3.3.3 Average number of research papers published per teacher in the Journals notified on UGC -CARE list in the UGC website/Scopus/ Web of Science/ PubMed during the last five years								
Sl. no	UGC-CARE ID/ PubMed ID	Publication Type	Publication Title	Author-name	Journal-name	Year	Link	ISSN NO
1	das.kundan92@gmail.com	International Publication-Research Article	A comparative study to find the effectiveness of William's exercises versus Mckenzie manual correction techniques in Hyper-lordosis causing low back pain	Kundan Das Ukil	International Journal of Research and Analytical Reviews (IJRAR)	2018	https://www.researchgate.net/profile/Sowmya_M_V/publication/341427048_A_comparative_study_to_find_the_effectiveness_of_William's_exercises_versus_McKenzie_correction_Techniques_in_hyperlordosis_causing_low_back_pain/links/5ebfd613458515626cacaea4/A-comparative-study-to-find-the-effectiveness-of-Williams-exercises-versus-McKenzie-correction-Techniques-in-hyperlordosis-causing-low-back-pain.pdf	2348-1269
2	priyadarshini.mishra87@gmail.com	International Publication-Research Article	Awareness Of Physiotherapy As A Course And Its Importance In Health Care Among High School Students –A Cross Sectional Study	Priyadarshini Mishra	International Journal Of Advanced Research	2019	https://www.journalijar.com/article/26348/awareness-of-physiotherapy-as-a-course-and-its-importance-in-health-care-among-high-school-students--a-cross-sectional-study/	2320-5407
3	priyadarshini.mishra87@gmail.com	International Publication-Research Article	Hiramaya disease:will physiotherapy help.	Priyadarshini Mishra	International Journal Of Health sciences And Research	2019	https://www.ijhsr.org/IJHSR_Vol.9_Issue.10_Oct2019/34.pdf	2249-9571

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Case Report

Hirayama Disease: Will Physiotherapy Help?

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ABSTRACT

Hirayama disease (HD) is a rare benign neurological disorder in the young with a male preponderance and usually affecting one upper extremity. It is characterized by the insidious onset and progressive weakness and wasting of a distal extremity. Generally, this disease is considered as a benign and non progressive motor neuron disease that stabilizes within five years of onset. This case report described a 19-year-old male patient who experienced left distal upper extremity amyotrophy with no sensorial abnormality. Early diagnosis is necessary as the use of a simple cervical collar preventing neck flexion, with postural correction and strengthening of weak muscle of hand and forearm has been shown to stop the progression. Further physiotherapy protocols have been found to be helpful in good prognosis of the condition.

Keywords: Hirayama disease, monomelic amyotrophy, motor neuron disease

INTRODUCTION

Hirayama disease (HD), also known as monomelic amyotrophy (MA) or Sobue disease or juvenile muscular atrophy of distal upper extremity [1] (JMADUE), is a rare motor neuron disorder that affects one upper extremity. Hirayama et al. pointed out that these clinical findings do not fit any of the previously known diseases that cause degenerative and progressive muscular atrophy. [2,3] Later, these clinical findings were identified in detail in 38 patients by Hirayama et al. This clinical picture was called as juvenile spinal muscular atrophy or juvenile asymmetric segmental spinal muscular atrophy [4] or juvenile muscular atrophy of unilateral upper extremity, [5] or Madras pattern of motor neuron disease. [2,6,7] It has been mostly reported in Japan, India, Sri Lanka, Korea, Hong Kong, Taiwan, and Malaysia. [2,4] The number of cases reported from Western countries is very low. [8] Men are affected by this disease five times more often than women. [2] It is generally seen among young people who are in a period of rapid growth. Clinical findings appear in the second or third decade and progress slowly. In this disease, unilateral or asymmetric bilateral muscle weakness and atrophy, which progress slowly, occur in the hands and forearm. The disease is limited to upper extremity motor neuron involvement; lower extremity, sensory, or bulbar involvement is not observed. In some cases, muscle weakness becomes evident in cold weather. Patients express that while weakness in fingers increases in cold weather, it gets normal in warm weather. Therefore, patients discover their disease for the first time during winter months. It is rarely seen with hyperhidrosis and abnormal sympathetic skin responses. In 20% of the cases, weakness of the upper arm can be seen. It displays asymmetrical and varying degrees of involvement in the thenar, hypothenar, and interosseous muscles of the hand. The cause of this disease is unknown. However, theories such as chronic spinal cord compression or atrophy have been suggested. In particular, crushed and flattened spine due to excessive forward displacement of the dural sac

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during cervical spine flexion and ischemic changes resulting from this situation are thought to be responsible for spinal anterior horn damage. [9] Further , on pre- and post-contrast neutral and flexion positioned cervical magnetic resonance imaging, localized lower cervical cord atrophy, straightening of the asymmetric cord, abnormal cervical curvature, loss of connection between the basal lamina and posterior dural sac, forward displacement of the posterior wall of the dural canal, and expansion of epidural component symptoms have been observed. [10] Familial incidence is very low, and very few cases of autosomal recessively inherited disorders have been reported. [1,2,7,8] This article describes the case of a 19-year-old male patient who came to Institute of Health Sciences, physiotherapy department with complaints of weakness and wasting of the left hand from past 3 years with initiation of right hand weakness from past two months.

CASE REPORT

A 19 year old male patient came to the physiotherapy department with a typical presentation of a slowly progressive weakness of left hand with an insidious onset and starting of involvement of right hand from past two months, He complaint of inability to lift heavy objects and hold a glass of water but able to do all his activities of daily living as it is his non dominant hand, further with a noteable wasting near the anatomical snuff box (fig 1) and the thenar eminence region and eminent slenderness of forearm on ulna side. In his history, it was revealed that he experienced occasional numbness and chills in his left arm and that he was unable to carry any load using that hand for a long time this had started before 3 years. Nothing significant was found in his family history but he stated that in his residential origin other people too suffered from similar complaint. Physical examination findings showed minimyoclonus, brisk reflexes whereas sensations were intact. Apparent atrophy was observed in thenar, hypothenar, interosseous muscle and forearm muscles but sparing brachioradialis (fig 2 (a)). The strength of his left hand hypothenar abductor digiti minimi and opponens digiti minimi muscles was 3/5, and that of his left hand thenar abductor pollicis brevis, opponens pollicis, flexor pollicis, adductor pollicis and left hand palmar interosseous and lumbrical muscles was 3/5. The strength of his left forearm flexor pollicis longus, flexor digitorum superficialis and profundus, abductor pollicis longus, extensor indicis, extensor pollicis brevis and longus, and extensor carpi ulnaris and radial muscles was evaluated to be 3/5. Measurements of girth of forearm showed a difference of 4 cm from the unaffected forearm. No atrophy was detected in the upper arm measurements. All values in hemogram and biochemical tests were found to be within normal limits.

Fig.1: This figure shows wasting of muscles near anatomical snuff box

MRI showed thinning of cord at C6-C7 level with separation of dura noted at C7-C8 & C8-T1 exaggerating on flexion study, pushing the cord anteriorly against the vertebra (fig 2). Loss of normal cervical lordosis was noted with early desiccation of C2-C3 and C3-C4 discs. EMG revealed left ulna axonal neuropathy with neurogenic pattern. It was detected that symptoms consistent with anterior horn cell involvement were limited in the left C7, C8,

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and T1 myotomes. The patient was diagnosed with MA based on these findings. When the patient was functionally assessed, except for skills requiring advanced skills, his left hand was independent in daily life activities. A difficulty was observed in his left hand grip. The patient was advised to use cervical collar further was taught postural correction exercises of neck and to maintain the condition patient was taught with various exercise which uses hand and forearm muscles. The patient was informed that his clinical information would be used for scientific purposes, and his consent was obtained.

