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3. To accelerate the progression of these fields by showcasing pioneering research, evidence-based practices, and transformative ideas.
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Editorial

The role of Physical therapy-from bench to bedside and beyond

Humda Niaz [1]

The Physiotherapy Clinic, RWP[1]

The origin of physical therapy traces back to Hippocrates in the 15th century, who integrated physical movement with traditional and holistic medicine, attributing diseases to physical or mental dysfunction.[1] The evolution of physical therapy continued with Per Henrik Ling (1776-1839), a medical gymnast, who laid the foundation by combining exercise, massage, and manipulations to optimize functional performance in treating musculoskeletal injuries.[2]

The polio epidemic in the 19th century led to the introduction of the "Kenny method" by Australian nurse Elizabeth Kenny. The method involved dry heat, stretching exercises, and assisted exercises. It showed positive effects and achieving an 80% recovery rate.[3] In 1925, the American Medical Association established physical therapy as a professional degree, leading to the formation of the American Physical Therapy Association.[4] Over time, physical therapy expanded its scope, incorporating the Bobath treatment for neurological diseases, OMPT by Geoff Maitland, Robin McKenzie's Mechanical Diagnosis and Therapy (MDT) for spine-related issues, Brian Mulligan's Movement with Mobilization (MWM), and techniques developed by David Butler and Michael Shacklock for neural mobilization. The field has evolved with evidence-based approaches, introducing various techniques like soft tissue therapy, deep tissue friction massage, trigger point therapy, myofascial release, active release technique, and dry needling to address symptomatic causes reported by patients.

In the last two decades the field of physical therapy has undergone the process of urbanization. Newer domains have emerged that supplement the field of healthcare. Modern practices integrate electrotherapy and exercise regimen to provide rehabilitation interventions addressing biopsychosocial factors for individuals with physical and mental challenges, whether congenital, trauma-related, or age-related. Physical therapy is now an integral part of healthcare, offering specialized postgraduate degrees in areas such as Neuro-physiotherapy, Cardiopulmonary physical therapy, Orthopedic physical therapy, pediatrics, musculoskeletal physical therapy, burn injuries, trauma injuries, women's health, sports, and oncology, aiming to decrease complications, accelerate recovery, and enhance overall quality of life.

The need for rehabilitation has exceeded in the last two decades. The evolving role of physical therapist in Global health is accredited by WHO, The World Health Organization (WHO) reports that approximately 63% of people globally require rehabilitation, with around 47 million individuals in Pakistan in need of such services. This indicates that one in five people in Pakistan is affected by a disabling condition, a trend exacerbated by the rise of non-communicable diseases. However, in middle-income countries like Pakistan, over 50% of people lack access to rehabilitation. Physical therapy is often recommended to a tertiary level of care for specific patient population. The Global Rehabilitation 2030 meeting in Geneva proposed integrating allied health professionals into the primary care workforce, offering competitive salaries and pathways for growth. To enhance rehabilitation, strategies include its incorporation into primary healthcare, workforce development, advocacy, awareness, research provision, and education on preventive rehabilitation strategies for the affected population during healthcare emergencies, aiming to reduce disability, prevent complications, and optimize recovery. The therapeutic alliance[5] between patients and therapists is a crucial aspect of physical therapy, extending beyond exercise regimens to encompass psychosocial elements. The patient's active engagement is key to efficient recovery, and their satisfaction serves as an indicator of overall service quality and treatment efficacy. Patients express satisfaction in various aspects of physical therapy, including accessibility, clinic environment, therapist's care, clear explanations of treatment, and respect for autonomy and privacy. These factors not only influence patient referrals but also contribute to their overall satisfaction with the treatment protocol.

The future of physical therapy is marked by significant advancements, driven by a growing demand for systematic functional evaluations and increasing patient awareness of their physical conditions. The profession's growing autonomy allows for direct patient referrals to physical therapy departments, with patients recognizing the importance of regular functional assessments. Telehealth has expanded access to physical therapy through remote consultations, facilitated by advancements like motion analysis systems for precise measurements of physical dysfunction. Integration of technology, including wearable sensors and virtual reality, is reshaping rehabilitation, providing interactive environments and alternative non-pharmacologic approaches to analgesia. Robotics in rehabilitation goes beyond assessment, offering comprehensive interventions with dynamic adjustments based on real-time feedback, enhancing the precision and effectiveness of therapy. Precision rehabilitation[6] is a newly introduced term in conjunction with precision medicine, It has the potential to improve patient outcomes, increase the efficacy of rehabilitation interventions, promote tailored and patient-centered approach to healthcare. In conclusion, the Physical rehabilitation is integral to comprehensive healthcare, emphasizing the importance of movement in life. The rapid progress in physical therapy has shifted the health paradigm towards movement medicine, positively impacting patients' perspectives and making them feel heard and acknowledged. Physical therapy not only changes patient perceptions but also plays a crucial role in reducing healthcare inequalities through interdisciplinary collaboration, promoting equitable access to rehabilitation for individuals of all ethnicities and abilities.

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Frequency & Pattern of Distribution of Bone Metastasis in Common Malignant Tumors on Bone Scan

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Abstract

Objective: To investigated the Frequency, pattern of Distribution of Bone Metastases in Malignant Tumors of Bone scan.
Study design: It is a descriptive study.
Place and duration of study: The study was carried out in Jahangir SON-X Diagnostic Center, Rawalpindi.
Material and Methods: 100 patients with Malignancy underwent bone scan. Findings were evaluated by nuclear medicine specialist. Data was analyzed viva SPSS v22.
Results: Among 100 patients 50 patients had positive bone scan for metastases. Most common primary site for of tumor was breast followed by prostate, unknown region, lungs, muscular tumor, ovarian, adrenal, hepato cellular carcinoma, thyroid gland, renal carcinoma, CA rectum, CA urinary bladder and CA stomach. Most common site for bone metastasis was spine followed by ribs, iliac bones, femur, sternum, skull bones, humerus and tibia. Among CA breast patients, common site of distribution of metastasis was spine followed by ribs. Among prostate CA patients' spine is the most common site followed by ribs and illiac bones.
Conclusion: Our results showed that pattern of distribution varies from tumor to tumor. bony metastasis in CA breast are usually distribute to spine and ribs. In prostatic CA metastasis usually distribute to spine followed by ribs and illiac bones.
Keywords: Frequency, Bone Scan, Hepatocellular Carcinoma, Metastasis.

1. Introduction

Metastasis is a term used for the spread of primary tumors to distant parts of the body and is the main cause of morbidity and mortality.[1] Metastasis of malignant neoplasm to bones is more frequent than the primary bone malignancies.[2] The lungs and liver are the number one sites for metastasis followed by the bones.[3]

The presence of bone metastasis represents a massive clinical challenge in the management of malignant tumors. A timely and accurate identification of the frequency and pattern of distribution of bone metastasis is essential for both diagnosis and treatment planning. The reason for this is that it informs clinicians of the extent of the involvement of the disease and thus helps in coming up with the most effective intervention. The complexity of bone metastasis lies in its heterogeneity across different primary malignancies, with various types of cancer exhibiting distinct preferences and behaviors for bone involvement.

The study thus seeks to lift the lid on the parts of the body that experience the most rates of metastasis and thus identify the skeletal locations that are prone to involvement. The increasing prevalence of bone metastasis presents a challenge, for the healthcare system. In the United States around 600,000 cases of bone metastasis are reported annually.[4] Bone metastasis can cause a deal of suffering including pain, limited mobility, fractures, compression of the cord or nerves, and hypercalcemia.[5] In Pakistan there is a lack of data regarding bone metastasis in tumors. To address this gap we conducted a study to identify how frequently and, in what patterns bone metastases occur in tumors using bone scans.

2. Materials & Methods

One hundred patients were involved in the study, sample was collected through questionnaire from various cancer hospitals of Rawalpindi and Islamabad, selected through consecutive sampling, and engaged for a period of 6 months.

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Participants were included based on a history of cancer and previous assessments with a bone scan. Patients without a history of cancer and those with other bone disorders were excluded. Ethical committee permission was obtained for data collection using a prescribed proforma, and patient data from Bone Scans were recorded, with the final diagnosis determined by a consultant radiologist. SPSS version 22 was employed for the data analysis focusing on identifying the frequency and distribution of bone metastasis in malignant tumors detected in the bone scans.

3. Results

The mean age of patients was 51 years. The majority of patients were females (69%). Among 100 patients, 50 had positive bone scans for metastases. The most common primary site for tumors was the breast (55%), followed by the prostate (14%), unknown region (12%), lungs (3%), thyroid gland (3%), CA urinary bladder (3%), muscular tumors (2%), HCCs (2%) , renal cell carcinoma (2%) , ovarian tumor (1%), adrenal tumor (1%), CA rectum (1%) , and CA stomach '(1%) (Figure 1 & 2). The most common site for bone metastasis was the spine (23.8%), followed by ribs (19.9%) , iliac bones (16%) , femur (12.2%), sternum (9.9%) , skull bones (9.9%), humerus (7.2%), and tibia (1.1%).

Figure l: Most common primary site for the tumor was breast followed by prostate.

