both type of tobacco smoking that is shisha and cigarette smoking are not good for health and cause adverse effect to lungs and airways as well as it deteriorate lung capacities.

Our study is based on the comparison of Inspiratory reserve volume (IRV) effects of both types of smokers. Cigarette smoking cause great decline in IRV on individuals' lungs.

There is a positive perception about shisha smoking in our society. Shisha is regarded as less harmful in contrast to cigarette²⁸. Even some communities believe that narghile have adverse effect on health. However in our study we witnessed that on spirometer, shisha smoker were having decline in hold time and therefore IRV were also dropped. In opposition to cigarette smoker the fall in IRV shisha smoker was larger.

CONCLUSION

As far as deciding between health concerning effects of shisha and cigarette smokers, the shisha smoking effects are same as cigarette smoking. IRV is disturbed by both means of smoking but shisha smoking has more potential risks.

Shisha smokers are more prone to carbon and smoke intake so the physician should advise that

contents of shisha and cigarette are same therefore health risks are similar for each category of smoker. Effects of water pipe smoking are alike of deep inhalation of cigarette smoke. Tobacco based shisha and herbal shisha are both toxic to health because smoke from both type contain carbon mono oxide and other toxic agents. These known toxic chemicals are cause of pulmonary cancer and other pulmonary diseases such as COPD. Smoking hookah exposes an individual to more smoke than cigarette smoker. Use of nicotine in shisha makes it addictive as it is totally wrong believing shisha is not addictive. Regular shisha smokers are addicted to it and they become tobacco dependent. Beside this tobacco smoking is cause of low birth weight infants whose mother smoke during pregnancy²⁸. Smoking has considerable health concern problem so public must be aware of its hazards. People who think that shisha is not harmful must be informed about its hazards. Regrettably many of the tobacco control programs exclude water pipe smoking. Worldwide awareness is required and strong rules to control water pipe. Clinicians can persuade public by performing simple spirometry test. Research can help the physician with data or convincing patients about the detrimental effects in lung capacities.

More research is needed that is related to water pipe smoking risk with high quality studies between shisha smokers and its clinical outcome¹³.

Government should take steps for the awareness about hazards of shisha. Shisha cafes should have prominent notice that" shisha kills just as we have on cigarette. Advertisement for the awareness should be on-air on official television channels.

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RESEARCH REPORT

COMPARING MUSCLE ENERGY TECHNIQUE AND HOLD RELAX IN THE MANAGEMENT OF NECK PAIN AND UPPER TRAPEZIUS TIGHTNESS

ABSTRACT

OBJECTIVE

To compare the efficacy of Muscle Energy Technique (MET) and Hold Relax Technique of Proprioceptive Neuromuscular Facilitation (PNF) in non-specific neck pain and upper trapezius tightness.

STUDY DESIGN AND SAMPLING TECHNIQUES

Experimental Study, Randomized Control Trial.

STUDY SETTINGS & PARTICIPANTS

Study was conducted at reputed Institute of Physical Therapy and Hospital including students, teachers, staff, and patients with a sample size of thirty participants.

INTERVENTION

MET and PNF hold relax technique is applied for non specific neck pain and upper trapezius spasm.

OUTCOME MEASURES

Using single blinded randomization, subjects were allocated into two groups A and B. In Group A hold relax of Proprioceptive Neuro-muscular Facilitation (PNF) was applied to upper trapezius muscle while in group B Muscle Energy Technique (MET) was applied on the same muscle. Comparison is made for examining the effectiveness of both PNF and MET on pain scale and cervical ranges.

RESULTS

Improvements were seen in both groups but results of Hold Relax PNF technique is found to be more effective than MET. Major difference was reported pre and post treatment in the pain magnitude and neck range of motion.

CONCLUSION

The result of this study supports the application of PNF technique for relieving non-specific neck pain and upper trapezius muscle spasm.

Keywords

Muscle Energy Technique, Proprioceptive Neuromuscular Facilitation, Hold Relax Techniques, Non-specific Neck Pain, Upper Trapezius Spasm, Pain Magnitude, Randomization

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INTRODUCTION

Neck pain is peculiar prevailing reason for musculoskeletal problem. Pain can arise from a number of reasons that may involve any tissue of the neck influencing 60-70% of the overall population at various times in their lives¹. Neck pain is very common, however, the uplifting news is that the majority of neck pain is not brought on by serious disease. Neck pain is common among workers, teachers, and students, has a wide range of reasons. While neck pain cannot generally be cured, there is various treatment options available. Neck pain without any underlying disease or abnormal anatomical structure is termed as non-specific neck pain and it can result from postural and mechanical factors such as sprains and strains of the muscles or ligaments in the neck. Symptom of non-specific neck pain includes pain develops in the neck and spread from the bottom of skull down to the upper trapezius region and moving the neck becomes painful¹. Upper trapezius tightness can also cause neck pain as these muscles are highly susceptible to overuse and by consistently overusing the muscle group can lead to muscle tightness and irritation as recurring motions do not permit the affected tissue to relax between movements².

