

## Osteoporosis in the Arab Region - A Systematic review

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### Review question

(1) What is the epidemiology of primary osteoporotic vertebral and hip fractures in adults in the Arab Countries?

(2) What are the available bone mineral density data in healthy adult individuals and in those with primary osteoporosis in the Arab countries?

### Searches

We will use Embase (1945 to Jan 2019), PubMed (1946 to Jan 2019), and Scopus (1823 to Jan 2019 ) to identify papers relevant to the topic of interest. The search strategy will include two key components: affiliation of the authors (first and correspondence authors as they are generally considered the main or lead investigators in multi-authored papers) and osteoporosis-related concepts. We will include only papers where the affiliation of the first and/or correspondence authors is with institutions located in one of the 22 Arab countries, as defined by the Arab League: Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, UAE and Yemen. For the osteoporosis-related concepts, we included in the search queries the following keywords (with various/different permutations): bone atrophy, bone content, bone demineralization, bone density, bone fracture, bone fragility, bone loss, bone mass, bone metabolism, bone mineralization, bone remodeling, bone resorption, bone turnover, broken bone, demineralization, densitometer, densitometry, fracture reduction, fragility fracture, hip fracture, osteolysis, osteopenia, osteoporosis, photon absorptiometry, radiodensitometer, radiodensitometry, and X-ray bone densitometer.

### Search strategy

[https://www.crd.york.ac.uk/PROSPEROFILES/191686\\_STRATEGY\\_20200611.pdf](https://www.crd.york.ac.uk/PROSPEROFILES/191686_STRATEGY_20200611.pdf)

### Types of study to be included

- Inclusion:

- o Observational studies describing bone mineral density (BMD) or bone turnover markers data in healthy individuals or in those with primary osteoporosis

- o Observational studies describing fragility fractures at hip or vertebra

- o Studies on hip or vertebral fragility risk factors, care gap, disease burden, outcomes (mortality, morbidity) and risk prediction

- o Studies on stress fractures when related to osteoporosis

- o Studies including both osteoporotic and traumatic fractures at the same time, our target being osteoporotic fractures

• Exclusion:

- o Studies on secondary osteoporosis
- o Letters, abstracts, conference papers, errata, notes, and other editorial material
- o Book chapters
- o Studies on surgical techniques for osteoporotic fractures
- o Studies on osteoporosis medications, with outcomes not related to bone mineral density, bone markers or fragility fractures
- o Studies describing osteopenia or osteoporosis when diagnosed on X-ray
- o Studies on peri-articular osteoporosis and bone disease in the oral cavity
- o Non-human studies

**Condition or domain being studied**

Osteoporosis constitutes both a significant personal burden as well as a major public health concern. After the age of 50 years, 1 in 3 women and 1 in 5 men are expected to develop an osteoporosis-related fracture ([www.iofbonehealth.org/whos-risk](http://www.iofbonehealth.org/whos-risk)). However, the prevalence and incidence of fractures vary worldwide and across ethnicities (Ballane 2000). Vertebral fractures rates range between 18-26% in European women and 9-24% in Asian women (Ballane 2000). Furthermore, in the US, prevalence rates in Whites are approximately 4-fold higher than in Blacks (Ballane 2000). For hip fractures, the highest incidence was reported in Europe, followed by the Western Pacific region, US, and Southeast Asia (Johnell 2006). Hip fractures represent the most serious consequences of osteoporosis and imply a significant morbidity, including pain and decreased functional capabilities (Cauley 2013), high total disability-adjusted life years (DALYs) lost (Johnell 2006), and high mortality, reaching 11.9% for women and 21.8% for men at 30 days (Brauer 2009, WHO 2002).

Despite this, osteoporosis was absent among the non-communicable diseases addressed in the 2010 WHO Global Status Report (WHO 2011). Nonetheless, the health burden of osteoporosis has been recognized by health authorities in many western and non-western countries (<https://www.iofbonehealth.org/regional-audits>), Lozano 2010, Baddoura 2011).

**Participants/population**

• Inclusion criteria

- o Studies on healthy individuals or those with osteoporosis, age > 18 years and from the Arab League countries.
- o Studies on the topic of interest where all authors are from Arab countries but details on the population are not provided, assuming that the population is from the Arab countries

**Intervention(s), exposure(s)**

Not applicable

**Comparator(s)/control**

Not applicable

**Main outcome(s)**

- (1) Describe the epidemiology of primary osteoporotic vertebral and hip fractures in the Arab countries
- (2) Describe bone mineral density data in healthy individuals and in those with primary osteoporosis in the Arab countries

\* Measures of effect

Incidence and prevalence of vertebral and hip fracture

Additional outcome(s)

Not applicable

\* Measures of effect

Not applicable

Data extraction (selection and coding)

We will review the title and abstract of retrieved citations in duplicate and independently, using title and abstract screening forms. The citation included by at least one of the reviewers will be considered as eligible.