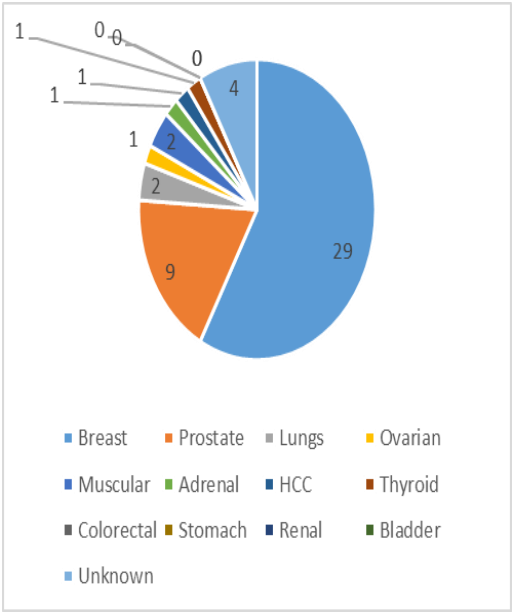


Figure ll: Common tumor sites

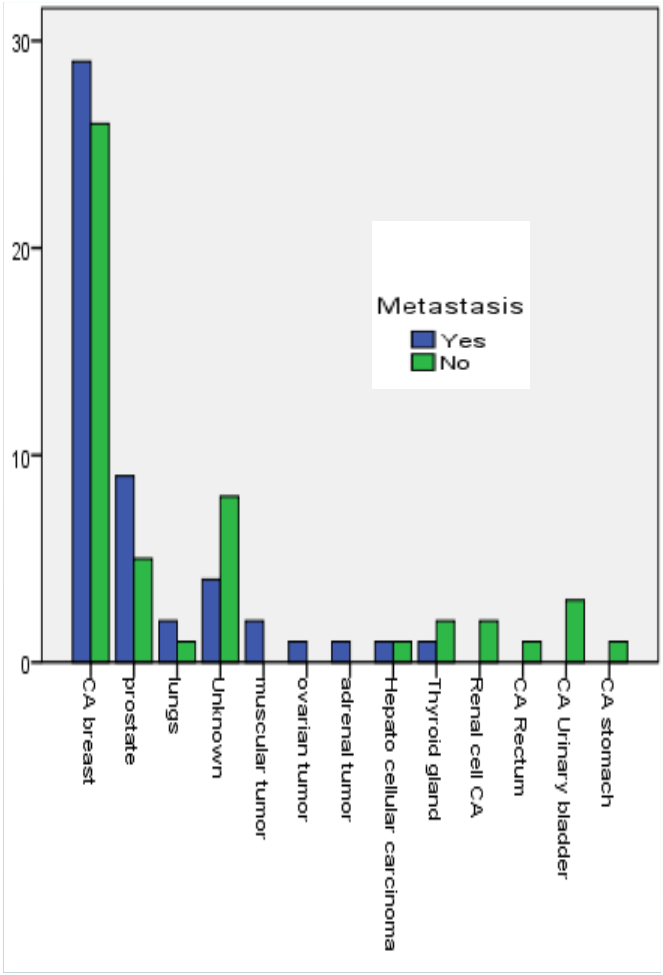
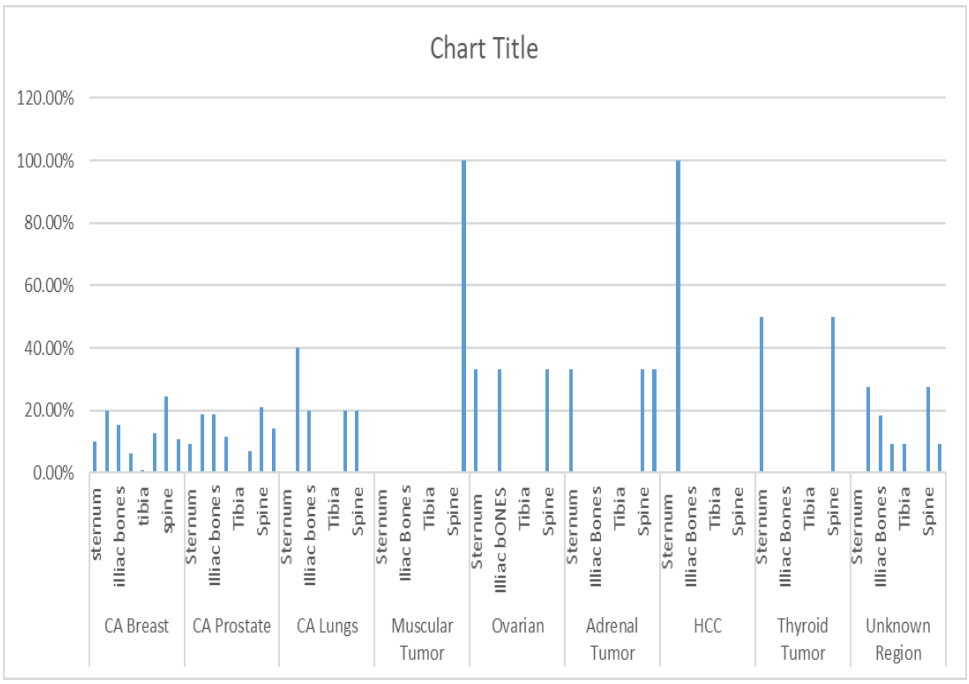


Figure lll: Common sites affected in CA lung patients



4. Discussion

Bone metastasis is more common than primary bone malignancies in malignant neoplasms. Findings show that there is a variation in the affected skeletal regions based on tumor origin. The study assessed 100 subjects and positive bone scans were detected in 50 patients.

The most common tumor sites were the breast, prostate, unknown region, lungs, muscular tumors, ovarian tumors, adrenal tumors, HCCs, thyroid tumors, renal carcinomas, CA rectum, CA bladder, and CA stomach. Previous studies by the likes of Kakhi VRD et al. and Harnandez et al. reported similar sequence of prominence in tumor origin.[10] Kakhki et al. also obtained comparable results, with the spine and ribs being most frequently involved and confirmed that the spine was the common site in breast cancer patients.[11] Similar findings were observed in prostate cancer patients,[10,11] A variation in lung cancer patients was that the ribs were frequently affected, followed by iliac bones, skull bones, and the spine, mirroring Kakhki's et al. findings.[11]

The primary site of the tumor played a crucial role in determining the likelihood of bone metastasis. The study evidenced that breast cancer was the common primary tumor site, followed by the prostate. The findings are consistent with literature in the area, which have disclosed that both breast and prostate have the most propensity for bone metastasis. The presence of bone metastasis in cases with unknown sites of primary tumors indicates a challenge to identifying and managing metastatic disease in patients with primary cancers whose origins are unknown or cannot be talked about with certainty.

The distribution of bone metastases showed the spine as the most common site, followed closely by the ribs, iliac bones, femur, sternum, skull bones, humerus and the tibia. The findings above also align perfectly with previous research on the topic where certain bones such as the ribs and spine are at an increased rate of metastatic involvement owing to their rich vascular supply and hematopoietic activity. The pattern of distribution also showed the importance of comprehensive imaging and staging especially among patients with primary tumors who are known to metastasize to bones.

Limitation of study is small sample size. The relatively small sample size used for this study means that it might not be fully accurate and a true representation of the topic. It means that the study might not be fully depended upon as an accurate depiction of the reality of the topic, hence call for further expansion of the sample size to make more informed conclusions.

A study of such magnitude calls for a lengthy period of data collection, to understand the consistencies and potential inconsistencies in data, hence help make informed conclusions on the subject. Future studies need to go for longer periods, to help follow up on the participants and thus, draw dependable conclusions that are in line with the findings.

Conclusion:

Our results showed that the pattern of distribution varies from tumor to tumor. Bony metastasis in CA breast is usually distributed to the spine and ribs. In prostatic CA metastasis usually distribute to spine followed by ribs and illiac bones. In CA lungs metastasis ribs are most frequently involved followed by iliac bones, skull bones and spine. These findings provide invaluable insight on bone metastases and inform the best possible ways to deal with, and treat such cases. They underpin the importance of understanding the areas of increased or heightened danger, and making sure that potential dangers are addressed early. The findings of this study are also largely consistent with those in literature in the same topic, and thus shows that the study is supported by theory on the same area.

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Comparative effects of Bebo concept and Diaphragmatic Breathing technique on stress incontinence in females after vaginal birth

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Abstract

Objective: To compare the effects of Bebo concept and Diaphragmatic Breathing technique on stress incontinence in females after vaginal birth.
Study design: It is a descriptive cross sectional hospital based study.

Place and duration of study: A Six-month study was carried out in Jinnah Hospital Lahore and Bahria International Hospital Lahore. (March 2022 to September 2022)

Material and Methods: The study design was RCT (Randomized control trial). Duration of the study was 6 months, March 2022 to September 2022. The total sample size of this study was 66. Out of which 33 candidates were allocated in each of the two groups. During this study, the Non probability purposive Sampling technique was used to select the sample and then randomly allocated into groups through Lottery Method. Group.1 was assigned for the receiving of Bebo Concept as intervention plan whereas the Group.2 was applied with the Diaphragmatic. Breathing exercises. Treatment plan consisted of 6-weeks for the females with stress urinary incontinence after vaginal birth. Palpation perfect test was used to measure

Results: Man Whitney U Test was for between group analysis of palpation perfect test, which indicated significant difference observed in posttest palpation perfect test results in both the interventions (p=0.001) and significant difference was observed in posttest palpation perfect test results in both the interventions (p=0.001) showing better results with Bebo.

Conclusion: Bebo concept showed more statistically significant improvement Urinary Distress Inventory, Short Form UDI-6 and Palpation perfect test but Quality of Life (ICIQ-US SF) remained same in both the groups, according to UDI-6 and ICIQ.

Keywords: Vaginal birth, Urinary stress incontinence, Physical Therapy techniques

1. Introduction

Nowadays seen as a disease that is social, incontinence of urine affects almost 20-60% of those women who are over 18 years in age.[1] In 2010, was known by the word "symptom", which mainly meant the Urinary Leakage that is involuntary in regards to person. First child birth, more importantly if it's a natural birth, undoubtedly has an impact on the structure and operation of the pelvic floor muscles (PFM) to a great extent. PFM dysfunction is increased by maternal features during delivery, such as age and a higher BMI, although birth circumstances also play a role.[2] Women who have experienced considerable perineal trauma are found to possess PFM dysfunction symptoms soon after giving birth.[4] Majority of these symptoms include urinary incontinence (UI), POP known as pelvic organ prolapse, and LAM- avulsion known by the term Levator Ani Muscle avulsion.[4] Moreover, natural birth may put the pelvic floor tissue under more stress than it can withstand, causing irreversible alterations in tissue characteristics that are crucial to the urethral support continence mechanism.[5]

In rare circumstances, injuries to the perineal muscles that are mechanical in nature can be irreparable.