Physical therapy management of neck pain and upper trapezius tightness can include wide range of interventions including electrotherapeutic modalities, stretching and strengthening exercises, myofascial release, traction and manual therapy. There are varieties of manual therapy treatment options available that can be used to decrease neck pain and improve neck ranges. These treatments may include trigger point therapy, mobilization and manipulation. Muscle Energy Technique (MET) is one of the techniques that are used to treat musculoskeletal dysfunctions. In muscle Energy Technique the affected person can actively contract the muscles from a controlled position in a specific direction in opposition to the force applied³. MET are widely used to treat muscle hyper-tonicity and muscular tightness and it is also effective technique in the management of joint dysfunction and in breaking joint capsule adhesions. MET is found to be effective in lengthening potentially shortened postural muscle, methods through which MET may turn out in improved joint range of motion stay unproven, some authors of MET claim that "MET produce relaxation of the affected muscles due to inhibition of motor activity through the Golgi tendon organs"⁴.

Proprioceptive Neuromuscular Facilitation (PNF) is another technique situated in the literature as more capable technique to bring muscle relaxation and to enhance range of motion⁵. PNF stretching comprises of different techniques that all incorporate alternating periods of contraction and relaxation of agonist and antagonist muscle.

Among PNF techniques, the Hold-Relax technique, uses an isometric contraction of muscles and is commonly used in clinics to relax muscle, relieve pain, and to improve the ROM of joints⁶. PNF employs the proprioceptive system of body to inhibit or promote soft tissue contraction. Dorothy Voss, one of the proponents who practiced PNF, explained it as "A method of promoting or hastening the response of the neuromuscular mechanism through the stimulation of proprioceptors"⁶.

In this research we compare the effects of hold-relax technique of PNF and MET for neck pain and upper trapezius tightness along with the application of techniques. Postural guidance given to patients as poor posture leads to the development of musculoskeletal dysfunctions. Unfortunately, there is not much evidence to support the effectiveness of Muscle Energy Technique. A research was conducted to explore the after effect of Muscle Energy Technique on cervical range of motion, this study comprises of seven treatment sessions with three repetitions of Muscle Energy Technique for four weeks utilizing 5-second contractions and result of the study revealed, case group range of motion was improved as compared to the control group which presents minimal or no change⁷. Fryer G, Ruzkowski W⁸ proved that five-second contractions of Muscle Energy Technique demonstrate significant results with application on restricted active rotation at the atlanto-axial joint.

In another study by Lenehan et al⁹ found that single application of Muscle Energy Technique on thoracic spine is effective in correction of rotation limitation and the study suggest that the appliance of Muscle Energy Technique is recommended to improve limited spinal rotation. In an examination of twenty six individuals with confined range of motion of lumbar expansion treated with Muscle Energy Technique two times every week for four weeks, Muscle Energy Technique found to fundamentally expand the lumbar extension range of motion and supporting Muscle Energy Technique as proper therapy for enhancing lumbar extension¹⁰. In another study done by Schwerla et al for the treatment of chronic neck pain, they compare MET with placebo ultrasound and found that the group receiving MET had reduce pain when compared to placebo group¹¹. A comparative study of neck muscle exercises therapy with Proprioceptive Neuromuscular Facilitation technique conclude that Proprioceptive Neuromuscular Facilitation found to be effective approach to reduce pain and enhance muscle strength in patient suffering from chronic neck pain¹². Moon et al. conduct a study to compare the effects of functional electrical stimulator and Proprioceptive Neuromuscular Facilitation treatment on thirty subjects, the group on which Proprioceptive Neuromuscular Facilitation is applied shows greater improvement in upper limb function¹³. Another study conclude that exercise

program that include Proprioceptive Neuromuscular Facilitation techniques found to be more effective in improving function of patient with myofascial pain syndrome¹⁴.

