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Research Article

A correlation study to establish a correlation between kinesiophobia with disability and mechanical factors in subjects with chronic non – specific low back pain

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ABSTRACT

Back problem has become the most expensive musculoskeletal malady in the industrialized nation of the world. It is the common affliction whose specific cause and precise treatment are still baffling to the medical profession. **Aim and objectives:-**to determine whether Kinesiophobia, Disability, Pelvic inclination angle, Lumbar Lordosis and Lumbar ROM have any correlation in patients with chronic back pain. **Methodology:** Patients coming to prayas health care centre, bala pritam hospital, gokul , sbspgi opd dehradun. They were assigned according to inclusion criteria with 15 females and 13 males in two groups. Data was collected via tampa scale of kinesiophobia, quebec back pain disability score, Bow leg caliper, flexible ruler and schober's method. **Result:** A statistically insignificant correlation was found between the mean of Tampa scale of kinesiophobia (TSK), quebec back pain disability score (QBPDS), Pelvic inclination angle (PIA), Lumbar lordosis (LL), Lumbar flexion (LF) and lumbar extension (LE) among the population. The Karl Pearson's correlation coefficient for TSK, QBPDS, PIA, LL, LF, LE found no correlation ie. (0.164), (0.911), (0.556), (0.900), (0.112) for females and (0.006) (0.914), (0.314), (0.958), (0.634) for males respectively. **Conclusion**: only TSK and QBPDS in males showed positive correlation.

Keywords: TSK, QBPDS, Pelvic inclination angle, Lumbar lordosis, Lumbar flexion, Lumbar extension.

Introduction

Back problem has become the most expensive musculoskeletal malady in the industrialized nation of the world. It is the common affliction whose specific cause and precise treatment are still baffling to the medical profession. Nachmenson states that "Low back pain occurs with about same frequency in people with sedentary occupations as in those doing heavy labour, although the latter have a higher incidence of absence from work because they are unable to work with their complaint." If physical exertion is not a predominant factor, there must be some inherited faults in our lifestyles to cause such a widespread problem. low back pain is not necessarily a consequence of degenerative process for many patients with recurring low back pain; they have no evidence of degenerative changes and many people who do have radiological changes have no back pain.[6]

In a study conducted in rural north india it was observed that 23.09% patients reporting to outpatient clinics during 1 year had back pain. In this group 67% has psychosocial issues, 57% were in blue collar jobs(heavy manual workers), 26% had a change/ leave their profession and 38% did not enjoy their present jobs. Many factors increase the risk of developing low back pain. Some of these factors are important risk factors for development of low back pain.

It has been found that chronic pain significantly restricts work, ADLs and social work in men and women equally. Frymoyer et al 1983 enumerated risk factors of low back ache such as spine geometry, increased lumbor lordosis, certain mechanical stresses, repetitive heavy

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lifting, obesity, sedentary life style, poor abdominal tone, certain personality profiles, psychological stresses, occupation that requires repetitive heavy lifting, pulling and twisting, more episodes of anxiety and depression, stressful life events, multiparous women, cigratte smokers. With precipitating factors such as new use, misuse, overuse, abuse or trauma.[4]

Possible sources of back pain can be vertebral bodies, kissing spines, lamina impaction, spondylolysis, muscle strain, muscle spasm, trigger points, muscle imbalance, iliac crest syndrome, compartment syndrome, herniation, dural pain, epidural plexus, interspinous ligament, illiolumbar ligament, sacroiliac joint pain, internal disc disruption.

It is also seen that population suffering from chronic low back pain also have fear of doing movements or activities which we called as “Kinesiophobia”. Kinesiophobia is defined by developers as “an irrational, and debilitating fear of physical movement and activity resulting from a feeling of vulnerability of injury or (re)injury.

One of the example of scale for kinesiophobia is Tampa scale of kinesiophobia (TSK). The scale is based on the model of fear avoidance, fear of work related activities, fear of movement/ reinjury.[7,8,9]

Various authors have correlated pain with disability and/ or pain with changes in the spinal angles due to long standing low back pain but not fear avoidance beliefs or kinesiophobia. As population with chronic low back pain along with biomechanical alterations in there spine have great fear of doing lot of day- to- day activities in belief to avoid exaggeration of their pain. In this study along with other variables emphasis is also laid on kinesiophobia with respect to disability and chronocity of pain.