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According to research, some women's PFM strength did not return within 8 months of birth, and 34% of them six weeks after giving birth, suffered from the loss of ability to contract the perineal muscles voluntarily.[5] Limited antepartum pelvic organ mobility have a higher incidence of developing postpartum vaginal wall prolapse.[6] Those with postpartum urinary incontinence due to stress had a substantially more flexible bladder neck than women who could contain their urine. After the first birth, the pelvic floor muscles' strength and endurance deteriorate dramatically. According to studies, 65 percent of women who have urinary incontinence recall the first time they suffered from an involuntary loss of urine was either during pregnancy or puerperium.[3]

The BeBo pelvic floor training, or BeBo Gesundheits training in German, was founded in Switzerland and is taught in group seminars. The approach is one of the ideas now utilised in order to avoid the dysfunction of PFMs. It's also utilized to treat urological and gynecological conditions in both men and women.[4] This therapy has the advantage of using a holistic perspective when studying the human body, paying close attention to the perineal muscles' activity as well as the pelvic floor muscles' activation.[5] Every respondent is required to complete a health survey form at the start of the workshop, which includes the data regarding any conditions which can be categorized as clinical in nature, symptoms related to UI, and other topics. Technique's Premises are based upon five basic types of exercises: 1st. Awareness, 2nd Movement, 3rd Strengthening, 4th Relaxation, and 5th Incorporating muscles of pelvic floor into activities of everyday.[5]

Ui-jae Hwang et al. in 2021 examined females with stress urine incontinence, the impact of pelvic floor electrical stimulation on tidal diaphragm excursion and rib cage movement, and forceful breathing and coughing. Since pelvic floor musces play a part in the respiratory function, this study used electrical stimulation of the pelvic floor muscles in women with stress urine incontinence exhibit diaphragmatic excursion, upper rib cage movement during tidal, as well as vigorous breathing and coughing (SUI). A randomised control trial was used in this investigation. This study found that in women with stress urinary incontinence (SUI), pelvic floor electrical stimulitation (PFES) significantly increased pelvic floor muscle (PFM) strength and diaphragm excursion during coughing, tidal and vigorous breathing, and coughing. This training could help the body maintain intra abdominal pressure, which can counter excessive urthral pressure compared to vesicular pressure and prevent urine leakage or stress urinary incontinence in women, particularly when they sneeze or cough.[6]

This study aimed to understand role of different techniques for the improvement of QOL and severity of stress incontinence and provide best possible treatment options and further ease the patients after viginal delivery.

2. Materials & Methods

The study design of this study was a Randomized clinical trial, non-probability purposive sampling technique was used to select the sample and then randomly allocated into groups through Lottery Method. Total sample size of this study was 66, randomly divided into 2 groups, 33 patients in each group.

Study duration was 6 Months (March 2022 to September 2022). Following was the Sample selection criteria, Inclusion criteria was Females that are primiparous and have only one pregnancy, 20–40 years old, Delivery between 37 and 42 weeks of pregnancy, 6 to 8 weeks after natural childbirth, No contraindications to exercise stated by an obstetrician.[5] and exclusion criteria was Multiple pregnancy, Caesarean delivery, Postpartum complications in the form of Pubic symphysis and sacroiliac joint separation, Thrombophlebitis, 3rd and 4th degree of perineal rupture, Diseases or infections of the urinary tract or vaginal tract during the experiment, 3rd and 4th degree of pelvic organ prolapse, 3rd degree of stress urinary incontinence or overactive bladder diagnosed before pregnancy, Gynecological surgeries, spine operations, Pelvic and spine fractures, injuries, Operations on the lower limbs 12 months or less previous to the study, Diseases of the nervous system, e.g. MS, stroke, Respiratory diseases, Diabetes, Cancer &rheumatic diseases.[5] Measuring tools used was UDI-6 (Urinary distress inventory, short form), International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form (ICIQ-SF) and palpation perfect test. Data collection procedure was well defined, after the approval of ethical, consent was taken from Patient as well as from department, allocation was

through lottery method in two groups, Group A and the other was Group B. Baseline assessment was noted for each patient.

The data analysis involved conducting a Normality Test initially. Subsequently, non-parametric Mann-Whitney tests were applied using SPSS version 21. Parametric tests were utilized for both between-groups and within-group analyses. Specifically, the Mann-Whitney test was employed for between-group analyses, while the Friedman test was used for within-group analyses.

3. Results

Since the study was an RCT, the participants were randomly allocated into 2 groups that are, Group 1 (Group A) and group 2 (Group B). There are 66 participants in this research among which 33 participants were in Group A (50%), that received bebo concept and 33 participants in Group B (50%) that received diaphragmatic breathing.

Many female patients suffer from urinary incontinence after giving birth. The data collected in this study illustrates that 6 month was the maximum duration reported by participants with frequency of 17 out of 66 participants. 15 participants suffered from urinary incontinence for about 7 months after giving birth that makes about 20% ratio out of 66 participants in total. 13 participants suffered from urinary incontinence for about 8 months after giving birth that makes about 20% ratio out of 66 participants in total. On the other hand 10 participants suffered from urinary incontinence for about 10 months after giving birth that makes about 15% ratio out of 66 participants in total.

Man Whitney U Test was for between group analysis of palpation perfect test, which indicated no significant difference in pretest values (p=0.14) but there were significant difference observed in posttest palpation perfect test results in both the interventions (p=0.001) and also Man Whitney U Test was for between group analysis of palpation perfect test, which indicated no significant difference in pretest values (p=0.14) but there were significant difference observed in posttest palpation perfect test results in both the interventions (p=0.001) but Independent sample T test was used for between group analysis of ICIQ-US SF to check quality of life. There was no significant difference observed in pretest (p=0.067) as well as posttest (p=0.083)

Paired Sample T test was used for with in group analysis of UDI-6, ICIQ-US SF and Palpation perfect Test, all the variables showed significant difference in pre-post test results having the P value= 0.000.

Table 1 Mean and standard deviation for Baseline measures

Variable	Bebo Concept (n=33) Mean ± SD	Diaphragmatic (n=33) Mean ± SD
Age (years)	26.51 ± 4.24	27.78 ± 4.87
Gestational weeks	39.63 ± 1.67	39.90 ± 1.68
Duration after child Birth (Months)	7.69 ± 1.42	7.75 ± 1.41

SD= Standard Deviation, n= Sample Population

DIAPHRAGMATIC EXERCISE GROUP

- Diaphragmatic exercise will include 1set each day with 30rep for 6 weeks
- Patient lie on his or her back on a flat surface or in bed, with the head supported and the knees bent. The patient's legs can be supported by placing a pillow under his or her knees. Place a hand on the person's upper chest and a second hand beneath the ribs. As it will enable you to feel the patient's breathing move the diaphragm
- Slowly inhale through their nose so that their stomach will slide outward against the caregiver's hand. As much as possible, the hand should not move from its position on the chest.
- Contract his or her stomach muscles, then ask him or her to let them relax as they exhale through pursed lips. The hand that is on the upper chest needs to stay as still as possible(5)

BEBO CONCEPT GROUP

Total 6 Weeks Physical Therapy Program according to Bebo Pelvic floor training concept, 60mins of single meetings twice a week for 6 weeks, 10 min of theoretical part, 50mins of practical, Set of home exercise plan

- **1st Week**
- Meeting 1&2: Home plan of sitting on a chair-10x, supine lying with leg bended and with expiration Pelvic floor muscle stimulation
- Inspiration-expiration-10x, Balance exercise, 1 leg standing for 10sc on each leg
- **2nd Week**
- Meeting 3&4: In addition to the previous week plan, up to 50% of PFM Max Strength and maintain the contraction for 1 cycle of breathing-5x, Each rep. will have 5 sec interval
- **3rd Week**
- Meeting 5&6: All task repetition with prolonged time of single leg standing to 20sec. 4th Week
- **4th Week**
- Meeting 7&8: Repetition of all previous tasks, up to 50% of PFM Max Strength and maintain the contraction for 2 cycle of breathing-5x, with interval of 5sec.
- **5th & 6th Week**
- Meeting 9,10,11,12: All Previous tasks, Single leg standing prolonged to 30Sec, Breathing Exercise, Postural training with the help of different sized ball, balance board, roller. It will include different starting positions i.e. kneeling, standing, side lying, prone lying

Table 2 Man Whitney U Test was applied for between Groups
analysis of Palpation perfect Pre Test and Post Test

Variable	Bebo Concept (n=33) Median (IQ)	Diaphragmatic (n=33) Median (IQ)	P Value (Man-Whitney U test)
Palpation Perfect Pre Test	2 (1)	2 (0.5)	0.14
Palpation Perfect Post Test	4 (1)	4 (1)	0.001

IQ: Inter-Quartile, n: Sample population, *P Value*: Probability of Findings

4. Discussion

Man Whitney U Test was for between group analysis of palpation perfect test, which indicated significant difference observed in posttest palpation perfect test results in both the interventions (p=0.001) and significant difference was observed in posttest palpation perfect test results in both the interventions (p=0.001) showing better results with Bebo. Urinary incontinence is a common condition that has affected women of all the ages. Incontinence of Urine was also termed as a "Symptom" of the involuntary leakage of urine. During the natural births, structure and the functions of PFMs has been impacted greatly. The Bebo pelvic floor training was founded as an approach utilized to prevent the PFM Dysfunctions. The pelvic floor supports the female body's urethral, anal, and vaginal orifice constrictor and continence processes.[1]

Diaphragmatic breathing (DB) exercises as well as Bebo Concept has significantly lowered the UDI-6 score. Similarly, in 2021, the study {Toprak N, S. Sen, et al. (2021)} discussed the significant improvements where the score of the UDI-6 was significantly decreased when only the DB exercises were applied.[7]