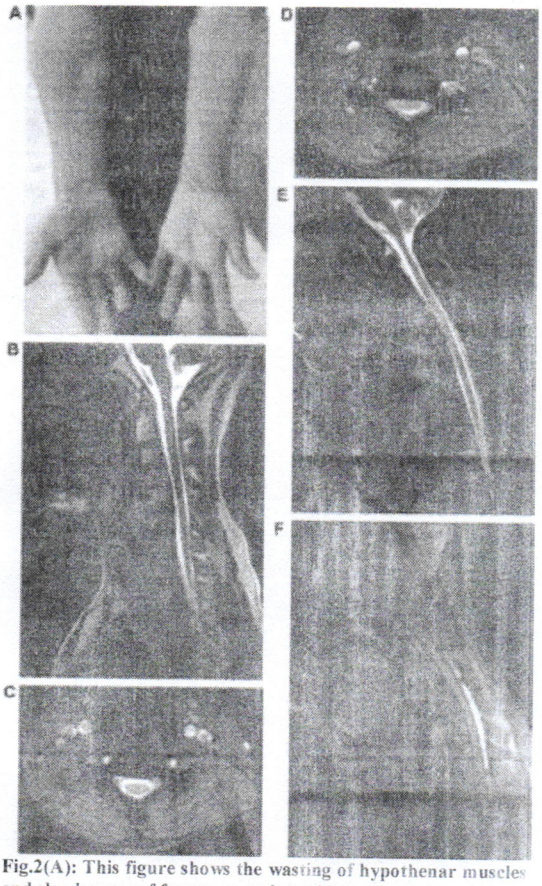

Fig.2(A): This figure shows the wasting of hypothenar muscles and slenderness of forearm on ulnar side
Fig.2(B),(C),(D),(E),(F): MRI showed thinning of cord at C6-C7 level with separation of dura noted at C7-C8 & C8-T1 exaggerating on flexion study, pushing the cord anteriorly against the vertebra

DISCUSSION

Hirayama disease came into recognition in Japan in 1959 where it was reported as Juvenile muscular atrophy of unilateral upper extremity. [3] In a report in 1991, Chan et al. estimated 150 cases from Japan, 37 from India, and 102 from Sri Lanka. The disorder has distinctive features of male predominance between the age of 15-25 years, asymmetric upper limb involvement and a self-limiting course. [12] There is unilateral involvement in majority but asymmetric and symmetric bilateral involvement is also observed. The weakness and atrophy predominantly involves the intrinsic hand muscles (hypothenar, thenar and interossei muscle groups) as well as the ulnar side of the forearm. There is sparing of the brachioradialis muscle giving the impression of an "oblique atrophy". Motor deficit and atrophy may progress for 1-3 years. In the series of Kikuchi et al, there were 17 males and 1 female and the progression of symptoms arrested within 5 years. [11] They also noted some improvement in strength after arrest of progression. Sensory symptoms and signs are conspicuously absent. Deep tendon reflexes are normal in both upper and lower extremities. On pathologic examination Hirayama et al. found the lesions predominantly in the anterior horns of the spinal cord particularly marked at C-7 & C-8. [13] Since the pathogenesis clearly understood, probable causes suggest imbalanced growth between the patients' vertebral column and spinal cord causing disproportional length between the vertebral column and the spinal canal contents. Hence, a "tight dural sac" in the neutral position and an anteriorly displaced posterior dural wall when the neck is flexed. In neck extension, the dura matter of the cervical spine is slack and thrown into transverse folds while in neck flexion, the dura becomes tighter because the length of the cervical canal increases as the neck moves from extension to flexion. Normally, the slack of the dura can compensate for the increased length in flexion and so the dura can still be in close contact with the walls of the spinal canal without anterior displacement. In Hirayama disease, the dural canal isn't slack in extension due to

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imbalance in growth of vertebrae and dura matter and therefore, the tight dural canal cannot compensate for the increased length of the posterior wall during flexion. This leads to anterior shifting of the posterior dural wall, consequently, compressing the cord which may lead to microcirculatory disturbances in the anterior spinal artery or in the anterior portion of the cord. The chronic circulatory disturbance resulting from repeated or sustained flexion of the neck may produce necrosis of the anterior horns which are most vulnerable to ischaemia. Conventional X-rays in Hirayama disease shows no abnormality except loss of the normal lordosis. MRI studies with neck in flexion are easy to obtain and show forward displacement of the posterior wall and a well enhanced crescent-shaped mass in the posterior epidural space of the lower cervical canal representing the congestion of the posterior internal venous plexus which vanishes once the neck returns to neutral position. MRI shows atrophy of the lower cervical cord in a neutral position with abnormal cervical curvature and loss of attachment between the posterior dural sac subject lamina, significant in Hirayama disease.

Hirayama disease is a self-limiting disorder and there is no consensus on the definitive treatment. However, early diagnosis is necessary because a cervical collar may arrest the progression of the disorder by limiting the neck flexion. Physiotherapy is also helpful in preventing complications resulting from immobility such as joint stiffness and muscle wasting. [14]

CONCLUSION

Hirayama disease should be considered in the differential diagnosis of young men with forearm and hand muscle atrophy. As early diagnosis is crucially important for the treatment of suspected patients, dynamic flexion MRI should be performed. With the help of early treatment modalities, use of cervical collar, postural correction and exercises of hand and forearm muscles the prognosis of the can be better off even helping to stop progression.

Informed Consent: Informed consent was obtained from patient who participated in this case.

Conflict of Interest: No conflict of interest was declared by the author.

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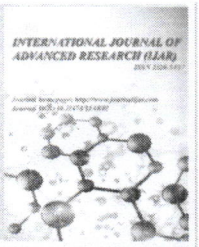

RESEARCH ARTICLE

AWARENESS OF PHYSIOTHERAPY AS A COURSE AND ITS IMPORTANCE IN HEALTH CARE AMONG HIGH SCHOOL STUDENTS- A CROSS SECTIONAL STUDY.

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Manuscript Info

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Key words:-
Awareness, Profession, Physical Therapy, Government, Private, Intermediate, Pre-medical.

Abstract

Purpose:-The purpose of the study is to imbibe awareness of physiotherapy as a subject of choice similar to other medical fraternity and its importance in health care among high school students.

Objective:-This study is to promote awareness of physiotherapy as a subject of choice similar to other medical fraternity and its importance in health care among high school students.

Methods:-It is a crossectional study design with a sample size of 1000 high school students

Results:-In the survey done about the awareness of physiotherapy as a course it is very abashing to recognize that many of the students are unaware of physiotherapy its treatment methods, infrastructure ,it contains and their usage and role of physiotherapy as eminent part of treatment in variety of cases, thereby their ignorance in choosing physiotherapy as a subject .

Discussion:-The result of the present study seems to draw our attention to the fact that still many high school students are unaware of physiotherapy as a course to pursue.

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Introduction:-

A profession is a rewarded occupation, especially one that involves prolonged training and a formal qualification whereas, a professional is engaged in a specified activity as main paid occupation rather than as an amateur . Health professionals play a central and critical role in improving access and quality health for the population. They asses, diagnose and treat various ailment with ease .This profession adds life to years not years to life creating a better life for ailing society.