Another study comparing the effectiveness of Muscle Energy Technique and static stretching on neck pain and active cervical range of motion conclude that Muscle Energy Technique was more effective than static stretching in treating neck pain and improving range of motion¹⁵. Study on efficacy of Muscle Energy Technique versus conventional therapy in low back pain of Sacroillitis origin, Muscle Energy Technique group demonstrate more improvement against conventional therapy group¹⁶. Studies conducted on thirty-two patients with myofascial pain syndrome were divided into two groups, Case group received Proprioceptive Neuromuscular Facilitation with relaxation therapy for upper trapezius and shoulder stabilizing exercises and control group received only the general physical therapies. Study was measured on Visual Analog Scale (VAS), Pressure Pain Threshold (PPT), the Neck Disability Index (NDI), and the constant Mosley scale. The result showed significant differences between the groups. They concluded that Proprioceptive Neuromuscular Facilitation is effective in improving the function of myofascial pain syndrome¹⁷. Another study was conducted on assessment of Range of Motion (ROM) in external rotation of athletes' shoulders. They compared effects of the contract-relax and hold-relax Proprioceptive Neuromuscular Facilitation (PNF) stretching with control group. There were thirty participants including adults of both genders aged 25 to 50 years. They were divided into three groups. Ten participants in each group were assigned. One group received contract-relax-contract (CRC) and the second group received hold-relax-contract (HRC) and remaining ten participants included in control group. They measured range of motion for external rotation of the shoulder with goniometer before and after six weeks of training. Results revealed that increase in range of motion from prior and after the test in CRC group (+14.60 degrees) and HRC group (+13.50 degrees), but there was no change in control group (+0.30 degrees). The enhancement in range of motion was alike among the HRC and CRC groups¹⁸. Another study was conducted to compare immediate as well as medium-term effects of three stretching methods (including proprioceptive neuromuscular facilitation, passive and active stretching) on the knee flexion after total knee replacement. There were 117 patients and randomly divided into three groups. First group received active stretching including thirty two subjects and second group received passive stretching including thirty five subjects and remaining thirty three subjects received Proprioceptive Neuromuscular Facilitation stretching. This research showed that all methods of stretching are effective for improving range of

motion¹⁹. A study was conducted to find the efficacy of muscle energy technique (MET) contrast by means of corticosteroid injections (CSIs) for chronic lateral epicondylitis (LE) and it revealed Muscle Energy Technique and Corticosteroid Injection both showed improvement in strength, pain, and function but Muscle Energy Technique (MET) reported effective treatment for lateral epicondylitis (LE)²⁰. A research was conducted on sixty-one subjects to compare the Muscle Energy Technique (MET) for the glenohumeral joint (GHJ) horizontal abductors and Muscle Energy Technique for the glenohumeral joint external rotators to improve glenohumeral joint range of motion (ROM) in baseball players. They were divided into three groups: Muscle Energy Technique for the glenohumeral joint horizontal abductors (including nineteen subjects), Muscle Energy Technique for the glenohumeral joint external rotators (including twenty two subjects), and control group (including twenty subjects). They measured range of motion before and after treatment and reported that the Muscle Energy Technique for the horizontal abductors significantly increase in glenohumeral joint horizontal adduction range of motion compared to the control group and a greater increase in internal rotation range of motion post-intervention compared to the group treated with the Muscle Energy Technique for the external rotators and the control group^{21,22}.

Neck pain is common problem among people who works for prolong hours and it is strongly recommended to motivate patient to seek conservative treatment such as manual therapy in which there is wide range of techniques that are used to relief pain. In this study, Muscle Energy Technique and Hold-Relax technique of Proprioceptive Neuromuscular Facilitation is used to identify the effectiveness of one technique over another.

METHODOLOGY

Population and Study Sample

Population of study comprises of students, workers and patients who had complain of neck pain without any underlying disease and pathology and having upper trapezius tightness. Sample size of 30 patients was collected. Simple Random Sampling Technique is used in this study. Single blinded randomization was used for the subjects to be allocated into two groups; A and B. In Group A, Hold Relax of Proprioceptive Neuromuscular Facilitation was given to upper trapezius muscle, and on group B Muscle energy technique is applied on the same muscle. A questionnaire was given outlining the eligibility criteria for the study to screen the subjects for any known medical condition of neck for example; history of neck trauma, congenital deformities, chronic conditions like arthritis. Selected participants were evaluated for pain using VAS scale and restricted neck range of motion due to upper trapezius tightness using goniometer. Both

Ranges and pain scales were recorded at initial assessment day and re-assessed after four weeks of treatment.

