

BMD Yes or NO: Is the BMD test associated with a decrease in the hazard of future hip fractures among different ethnic groups?

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BACKGROUND

Bone Mass Density (BMD) test is used for diagnosing osteoporosis and identifying patients at high risk for fractures. Hip fractures are considered one of the common negative outcomes of osteoporosis. Previous studies have examined demographic variations in osteoporotic hip fractures among different groups, but the value of BMD for predicting future fracture among different demographic groups is not well understood.

THE AIM OF THE STUDY

To determine whether BMD test is associated with a lower risk of first hip fractures in patients aged 50 years and older in various demographic populations in Israel.

METHODS

- » Prospective cohort study included 805,124 members of Clalit Health Services who were aged 50-80 years, some of whom had a BMD test during 2008. Data were extracted from Clalit Health Services in 1.1.2008 including demographic variables, risk factors for osteoporosis, and BMD tests. Follow-up period for assessing fractures was through 31/12/2014.
- » Multivariable Cox proportional-hazards regression was used to examine the association between relevant socio-demographic and clinical risk factors and the risk of first hip fractures over the study period among the general study population.

- » Because the groups that did and did not have a BMD were different, propensity scores (PS) for having the BMD test were generated. All patients were divided into 5 groups according to the propensity to perform the BMD test.
- » Due to the low incidence of fractures in the lower propensity groups we focused our attention on the highest propensity groups. The association was further stratified by age groups (either up to age 65 and 65 and older or up to age 60 and 60 and older), sex, population sector (Jewish/ Arab) and different ethnic origin (Israel /Yemen/ Ethiopia/former Soviet Union).

RESULTS

Distribution of characteristics between the population with and without a BMD test during 2008

	Yes BMD N=19,094 (2.4%)	No BMD N=786,024 (97.6%)
Gender		
Female	14,855 (77.8)	348,631 (44.4)
Male	4,239 (22.2)	437,393 (55.6)
Age groups		
50-60	4,687 (24.5)	395,591 (50.3)
61-65	4,289 (22.5)	108,117 (13.8)
66-70	3,282 (17.2)	82,552 (10.5)
71-80	5,247 (27.5)	124,456 (15.8)
Socio-demographic		
High	5,385 (28.3)	171,405 (22.0)
Low	5,154 (27.1)	286,941 (36.8)
Sector		
Jewish	18,156 (95.1)	691,602 (88.0)
Arabs	819 (4.9)	84,052 (12.0)
Drugs - Steroids > 3 Months		
Yes	11,540 (60.4)	297,788 (37.9)
No	7,554 (39.6)	488,236 (62.1)
Rheumatoid-Arthritis		
Yes	1,057 (5.5)	16,139 (2.1)
No	18,037 (94.5)	769,885 (97.9)
Diabetes-mellitus		
Yes	5,045 (26.4)	196,870 (25.0)
No	14,049 (73.6)	589,154 (75.0)
COPD		
Yes	1,187 (6.2)	40,513 (5.2)
No	17,907 (93.8)	745,511 (94.8)

The risk for first hip osteoporotic fractures in the general population: Multivariable Cox proportional-hazards regression

	HR	95% CI
Female (ref = Male)	1.50***	1.44-1.56
Age groups (ref = 50-60)		
61-65	2.03***	1.85-2.22
66-70	3.63***	3.34-4.00
71-80	7.83***	7.23-8.47
Low socioeconomic status (ref= high)	1.18***	1.12-1.25
Country of origin (ref = Israel)		
Soviet Union	0.89**	0.83-0.95
Ethiopia	0.32***	0.25-0.41
Yemen	0.64***	0.56-0.73
Other	ns	
Arabs (ref = Jewish)	1.34***	1.24-1.44
BMI ≤19 (ref > 19)	2.33***	2.05-2.64
Smoker (ref = non smoker)	1.40***	1.33-1.48
Drugs - Steroids > 3 Month	1.09***	1.05-1.14
Diabetes-mellitus	1.28***	1.23-1.33
Hyperthyroidism	1.21**	1.08-1.36
Chronic obstructive lung diseases	1.19***	1.12-1.26
Charlson score (ref = 0)		
1-3	1.72**	1.18-2.53
4+	3.00***	2.04-4.41
No BMD	1.20***	1.09-1.33