Physical therapy, as a health care profession, was formally recognized in the second decade of the 20th century, after the World War I (1914-1918) whereas the profession was endorsed due to numerous emerging cases of poliomyelitis after World War II . World Confederation for Physical Therapy (WCPT) defines Physical Therapy as "A profession which is concerned with identifying and maximizing quality of life and movement potential within the spheres of promotion, prevention, intervention, and rehabilitation. This encompasses social, psychological, physical and emotional wellbeing.".The profession of Physical Therapy started off as a diploma program progressing to Bachelor and now leading to Master and PHD programs. It has grown such rapidly that the basic educational process required to become a PT is upgraded to the Doctor of Physical Therapy (DPT) degree. After DPT the need for further advancement in studies emerged realizing the need for equal credentials of old Bachelors in the market with

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the new graduates coming with the DPT degree. Hence, the Post Professional degree program was introduced. Similar concerned issues were raised when the mode was to move from Bachelor to the professional Master degree . The Post-Professional DPT degree permits PT to achieve degree uniformity with PT that holds the skilled DPT degree by filling in any gaps between their skilled baccalaureate academic degree education and current skilled DPT degree education.

American Physical Therapy Association (APTA) represents more than 80,000 Physiotherapist, Physiotherapist assistants, students and in U.S. Physical Therapy is ranked fifth in best healthcare jobs and eight in the 100 most excellent jobs in 2013. According to Vision 2020, the new graduates taking the national licensure examination in the field after 2020 will be required to hold at least DPT degree .Physiotherapist practice independently of other health care providers and also within interdisciplinary rehabilitation programs. Clinical specialization opportunities are also available, for Physiotherapist, in the fields of, Neurology, Orthopaedics, Geriatrics, Paediatrics, Women's Health, Sports and Clinical Electrophysiology . A study conducted by Prati and Liu. in October 2006 showed that the students have a positive attitude towards physical therapy. College students also observed the DPT as educating more competent practitioners. However, DPT programs should put in efforts to advocate their programs not only on-campus but also off-campus. DPT programs and APTA should promote more seriously to the public, the changes undergoing in the field of physical therapy .

Despite Physical Therapy being such a rapidly growing and emerging field there is not much work done to check the awareness of Physical Therapy and thus this study is being conducted as having the knowledge of awareness would help in creating more effective marketing strategies as many of these students could become practitioners as well as patients in future. Also understanding the factors for which the students do not choose Physical Therapy as their first option for career choices, would help in learning the misconceptions regarding theprofession that need to be corrected.

The objectives of the study are to determine the awareness and perception of Physical Therapy, to compare the frequency of physical therapy as career preference among students of government and private sector colleges and to identify the factors for which students do not choose Physical Therapy as first option for career choices

Methodology:-

1. Study design – Descriptive study
2. Study type – Cross-sectional study
3. Sample size – 1000
4. Sampling method – convenient sampling
5. Settings – govt and private colleges, BBSR
6. Study duration – 2 months

Procedure:-

A survey was conducted using questionnaire which was pretessted and modified with a convenient sample of two physiotherapist and 5 doctors of different fraternity. Then, the questionnaires, its content, wording, instructions and ease of completion were revised accordingly.

Questionnaire comprised three sections (part A,part B, partC) .Part A consists of subjective information ,part B consist of source of information ,part C consist of 11 close ended questions with multiple options, which were framed to enquire respondents of:

1. Knowledge about physiotherapeutic interventions
2. Physiotherapy as a course,services and availability
3. Physiotherapy intervention for various diseased condition

The questionnaire was distributed in one government and two private colleges of eastern Odisha. Responses were recorded inform of graph and bar diagrams. Participants were explained in detail regarding the purpose of the study; informed consent was obtained and questionnaires were distributed. Necessary steps were taken to maintain anonymity.

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Results:-

Statistics :-

Thousand students were given the survey questionnaire out of which only number of students who responded back to the questionnaire were only 607 out of which females were more than males .The following are the results of the survey:

Source of information about physiotherapy:-

According to the results of the survey the commonest source of information is found to be news paper/magazine (23.3%), internet (23.3%), visits to physiotherapy school/ hospital/etc (17.4%), through advertisements(16.6%), and less common sources of information are televisions (12.7%), patient as client (12.6%), films(10.8%), friend as a therapist(10.1%), teacher/counselor/coach(10.1%), family physician (9.4%), family member therapist (7.8%), volunteer (6.6%), career day/health care (5.6%), radio (5.5%), personally a client (4.6%), friend is a client(4.5%), literature(2.5%), and people who are unaware of physiotherapy from any of the above mentioned sources(40.7%).

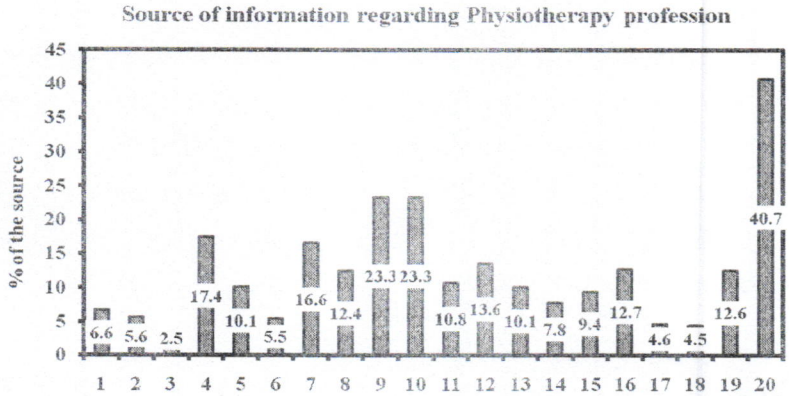
Awareness in physiotherapy:-

In the survey done about the awareness of physiotherapy it is very abashing to recognize that many of the students are unaware of physiotherapy its treatment methods, infrastructure it contains and their usage, role of physiotherapy in diseased conditions other than sporting activities. Out 100% the response percentages were very unsatisfactory.

The percentage responses for each question is given below:-

1. Q.no1:-23% of students attempted the correct answer while 33%of them did not attempt the question and 44% attempted multiple or other individual options.
2. Q. no2: 6% of students attempted the right answer, 35% did not attempt and the remaining 10% of students marked multiple options.
3. Q. no3: 14% of students attempted all four options which is correct option and 33% did not attempt the question whereas 28% marked single options and 25% students marked other mixed options.
4. Q. no4: 25% of student's marked right option, 34% did not attempt and 16% marked all four options and other 25 % attempted one or multiple options.
5. Q. no5: only 7% marked correct answer, 37% did not attempt the question 37% marked any one of the option and other 20% marked multiple options.
6. Q. no6: 9% attempted right option 37% didn't attempt whereas 34% marked individual options and 20% marked multiple options.
7. Q. no7: 11% of students marked correct option, 37% did not attempt 31% marked individual options and other 21% marked multiple options.
8. Q. no8: 6% of them attempted all four options which is correct,31% marked any of the single option, 20% marked other multiple options where as 43% did not mark any of the options.
9. Q. no9: only 5% of the students attempted all options which is right and majority i.e. is 47% did not answer, 34% answered individual option and the other 10% attempted other multiple answers.
10. Q.no10: 7% of them marked the correct options, 42% did not mark any of the options, 32% attempted individual options and 19% marked other multiple options.
11. Q.no11: 10% of the students marked all four options which is right, 38% not attempted the question, 33% marked only any one of the options and 19% attempted other multiple potions.