Inclusion Criteria

- o Pain positive on VAS (mild to moderate)
- o Age between 18-35 years
- o Gender both male and female
- o Working 6-10 hours/day (Job or study)

Exclusion Criteria

- o Suffering with derangement disorder
- o Osteoarthritic changes such as reduced intervertebral disc spaces and osteophyte formation
- o History of cervical trauma
- o Congenital deformities such as torticollis, schro-mal nodule
- o Infectious diseases

ETHICAL CONSIDERATION

The purpose of this study has been explained and a written informed consent was obtained from all the participants. Detailed explanation of study protocol and written informed consent was obtained from the researcher and approval was taken by the Ethical Review Board.

RESULTS

The data was evaluated and analysed at Statistical package for social science (SPSS-20).

Sample size of 30 participants was included via Simple random technique.

In this study we apply the two techniques over upper trapezius muscle (upper trapezius tightness)

Study includes 14 males and 16 females (table 1) of age between 19-30 years; all participants were healthy and are not physically or mentally disabled. On the basis of cervical ROM we consider the following movements after application of techniques over cervical spine

- I. Neck flexion
- II. Neck extension
- III. Neck right rotation
- IV. Neck left rotation
- V. Neck right side bending
- VI. Neck left side bending

Assessment of participants was done on the basis of cervical spine (ROMs) and Pain Management on

VAS scale.

After application of both the techniques it was observed that both techniques were effective in order to relieve pain and increase ROM.

Table 1

	N	Minimum	Maximum	Mean	Std. Deviation
age of participant	30	19.00	29.00	24.00	2.57
gender of participant	30	1.00	2.00	1.53	0.50
What is your occupation/ profession	30	1.00	3.00	2.56	0.56
Working hours for specified occupation profession	30	1.00	4.00	2.46	1.07
Valid N(list wise)	30				

Table 2

Statistical comparison of Cervical Range of motion after application of both techniques

S.No	RANGE OF MOTION	PNF		MET	
		Frequency	Percent	Frequency	Percent
1	Flexion	5	25.4	8	50.2
		5	41.2	3	23.1
		3	17.6	2	15.4
		2	11.8	2	15.4
		0	0	0	0
2	Extension	2	9.8	6	34.8
		6	47.1	5	38.5
		5	29.4	2	15.7
		2	11.8	1	7.7
		0	0	1	0
3	Left	2	11.8	2	15.4
		2	11.8	3	7.7
		3	5.9	2	15.4
		8	47.1	2	15.4
		0	0	3	23.1
	Right	0	0	2	15.4
		2	11.8	1	7.7
		1	5.9	5	23.1
		4	35.3	1	7.7
		5	29.4	2	15.4
4	Left	1	5.9	2	15.4
		2	10.6	4	30.8
		6	11.8	3	9.7
		3	8.8	7	53.8
		5	5.9	1	7.7
	Right	1	47.1	1	7.7
				3	23.1
		5	29.4	7	40.5
		3	25.4	4	30.8
		5	29.4	4	30.8
		2	11.8		

Results for Range of Motions after comparison of both techniques is made PNF is more accurate and reliable to increase the range of motion of cervical spine and to release upper trapezius tightness(table 2)

Results of Visual Analog Scale shows that the mean Rank for PNF (Hold relax) in VAS Scale is high therefore PNF is much better in relieving pain than Muscle energy technique (table 3a).

Table 3a.

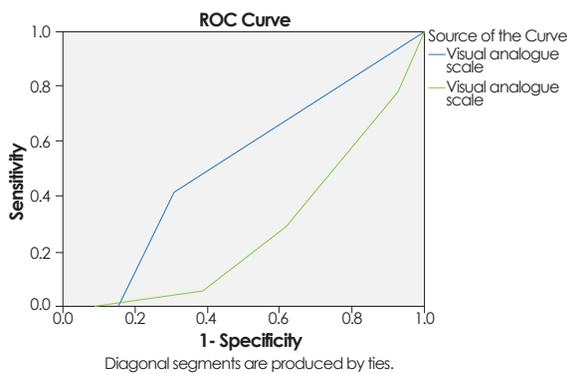
Technique applied	N	Mean Rank	Sum of Rank
MET	Negative Ranks	14 ^a	8.50
	Visual analogue scale - Positive Ranks	0 ^b	.00
	Ties	1 ^c	.00
	Total	15	
PNF	Negative Ranks	15 ^a	7.00
	Visual analogue scale - Positive Ranks	0 ^b	.00
	Ties	0 ^c	.00
	Total	15	145.00

a. Visual analogue scale < Visual analogue scale
 b. Visual analogue scale > Visual analogue scale
 c. Visual analogue scale = Visual analogue scale

Table 3b.

