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Influence of fear avoidance beliefs on pain and disability among computer workers with low back pain: A cross-sectional study

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Abstract
In the era of modernization, networking and computerization has become an important part in each and every individual's life in the world. From primary level to higher level use of computers has become a must and is used in almost every sector nowadays. So the individuals are prone to gain musculoskeletal problems due to various factors like poor posture, more working hours, prolonged standing, prolonged sitting, etc. and these leads to various musculoskeletal problems. Among all these problems Low Back Pain is common. So evaluation of pain, the fear to do physical activity due to pain and disability related to it is necessary. Aims and objectives of the study were to investigate the structure of Fear-Avoidance Beliefs Questionnaire (FABQ) in a population of people with low back pain by means of confirmatory analysis. To see the relationship Fear-Avoidance Beliefs Questionnaire (FABQ) and perceived disability as well as participation in daily and social life. To examine whether the perceived disability mediates the association with pain and participation and between fear avoidance beliefs and participation. Materials and Methodology After the baseline assessment, the VAS was obtained which determines the pain intensity of the subject with LBP. Consecutively both the questionnaires were filled FABQ for fear in the subject to pain and MOSW for disability due to LBP. Hence all the data was obtained for the study. For the results the data was analysed using Pearson co-efficient of correlation to examine the relationship between VAS, FABs about work and MOSW. The correlation co-efficient between VAS and FABs about work was 0.388 (p>0.01) and correlation co-efficient between FABs about work and MOSW was 0.473 (p>0.01). The study concluded that there was a significant association between the pain, fear avoidance beliefs and disability in computer workers in low back pain. This relationship has an important implication for the development of the rehabilitation programs that aim to improve disability in the population with low back pain and also to reduce pain in the population with low back pain.

Keywords: low back pain, fear avoidance beliefs, fear avoidance belief questionnaire, modified oswestry low back pain disability questionnaire, visual analogue scale

Introduction
LBP is defined as an acute, subacute, or chronic discomfort localized to the anatomic area below the posterior ribs and above the lower margins of the buttock. LBP is caused by the complexity of the spine. The spine is the only structure in the body that consists of bones, joints, ligaments, fatty tissue, multiple layers of muscles, peripheral nerves, nerve roots, sensory ganglia, autonomic ganglia, and the spinal cord. The intervertebral discs lie between the vertebral bodies, linking them together. They are the main joints of the spinal column and occupy one-third of its height. The major role is mechanical, as they constantly transmit loads arising from body weight and muscle activity through the spinal column. They provide flexibility to this, allowing bending, flexion, and torsion. The central nucleus pulposus contains collagen fibers, which are organized randomly,8 and elastin fibers which are arranged radially; these fibers are embedded in a highly hydrated aggrecan-containing gel. This is made up of a series of 15 to 25 concentric rings, lamella with the collagen fibers lying parallel within each lamella. Elastin fibers lie between the lamellae, possibly helping the disc to return to its original arrangement following bending, whether it is flexion or extension. The third morphologically distinct region is the cartilage endplate, a thin horizontal layer, usually less than 1 mm thick, of hyaline cartilage. The posterior longitudinal ligament (PLL) is richlyinnervated by nociceptive fibers.

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Biopsychological model of illness
Loeser presented the clinical model of pain based on the gate control theory. It was conceptual and was an aid to understanding rather than for practical clinical use. The elements described did not give any idea of it in clinical practice. It was purely based on pain and did not include the social element or disability. Waddell and Main used an analysis of low back more practical biopsychosocial model it was useful as an aid understanding but was also useful in clinical practice. But it failed to include the cognitive dimension.

Fear avoidance beliefs questionnaire
A Fear-Avoidance Beliefs Questionnaire (FABQ) was developed which is mainly based on theories of fear and avoidance behaviour and focussed specifically on patients' beliefs about how physical activity and work affected their low back pain. The aim was to develop a questionnaire to measure fear-avoidance beliefs about physical activity and work suitable for routine use in patients with low back pain and to use that questionnaire to investigate the relationship between low back pain, fear-avoidance beliefs and chronic disability in activities of daily living and work loss in the working population. Fear- Avoidance Beliefs Questionnaire (FABQ) is used to assess the physical activities such as bending, lifting, walking or driving affect or would that affect the back pain. Fear-Avoidance Beliefs Questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability gave the concept of fear theory is based on the powerful body of any person.
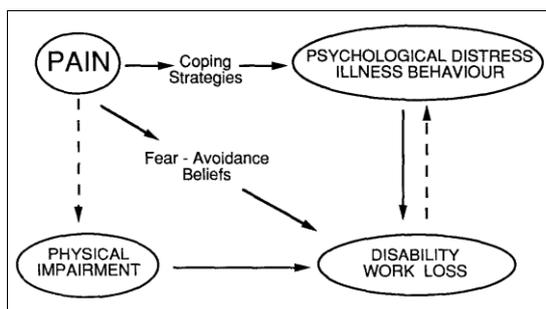
Fig 1: Model of FABs