Tables and graphs:-



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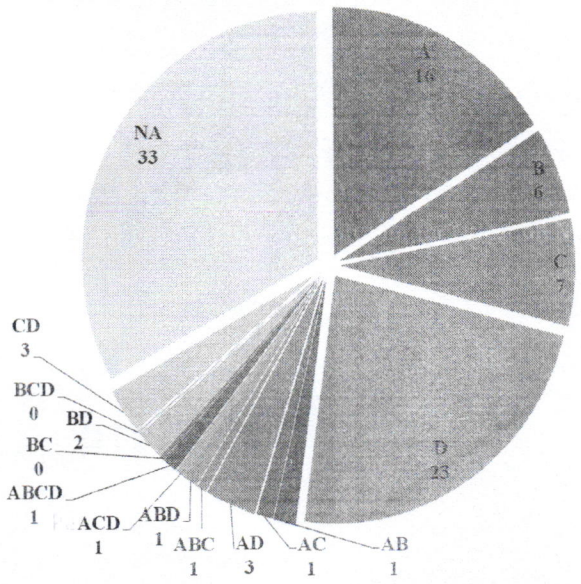
Percentage distribution of Answer for Question No.1



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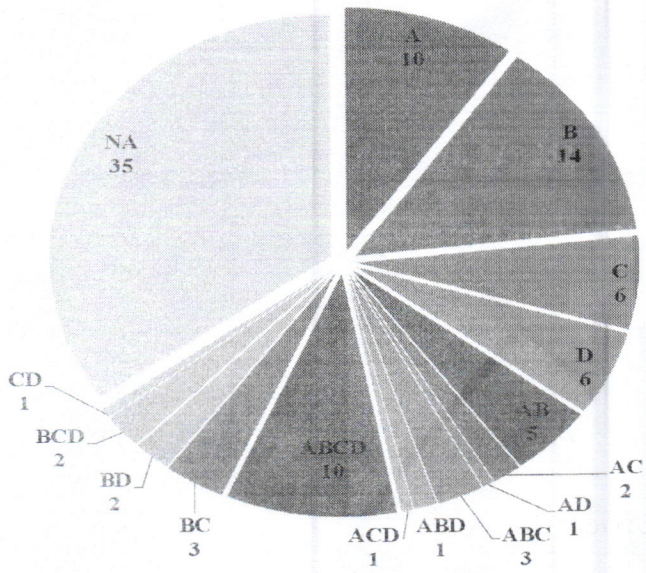
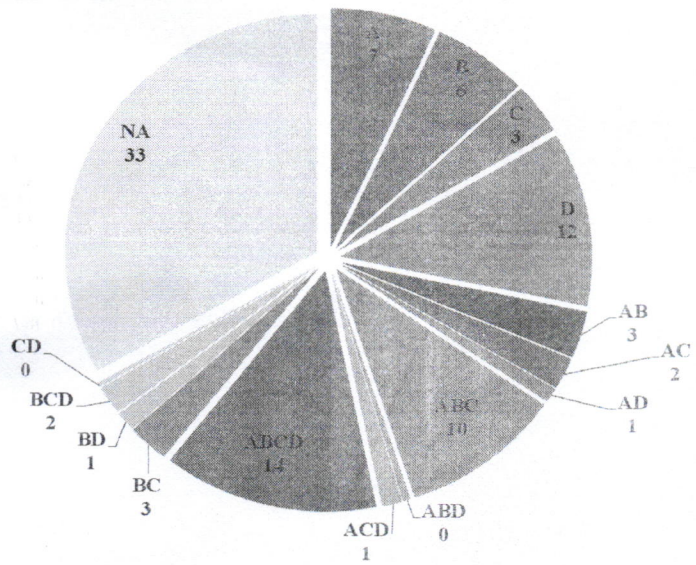


Percentage distribution of Answer for Question No.3



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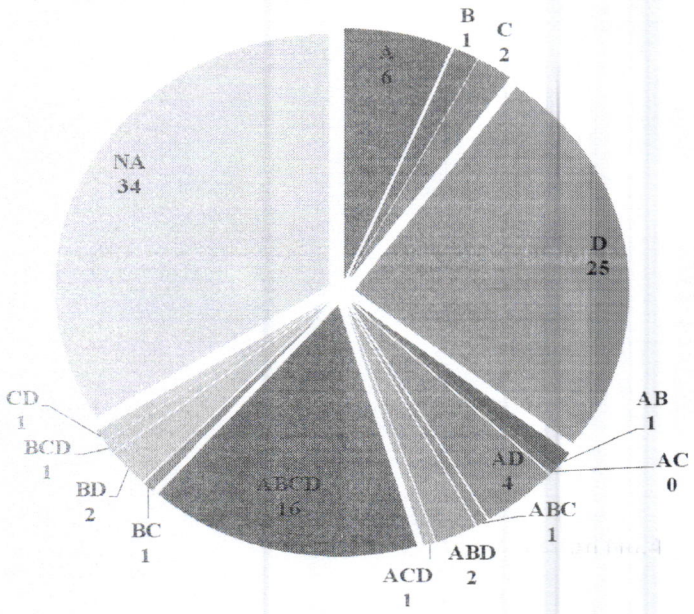

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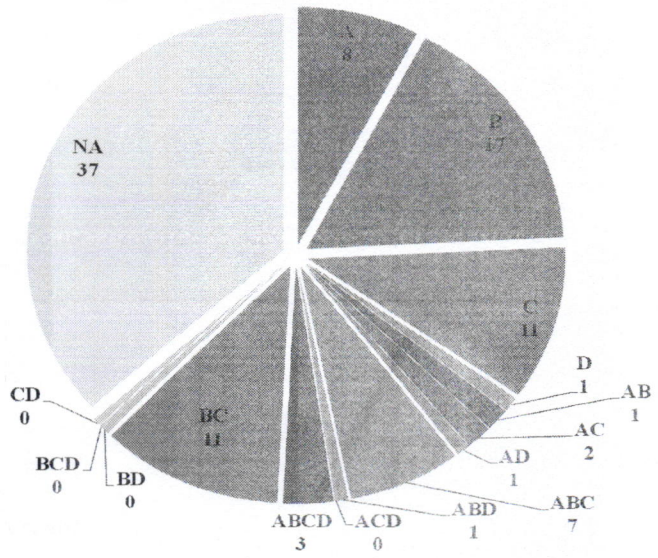
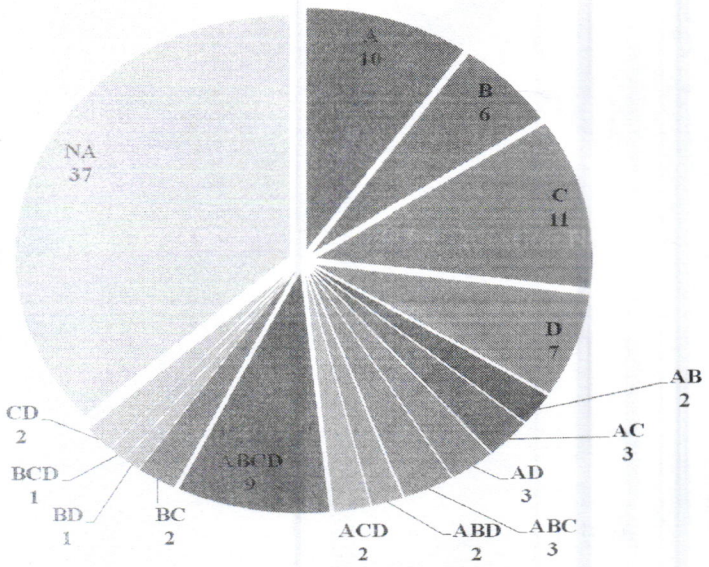
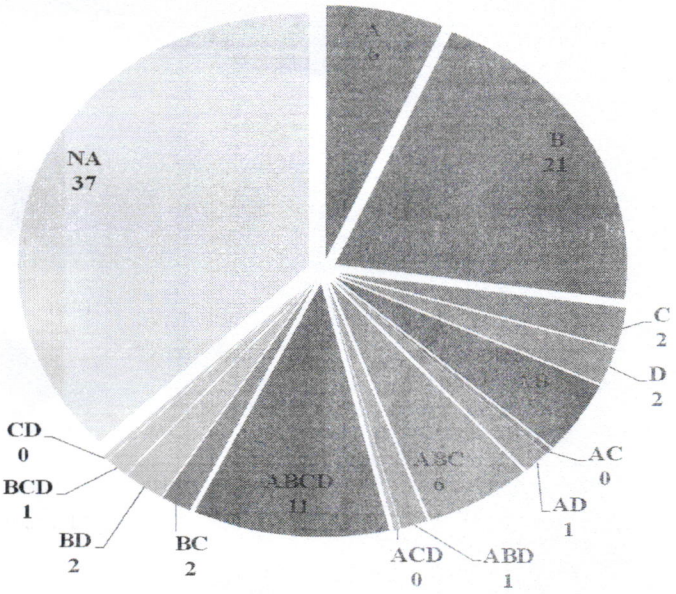
Percentage distribution of Answer for Question No.5