*** p<0.001; **< 0.05; ns – not significance

- » When looking across the 5 PS strata, the primary association was only significant among the strata who had the highest risk and the highest propensity to perform a BMD test (typically women aged 65+, high SES, Jewish ethnicity, treated with steroid medication and having osteoporosis-related diseases).
- » In this PS strata, after adjusting for all risk factors, the model suggested that **non-performance of a BMD test was associated with a higher risk for first hip osteoporotic fractures by 32% (p<0.001).**

Multivariable Cox proportional-hazards regression for the association between BMD test and the risk of first hip fracture, among the population who had the highest propensity for performing a BMD

	HR	95% CI
No BMD	1.32***	1.16-1.50
Age groups (ref = 50-60)		
61-65	1.91***	1.44-2.52
66-70	3.62***	2.76-4.76
71-80	9.24***	7.08-12.06
Low socioeconomic status (ref= high)	1.14**	1.04-1.24
Arabs (ref = Jewish)	1.57**	1.28-1.93
BMI ≤19	2.33**	1.90-2.89
Smoker (ref = non smoker)	1.25**	1.10-1.43
Diabetes-mellitus	1.33***	1.24-1.42
Hyperthyroidism	1.29**	1.10-1.53
Charlson score (ref = 0)		
1-3	1.72**	1.18-2.53
4+	3.00***	2.04-4.41

*** p<0.001; **< 0.05

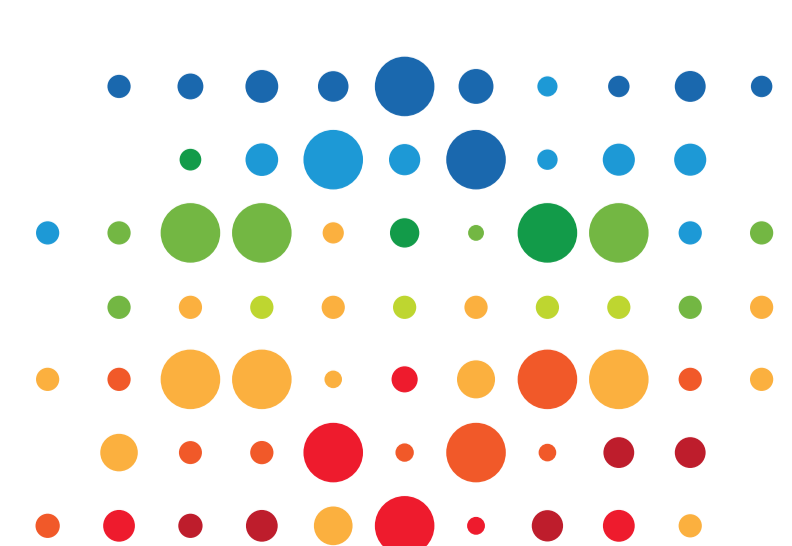
Among the population who had the highest propensity for performing a BMD it was found that **BMD test was associated with a lower risk for first hip osteoporotic fractures** among the following stratified groups:

- » Among the age of 65 and older (HR=0.30; 95% CI=1.12-1.61), but not among the younger age group
- » Among women (HR=0.24; 95% CI=1.10-1.48), but not among men
- » The association did not differ by population sector or by ethnic origin

CONCLUSIONS

- » BMD test is an effective screening tool to lower the risk for osteoporotic hip fractures mainly in high risk sub-populations and not as a screening tool for the general population.
- » In contrast to the current recommendations in Israel, one could consider raising the age for BMD from 60 to 65 years old and older.
- » Men, individuals of low economic status and Arabs are should be targeted for performing the BMD test. It appears these groups underutilize the BMD test and tend to be at highest risk for fractures.

NO CONFLICT OF INTEREST



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