INTRODUCTION

Low back pain is one of the most prevalent complaints in musculoskeletal pain, and is a serious condition that may result in loss of functionality as well as labor. In chronic cases, by producing a number of pathological changes, it may lead to difficulty in the performance of routine tasks. In their studies, Russel et al observed muscle atrophy in patients with vitamin D deficiency, and the biopsies they conducted on atrophic muscles provided evidence that atrophy rates were significantly higher in type II-a muscle fibers. A review of the relevant
literature reveals that research into the relationship between chronic musculoskeletal pain and vitamin D are few in number, with contradictory findings. In this study, it was aimed to investigate the better diagnostic criteria between vitamin D levels, T score and Z Score in CLBP. Dual energy X ray absorptiometry (DXA) scans to measure bonemineral density (BMD) at the spine and hip have an importantrole in the evaluation of individuals at risk of osteoporosis, and in helping clinicians advise patients about the appropriate use of antifracture treatment. Central DXA examinations have three major roles, namely the diagnosis of osteoporosis, the assessment of patients’ risk of fracture, and monitoring response to treatment. The reasons for preferring to use central DXA include: the fact that the lumbar BMD is the most reliable measurement for predicting hip fracture risk; the use of the spine for monitoring treatment; and the consensus that spine BMD measurements in urban population of Bengal, India should be interpreting the WHO T-score definitions of osteoporosis and osteopenia (table 1).

The World Health Organization definitions of osteoporosis and osteopenia from DXA scan of Lumbar spine

![Terminology Table]

- **T Score** = Measured BMD - Young adult mean BMD
  - Young adult population SD
- **Z score** = Mean BMD - Age matched mean BMD
  - Age matched population SD

Current standard approach for diagnosing osteoporosis is the estimation of bone mineral density (BMD) using dual energy X-ray absorptiometry (DEXA). Low serum 25(OH) D concentrations have been reported in community-dwelling Bengali Indians with no previous history of osteoporosis. Varying effects of 25(OH) D concentrations on bone mineral density (BMD) were reported in these studies. However, very few studies have investigated the status of vitamin D in adults with prevalent low BMD have been reported in these investigations. Another such study on southeast Asians included very few Indian subjects (3.1% of total study subjects). The objectives of this study were to assess the correlation among 25(OH) D levels, and BMD in a population of Indian patients presenting for the evaluation of low BMD. In the light of this study the aim of our study is to compare and study whether DXA-BMD or Vit D3 is a better predictive criteria for declaring osteoporosis in urban Bengal population.

**METHODS**

After prior approval by institutional ethics committee, laboratory data and files belonging to patients who attended our polyclinic for CLBP over the period of November 2012 to December 2017 were retrospectively analyzed. 299 subjects (female/male: 154:145) with CLBP (defined as back pain more than 3 months refractory to conservative measures), aged between 20 and 60 years (mean age:45.05 ± 8.14), participated in the study. **Inclusion criteria** All patients who had a low BMD defined as a T-score (determined by DEXA) < −1.0 SD at the lumbar spine and Vit D3 < 12ng/ml were included in the study. Patients with or without fragility fractures were included. Patients excluded were with conditions associated with malabsorption of vitamin D.
such as inflammatory bowel disease, chronic pancreatitis, or a history of gastric or small bowel resections, patients taking medication(s) that could adversely affect bone metabolism and thus contribute to a decreased BMD by causing vitamin D deficiency with creatinine clearance ≤50 ml/min, with secondary osteoporosis, prolonged glucocorticoid intake (defined as use of prednisolone in a dosage of more than 5 mg/d for at least 3 months), or significant hepatic, thyroid dysfunction or abnormal blood markers. All participants in the study were nonsmokers, denied alcohol consumption, were ambulatory and were not receiving antiosteoporosis agents, subjects were put into three groups according to their result estimation-Vit D3 (measured by radioimmunoassay (DiaSorin Inc., Stillwater, Minnesota), T score, Z score. (DXA BMD-Lunar iDXA, GE Inc.). BMI was calculated in all the subjects. Osteopenia was defined with T-score between −1 and −2.5 and osteoporosis was defined with T-score less than −2.5. Patients were classified according to three categories- Vit D estimation(n=111), T score estimation (n=98), Z score estimation(n=89). Findings were expressed in mean and standard deviation (mean ± sd). All data compiled was analyzed on SPSS 20.0 (SPSS Inc., Armonk, New York, USA) software. Statistical significance value was set at p< 0.05 with CI 95%.

RESULTS
Mann-Whitney U test, Friedman’s two way ANOVA was not significant for the hypothesis(p>0.05). For the comparison of the groups Spearman’s rank order correlation, Kendall’s tau b and Pearson had significant correlation (p<0.05). Also paired T test gave significant correlation between Vit D3, T and Z score(p<0.05) Hence it was concluded though there was a good correlation between Vit D3 and T and Zscore expressed as SD, there was no significance in estimating only Vitamin d3 as a sole predictor of OSTEOPOROSIS. BMD DEXA with T and Z scores are inevitable in predicting and therapeuting treatments accordingly.

DISCUSSION
As a technique for performing bone densitometry, spine DXA examinations have a number of important clinical advantages including compatibility with the WHO T-score definition of osteoporosis, their proven effectiveness at predicting fracture risk, proven effectiveness for targeting of antifracture treatment, effectiveness at monitoring patients’ response to treatment, and compatibility with the new WHO fracture risk algorithm. Other advantages include the stable calibration of hip and spine DXA scanners, the good precision of the measurements, and the availability of reliable reference ranges. Their future clinical use will be determined by the NICE guidelines and by the new approach of basing patient treatment on individual fracture risk. It is likely in the future that hip BMD examinations will be performed for making decisions about treatment and spine BMD examinations for the purposes of treatment monitoring.

CONCLUSION
T and Z scores estimated through DXA BMD have a better predictive value of osteoporosis in urban Bengali population than Vitamin D3 estimation. The above article had no conflict of interest and was funded by the two authors.
REFERENCES