Percentage distribution of Answer for Question No.6



Percentage distribution of Answer for Question No.7



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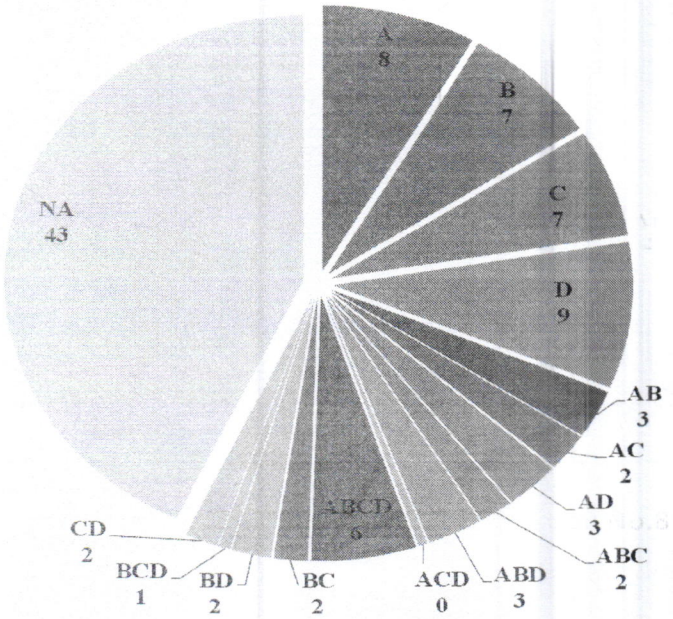

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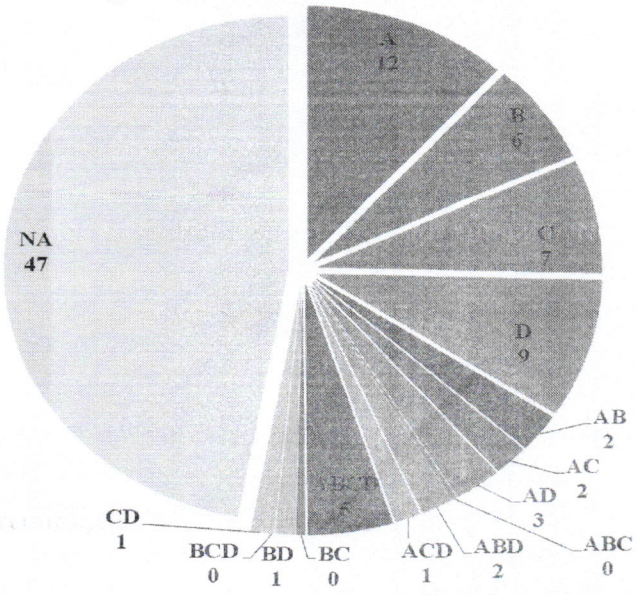
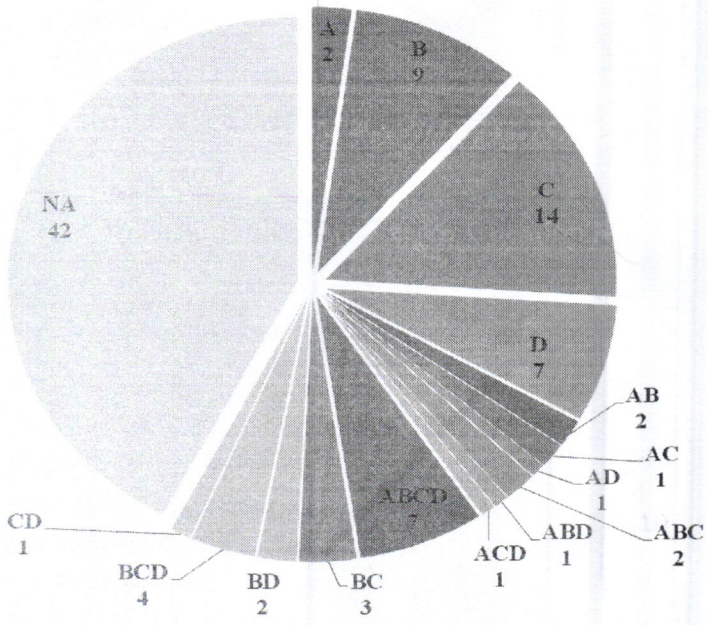
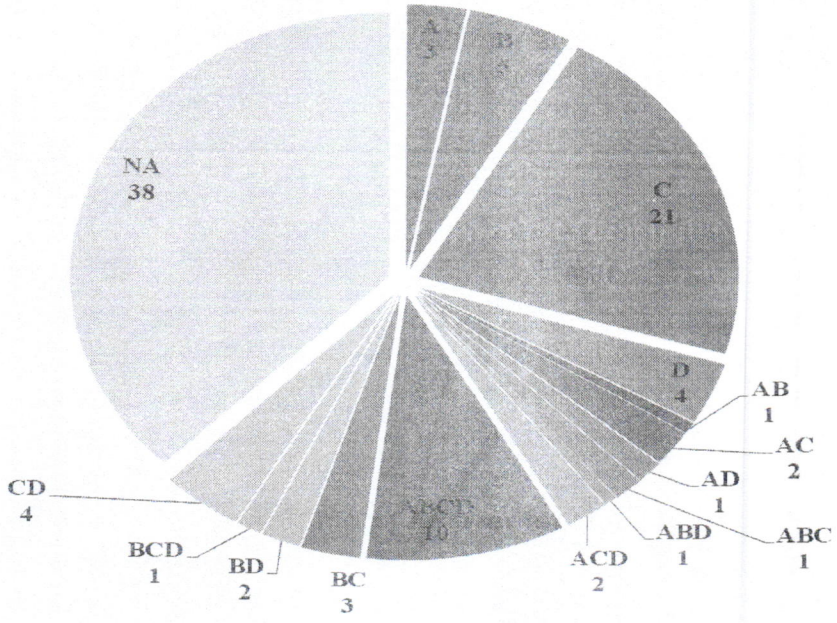
Percentage distribution of Answer for Question No.9



Percentage distribution of Answer for Question No.10



Percentage distribution of Answer for Question No.11



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Discussion:-

This study was conducted to get an idea on the fact whether high school students are aware about physiotherapy as a course to pursue and what are its utility as an entity in health care field. The selected population is higher secondary with science background .In Odisha ,under Utkal university the basic prerequisite for a student to enroll under physiotherapy course is its specificity of physics, chemistry and biology as subjects in higher secondary. The basic awareness about Physiotherapy among higher secondary students is not satisfactory , they only had a knowledge of it only as an adjunct in case of sports injuries. The commonest source about was through news paper ,internet and movies of recent kind.Abd RazakZakara etal implicated the existing higher secondary curriculum in Malaysia should be revised by introducing Physiotherapy. Riju etal emphasized that there is a need for a programme for school children in Anand city of India to educate them about Physiotherapy. According to Ginzberg (1972) theory, between early to late adolescent is the period in which career choice is made. According to Super's developmental theory, individuals between the ages 15 and 24 years are at the exploration stage of their development. This phase is characterized by the making of tentative choices and skill development. In India the students will be in higher secondary level at the age of 16-18 and that is the period to select their future career. Hence we have to provide adequate information about the profession through print and electronic media so that the student may take Physiotherapy as career in health care.