As per the results measured in the study accomplished, the p-value was <0.05 for Palpation Perfect Test which was Non-Significant. A previous study done in 2021 shows the results from Perfect Test statistically significant improvements which were noticed through all the parameters. During study completed by the researcher, the progression was implied in both subjective and objective measurement values in both groups using UDI-6 & ICIQ-SF. Self-regeneration of Pelvic Floor Muscles i.e. PFM. Similarly, the previous study quoted above, suggested the observable progression for both of the measurement values as ours along with depiction of increased expectation to achieve self-regeneration to take place within 3 months, post the natural childbirth, when significant gains in strength were observingly demonstrated by both groups including differed improvement in the quality of life was greatly observed when analyzed through the ICIQ-SF showing high difference factor in improvement ratio.[5]

while the results achieved through this study calculated the p-value to be finalized at <0.05, however, during a previously completed study Colla, C., L. L. Paiva, et al. in 2018 suggested the same as with value to be P-value <0.05. On the other hand, as discussed in the information presented above, it was concluded that natural childbirth impacts the pelvic floor muscles which turns out as PFD i.e. Pelvic Floor Dysfunction which causes Urinary Incontinence. But during the previously completed same quoted study, the ICIQ-SF and Jorge-Wexner, along with the usage of visual analogue scale concluded for this very study that no significant or induced differences were observed despite of the type in regards to the method of delivery chosen by the female.[8]

Current study concluded that the pelvic floor muscle training has great positive impact on the condition of Urinary Incontinence with greatly observed improvement in the quality of life when calculated through the ICIQ-SF. Moreover, the Bebo Concept also proved to imply the similar improvements in improving the condition of Urinary Incontinence after the child birth. Similarly, when going through the previously done literature, a study Zarawski M, Kołomańska D, Maj M, Panicz D, Opławski M, et al. in 2017 on almost a similar approach, same changes were obsesrved i.e. PFM training exercises improved the condition of UI which was considered to be imposed by PFD, Postpartum, etc. As per our study, it was shown that there was a ratio of 20% cases recorded suffering from Urinary Incontinence after the child birth took place despite of the method of delivery taken under consideration. On the other hand, opposite to our study, 45% of women were assessed and considered to be suffering from Urinary Incontinence. as discussed in our current study, it was suggested that Pelvic Floor disorders or dysfunctions participated greatly in the presence of Urinary Incontinence. While analyzing the same recent literature, the same point of

consideration was observed depicting that disorder with Pelvic Floor Muscles do contribute as a causative factor for Urinary Incontinence.[9]

During our study, we observed a significantly difference was observed in the form of improvement during before and after the intervention plans were applied with improvement in the p-value of less than 0.05 with similar results applying any of the 2 opted plans i.e. DB exercises and Bebo Concept. Considering the literature, a study was done by El Nahas, E. M., M. A. Mohamed, et al. in 2017, implimenting the same results mentioning the training of PFMs i.e. Pelvic Floor Muscles training improved the condition with significant improvement in the p-value which was less than 0.001 previously with improvement and end calculated p-value of less than 0.05.[10]

No physiological aspect was measured, which may be able to lead changed perception. Sample size of our study was small and only women after virginal child birth were included. Also our study did not measure pre conception level of physical activity which can vary results.

Conclusion:

Based on the study findings it is concluded that physiologically both Bebo concept and Diaphragmatic breathing technique have effects on stress urinary incontinence but Bebo concept showed more statistically significant improvement UDI-6 and Palpation perfect test but Quality of Life (ICIQ-US SF) remained same in both the groups. According to UDI-6 and ICIQ. However, the patient ease of adherence was observed to be more significant with Bebo concept. Hence it is implied that it is safe to incorporate Bebo concept for the treatment of stress incontinence in females after vaginal birth

Further large-scale studies on this topic using rigorous research methods are recommended, so that the findings of current trial may be validated for generalization.

Disclosure/Conflict of interest:

Authors declared no conflict of interest.

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Effects of Thoracic Manipulation in patients with Cervical Radiculopathy: a randomized control trial

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Abstract

Objective: To determine the effects of Thoracic manipulation on Pain, Cervical and Thoracic range of motions as well as Neck disability in patients with Cervical Radiculopathy.
Study design: It is a Randomized Control Trial Study.

Place and duration of study: A Six-month study was carried out in The Physiotherapy Clinic, Saidpur Road, Rawalpindi. (from January 2023 to July 2023)

Material and Methods: 44 patients in accordance to the inclusion exclusion criteria were randomly allocated through sealed enveloped method in Group A (Thoracic manipulation) and B (SNAGS) i.e. Group A (n=22) and Group B (n=22). Both groups received conventional therapy including IFT, hot pack and stretching for SCM, levator scapulae etc. The frequency of treatment was 3 sessions per week for a total of 4 weeks. Variables of the study were Numeric pain rating scale (NPRS), Neck disability index (NDI), cervical and thoracic range of motions.

Results: Between group Analysis shows that there was no significant difference in effects of thoracic manipulation and SNAGS with p value > 0.05 in all variables i.e. NPRS, NDI, Cervical ranges, thoracic ranges.

Conclusion: Both techniques i.e. thoracic manipulation and SNAGS are equally effective in reducing neck pain, improving range of motion in cervical and thoracic spine and reducing neck disability in patients with cervical radiculopathy.

Keywords: Cervical radiculopathy, NPRS, NDI, SNAGS, Thoracic range of motion, Thoracic manipulation

1. Introduction

Cervical radiculopathy, commonly called "Pinched Nerve," is a neurological ailment brought on by underlying musculoskeletal conditions, such as herniated discs and degenerative changes in the cervical spine that cause the intervertebral foramen to narrow or become stenosed.[1] The nerve root at the corresponding foramen is compressed as a result of this constriction. Numbness, tingling, discomfort, and motor weakness in the neck and upper extremity are signs of a compressed nerve root.[2] The cervical radiculopathy is often unilateral, but in severe cases, it can be bilateral where nerve roots are compressed on both sides.

The pathological condition associated with compression and inflammation of the cervical spinal nerve or nerve root is known as cervical radiculopathy. Herniated cervical discs and cervical spondylosis are the two main causes of cervical radiculopathy.[3] Only 21.9% of cervical radiculopathy cases are caused by disc herniation.[4] Tumors, trauma, synovial cysts, meningeal cysts, Dural arteriovenous fistulae, or twisted vertebral arteries cause cervical radiculopathy.[5]

Cervical radiculopathy, is a wide condition with multiple causes of pathology that can afflict persons of any age but peaks in prevalence between the ages of 40 and 50.[6]

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The most prevalent type of lesions, according to historical studies comparing radiological, clinical, and surgical data, are C7 root lesions. The most frequent form of cervical root lesion is a compressive radiculopathy. Compressive lesions can also be brought on by focal masses like tumors or infectious diseases, though less frequently.[7]

Cervical radiculopathies are characterized by discomfort, sensory as well as motor impairment of area served by the afflicted nerve root. The pain itself is described in a variety of ways that can include aching, lancinating, or burning sensations.[8] Neck discomfort, paresthesia, muscle weakness in a myotomal pattern, reflex impairment or loss, headaches, scapular pain, sensory and motor dysfunction in the upper extremities, and neck pain are typical symptoms of cervical radiculopathy.[9] Stiff neck, a reduction in the cervical spine's range of motion (ROM), secondary musculoskeletal problems, a shortening of the muscles that support the neck (the upper fibres of the trapezius, scalene, and levator scapulae) may also occur

Common physiotherapy techniques used for the treatment of cervical radiculopathy includes Cervical Traction, Heating pad, strengthening techniques.[10] Manual techniques include positional release technique, muscle energy technique, myofascial release technique, Cyriax technique, NAGS and SNAGS, manual pressure release, proprioceptive neuromuscular facilitation and ischemic compression.

Thoracic spine manipulation a high-velocity/low amplitude movement or “thrust” directed at any segment of the thoracic spine. Recent research has shown that Thoracic Joint Manipulation directed to the thoracic spine provides a therapeutic benefit to patients with neck pain and has been suggested as an appropriate strategy to minimize the risks associated with manipulation of the cervical spine.[10] Sustained Natural apophyseal glides are proved to be an effective treatment for cervical radiculopathy in improving pain, cervical and thoracic range of motions.

There are many manual therapy techniques which are effective in reducing pain, improving ROM, improving functional disability including Sustained natural apophyseal glides and thoracic manipulation. There is lack of evidence to allow conclusions to be drawn about the effectiveness of Thoracic manipulation combines with. Therefore, in this study we have checked the effectiveness of thoracic manipulation for decreasing pain, improving cervical and thoracic ranges and functional disability in patients with cervical radiculopathy. Parent article that claimed SNAGS was useful for radiculopathy in the long run had a number of flaws, including a small sample size and inadequate follow-ups. This study's evaluation of the effects of thoracic manipulation on the upper thoracic spine, which becomes dysfunctional as a result of lower cervical spine diseases, is equally significant. Comparing the results of thoracic manipulation and SNAGS is the study's goal.

The objective of this study was determine the effects of Thoracic manipulation on Pain, Cervical and Thoracic range of motions as well as Neck disability in patients with Cervical Radiculopathy.

2. Materials & Methods

A Randomized controlled trial (RCT) was conducted at the Physiotherapy clinic, satellite town Rawalpindi from January to July 2023. After the approval from Riphah international university ethics review committee, BASR and permission from the physiotherapy clinic the RCT was registered under the international RCT registry which was NCT05749835. Ethical values during study were considered on priority. Sample size was calculated using GPower application through post treatment values of cervical ROM. Total sample size is 44; 22 participants in each group.[11] Non probability purposive sampling was used and patients were randomly allocated using sealed envelope method in group A and B, 22 participants in each group.