Technique applied	Visual analogue scale - Visual analogue scale
MET	Z -3.08 ^a
	Asymp. Sig. (2-tailed) 0.002
PNF	Z -3.71 ^b
	Asymp. Sig. (2-tailed) 0.000

a. Wilcoxon Signed Ranks Test
 b. Based on positive ranks.



Overall, the results (table 3b) shows that both techniques are effective in reducing pain and increasing cervical range of motion but PNF techniques show more significant results as compared to MET.

DISCUSSION

Muscles are dispersed throughout the human body and they are the most important energetic tissues that maintain posture and helps in the movements of the musculoskeletal system. Neck pain is one of the most common problems in our society. Upper trapezius is the most probable postural muscle which gets shortened in most of the cases. There are several ways to treat upper trapezius tightness. In this study two techniques Muscle energy Technique (MET) and Hold Relax technique of Proprioceptive Neuromuscular Facilitation (PNF) is compared. There is a lack of evidence about the effectiveness of Muscle Energy Technique (MET) when compared with the stretching technique of Proprioceptive Neuromuscular Facilitation (PNF).

Past researches have typically demonstrated that most frequent treatment technique PNF which is used to treat physical dysfunction resulting from any damage or disease^{23, 24}. A study conducted in 2004 showed improvement in hamstring flexibility with the application of PNF technique²⁵. Another study conducted by Gonzakz Rave et al, showed

increase in the ranges of motion of the shoulder and hip joints in 51 patients with the application of Proprioceptive Neuromuscular Facilitation technique. The result of our study indicated that the neck pain decreased and range of motion is increased in group who performed isometric exercises of neck. On the other hand, Muscle Energy Technique (MET) is also effective in decreasing pain and dysfunction. Muscle Energy Technique (MET) is also used to stretch a shortened muscle and strengthen a weakened muscle. There is a lack of evidence to make any absolute result about the efficacy of Muscle Energy Technique (MET) on neck pain and upper trapezius tightness. Overall we found minimal evidence that Muscle Energy Technique (MET) reduce pain on upper trapezius tightness.

In this study after comparison of both techniques, our analysis proved that Proprioceptive Neuromuscular Facilitation is more effective than Muscle Energy Technique. In the present study, the experimental group which received Proprioceptive Neuromuscular Facilitation technique showed statistically significant result in VAS, having Z score is -3.71 while Muscle Energy Technique has Z score is -3.08. And in our study sum of rank of Proprioceptive Neuromuscular Facilitation are 145 while on other hand Muscle Energy Technique has 80 sum of rank. Basically this study is based on effectiveness of both Proprioceptive Neuromuscular Facilitation and Muscle Energy Technique on cervical range of motion, ranges include cervical flexion, extension, right rotation, left rotation and right and left side bending.

There is lack of evidence found on the Muscle Energy Technique in comparison with other manual therapy treatment. In our study it also shows that there is minimal effect of Muscle Energy Technique on neck pain and cervical range of motion. On other hand, our study shows good effect of Proprioceptive Neuromuscular Facilitation in the management of pain in VAS scale and in cervical ranges. Whereas, our study also shows some positive effect of Muscle Energy Technique like Muscle Energy Technique is much effective in left rotation and Proprioceptive Neuromuscular Facilitation effect more in right rotation. In this study ROC curve shows the activity of pain on Vas scale in which the mean rank for Proprioceptive Neuromuscular Facilitation (Hold relax) in Vas scale is high, which proves that Proprioceptive Neuromuscular Facilitation is much pain relieving in upper trapezius tightening than Muscle Energy Technique.

This study wined up that both treatment techniques, Muscle Energy Technique (MET) and Proprioceptive Neuromuscular Facilitation (PNF) were effective on neck pain and muscular tightness but Proprioceptive Neuromuscular Facilitation is more effective. Further studies are required to know the

comparison of Muscle Energy Technique and Proprioceptive Neuromuscular Facilitation in other joints or other areas of body. From all of the above, we conclude that in the management of pain and to improve cervical range of motion Proprioceptive Neuromuscular Facilitation technique is much effective than Muscle Energy Technique.

CONCLUSION

Statistical analysis shows for group A and B, there was mild significant effects after applying PNF Technique than MET.

Hence, PNF (Hold relax technique is much effective than MET in relieving of muscle tightness and management of pain in upper trapezius tightness and pain.

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