Many of them believe Physiotherapy is practiced by doctors, it indirectly depicts Majority of the students are not aware physiotherapy is a unique profession and practiced by Physiotherapist. It is also noticed that student assumes masseurs are Physiotherapist, But the fact is Physiotherapist practice massage as a part of their therapeutic maneuver where and when required depending on the condition. When we compare with similar studies done by Shimpachiro etal in japan among ishikawa high school students it was noted 58% of respondents were believed to have had some knowledge in Physiotherapy. Whereas in the study conducted in high school students in Sri Lanka more than 63% of them were unaware about physiotherapy profession & its applications in patient management. Hence similar trend is noticed among the students in Japan and in Sri Lanka. The awareness seems to be coherent to the similar study conducted at Meerut etal (India) in which 41% of higher secondary students had an idea about Physiotherapy .In contradict to the first finding (awareness about physiotherapy), it was inferred satisfactorily about the role of physiotherapy in the improvement of fitness level of sportsperson. This is an interesting finding that majority of the sample where mot much aware of the role of physiotherapy in rehabilitation of injuries, improving quality of life of injured person, regaining activities of daily living. The awareness about other modalities other than electrical modality is not satisfactory. Many students believe physiotherapist uses electrical modality more than manual techniques, exercise equipment. Similar result but a very high awareness about electrical modality (95%) is noticed in the similar study conducted in srilanka. In difference to the above finding many students aware about manual therapy (82.22%) followed by electro therapy and exercise therapy (75.56%) as a mode of Physiotherapy treatment. The awareness about ice/heat therapy and hydrotherapy is not satisfactory. This is highly controversial to the previous finding Many students believe Physiotherapy unit comprises of electrical modalities (40%) followed by therapeutic pool (40%). This results shows the students are not very clear about the mode of Physiotherapy treatment and component of Physiotherapy unit. Only few are aware of all four (Manual therapy, Ice/heat therapy, hydrotherapy, electrotherapy & exercise therapy) components of Physiotherapy. Though only less than half of the samples aware that Physiotherapy can improve the fitness level of sports person, there is a good awareness about when to meet the team Physiotherapist. It is evident from the study most of the respondents aware of Physiotherapy is useful in Musculoskeletal and neurological conditions only . The similar findings noticed in the study conducted by Riju etal among high school students in Anand district (India). Kacie etal who conducted a study among public at Kansas city, United states the highest awareness of Physiotherapy is musculoskeletal conditions (90%).This study implicates the awareness about the role of Physiotherapy in other specialty (Cardiorespiratory, Women's health, Paediatrics) needs improvisation and random awareness camp for the same .

Conclusion:-

The students have a moderate awareness about Physiotherapy, The awareness about the role of Physiotherapy in specialties other than orthopaedics and neurology is not satisfactory, Television has been identified as the major source of information about the Physiotherapy.

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Further Recommendation:-

Measures has to be taken to increase the awareness among the students. A brief introductory session can be conducted to higher secondary students to develop better awareness about the profession which would enlighten the minds of aspiring students to choose Physiotherapy .

Acknowledgement:-

I would like to pay my hearty gratitude and benevolence to the Almighty, who showered his blessings to make my paper a successful one and my parents for their support throughout.

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A comparative study to find the effectiveness of William's exercises versus McKenzie correction Techniques in hyperlordosis causing low back pain

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A COMPARATIVE STUDY TO FIND THE EFFECTIVENESS OF WILLIAM'S EXERCISES VERSUS MCKENZIE MANUAL CORRECTION TECHNIQUES IN HYPER-LORDOSIS CAUSING LOW BACK PAIN

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ABSTRACT

Aim: To find the effectiveness of William's exercises versus McKenzie manual correction techniques in hyperlordosis causing low back pain **Objective:** The objective of the study is to compare the efficacy of Williams's flexion exercise and mc-kenzie manual correction technique to reduce the pain and functional disability and to reduce the exaggerated lordotic curvature of lumbar vertebra in patient with mechanical low back pain. **MATERIALS AND METHODOLOGY:** Patients were participated in this study screened for inclusion criteria Age- 30 to 40 Participants with lumbarlordotic curve (cobb`s angle) greater than 76° in lateral computerised radiograph, Postural low back pain with excessive lumbar lordosis, Women after delivery present with back pain and exaggerated lumbar lordosis,and Exclusion Criteria - Presence of spondylolisthesis, History of disc protrusion, congenital deformities of vertebrae, scoliosis., Sacro iliac joint dysfunction. Any pelvic surgery including caesarean section, 50 samples were selected using simple random sampling technique.They were explained about safety and simplicity of the procedure and informed consent was obtained. **Result:** It is concluded that both the technique is not showing improvement in hyperlumbarlordosis compare to the pre test values, there by accepting the null hypothesis **CONCLUSION:** For the parameters of pain and functional disability Williams flexion exercise is found to be effective than McKenzie manual correction technique there by rejecting the null hypothesis.

Key Words: WILLIAM'S EXERCISES;MC KENZIE MANUAL CORRECTION ;HYPERLORDOSIS; LOW BACK PAIN

I. INTRODUCTION

Lordosis is the inward curvature of a portion of the lumbar and the cervical vertebral column.[14] Two segments are the vertebral column, namely cervical and lumbar, are normally lordotic, that is, they are set in a curve that has its convexity anteriorly and concavity posteriorly, that is known as kyphotic curvature of the spine.[8,24]

Lumbar hyperlordosis is a condition that occurs when the lumbar region experiences stress or extra weight and is arched to point of muscles pain or spasms. Lumbar lordosis is a common postural position where the neutral curve of the lumbar region is slightly or dramatically accentuated[22]. Excessive lordosis or hyperlodosis is commonly referred to swayback or saddle back, a term that originate from the similar condition that arises in some horses. A major factor of lordosis is anterior pelvic tilt[15].

A consequence of the normal lordotic curvature of the vertebral column is that there are differences in thickness between the anterior and posterior part of intervertebral disc.lordosis may also increases at puberty sometimes not becoming evident until the early or mid-20s.imbalances in muscles strength and length are also a cause, such as weak hamstrings, or tight hip flexors[4].

Excessive lordotic curvature is also called hyperlordosis, hollow back, saddle back and swayback[23]. Common cause of excessive lordosis include tight low back muscle, excessive visceral fat, and pregnancy. Although lordosis gives an impression of a stronger back, incongruently can lead to disc degeneration, nerve root compression and wear and tear to all structures of lumbar spine and surrounding soft tissues cause moderate to severe low back pain[9].

Abdominal muscles are being weak and the rectus femoris, quadriceps being tight are signs that improper muscles are being worked while pedestrian activities which leads to lumbar lordosis[10]. The most obvious signs of lumbar

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lordosis is lower back pain in pedestrian activities as well as having the appearance of a swayed back. All of these are signs that damage is being done, and preventive action needs to take place. Hence lumbar hyper lordosis is not a fixed condition like scoliosis and kyphosis, it can be reversed. This can be accomplished by stretching the lower back, hip flexors, and strengthening abdominal and hamstring muscles[4,25,1].