Patients included in the study lied between the age of 18 to 40 years,[12] patients complaining of pain in cervical spine and paresthesia travelling from the neck into arm, forearm and hand,[13] patients having cervical lateral flexion and rotation of the involved side less than 60 degree, patients having positive score on 3 out of 4 test i.e. spurling test, upper limb neurodynamic test median nerve, cervical distraction test, painful and limited cervical rotation,[14] patients having Hypomobility at T1-T5 thoracic vertebrae on springing test were also included in the study.[15] Those participants who had any history of VBI, cervical surgeries, trauma or fracture of

cervical spine, history of osteoporosis and any congenital deformity were excluded from the study

For the sake of study, patient that came to clinical setting with complaint of neck pain, diagnosis of their problem was done based on, symptoms and special tests (spurling test) after that if they were diagnosed as Cervical-radiculopathy patients then verbal as well as written consent was taken from the patients before study and after their consent patients were included in research. After that patients were divided into two groups, groups A (SNAGS+ Thoracic manipulation) and group B (SNAGS), randomly using sealed enveloped method in which an envelope is opened and the patient is then offered the allocated treatment regimen, labeled as snags and thoracic manipulation, to ensure transparency in randomization. After allocation baseline readings were obtained by using tools like numeric pain rating scale for pain, inclinometer was used for measuring flexion and extension, side bending and rotational ranges and NDI for functional activity status. After obtaining the baseline values, physiotherapy session was given and intervention is applied based on their group and again readings were obtained using above mention tools and these readings were labeled as after session day 1 readings and patient were guided for home plan and similar protocol is repeated and data was recorded at 2nd and 4th week of the study. To ensure confidentiality data was self-collected and analyzed. All patients were provided with complete information about the study and intervention and written informed consent was signed before the treatment program in English/Urdu according to the need.

Data was analyzed with SPSS version 25. Normality of data was checked through Shapiro-wilk.Demographics and descriptive data was presented in form of percentages, frequencies and mean + SD.

3. Results

Total 44 patients were treated in this study with mean age 43.84 ± 10.24 years with min age 27 years and max age 65 years. The patients were equally divided, 22 each into both groups. Mean age of patients in group A and group B was 42.36 ± 11.21 years and 45.31 ± 9.19 years respectively. (54.5%) patients were male and 20 (45.5%) patients were female. In group A 11 (50%) were male and 11 (50%) were female while in group B 13 (59.1%) were male and 9 (40.9%) were female.

Mixed way ANOVA was used to compare and determine the time and interaction effects of two groups. The variance and covariance was greater than .05 measured from box plot and lavene's test respectively. That fulfilled the assumption of normality to use the mixed way ANOVA. To examine the effects of time and intervention on NPRS p-value = 0.21 indicate that the intervention had no discernible primary impact. However, there was a significant main impact of time with a p-value of 0.001 .Furthermore p-value = 0.85 indicated that there was no significant relationship between the intervention and the time. For cervical flexion. p-value = 0.55 indicate that the intervention's main effect was not statistically significant. However, there was an appreciable primary impact of time with a p-value of 0.001. Additionally, the relationship between treatment and time, was not statistically significant and had a p-value of 0.20. For cervical extension. p-value =0.15 indicate that the intervention's main effect was not statistically significant. The main effect of time, however, was significant with a p-value of 0.001. Furthermore, p-value = 0.20 indicated that there was not a significant connection between the intervention and time. For right side bending. F-value (1, 42) = 0.01 and p-value = 0.90 indicate that the intervention's main effect was not statistically significant. The main effect of time, however, was significant with an F (1, 42) value of 641 and a p-value of 0.001. Likewise, F (1, 42) = 0.90 and p-value = 0.53 indicated that there was not a significant connection between the intervention and time. For left side bending to examine the effects of intervention and time. F-value (1, 42) = 0.02 and p-value = 0.86 indicate that the intervention's main effect was not statistically significant. The main effect of time, however, was significant with a F (1, 42) value of 672 and a p-value of 0.001. Furthermore, F (1, 42) = 1.6 and p-value = 0.21 indicated that there was no significant interaction between the intervention and time.

For left side bending to examine the effects of intervention and time. F-value (1, 42) = 0.02 and p-value = 0.86 indicate that the intervention's main effect was not statistically significant. The main effect of time, however, was significant with a F (1, 42) value of 672 and a p-value of 0.001. Furthermore, F (1, 42) = 1.6 and p-value = 0.21 indicated that there was no significant interaction between the intervention and time. For left rotation, a two-way mixed ANOVA was performed. F-value (1, 42) =0.02 and p-value =0.86 indicated that the

main effect of the intervention was insignificant. F (1, 42) = 1398 and p-value = 0.001 indicated that the main effect of time was significant. Furthermore, F (1, 42) = 1.10, p = 0.31, and the interaction between time and intervention was not statistically significant. For NDI to examine the effects of intervention and time. F-value (1, 42) = 1.7 and p-value =0.19 indicate that the intervention's main effect was not statistically significant. Yet, there was a noteworthy main effect of time with a p-value of 0.001 and F (1, 42) = 6438. A substantial relationship between the intervention and time was also present, with F (1, 42) = 0.25 and a p-value of 0.006.

For thoracic flexion to examine the effects of intervention and time. F-value (1, 42) = 0.02 and p-value = 0.86 indicated that there was no significant main effect of the intervention. F (1, 42) = 6121 and p-value = 0.001 indicated that the main effect of time was significant. Furthermore, F (1, 42) = 0.17 and a p-value of 0.83 indicated that there was no significant interaction between the intervention and time. For Thoracic extension. The main effect of the intervention was not statistically significant, with F-value (1, 42) = 2.8 and p-value = 0.96. The main effect of time, however, was significant with a F (1, 42) value of 19200 and a p-value of 0.001. Furthermore, F (1, 42) = 2.5, p-value = 0.08, indicated that there was no significant interaction between the intervention and time. For right lateral bending. F-value (1, 42) = 0.0009 and p-value = 0.92 indicate that the intervention's main effect was not statistically significant. The main effect of time, however, was significant with a p-value of 0.001 and F (1, 42) = 4043. A significant relationship among intervention and time was also present, with F (1, 42) = 0.02 and a p-value of 0.95. For left lateral bending to examine the effects of intervention and time. F-value (1, 42) = 0.0009 and p-value = 0.92 indicated that the main effect of the intervention was insignificant. F (1, 42) = 4043 and p-value = 0.001 indicated that the main effect of time was significant. Furthermore, there was a notable interaction between the intervention and the time, with F (1, 42) = 0.02 and a p-value of 0.95.

4. Discussion

Within group analysis of NPRS for cervical painful ranges in radiculopathy shows that both techniques i.e. thoracic manipulation and SNAGS are effective in reducing cervical pain in patients with radiculopathy symptoms having p value <0.001. Between groups Analysis of NPRS in patients with cervical radiculopathy shows that both group A and group B are equally effective in reducing cervical pain in symptomatic patients having p vale of 0.85. These results are in accordance to the previous studies In a study, Cleland contrasted the instantaneous consequences of thoracic manipulation on individuals with cervical pain. He concluded that thoracic pain immediately improved NPRS score from 7 to 5 in 1 session. In his study, Ghada A. Abdallah came to the conclusion that patients with unilateral cervical radiculopathy who received both LLLT and SNAGs Mulligan methods showed improvements in pain intensity, EMG dermatomal somatosensory evoked potential, and functional level. Within group analysis for cervical range of motions shows that both techniques are effective in the improvement of cervical ranges towards normality with p values <0.001. Between groups Analysis for Cervical range of motions in radiculopathy patients shows that both techniques are equally effective in improving cervical ranges having p value > 0.05 which shows non-significant results. This can be justified through previous studies In his study, Adesola Ojo Ojoawo came to the conclusion that sustained natural apophyseal glides are useful for treating cervical radiculopathy patients' discomfort and enhancing their range of motion and neck function. Within group analysis of Neck disability index in patients with functional limitation and ADLS dependency shows that both techniques are effective in the improvement of ADLS towards independency and reducing values on disability index. Between group analysis of NDI in both group A and B in patients with cervical radiculopathy shows that both groups are equally effective in improving ADLS in patients and reducing their disability level with p values > 0.05. These results are in accordance with our previous studies Young IA et al. (50) came to the conclusion that thoracic manipulation had rapid and short-term effects on cervical radiculopathy, and they saw improvements in pain, cervical range of motion, and cervical flexor endurance after just one session. Michael et al. in 2019 came to the conclusion that Thoracic Spine Manipulation is more beneficial than thoracic mobilization, cervical mobilization, and conventional care in their comprehensive review and meta-analysis. Within group analysis of Thoracic range of motions shows that both

techniques are somewhat effective in improving thoracic spine ranges in patients with cervical radiculopathy. Between group analysis of thoracic range of motions variable shows that both techniques i.e. thoracic manipulation and SNAGS are equally effective in improving thoracic ranges with p value >0.05. These results contradicts previous studies In their 2016 study, Kwan-Woo Lee et al. Came to the conclusion that deep cranio-cervical flexor training in conjunction with thoracic manipulation was a more successful intervention for treating non-specific chronic neck pain and enhancing patients' range of motion, muscle function, and neck impairment.

Conclusion:

This study concludes that both techniques thoracic manipulation and sustained natural apophyseal glides are equally effective in improving patient's ranges of cervical and thoracic region, in reducing cervical pain and making patient more comfortable in performing ADLS whilst reducing neck disability in all variables i.e. NPRS, cervical and thoracic spine ranges and neck disability index. The limitation faced during this study were that gender was not equally distributed among both groups, numbness was not improved in both groups although pain was subsided for future reference some other technique must be added to improve numbness in the study. Effects of thoracic manipulation can be observed on the respiratory system. Control group should be added in the study to assess the results more efficiently.