Visual analogue scale
Visual Analogue Scale is a pain-rating scale which allows the patient to visually gauge the amount of pain along a solid 10 cm line.

Modified Oswestry low back pain questionnaire
Modified Oswestry low back disability questionnaire consists of 10 items addressing different aspects of function. Each item is scored from 0 to 5, with higher values representing greater disability. The total score is multiplied by 2 and expressed as a percentage.

Methods
60 subjects who were computer workers were selected through convenient sampling for the cross-sectional study. The data was collected from The Kalupur Commercial Co-operative Bank Pvt. Ltd and The LIC India. Inclusion and exclusion criteria were set accordingly Age group: 18-60 year. Population having complained of low back pain in the last 3-4 months. Population with serious spinal pathology, tumour, infection or inflammatory disease, spinal fractures, structural spinal deformity, major neurology. History of primary psychiatric disease or alcohol abuse. Ability to read

and write in English. The Outcome Measures were VAS (Visual Analogue Scale), FABQ (Fear Avoidance Beliefs Questionnaire), MOSW (Modified Oswestry Low Back Pain Disability Questionnaire).

Procedure
Ethical clearance was taken from the ethical committee before starting the procedure. The purpose of the study was explained to the subjects and a written consent was obtained from them. VAS was taken to see the intensity of pain in the subject for the fulfilment of the inclusion criteria. After that FABQ (SCALE 1) was used as questionnaire form 1 for the fear avoidance beliefs. And MOSW was used to assess the disability in the subject due to low back pain. Information was given for the statements listed in the questionnaire and was encouraged to ask any question if the statements were unclear to them. Subjects were given the questionnaires and the correct responses were to be filled by them. Assurance was given that the provided information by them will be kept confidential and will be used for the research purpose only.

Results
Data analysis was done using SPSS version 22. The baseline was obtained from demographic data of Age and Gender. Positive correlation was obtained between VAS and FABQ (SCALE 1) with the Pearson co-efficient. Positive correlation was obtained between FABQ (SCALE 1) and MOSW with the Pearson co-efficient. Analysis of total 60 subjects were done in which the mean $\pm$ SD was obtained as follows $(40.9833333 \pm 9.84023506)$.
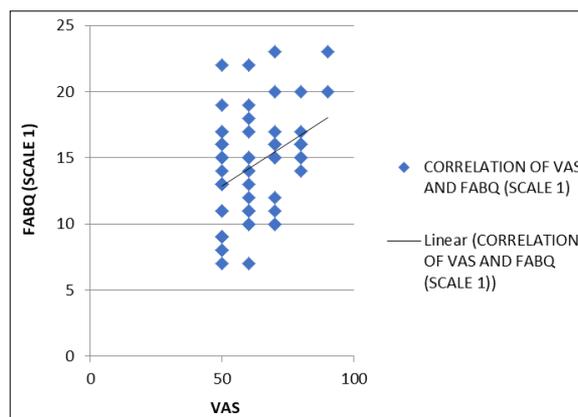
Fig 2: Correlation of VAS and FABQ (SCALE 1)

A linear positive correlation is obtained between the correlation co-efficient .388. The correlation was statistically obtained with $(p > 0.01)$.
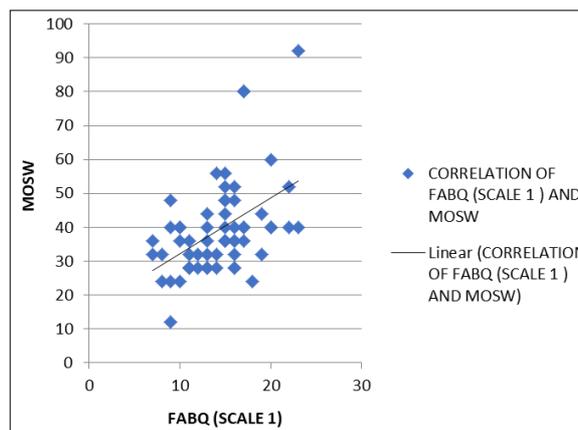
Fig 3: Correlation of FABQ (SCALE 1) and MOSW

A linear positive correlation is obtained between the correlation co-efficient.473. The correlation was statistically obtained with (p>0.01).