To achieve the above explained goal two different exercise protocol are being comparatively evaluated in study. McKenzie manual correction technique are conservatively used to treat lumbar hyperlordosis in physiotherapy The McKenzie method (also MDT = Mechanical Diagnosis and Therapy) is a comprehensive method of care primarily used in physical.

New Zealand physical therapist Robin McKenzie (1931–2013) developed the method in the late 1950s. In 1981 he launched the concept which he called Mechanical Diagnosis and Therapy (MDT) - a system encompassing assessment (evaluation),diagnosis and treatment for the spine and extremities. MDT categorizes patients' complaints not on an anatomical basis, but subgroups them by the clinical presentation of patients. McKenzie states that self treatment is the best way to achieve a lasting improvement of back pain[20].

But recent approach in treating lumbar hyperlordosis can be Williams Flexion Exercises commonly known as WFE. Williams exercise-are a set or system of related physical exercises intended to enhance lumbar flexion, avoid lumbar extension, and strengthen the abdominal an gluteal musculature in an effort to manage low back pain, first adviced in 1937 by Dr. Paul C. Williams (1900 – 1978)[20,29]

These exercises were developed for men under 50 and women under 40 years of age who has exaggerated lumbar lordosis, whose x-ray film showed decreased disc space between lumbar spine segments (L1-S1), and whose symptoms were chronic but low grade[28,29]. The goals of performing these exercises were to reduce pain and provide lower trunk stability by actively developing the "Abdominal, gluteus maximus and hamstring muscles as well as "passively stretching the hip flexors and lower back (sacrospinalis) muscles. williams said : " the exercises out lined will accomplish a proper balance between the flexor and extensor groups of postural muscle..." (Williams 1965,williams 1937, blackburn 1981, ponte et al.) Williams suggested that a posterior pelvic –tilt position was necessary to correct the hyperlordosis[2].

In this study both these excises protocol are used in two different experimental group to compare the result of reversing the hyperlordosis and reducing the low back pain. The samples were selected by using an inclusion criteria and outcome measurement is being evaluated by using computerised radiograph(CR) and a pain and disability scale. The goal of the study is to identify the right excercise protocol in correcting hyperlordosis which can be a corner stone therapy in physical therapy to manage low back pain.Anderson BJG 1981 has mentioned that 28.5 percent of work days are lost in an individual due to low back pain per year. Endurance of the back extensor muscle is lost in increased lordotic curvature of lumbar vertebra. Conventional physiotherapy for mechanical low back pain include electrotherapy, manual therapy active and passive stretching. Advance technique like different exercise protocol is also proven to be effective in reducing pain and disability. Need of this study is to highlight lumbarhyperlordosis is one of the underlying cause of mechanical low back pain and to investigate the Williams Flexion Exercise protocol over Mc-kenzie manual correction technique for the management of mechanical low back pain due to lumbar hyperlordosis.

II. MATERIALS AND METHODOLOGY:

Patients were participated in this study screened for inclusion criteria Age- 30 to 40· Participants with lumbarlordotic curve (cobb's angle) greater than 76° in lateral computerised radiograph, Postural low back pain with excessive lumbar lordosis, Women after delivery present with back pain and exaggerated lumbar lordosis,and Exclusion Criteria - Presence of spondylolisthesis, History of disc protrusion, congenital deformities of vertebrae, scoliosis., Sacro iliac joint dysfunction, Any pelvic surgery including caesarean section, 50 samples were selected using simple random sampling technique.They were explained about safety and simplicity of the procedure and informed consent was obtained. This study was conducted in MeenakshiCollege of physiotherapy, OPD, Virugambakam, Chennai India.

Pre-Measurment Values were taken using the Quebec pain disability scale, Computerised radiograph, Visual Analogue Scale. Randomization Was Done and Participants Were Divided into Two Groups. GROUP A (n=25) received Williams flexion exercise in the following steps.The patient was made to lie on his back with knees bent, feet flat on the floor. Patient is asked to perform a pelvic tilt followed by single knee to chest exercise.Similarly the double knee to chest exercise is performed with the hold of 5 to 10 seconds. Patient was further asked to perform partial sit up along with pelvic tilt and while holding this position slowly curl up the head and shoulders off the floor.

Further, hamstring Stretchis done in long sitting with toes directed towards the ceiling and knees fully extended and slowly lower the trunk forward over the legs, keeping knees extended, arms outstretched over the legs, eyes focus ahead.Hip flexors stretchwas done placing one foot in front of the other with the forward knee flexed and the back knee held straight. Flex the trunk until the left knee contacts the axillary fold. Repeat the same with the other

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leg.Squat is done with both the feet parallel, about shoulder width apart. attempting to maintain the trunk as perpendicular as possible to the floor, eyes focused ahead, and feet flat on the floor, the subject slowly lowers his body by flexing his knees.

Group B were asked to perform McKenzie, Cat and Camel exercise, RectusFemoris Stretch was done by kneelingwith the right knee with the left foot in front such that the left knee is at 90 degrees.Grab your right foot behindandpull your right foot up to your buttock.Knee To Chest exercises is done in supine lying position where both knees are brought towards the chest, toe touch with push down is done by bending forward and touching the pillow and pushing against the pillow. Posterior tilt Excercise- Stand against the wall and contract the abdomen.Static Abdomen- Press the back against the pillow in crook lying.Gluteal Activation Lifts Prone lying over the pillow lift the legs up all the above said exercises were done with the hold of 10sec and 10 repetitions. The exercise session was done for 3 days in a week and consisted of 45 minutes per session. After 4 weeks of intervention post test measurement values were taken.

III. RESULTS:

TABLE1

COMPARISION BETWEEN PRE TEST & POST TEST OF VAS SCALE IN GROUP A

VAS	MEAN (Centimeter)	SD	t-TEST
PRE TEST	7.32	1.18	14.37
POST TEST	2.29	1.27	

From the above table we have arrived the mean and standard deviation of pre and post test for Williams flexion exercise

By using paired t-test:

1. The two-tailed P value is less than 0.0001
2. Difference is consider to be extremely statistically significant
3. Mean of group A pre minus post equals 5.03
4. 95% confidence interval of this difference : from 4.32 to 5.73

TABLE 2

COMPARISION BETWEEN PRE TEST & POST TEST OF VAS SCALE IN GROUP B

VAS	MEAN (Centimeter)	SD	t-TEST
PRE TEST	7.57	0.86	11.35
POST TEST	4.52	1.18	

From the above table we have arrived the mean and standard deviation of pre and post test group B

By using paired t-test:

1. The two-tailed P value is less than 0.0001
2. Difference is consider to be extremely statistically significant
3. Mean of group B pre minus post equals 3.05
4. 95% confidence interval of this difference: from 2.51 to 3.59

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TABLE 3

VISUAL ANALOGUE SCALE

VAS	MEAN (Centimeter)	SD	t-TEST
GROUP A	2.29	1.27	6.02
GROUPB	4.44	1.23	

From the above table we have arrived the mean and standard deviation of post test for group A and group B
By using unpaired t-test:

1) The two tailed p value equals 0.0001
2) Difference is considered to be extremely statically significant
3) Mean of group A post minus group B post equals 2.15
4) 95% confidence interval of this difference from 2.87 to 1.43

TABLE 4

COMPARISION BETWEEN PRE TEST & POST TEST OF QUBEC PAIN DISABILITY SCALE IN GROUP A

QUBEC	MEAN (Percentage)	SD	t-TEST
PRETEST	65.72	10.31	11.15
POSTTEST	35.21	8.72	

From the above table we have arrived the mean and standard deviation of pre and post test for group A