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Tables:

Table 1: Mixed way ANOVA time, treatment group and interaction effect

Sr. No.	Variables		Time			Treatment Group			Interaction effect		
			F(df)	η2	p-value	F(df)	η2	p-value	F(df)	η2	p-value
1.	NPRS	Baseline	2487 (1)	0.97	.000	1.5(1)	0.03	0.21	0.10 (1.5)	0.003	0.85
		2nd week									
		4th week									
2.	flexion ROM	Baseline	4393 (1)	0.99	.000	0.35(1)	0.008	0.55	1.66(1.1)	0.38	0.20
		2nd week									
		4th week									
3.	extension ROM	Baseline	1521(1)	0.97	.000	2.0(1)	0.04	0.15	1.6(1.4)	0.03	0.20
		2nd week									
		4th week									
4.	Rt-side bending	Baseline	641(1)	0.93	.000	0.01(1)	0.000	0.90	0.55(1.5)	0.01	0.53
		2nd week									
		4th week									
5.	Lt-side bending	Baseline	672(1)	0.94	.000	0.02(1)	0.001	0.86	1.6(1.4)	0.03	0.21
		2nd week									
		4th week									
6.	Rt-rotation	Baseline	1727(1)	0.97	.000	2.8(1)	0.06	0.10	1.4(1.1	0.03	0.24
		2nd week									
		4th week									
7.	Lt-rotation	Baseline	1398(1)	0.97	.000	0.02(1)	0.001	0.86	1.10(1.1	0.02	0.31
		2nd week									
		4th week									
8.	NDI	Baseline	6438(1)	0.99	.000	1.7(1)	0.04	0.19	0.25(1.9)	0.77	.006
		2nd week									
		4th week									
9.	Thoracic flexion	Baseline	6121(1)	0.99	.000	0.02(1)	0.001	0.86	0.17(1.1)	0.004	0.83
		2nd week									
		4th week									
10.	Thoracic extension	Baseline	19200(1)	0.99	.000	2.8(1)	0.06	0.96	2.5(1.9)	0.05	0.08
		2nd week									
		4th week									
11	Rt-lateral bending	Baseline	4043(1)	0.99	.000	0.009(1)	.000	0.92	0.02(1.7)	0.001	0.95
		2nd week									
		4th week									
12.	Lt-Lateral bending	Baseline	4043(1)	0.99	.000	0.009(1)	.000	0.92	0.02(1.7)	0.001	0.95
		2nd week									
		4th week									

Prevalence of various types of amblyopia in different age groups

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Abstract

Objective: To find out the prevalence of various types of amblyopia in patients of different age groups.
Study design: It is a descriptive cross sectional hospital based study.
Place and duration of study: A Six-month study was carried out in Department of Ophthalmology, Eye OPD, Holy Family Hospital, Rawalpindi . (from April 2022 till September 2022)
Material and Methods: Fifty patients were studied for the research purpose. Detailed examinations were performed including history taking, slit lamp examination, vision and refraction and fundoscopy. Orthoptic assessment was done on patients presented with the complaint of deviation. Patients who were performed with cycloplegic refraction were called on a follow up for the post mydriatic test (PMT).
Results: Out of the 50 amblyopic patients presented in the refraction room, ametropic amblyopia was seen as the most frequent type of amblyopia. As per data, 22 out of 50 patients had ametropic amblyopia. Meridonial amblyopia came out to be the second most frequent type with 13 patients followed by anisometropic amblyopia that had 8 patients. 5 of the patients had strabismic amblyopia and 2 were presented with deprivation amblyopia.
Conclusion: Ametropic amblyopia is the most common type of amblyopia. It is more frequently seen in males than females. Although amblyopia develops in early childhood, the age group in which ametropic amblyopia is frequently presented in the eye OPD is 11-16 years of age and then 5-10 years of age.
Keywords: Amblyopia, anisometropic amblyopia, ametropic amblyopia, deprivation amblyopia, meridonial amblyopia, strabismic amblyopia, patching therapy.

1. Introduction

Amblyopia is the term used to describe a unilateral or bilateral decrease in best corrected visual acuity that is not directly related to an abnormality of the eye's structure or the posterior visual pathways. On a physical examination of the eye, no obvious cause is found.[1] In other words, when binocular vision is compromised in early childhood, amblyopia generally develops as a neurodevelopmental disorder of the visual cortex. On the basis of visual acuity, this is easily diagnosable. The mechanism to see one image by the both eyes simultaneously is called Binocular single vision. There are certain levels of binocular vision. l- Simultaneous perception (when a person perceives an image with his both eyes simultaneously) 2- Fusion (when two retinal images in cortex fuse to give the perception of single image) 3-Stereopsis (after the fusion of retinal images there is a slight horizontal difference that makes the perception of depth).[2]

When specific retinal areas are activated simultaneously, the sensation of single vision is created. These areas are corresponding retinal areas. When corresponding points of both the retinas lie in the same position with respect to fovea, this is referred to as normal retinal correspondence.[3] Visual confusion arises when dissimilar images stimulate the corresponding retinal sites. It seems as though images are stacked on top of one another. Diplopia occurs, when non-corresponding retinal sites are activated.[4] The cortex ignores the image of one eye and only uses the healthy eye to produce images on the retina in order to prevent confusion and diplopia. This process is termed as Suppression.[5] Amblyopia may result from monocular suppression. Thus, amblyopia is a condition of diminished visual form sense that is not brought on by any clinically evident aberration of the visual pathway and is not alleviated by the removal of any defect that creates a dioptric barrier to the development of the foveal image.[6]

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There are additional elements that affect the development process and create amblyopia, as there is no underlying abnormality in the eye that affects the normal development of vision after birth. Refractive errors, strabismus, and occasionally any media opacification such as a cataract that prevents light from reaching the retina are among these causes.[7] Strabismus impairs the development of binocular single vision.

The most prevalent kinds of amblyopia are strabismic amblyopia, refractive amblyopia and deprivation amblyopia. Refractive amblyopia includes anisometropic, ametropic, meridonial and bilateral amblyopia.

When the refractive error is larger in one eye than the other, it's known as anisometropic amblyopia. The brain "turns off" the eye that is more farsighted in favor of the eye that produces a sharper image. As little as a 1D change in refractive error between the two eyes can cause anisometropic amblyopia.[8] Refractive amblyopia may not be detected until the child undergoes a vision examination.

A squint develops in strabismic amblyopia as a result of an imbalance between the muscles supporting the position of the eyes. The brain mostly uses the images produced by the stronger eye and "ignores" the eye that is not straight.

Deprivation amblyopia is a condition in which one eye is "deprived" of sight as a result of the formation of a cataract or a ptosis that covers the pupil. Reverse amblyopia or occlusion amblyopia, is brought on by excessive patching for therapeutic reasons.[9]

A significant amount of bilaterally uncorrected refractive error, typically hypermetropia, results in ametropic amblyopia.[10] Meridonial amblyopia, which can be unilateral or bilateral, is brought on by uncorrected astigmatism that lasts past the point of emmetropization in early childhood and is typically >1D.[11]

To prevent amblyopia, early detection and therapy are crucial. Vision screening is advised in children between three and five years of age at least once to check for the possibility of amblyopia or its risk factors.[12] When reading single letters as opposed to letters in a row, amblyopia sufferers typically have superior visual acuity. While this "crowding" phenomenon happens in normal individuals to some degree, it is more noticeable in amblyopes.[13] For the purpose of diagnosing amblyopia, a linear test type is therefore preferable. Pinhole testing is performed if visual acuity is not 20/20. Refractive error alone is present if vision becomes 20/20 with a pinhole; if not, amblyopia needs to be taken into account.

Since amblyopia typically does not occur beyond the ages of 6 to 8, it is possible that there is a "sensitive period" during which it develops. It can be inferred from the sensitive time for amblyopia development that there is a sensitive phase for its therapy. Clinical treatment was therefore frequently restricted to young children. But according to new research, older youngsters (ages 13 to 17) who have never received treatment before may benefit from it.[14]

Patching therapy or occlusion therapy has proved to be the most beneficial treatment option for amblyopia. The best course of action is to occlude the normal eye in order to promote the usage of amblyopic eye. It is a frequently employed method in which an adhesive patch (opticlude or coverlet) is applied to the good eye.[15] The patch can be worn for a customizable amount of time. Occlusion has a dose-response effect that is linear, and the results of a dosage of two hours per day are comparable to longer-term therapy.

Other treatment options include atropine penalization, refractive correction, surgical treatment for strabismic and deprivation amblyopia, additional techniques like cloth for patching of glasses, opaque contact lenses and adjusting the prescription for blurring of vision in better eye.[16]

An investigation into the global prevalence of amblyopia in children was conducted in 2020 by the Romanian Journal of Ophthalmology. 131 studies were found among the 952 collected citations. Amblyopia affects 4.3% of children worldwide, according to mathematical estimates. According to the subgroup analysis, the majority of children worldwide had the highest prevalence of amblyopia (5.57%, 95% CI: 2.23%-13.94%, P-value 0.0001) in America and the lowest prevalence (7.1%, 95% CI: 0.003%-172.53%, P-value 0.05) in Africa. The overall prevalence of amblyopia was estimated to be 3.4%. However, estimates vary across all continents, particularly in Africa.[17]

A study conducted at Jaipuriya Hospital in Jaipur to identify the various forms of amblyopia in kids between the ages of 5 and 15. 44 of the 4020 kids overall had an amblyopia diagnosis. Anisometropic amblyopia (29.5%), strabismic amblyopia (25%) meridional amblyopia (13.6%), ametropic amblyopia (11.6%), and the least common kind of amblyopia, which was caused by visual deprivation (4.5%), were the types of amblyopia that were diagnosed.[18] The frequency of these types of amblyopia may vary depending on the regional differences and sample size.

2. Materials & Methods

Descriptive cross-sectional hospital based study was conducted within the duration of six months. Out of 2500 patients presented in the eye OPD, Holy Family Hospital, Rawalpindi, 926 were referred to the refraction room. Taking into account the study duration, 50 patients with amblyopia were studied for research purpose. Data was collected through specifically designed proformas. History was taken and detailed eye examinations were performed including slit lamp examination, vision and refraction, orthoptic assessment and fundoscopy.