Discussion

The aim of the present study was to investigate the structure of FABQ in a population of people with low back pain by means of confirmatory analysis also to see the relationship FABQ and perceived disability as well as participation in daily and social life and to examine whether the perceived disability mediates the association with pain and participation and between fear avoidance beliefs and participation. In the study two findings are obtained. The first finding was that there is mild relationship between the pain and fear-avoidance beliefs about work i.e. FABQ (SCALE 1). The second finding was that there is moderate relationship between fear-avoidance beliefs about work i.e. FABQ (SCALE 1) and disability in computer workers with low back pain. A positive correlation was obtained in both the findings of pain and fear-avoidance beliefs and disability in low back pain and fear-avoidance beliefs.

Pain is connected with the psychological aspect of an individual. In a study by Mary Ellen Wewers and Nancy K. Lowe *et al.* gave the definition of VAS in A Critical Review of Visual Analogue Scales in the Measurement of Clinical Phenomena as this A VAS is a straight line, the end anchors of which are labelled as the extreme boundaries of the sensation, feeling, or response to be measured. It also stated that conceptual, psychometric, and statistical aspects of the VAS were also considered [32]. Hence in the present study VAS was taken with the FABs of work which got positive correlation with it and from the result it can be said that psychometric factors are related with each other. The level of correlation was mild but still it has some relationship.

Edwin Kremer *et al.* stated the following for VAS is acknowledged as the best paper and pencil instrument for assessing clinical pain intensity, based on the following observations: patients produce a uniform distribution of pain intensity estimates on a VAS pain estimates on a VAS are reliable over time variance due to psychomotor factors is small the VAS is sensitive to pain change and the VAS does not force quantum changes in pain intensity as occur with category scales [33]. So in the present study VAS was taken for the assessment of pain in subjects with low back pain in computer workers.

Jens R. Chapman *et al.* have studied in Evaluating Common Outcomes for Measuring Treatment Success for Chronic Low Back Pain and concluded that The Fear Avoidance Beliefs Questionnaire, Tampa Scale for Kinesiophobia, and Beck Depression Inventory (BDI) were the most common measures. All three have been validated in populations with CLBP and have been found to be reliable [34]. Hence FABs for work was taken to assess the psychological aspect of pain in computer workers with low back pain.

Julie. M. Fritz *et al.* have studied Identifying Psychosocial Variables in Patients With Acute Work-Related Low Back Pain: The Importance of Fear-Avoidance Beliefs and concluded that Fear-avoidance beliefs about work was the psychosocial factor that could best be used to predict return to work in patients with acute work-related low back pain. Pearson correlation coefficients between disability scores and measures of fear avoidance beliefs in studies involving patients with chronic LBP have ranged between .37 and .55 [35]. However in the present study FABs of work was correlated with MOSW the disability scale for low back pain

for the first time and the results obtained was .473 with positive correlation.

Hence the present study concluded that there is positive correlation between pain and fear avoidance beliefs. Also a positive correlation was obtained between fear avoidance beliefs and disability. And various supportive studies also state that there is relationship between pain and FABs about work and FABs about work and disability among computer workers with low back pain.

Limitations of the study were as follows the sample size was small. The sampling method was convenient so the affected population was not able to excess properly. There were some components used in questionnaire which the subjects were unable to understand and proper explanation was needed for it.

Future recommendations for the study are as follows the study population used in the study were computer workers but other population can also be used for the same study. The scales used in the study can be used for the early assessment of back pain in acute stage and the fear related pain can be treated. The same study can be conducted in future with larger population size to get better results.

Clinical implications of the study is This study is helpful and from it rehabilitation programmes can be made for reduction of pain in the patient with low back pain. Protocols for improvement in the disability also can be generated. Knowledge of ergonomics can also be given to the patient to reduce the risk of low back pain.

Conclusion

This study was able to significantly correlate pain component and fear avoidance beliefs about work scale in computer workers with low back pain. The study was also able to significantly correlate fear avoidance beliefs about work scale with Modified Oswestry Low Back Pain Disability scale.

Acknowledgement

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