By using paired t-test

1. The two-tailed P value is less than 0.0001
2. Difference is considered to be extremely statistically significant.
3. Mean of group A pre minus post equal 30.51
4. 95% confidence interval of this different from 25.01 to 36.01

TABLE 5

COMPARISION BETWEEN PRE TEST & POST TEST OF QUBEC PAIN DISABILITY SCALE IN GROUP B

QUBEC	MEAN (Percentage)	SD	t-TEST
PRE TEST	64.30	7.33	7.24
POST TEST	48.59	9.26	

From this above table we have arrived the mean and standard deviation of pre and post test for group B

By using paired t-test

1. The two tailed P value is less than 0.0001
2. Difference is considered to be extremely statistically significant.
3. Mean of group A pre minus post equal 15.71

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4. 95% confidence interval of this difference from 11.37 to 20.06

TABLE 6

QUEBEC PAIN DISABILITY SCALE

QUEBEC	MEAN (Percentage)	SD	t-TEST
GROUP A	35.40	8.40	4.86
GROUP B	47.17	8.52	

From the above table we have arrived the mean and standard deviation for group A and group B

By using unpaired t-test

1. The two – tailed P value is less than 0.0001
2. Difference is considered to be extremely statistically significant
3. Mean of group A post minus group B post equals 11.77
4. 95% confidence interval of this difference from 16.63 to 6.90

TABLE 7

COMPARISION BETWEEN PRE TEST & POST TEST OF RADIOGRAPHIC RESULT IN GROUP A

RADIOGRAPH	MEAN (Degree)	SD	t-TEST
PRE TEST	80.49	1.64	3.69
POST TEST	78.96	1.20	

From this above table we have arrived the mean and standard deviation of pre and post test for group A

By using paired t-test

1. The two tailed P value is less than 0.0006
2. Difference is considered to be extremely statistically significant.
3. Mean of group A pre minus post equal 1.52
4. 95% confidence interval of this difference from 0.69 to 2.36

TABLE 8

COMPARISION BETWEEN PRE TEST & POST TEST OF RADIOGRAPHIC RESULT IN GROUP B

RADIOGRAPH	MEAN (Degree)	SD	t-TEST
PRE TEST	79.88	2.30	0.97
POST TEST	79.30	2.26	

From this above table we have arrived the mean and standard deviation of pre and post test for group B

By using paired t-test

1. The two tailed P value is less than 0.0333
2. Difference is considered to be statistically significant.
3. Mean of group B pre minus post equal 0.58
4. 95% confidence interval of this difference from 0.61 yo 1.77

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TABLE 9

RADIOGRAPHIC ANGLE

RADIOGRAPH	MEAN (Degree)	SD	t-TEST
GROUP A	78.96	1.19	0.88
GROUP B	79.30	2.19	

From the above table we have arrived the mean and standard deviation for group A and group B

By using unpaired t-test

1. The two – tailed P value is less than 0.0383
2. Difference is considered to bestatistically significant
3. Mean of group A post minus group B post equals 0.34
4. 95% confidence interval of this difference from 1.45 to 0.59

IV. DISCUSSION

Interpreting the results of the present study shows that Williams flexion exercise protocol is more effective to improve both low back pain and hyperlordosis than Mckenzie manual correction exercise protocol. Demographic data of both the group were seen similar with the expectation of duration of symptoms at the beginning of the study (pre-test).

Both the groups have shown improvement in back pain and disability score (QUEBEC) proving the improvement in back function after the treatment. The reason behind the improvement in functional activity might be due to ease in pain and decrease in minimal hyperlordotic angle which was the reason of back pain and disability. Both the groups had reduction in their pain and disability, where as group A statistically improved better in term of pain (p=0.0001), disability(p=0.0001) but in correction of exaggerated lordosis angle though there is statistically significant changes (p=0.0383) clinically it is inconclusive as there was no clinical changes are being observed

Literature shows that hyperlordosis of the back is not a fixed condition like scoliosis or kyphosis, it is mostly acquired and can be reversible. In a study on 2010 titled Comparison of three therapeutic exercises protocols to lumbar hyperlordosis improvement in asymptomatic youths has shown that hyperlordosis is a reversible condition by using different exercises protocol and in this study Williams flexion exercise is one of the criteria[19]. In an another study on 1984 by David Joseph Ponte titled A Preliminary Report On The Use Of The McKenzie Protocol Versus Williams Protocol In The Treatment Of Low Back Pain has shown that both these exercise are used in back pain has an significant improvement. Whereas in this study McKenzie group has shown better improvement than William exercise group[6].In the above mentioned study Mckenzie extension and flexion exercise were used as an intervention to improve back pain, but in this present study only flexion exercise is used to correct the exaggerated lumbar lordosis which relives back pain, in this study Williams group has shown better improvement than McKenzie group in relation to hyperlumbarlordosis,back pain and disability.

Loss of endurance of the back extensor muscles had the highest association with low back pain which is lost in increased lordotic curvature of the lumbar vertebra, in other way increased lordotic curve occurs due to loss of endurance of the back extensor muscle. This can be influenced by many factor and one of the prime cause is postural adaptation[2,18]. This mechanical changes are well described in a study titled relation between mechanical factors and incidence of low back pain by Mohammad Reza Nourbakhsh and Amir Massoud Arab in 2002.Both these exercise protocol are designed to alter the postural adaptation by strengthening the muscles group[18]

Group A received Williams flexion exercises which are designed to alter spinal curvature due muscular imbalance. As per the study in hyperlordosis the back flexor and hip extensor goes for weakness and back extensor and hip flexor goes for tightness .William flexion exercise include active stretching and strengthening of this muscle group. In a study by Stan E Blackburn has shown that electromyography activity during Williams exercise with posterior tilt is minimised in lumbar and sacral regions the occurs in conjunction with lengthen of the tight muscle during posterior tilt. Thus it proves the postural changes during Williams exercise[2,28].

These exercises accomplished a proper balance between the flexors and the extensors group of postural muscles. Williams flexion exercises stretches the ligamentous structure of the back, open the vertebral canal thus it helps to

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reduce the pain and the exaggerated lumbar lordotic curvature. The result are best obtain by maintaining a posterior pelvic tilt during the exercise[2,28,29].

Group B were given Mckenzie manual correction exercises work on spinal movement and curvature. In this study all the manual correction exercises are derived from Mckenzie flexion based exercise which is effective to correct the hyperextension of lumbar vertebra otherwise known as hyperlordosis of back. The exercises centralize the pain and effective in acute stage[20].

Patient suffering from hyperlordosis often dose not seek medical attention as sometime the condition dose not elicit pain, during this study most of the patient came in the clinic with severe pain regarding to disc prolapsed who were later excluded from the study. During data collection there was some difficulty with the understanding of language which was solved by using a translator who was also a physiotherapist.

V. LIMITATIONS AND RECOMMENDATIONS

LIMITATIONS

- Communication difficulty due to language problem

RECOMMENDATIONS

- Corrective exercise strategy can be included with the program
- The evaluation of hyperlordotic angle can be followed by using goniometer

VI. CONCLUSION

For the parameters of pain and functional disability Williams flexion exercise is found to be effective than McKenzie manual correction technique there by rejecting the null hypothesis. But in parameters of lordotic (cob's) angel even though statistical significant difference is found between the two exercise technique, on comparison of post test mean values of group A (78.96±1.19), group B (79.30±2.19) is not showing marked differences, hence it can be concluded that both the technique is not showing improvement in hyperlumbarlordosis compare to the pre test values, there by accepting the null hypothesis.

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