On the basis of inclusion criterion, patients of all age groups, both genders, patients with complaint of decreased vision and the ones with refractive errors and strabismus were included in the study.

Non-cooperative patients and patients with ocular pathologies were excluded on the basis of exclusion criterion.

3. Results

Results of my study showed that amblyopia has various types and the most common type seen within the given sample size is ametropic amblyopia. 22 out of 50 patients had ametropic amblyopia that makes it a total of 44%. 13 (26%) out of 50 had meridonial amblyopia, 8 (16%) out of 50 had anisometropic amblyopia, 5 (10%) out 50 had strabismic amblyopia and only 2 (4%) out of those 50 patients had deprivation amblyopia. Out of these cases, 33 (66%) were males and 17 (34%) were females. Age based distribution showed that only 35% of the cases were presented in the age group 5-10 years whereas 65% of the cases were presented between 11-16 years of age. Gender based distribution showed that 12 (54%) out of the 22 ametropic amblyopia patients were males and 10 (45%) were females. Similarly, 9 (69%) of the 13 patients with meridonial amblyopia were males and 4 (31%) were females. Anisometropic amblyopia had 6 (75%) males and 2 (25%) females out of the 8 cases presented. Strabismic amblyopia had 4 (80%) males and only 1 (20%) female out of the 5 presented cases while 100% of the cases with deprivation amblyopia were seen to be males.

The following table shows that the number of patients timely diagnosed with amblyopia were less than the ones diagnosed later.

Table 1: timely diagnosed patients with amblyopia

Timely Diagnosis	Frequency	Percent
Yes	19	38.0
No	31	62.0
Total	50	100.0

As amblyopia is a common cause of monocular vision loss, in my research unilateral amblyopia was seen to be more frequent than bilateral amblyopia.

4. Discussion

Amblyopia is the unilateral or bilateral decline in best corrected visual acuity resulting from aberrant binocular interaction or from vision deprivation for which there is no discernible pathology of the visual pathway or the eyes. The critical period for amblyopia development is 6 to 8 years of age. This also indicates a critical period for its management and treatment. However, recent studies suggest that cases presented later in life (13 to 17 years) also show compliance to amblyopia treatment.

The purpose of this study is to determine the various types of amblyopia, the age groups it is most commonly presented in and the most common type of amblyopia presented. The study began on 2nd of April 2022 and lasted on 30th of September 2022. Out of the 24,618 patients presented in the eye OPD of Holy Family Hospital, nearly 9000 patients were referred to the

refraction room. Depending on the time availability and the number of patients presented, a sample size of 50 patients with amblyopia was taken. The sample selection was done along with an inclusion and exclusion criterion. The inclusion criterion allowed patients of all age groups, patients of both the genders, patients with complaint of decreased vision and patients presented with refractive errors and strabismus. Non-cooperative patients and patients with ocular pathology were excluded as a part of the exclusion criterion.

The research was held over a period of 6 months. My study showed that ametropic amblyopia is the most common type of amblyopia presented. 22 out of 50 patients had ametropic amblyopia that makes it a total of 44%. 13 (26%) out of 50 had meridonial amblyopia, 8 (16%) out of 50 had anisometropic amblyopia, 5 (10%) out 50 had strabismic amblyopia and only 2 (4%) out of those 50 patients had deprivation amblyopia. Out of these cases, 33 (66%) were males and 17 (34%) were females. Age based distribution showed that only 35% of the cases were presented in the age group 5-10 years whereas 65% of the cases were presented between 11-16 years of age. Since amblyopia doesn't develop beyond the age of 8 years, a late presentation also indicates negligence on the part of patients and their parents. Gender based distribution showed that 12 (54%) out of the 22 ametropic amblyopia patients were males and 10 (45%) were females. Similarly, 9 (69%) of the 13 patients with meridonial amblyopia were males and 4 (31%) were females. Anisometropic amblyopia had 6 (75%) males and 2 (25%) females out of the 8 cases presented. Strabismic amblyopia had 4 (80%) males and only 1 (20%) female out of the 5 presented cases while 100% of the cases with deprivation amblyopia were seen to be males. The results showed that ametropic amblyopia is the most common type of amblyopia, presented more commonly in males than females and reported more commonly in 11-16 years of age.

The limitations of my study are small sample size and a single study location. Larger sample size with more than one hospital could give better results.

Conclusion:

Types of amblyopia presented in the eye OPD, Holy Family Hospital, are ametropic amblyopia,meridonial amblyopia, anisometropic amblyopia, strabismic amblyopia and deprivation amblyopia. Ametropic amblyopia is seen to be the most common type, presented more commonly in males presented in the age group 11-16 years.

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Disclosure/Conflict of interest:

Authors declared no conflict of interest.

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Prevalence of Dequervain Tenosynovitis due to Excessive use of Smartphones among Students of Public Sector Institutes of Rawalpindi City

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Abstract

Objective: To investigate the prevalence of Dequervain Tenosynovitis due to Excessive use of Smartphones among Students of Public Sector Institutes of Rawalpindi City
Study design: It is a cross sectional study.
Place and duration of study: A four-month study was carried out in public sector Institutes of Rawalpindi city.
Material and Methods: The study was conducted from June 2023 to September 2023. Participants of age 15-30 years, both genders who were long term excessive smartphone users were included in study. Students with any fracture or deformity at wrist or hand and those who do not use gadgets were excluded from the study. Our Sample size was 346 students which were selected through non-probability convenient sampling. Data was collected through self-structured questionnaire which includes Finklestein test for physical examination, Numeric pain rating scale (NPRS) to assess intensity of pain and general questions to check functional status of individuals.
Results: The prevalence of DQT among smartphone users is 43.4% (150/346) positive and 56.6% (196/346) negative according to Finklestein test. Moreover, intensity of pain according to NPRS among 41% (142/346) participants were with no pain while according to our self-designed questionnaire with excellent functional status were 217 out of 346(62.7%).
Conclusion: The results concluded that partial participants (150/346) experienced DQT due to excessive phone use. Slight decrease in functional status of affected individuals was also observed.
Keywords: Dequervain tenosynovitis, Finklestein test, Numeric Pain rating scale, Abductor pollicis longus, Extensor pollicis brevis, smart phones

1. Introduction

Texting thumb is an ailment in which stenosis (Lee, Stranix et al. 2017) of thumb abductors surrounding the radial styloid process takes place (Ali, Asim et al. 2014, Taufiq, Batool et al. 2015).The condition affects the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) tendons as they pass through a fibro-osseous tunnel in the hand, essential for moving the thumb away from the palm (radial abduction) (Taufiq, F., et al. 2015). Similar to trigger finger, this ailment involves non-inflammatory thickening of these tendons and the tunnel they pass through. The tendons are anchored against the radial styloid by the extensor retinaculum, forming the tunnel (Iqbal, S., et al. 2021) Thickening due to trauma restricts normal movement, leading to inflammation and further swelling. Inflammatory cells are found within the tendon sheath upon microscopic examination (Janson Mak. 2018).

It prevails in 1.3% females and 0.5% males approximately. The peak prevalence tends to be among people in their forties and fifties, making it more prevalent within this age group (Satteson and Tannan 2022).Mothers and child care providers may face bilateral symptoms, but things tend to get better as they lift the child less frequently. Meanwhile, in industrial settings, about 8% of individual's experience wrist pain with a positive Finkelstein's test (Som, Wermuth et al. 2022).

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Understanding these factors can help us provide better care and support to those affected. (Ashurst, Turco et al. 2010, Satteson and Tannan 2022). The sign and symptoms associated with texting thumb include: Pain (Baabdullah, Bokhary et al. 2020, Zirek, Mustafaoglu et al. 2020), tenderness (Satteson and Tannan 2022), discomfort and edema around wrist 1st dorsal compartment (Lee, Stranix et al. 2017), stiffness of first extensor compartment tendons of hand (Ilyas, Ast et al. 2007, Turkay, Inci et al. 2017).

Women having a higher susceptibility of this condition, especially during and after pregnancy. Hormonal fluctuations and increased fluid retention during pregnancy may contribute towards the onset of De Quervain's tenosynovitis in women (Chaya, Bakhach et al. 2018).

The diagnosis of de Quervain's tenosynovitis is confirmed through the Finkelstein test, a clinical procedure where the therapist holds the patient's thumb and tilts the hand towards the ulnar direction. The other diagnostic test called Eichhoff's test, in which the therapist places the thumb inside the palm and curls the fingers around it. The therapist then gently moves the thumb in an ulnar direction (Mak 2018). Another diagnostic test for DQT is the Wrist Hyper flexion and Abduction of the Thumb (WHAT) test. During this test, the patient's wrist is hyper flexed, and the thumb is abducted while the therapist resists the movement.(Fakoya, Tarzian et al. 2023). Ultrasonography is an efficient diagnostic tool to diagnose DQT. (Ashurst, Turco et al. 2010). MRI is employed as a diagnostic tool for de Quervain tenosynovitis also.(Ashurst, Turco et al. 2010).

For the management of DQT conservative treatment include casts, splints (MAHDINASAB and ALEMOHAMMAD 2010) corticosteroid injections. (Mak 2018). Spica splint with therapeutic ultrasound is proven more effective conservative management (Awan, Babur et al. 2017) Corticosteroid injection along with orthotic devices is proved to be more efficient than corticosteroid injection alone (Cavaleri, Schabrun et al. 2016). Active assisted exercises with stretchings of the associated joints is performed. (Goel and Abzug 2015). MWM during lateral and medial glide of carpus are used for treatment of de Quervain's tenosynovitis.

In severe cases, surgical intervention is considered for de Quervain's tenosynovitis. One effective technique involves releasing the hand extensor compartment. (Bosman, Duraku et al. 2022).Also a minimally invasive approach involves ultrasound-guided partial release combined with a corticosteroid injection using a 21-gauge needle (Mak 2018)

The significance of our survey was to aware general population about the prevalence of DQT among students with excessive mobile usage. The students will get aware about the risk factors of excessive use of mobile and SMS texting. The previous studies conducted were not covering the twin cities literature. Our main focus is to check the occurrence of DQT among students of Rawalpindi physiotherapist of Pakistan will get aware and can widen their treatment approaches on students.