Statement of study:

Does there exists a relationship between functional disability, kinesiophobia and spinal angles of lumbar region, pelvis in patients with mechanical low back pain?

Aim and purpose of study:

- To determine whether tsk have any correlation with quebec score in chronic low back pain patients.
- To determine whether tsk score and lumbar lordosis have any association.
- To determine whether tsk score and pelvic inclination angle have any association.
- To determine whether tsk score and lumbar flexion and extension range of motion have any association.

Significance:

In this study, we revealed that this method is a non invasive and cost effective method which provides more generalization of norms and also assures to be a user friendly. It negates the effects of kinesiophobia and help in avoidance of fear beliefs leading to better rehabilitation in chronic non specific low back ache.
This treatment protocol can be useful in clinical settings to establish prognostic criterias of the patients as it can address unhelpful beliefs that may contribute to development, maintaince of disability by catering to the pshychosocial needs of the patient and thus help in proper post rehabilitation assessment.
Also, many studies have been done earlier but none was done relating kinesiophobia, fear avoidance beliefs, so this study is an attempt to establish a more reliable method to treat chronic non specific low back ache.

Methodology:

This study is correlative study design in which 28 subjects were taken by convinient sampling i.e 15 females and 13 males from all the patients coming to prayas health care centre, bala pritam hospital, gokul , sbspgi opd Balawala, Dehradun.

Inclusion criteria were subjects in the age group of 30-50 yrs, Patients with primary complaint of frequent or constant back pain. The exclusion criteria was patients suffering from any of the pathological conditions resulting in alterations of the factors included in the study like, post natal back pain,sciatica or any neurological deficit, spinal fractures, previous history of

surgery, spinal fusions,herniated intervertebral disc, muscle atropic diseases.

Procedure:

1. Quebec Back Pain Disability Score:

This questionnaire has being designed to give information how back pain affects our patients to manage in their everyday life.in this questionnaire patient has to mark a box that most closely described the patients condition. It consists of 20 activities addressing different type of functions. Each activity is scored from 0-5, with higher values representing greater disability.[6]

2. Tampa Scale Kinesiophobia:

Number of scales or questionnaires has been designed by various investigators in order to get an appropriate method for calculating and documenting the score of kinesiophobia in population suffering from chronic low back pain. The scale is based on the model of fear avoidance, fear of work related activities, fear of movement/reinjury. The scale consist of 17 questions whose total score is calculated by inversion of 4,8,12,16 questions.[9]

3. Pelvic Inclination Angle:

The subjects were asked to remove their shoes and stand relaxed but erect on level floor or surface while looking forward. The position of anterior superior iliac spine and posterior superior iliac spine were determined by palpation and marked. The distance from ASIS to PSIS was measured with bow – leg caliper, and was then determined by placing them on a metric ruler. The difference in heights from floor to ASIS(B) and PSIS(A) was determined. The angle of pelvic tilt was then calculated using, the trigonometric formula[21] –

$$\sin \theta = \frac{A - B}{C}$$

4. Lumbar Lordosis:

For evaluating lumbar lordosis, the subjects were asked to remove their shoes and stand while the spinous process of L1 and S2 were marked with stickers. The subjects were asked to assume their normal standing position, and the end of the flexible ruler was placed on S2 and moulded over the skin. The L1 level was marked with tape in the flexible ruler. After moulding the ruler to the shape of lumbar curve, the obtained curve was traced on paper for analysis.[11,12,13,14,15,16]

$$\Theta = 4 \arctan (2h/l)$$

5. Lumbar R.O.M:

This was measured with schobber's method in which S2 level was marked. Two other points 10 cm above and 5 cm below S2 was marked. Now the distance between two points was measured during flexion and extension with the help of measuring tape.[30]

Data analysis:

The data analysis was done by statistical test performed by using SPSS 17.0 version software package.

Karl-Pearson test has been performed in order to find out the correlation between (TSK) Tampa Scale of Kinesiophobia with (QBPDS) Quebec Back Pain Disability Scale,(PIA) Pelvic Inclination Angle, (LL) Lumbar Lordosis,(LF) Lumbar Flexion and (LE) Lumbar Extension.

