The impact of the Hologic versus the Indian Council of Medical Research (ICMR) database in diagnosis of osteoporosis among South Indian subjects from India with Low impact Hip fractures

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### Background

- **HOLOGIC-NHANES III DATABASE**
- **Osteoporosis in NHANES**
- **Population based Reference Standards of Peak Bone Mineral Density of Indian Males and Females**
- **ICMR**

### Aims & Objectives

- **To assess the agreement between the Hologic Database (HD) and the ICMR database (ICMRD)**
- **In defining normal and subnormal BMD**
- **In diagnosing osteoporosis in subjects with low impact Hip fracture.**
- **To arrive at a cut off of BMD and T scores which have a high sensitivity of predicting fracture using both databases.**

### Methodology

- **The DXA scans - Hologic QDR 4500 Discovery A densitometer.**
- **Data regarding Age, Sex, BMD.**
- **T-score of Hip were computed using Hologic and ICMR databases.**
- **BMD sub-categorisation was based on WHO Classification.**

- **Normal**
  - T score > -1
- **Osteopenia**
  - T score -2.5 < T <-1
- **Osteoporosis**
  - T score < -2.5

- **Weighted Kappa was used to look at the agreement between Hologic and ICMR databases.**
- **Receiver operating characteristics (ROC) curve was plotted using different cut-offs of BMD and T scores, which could best predict the Hip fracture risk.**
- **SAS 9.1.3 version was used for Data analysis.**

### Results

#### Demography

- **Sex Distribution**

#### Distribution of Hip BMD according to Hologic and ICMR database

- **ICMR Database**
  - Osteopenia: 121
  - Osteoporosis: 73
  - Total: 194

- **Hologic Database**
  - Osteopenia: 120
  - Osteoporosis: 120
  - Total: 240

#### Agreement between HD & ICMRD in Hip fractures

- **Weighted Kappa**
  - 0.65, 0.64; 95% CI 0.61-0.69
  - **SUBSTANTIAL AGREEMENT**

#### Comparison of Hip BMD between HD and ICMRD in subjects with hip fracture

#### ROC curve of BMD in relation with fracture using hospital data as controls

- **Cut offs for predicting HIP fracture risk (Hospital control)**
  - 0.681 gm/cm² (sensitivity 62% & specificity of 71%)
  - -2.1 (sensitivity 82% & specificity of 69%)
  - -2.0 (sensitivity 82% & specificity of 70%)

#### ROC curve of BMD in relation with fracture using community data as controls

- **Cut offs for predicting HIP fracture risk (Community controls)**
  - 0.651 gm/cm² (sensitivity 80% & specificity of 65%)
  - -2.4 (sensitivity 81% & specificity of 62%)
  - -2.2 (sensitivity 80% & specificity of 65%)

### Discussion

- **Agreement between the ICMRD and HD in categorization of BMD was “perfect” overall and “substantial” in Hip fracture subjects.**
- **About 20% subjects defined as osteopenia according to ICMRD were reclassified as osteoporosis by HD.**
- **ROC derived BMD cut offs for predicting the risk of Hip fracture were in the osteopenic range (T-score -2 to -2.4).**
  - **Sensitivity - 80% & Specificity - 70%**
- **This could imply the importance of assessing other risk factors affecting bone health while making therapeutic decisions.**
- **Incorporating FRAX - INDIA in clinical decision making may help in better management of patients.**

### Limitations

- **Other Risk factors predisposing to Hip fractures were not assessed in this study.**

### Conclusion

- **Use of ICMR database may lower the categorization into osteoporosis in Indians.**
- **Therapeutic decision may be considered even at osteopenic range (-2.0 to -2.4).**
- **However, prospective studies are needed to further validate our findings.**

### Reference


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