2. Materials & Methods

A descriptive cross sectional survey was done within a period of 4 months among the students of public sector Institutes of Rawalpindi city. Sample size was 346.Non probability convenience sampling was used. Our study included student age between 15-30 years. Smart phone using students were only included in the study. Students of both genders who were willing to complete the observation period were included. Students with any physical deformity of wrist and thumb were excluded. Students with wrist and thumb fractures and systemic disorders were not included. We used self-designed questionnaire. Finkelstein assessment test and NPRS (numeric pain rating scale) was used to assess pain. We seek permission from CASHT research committee. Consent form was signed from the research participants. After taking consent from the student's self-designed questionnaire, NPRS (numeric pain rating scale) was filled from students and Finkelstein test was applied on students to diagnose DQT. We used SPSS 21 version for analysis. For qualitative and quantitative variables and mean, frequency and percentages were taken. Frequency charts and plots were used for showing the results of variables.

3. Results

In this following study, the data was obtained from the undergraduate and college students of government colleges and universities of Rawalpindi, the sample size was 346 with mean and standard deviation (173.50±100.026). The students falling in the inclusion

criteria were only included in the study. The individuals aged between 15-30, male and female who were continuous long-term users of smart phone. The students falling in the exclusion criteria were already excluded from the study.

The results demonstrate that 151 students fall in 15-20 age group, 183 participants were falling in 21-25 age group, and 12 participants were in 26-30 age group.

The results show that out of 346 study participants 66 are male and 280 are female. Table 1 shows the frequencies of gender included in the study.

Table 1: Frequency of Gender distribution of study participants

Student gender	Frequency	Percent	Valid Percent	Cumulative Percent
male	66	19.1	19.1	19.1
female	280	80.9	80.9	100.0
Total	346	100.0	100.0	

The results obtained from the physical examination test performed on 346 participants shows that 196 participants are falling in negative criteria and 150 are falling in positive criteria.

Table 2: Frequency distribution of Finkelstein test

Finkelstein test	Frequency	Percent	Valid Percent	Cumulative Percent
negative	196	56.6	56.6	56.6
positive	150	43.4	43.4	100.0
Total	346	100.0	100.0	

The results gathered about the frequency of hours spent by students on mobile phone. From 346 total participants 49 were using less than 2 hours, 93 were using 2-4 hours, 82 were using 4-6 hours, 61 were using 6-8 hours and 61 were using smart phone more than 8 hours.

Table 3 below shows the frequency of pain experienced by the participants of the study. Among 346 total participants 142 experienced zero intensity pain,47 experienced 1 intensity pain, 77 experienced 2 intensity pain, 12 experienced 3 intensity pain, 26 experienced 4 intensity pain, 13 experienced 5 intensity pain, 17 experienced 6 intensity pain, 2 experienced 7 intensity pain, 9 experienced 8 intensity pain, 1 experienced 9 intensity pain.

Table 3: Frequency ranges of numeric pain rating scale

NPRS	Frequency	Percent	Valid Percent	Cumulative
0	142	41.0	41.0	41.0
1	47	13.6	13.6	54.6
2	77	22.3	22.3	76.9
3	12	3.5	3.5	80.3
4	26	7.5	7.5	87.9
5	13	3.8	3.8	91.6
6	17	4.9	4.9	96.5
7	2	.6	.6	97.1
8	9	2.6	2.6	99.7
9	1	.3	.3	100.0
Total	346	100.0	100.0	

Underlying table 4 shows the total score of the questionnaire and describe the results on the basis of type of functional status. Out of 346 sample size 217 were falling in excellent functional status category, 112 were falling in good functional status category and 17 were falling in fair functional status category.

Table 4: Frequency of total score

Total score	Frequency	Percent	Valid Percent	Cumulative Percent
excellent functional status (0-15)	217	62.7	62.7	62.7
good functional status (16-30)	112	32.4	32.4	95.1
fair functional status (31-45)	17	4.9	4.9	100.0
Total	346	100.0	100.0	

4. Discussion

The study conducted to find out the prevalence of Dequervain tenosynovitis due to excessive use of smart phones among students of government educational institutes in Rawalpindi city. The excessive use of smart phones among students is a common problem today which leads to wide variety of clinical conditions and diseases in which De Quervain's tenosynovitis is one disease of interest associated with excessive smart phone use. The main focus of our study is to assess the prevalence of de Quervain's tenosynovitis among students aged between 15-30 years with excessive smartphone use and to evaluate the functional status and intensity of pain at radial styloid process. The inclusion criteria of our study included students aged between 15-30years using smart phone excessively and both genders were included. We excluded individuals having fracture or wrist deformity and those who don't use smartphone.

Other researchers have conducted similar studies with comparable outcomes. For instance, Ahmed et al. (2019) conducted a cross-sectional study in Karachi, surveying individuals aged 15-35 to determine the prevalence of De Quervain's tenosynovitis associated with text messaging. Their study involved 700 participants with diverse educational backgrounds. They utilized the Finkelstein test for diagnosis and analyzed the data using SPSS version 20. Their findings indicated a male-to-female ratio of 1:2. Likewise, in our study, the male-to-female ratio is slightly lower for males. Both studies observed a higher usage of touchscreen mobile phones, especially among individuals with excessive internet use. Additionally, a significant portion of the population utilized mobile phones for purposes beyond texting and gaming. In their study, 58.8% of the participants tested positive for the Finkelstein test. In comparison, our study found 150 out of 346 participants exhibiting positive Finkelstein test results. A positive Finkelstein test suggests the presence of De Quervain's tenosynovitis. These findings indicate a consistent trend in the development of this condition across different studies (Ahmed et al., 2019).

Another study, conducted by Sarfraz et al. in 2022, investigated the prevalence of De Quervain's tenosynovitis and its connection to mobile texting. Their research revealed a higher occurrence of De Quervain's tenosynovitis among students who excessively used mobile phones. Their cross-sectional study involved 191 participants and utilized the Numeric Pain Rating Scale and Finkelstein test for assessment, along with the standard Michigan Hand Outcomes Questionnaire. Data analysis was conducted using SPSS, and categorical variables were compared through chi-square tests. In contrast to our study, which focused on individuals aged 15 to 30 years, Sarfraz et al.'s study included participants aged between 22 and 32 years. Both male and female students were part of their study, with a slightly higher number of females compared to males, mirroring the gender ratio observed in our research. Their findings emphasized a positive correlation between the Finkelstein test and the Michigan Hand Outcomes Questionnaire, as well as the Numeric Pain Rating Scale and the Michigan Hand Questionnaire. Much like our study, their research highlighted that a significant portion of the younger population develops De Quervain's tenosynovitis due to excessive phone use, demonstrating a clear connection between texting on smart phones and pain around the radio-styloid process (Sarfraz et al., 2022).

A study conducted by Ayaz and group in 2022 highlights the prevalence of De Quervain tenosynovitis among

phone gamers, attributing it to repeated thumb movements and overuse of the wrist joint, intensifying the symptoms. The research employed a cross-sectional survey, utilizing a self-designed questionnaire and a reliable Finkelstein test. The study focused on young students in Multan, with data collected from 300 participants, both male and female, using purposive sampling techniques. Results indicated that 13% of gamers exhibited De Quervain tenosynovitis, which aligns with our findings where 150 out of 346 participants showed positive results for the Finkelstein test. The study observed a strong correlation between tenosynovitis and gaming hours, substantiated by a low p-value of 0.000. Furthermore, 87 students experienced stress during gaming, reporting difficulties in gripping objects, twisting keys, and typing on keyboards—paralleling our findings where 150 participants demonstrated similar symptoms. It's important to note that Ayaz et al.'s study specifically focused on young mobile gaming students in Multan, while our research encompassed smart phone users from Rawalpindi's government sector universities and colleges (Ayaz et al., 2022)

Our findings describes that excessive smart phone usage is linked with prevalence of DQT as 43.3% individuals are giving positive results on Finkelstein test. Our result suggests that there are weak findings in decreased functional status and occurrence of DQT as only 4.9% are falling in fair functional status criteria and 62.7% individuals are in excellent functional status category. Texting is not the only reason for the occurrence of DQT, as 32.1% individuals send 10-30 text messages per day while only 10.7% individuals send >200 text messages per day they may use mobile phone for gaming and other social networking that may lead to DQT. Participants scoring zero intensity pain criteria are 41% while those scoring 9 intensity pain are 3%. This shows that pain is not only a symptom of DQT.

Conclusion:

The primary objective of this study was to assess the prevalence of De Quervain's tenosynovitis among students using smart phones, along with evaluating their pain intensity and functional status. The results indicated that 43.3% participants experienced De Quervain's tenosynovitis due to excessive mobile phone usage. Additionally, a slight decrease in the functional status of affected individuals was observed. The study concluded that these individuals experienced mild to moderate pain.

Limitations:

Our study is not generalized because of short duration and limited sample size. The vastness of our study results implication is limited because we included universities and colleges. Our study included students because they use smarter phone for academic and personal usage as compared to general public. Results of present research is based on 15-30 age group individuals; it cannot be applied to all age groups. This study may identify a link between mobile phone use and DQT but other factors such as genetics and ergonomics could contribute to the condition. A cross-sectional study design may not capture the temporal relationship while longitudinal studies would provide more insight. Students may have busy schedules making participation challenges, this could impact the sample size.

Recommendations:

Our recommendations for future researchers will be that they should include large sample size and increase time duration for more generalized results. This study was limited to Rawalpindi but efforts can be made to generalize the findings by including more areas all over the world. Future researchers could include private sector institutes also. Researchers could consider using longitudinal-study design for greater accuracy. Including general public could solve the problem of busy schedules of students.

Conflict of Interest:

The authors declare that there is no conflict of interest.

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