The level of significance was kept at probability ($p<0.01$)

Result:

CORRELATION TABLES- LEVEL OF SIGNIFICANCE IS ($p< 0.01$).

Table 1: correlation coefficient between TSK and QBPDS in males.

Correlations (Male)

		TSK	QBPDS
TSK	Pearson Correlation	1	.714**
	Sig. (2-tailed)	.	.006
	N	13	13
QBPDS	Pearson Correlation	.714**	1
	Sig. (2-tailed)	.006	.
	N	13	13

**. Correlation is significant at the 0.01 level

Data analysis was performed between TSK and QBPDS in males with the help of Karl-Pearson correlation coefficient test in order to find out the correlation($p<0.01$). It showed that their exists a correlation between TSK and QBPDS in

males suffering from chronic, non-specific low back pain(r=0.006)

Table 2: correlation coefficient between TSK and QBPDS in females.

Correlations (Female)

		QBPDS	TSK
QBPDS	Pearson Correlation	1	.379
	Sig. (2-tailed)	.	.164
	N	15	15
TSK	Pearson Correlation	.379	1
	Sig. (2-tailed)	.164	.
	N	15	15

Data analysis was performed between TSK and QBPDS in females with the help of Karl-Pearson correlation coefficient test in order to find out the correlation with ($p<0.01$). It showed that their exists no correlation between TSK and QBPDS in females suffering from chronic, non-specific low back pain(r=0.164).

Table 3: correlation coefficient between TSK and PIA in females.

Correlations (Female)

		TSK	PIA
TSK	Pearson Correlation	1	.031
	Sig. (2-tailed)	.	.911
	N	15	15
PIA	Pearson Correlation	.031	1
	Sig. (2-tailed)	.911	.
	N	15	15

Data analysis was performed between TSK and PIA in females with the help of Karl-Pearson correlation coefficient test in order to find out the correlation with ($p<0.01$). It showed that their exists no correlation between TSK and PIA in females suffering from chronic, non-specific low back pain(r=0.911).

Table 4: correlation coefficient between TSK and LL in females.

Correlations (Female)

		TSK	LL
TSK	Pearson Correlation	1	-.165
	Sig. (2-tailed)	.	.556
	N	15	15
LL	Pearson Correlation	-.165	1
	Sig. (2-tailed)	.556	.
	N	15	15

Data analysis was performed between TSK and LL in females with the help of Karl-Pearson correlation coefficient test in order to find out the correlation with ($p<0.01$). It showed that their exists no correlation between TSK and LL in females suffering from chronic, non-specific low back pain(r=0.556).

Table 5: correlation coefficient between TSK and LF in females.

Correlations (Female)

		TSK	FLEXION
TSK	Pearson Correlation	1	.036
	Sig. (2-tailed)	.	.900
	N	15	15
FLEXION	Pearson Correlation	.036	1
	Sig. (2-tailed)	.900	.
	N	15	15

Data analysis was performed between TSK and Lumbar Flexion in females with the help of Karl-Pearson correlation coefficient test in order to find out the correlation with ($p<0.01$). It showed that their exists no correlation between TSK and Lumbar Flexion in females suffering from chronic, non-specific low back pain(r=0.900).

Table 6: correlation coefficient between TSK and LE in females.

Correlations (Female)

		TSK	EXTENSIO
TSK	Pearson Correlation	1	.427
	Sig. (2-tailed)	.	.112
	N	15	15
EXTENSIO	Pearson Correlation	.427	1
	Sig. (2-tailed)	.112	.
	N	15	15

Data analysis was performed between TSK and Lumbar Extension in females with the help of Karl-Pearson correlation coefficient test in order to find out the correlation with ($p<0.01$). It showed that their exists no correlation between TSK and Lumbar Extension in females suffering from chronic, non-specific low back pain(r=0.112).

Table 7: correlation coefficient between TSK and PIA in males.

Correlations (Male)

		TSK	PIA
TSK	Pearson Correlation	1	-.385
	Sig. (2-tailed)	.	.194
	N	13	13
PIA	Pearson Correlation	-.385	1
	Sig. (2-tailed)	.194	.
	N	13	13

Data analysis was performed between TSK and PIA in males with the help of Karl-Pearson correlation coefficient test in order to find out the correlation with ($p<0.01$). It showed that their exists no correlation between TSK and PIA in males suffering from chronic, non-specific low back pain($r=0.194$).

Table 8: correlation coefficient between TSK and LL in males.

Correlations (Male)

		TSK	LL
TSK	Pearson Correlation	1	-.303
	Sig. (2-tailed)	.	.314
	N	13	13
LL	Pearson Correlation	-.303	1
	Sig. (2-tailed)	.314	.
	N	13	13

Data analysis was performed between TSK and LL in males with the help of Karl-Pearson correlation coefficient test in order to find out the correlation with ($p<0.01$). It showed that their exists no correlation between TSK and LL in males suffering from chronic, non-specific low back pain($r=0.314$).

Table 9: correlation coefficient between TSK and LF in males.

Correlations

		TSK	FLEXION
TSK	Pearson Correlation	1	.016
	Sig. (2-tailed)	.	.958
	N	13	13
FLEXION	Pearson Correlation	.016	1
	Sig. (2-tailed)	.958	.
	N	13	13

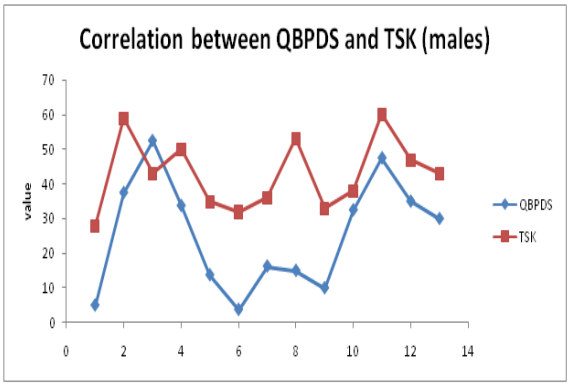
Data analysis was performed between TSK and Lumbar Flexion in males with the help of Karl-Pearson correlation coefficient test in order to find out the correlation with ($p<0.01$). It showed that their exists no correlation between TSK and Lumbar Flexion in males suffering from chronic, non-specific low back pain($r=0.958$).

Table 10: correlation coefficient between TSK and LE in males.

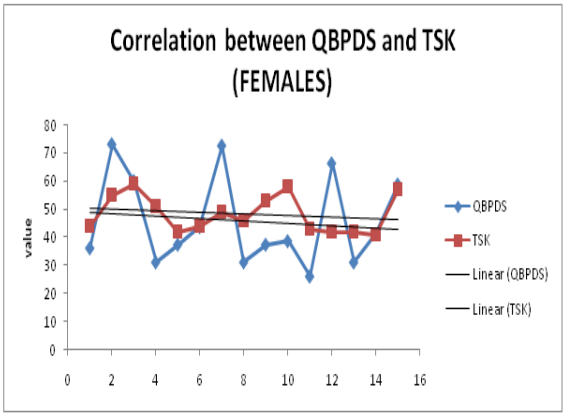
Correlations (Male)

		TSK	EXTENSIO
TSK	Pearson Correlation	1	.146
	Sig. (2-tailed)	.	.634
	N	13	13
EXTENSIO	Pearson Correlation	.146	1
	Sig. (2-tailed)	.634	.
	N	13	13

Data analysis was performed between TSK and Lumbar Extension in males with the help of Karl-Pearson correlation coefficient test in order to find out the correlation with ($p<0.01$). It showed that their exists no correlation between TSK and Lumbar Extension in males suffering from chronic, non-specific low back pain($r=0.634$).



Graph 1:



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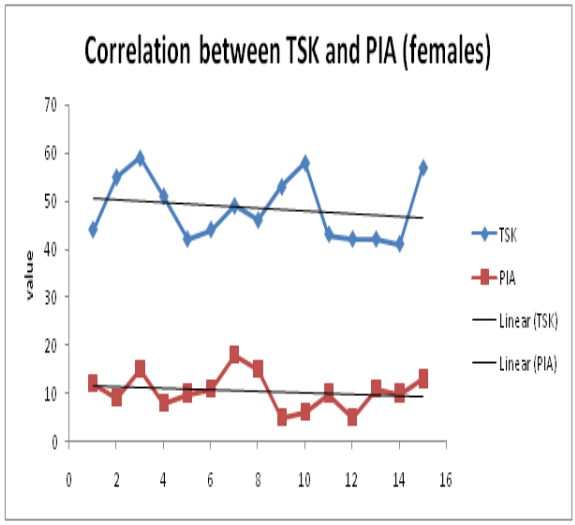
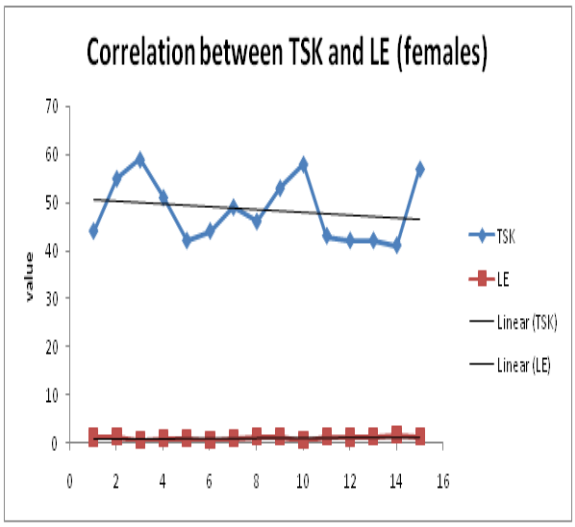
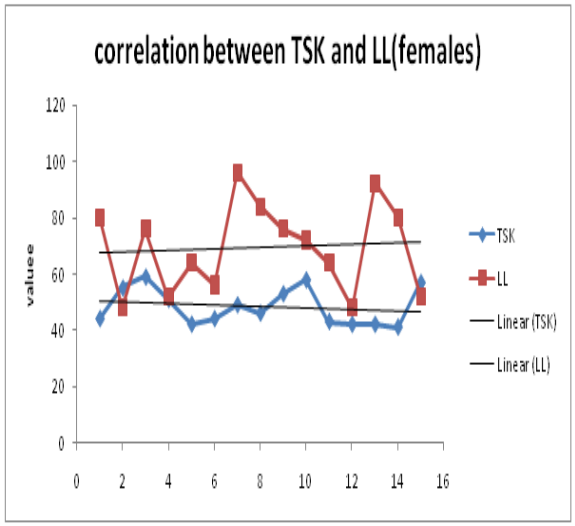


Graph 3:



Graph 6



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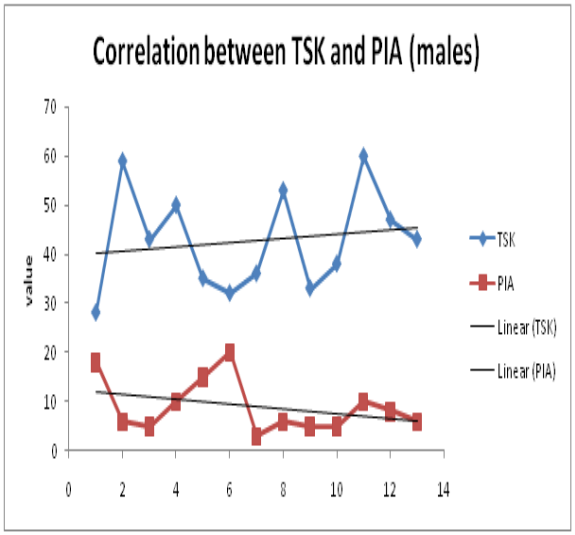
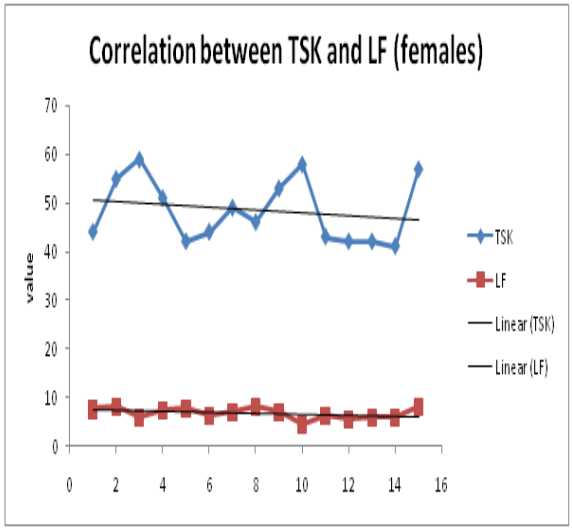
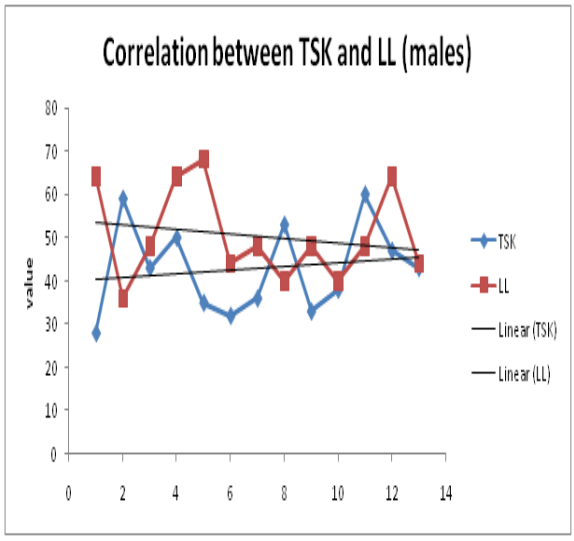


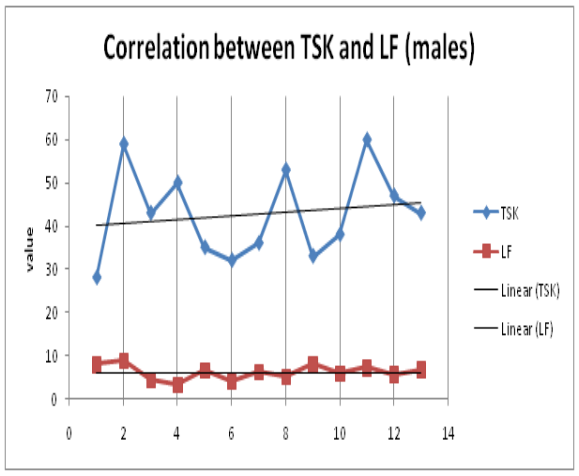
Graph 7



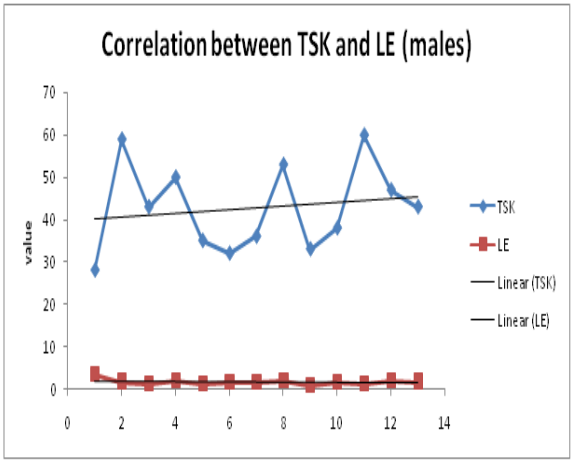
Graph 5:



Graph 8



Graph 9



Graph 10

Discussion:

According to collected data no correlation was found between TSK, QBPDS, PIA, LL, LF and LE in subjects suffering from chronic, non-specific low back pain except a correlation between TSK (fear) with QBPDS(disability) in males.

Jeffrey Roelofs , Judith sluiter et al. in their study to set norms for Tampa Scale of Kinesiophobia across pain diagnosis and various countries used large sample of pain patients with various diagnosis. The data received added to previous studies that have supported the reliability and validity of TSK scales by providing norms that may assist the clinician and researcher in the process of decision making and treatment evaluation. Pain diagnosis significantly predicted TSK scores in patients with low back pain having higher scores on all TSK scales compared with fibromyalgia, osteoarthritis and upper extremity disorders. Thus patients with low back pain seems to endorse beliefs that the occurrence of pain indicates underlying serious bodily damage (TSK-SF) and anxious beliefs that activity may result in re(injury) or increased pain (TSK-AA) to a greater extent than patients with another pain diagnosis.[7]

Kopec JA, Lamping DL calculated test-retest and internal consistency coefficients, evaluated, construct validity of QBPDS scale and tested its responsiveness against a global index of change. Direct comparisons with the Roland, Oswestry and SF-36 scales were carried out. The scale coorelated as expected with other measures of disability, pain, medical history and utilization variables, work related variables and socio-demographic characterstics. Significant changes in disability over time and differences in change scores between patients that were expected to differ in the direction of change were found and concluded that Quebec scale can be recommended as an outcome measure in clinical trials, and for monitoring the progress of individual patients participating in treatment or rehabilitation programs.[6]

Michiel F.Reneman, Henrica R.et al. in their study has demonstrated that the associations between pain intensity and pain related fears on one hand and FCE performances on the other hand were generally weak or non-significant. Correlations between pain intensity and pain related fears and performances were significant in only 7 out of 25 analyses. Thus, overseeing all the results of the study, it appears that the relationships between pain and pain related fears and performances in FCE (Functional Capacity Evaluation) are generally weak or non-existent.[19]

M. Yousefi, M. Rahimi et al. conducted the first systematic review and meta-analysis to examine the relationship between physical activity and disability in persons with LBP. They found persons with acute/subacute LBP there is a weak, non-significant, no clinically meaningful relationship between physical activity and disability. However, a moderate correlation between physical activity and disability for persons with chronic LBP, which indicates that persons with chronic LBP and high levels of disability are also likely to have low levels of physical activity.[16]The present study done do

not show any correlation between TSK, Disability and Lumbar lordosis as one of the studies by Sarikaya et al., who stated that although nature of occupation may have influence on lumbar spinal curvature , lumbar angles are not a determinant of law back pain, but on contrary if there is exaggerated lordosis or kyphosis it will increase the disability of the person as it will hinder in performance of the activities of daily living.[26]

Donald D. Harrison et al. through their study stated that acute low back pain subjects compared to normal group have hyperlordosis whearas chronic pain and radiographic abnormality groups had hypolordosis. The acute pain subjects had increased cobb's angle, increased sacral base angle (Ferguson) increased rotation of pelvis and increased lumbar extension but the chronic pain group and radiographic abnormality group had hypolordosis and streached ellipses for lumbar curvature, smallest cobb's angle, smallest Ferguson's sacral base angles, smallest arcuate angles for pelvic tilt and smallest lumbar flexion compared with normal group.[20] Various studies on back pain exhibits loss of lordosis. Although patients with low back pain did exhibit a loss of segmental lordosis, there is no data to state that patients who have loss of segmental lordosis have low back pain as a result of it. Moreover pain differs widely between different cultures, different individuals and circumstances. With this discussion which was also supported by

Sarikaya et al., we can infer that though individuals with low back pain exhibit flattened spine but patients with flat back can be asymptomatic many a times so pain and spinal angles do not relate to each other.[26]

Evick et al. claimed the association of lumbar lordosis with lumbar extension. Pronounced lumbar lordosis leads to more approximation of facet joints thus forming the mechanical barrier that limits further extension. Thus mechanical deformation causes limited extension and thus back pain.[24] No significant limitation of lumbar range of motion was found in patients with chronic low back as compared to normal subjects. Few of the patients assessed were undergoing physiotherapy treatment which may have decreased the effect of mechanical factors. This was supported by bstudies conducted **by Mellin, Sullivan et al, Youdus et al., NG et al and Nourbaksh.**[11]

The study by **R.Rajabi, F.Mohammadi** to find out an accurate method using flexible ruler to measure lumbar curvature angles showed that there is significant difference in mean of lumbar curvatures obtained by two methods of flexible ruler ie. mid-point and deepest point of curve with each other and even with X-ray method. The results of mean lumbar curve measurements performed by deepest part method of flexible ruler (35.61°) was close to x-ray method (40.68°) and the mean of measurements by mid-point of flexible ruler(33.65°) and thus concluded that there is a significant difference between three methods of measurements.[15]

Thus, the results of our present study indicate that lumbar lordosis, pelvic tilt, lumbar mobility, TSK and QBPDS are independent in relationship and hence nullifies our hypothesis. Also these mechanical factors do not have any significant contribution in chronic low back pain.

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