We will retrieve the full text of the potentially eligible studies and two reviewers will assess them in duplicate and independently for eligibility, following a priori defined full text screening forms. Using standardized forms, one reviewer will extract data from each eligible study. Data will be checked by a senior reviewer (GEHF, MB, MC).

We will abstract data on the following parameters: Author, year of publication, country, journal name, study design, study population, age, gender, topic covered (BMD data, hip fracture, vertebral fracture), risk factors assessed, risk factor in association with osteoporosis confirmed by statistical analysis.

For papers discussing BMD, we will abstract data on: Sampling method and representativeness of the sample enrolled (multicenter or population based or single center, sample size), prevalence by BMD T-score in male, prevalence by BMD T-score in female, overall prevalence, BMD mean and T-score  $\pm$  SD in male, BMD mean and T-score  $\pm$  SD in female reference population, BMD machine used, Coefficient of Variation (CV).

For papers on vertebral or hip fractures, we will abstract data additionally on: method of identifying fracture, method of fracture grading, whether one or two reviewers of imaging, prevalence or incidence of fracture.

Risk of bias (quality) assessment

We will use a quality score to evaluate the studies reporting data on bone mineral density and/or fracture.

For BMD studies, the quality score includes the following:

- Multicenter or Population based (=1)/No (= 0)
- Prospective (=1)/Retrospective (=0)
- Ethnicity defined (=1)/Not defined (=0)
- Reference population
  - o For hip BMD (Caucasian database (=1) versus national database or not specified (=0))
  - o For lumbar spine BMD (Manufacturer database (=1) versus national database or not specified (=0))
- Machine used (FDA approved (=1) versus non-FDA approved (=0))
- CV of BMD measurement (reported (=1) / not reported (=0)).

For fracture data, the quality score was developed by our group (Cauley 2011), and used by others (Kanis 2012); it includes:

- Multicenter or Population based (Yes (=1) / No (=0))

- Prospective (=1)/Retrospective (=0)
- Ethnicity defined (=1)/Not defined (=0)
- Study duration (?1 year=1; <1year=0)
- Method used to define fracture (imaging or questionnaire and adjudication =1; questionnaire only =0)
- Definition of the included fractures as osteoporotic (yes=1)/(No=0)
- ICD code specified (yes=1)/(No=0) (only for hip fracture)
- Imaging reviewers (2 reviewers (=1) / 1 reviewer (=0)) (only for vertebral fracture)

The study quality is good if the score is ?5, fair if the score is 3-4, and poor if the score is <3.

### Strategy for data synthesis

For vertebral fractures, we will describe the prevalence of vertebral fractures across various countries, while highlighting the identification method and grade.

For hip fractures, we will compare the incidence of hip fractures across various countries and calculate age-adjusted rates, using reported crude incidence rates in individual studies standardized to the UN 2010 population.

For BMD, we will describe BMD and T-score at hip, lumbar spine and forearm, by gender and age category, as reported in studies from various countries, in both healthy adults and those with osteoporosis.

### Analysis of subgroups or subsets

Not applicable

### Contact details for further information

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### Type and method of review

Epidemiologic, Systematic review

### Anticipated or actual start date

02 July 2018

### Anticipated completion date

01 December 2020

### Funding sources/sponsors

None

Grant number(s)

None

Conflicts of interest

Language

English

Country

Lebanon

Stage of review

Review Ongoing

Details of final report/publication(s) or preprints if available

None

Subject index terms status

Subject indexing assigned by CRD

Subject index terms

MeSH headings have not been applied to this record

Date of registration in PROSPERO

11 July 2020

Date of first submission

11 June 2020

Details of any existing review of the same topic by the same authors

None

Stage of review at time of this submission

Stage	Started	Completed
Preliminary searches	Yes	Yes
Piloting of the study selection process	Yes	Yes
Formal screening of search results against eligibility criteria	Yes	Yes
Data extraction	No	No
Risk of bias (quality) assessment	Yes	No
Data analysis	No	No

*The record owner confirms that the information they have supplied for this submission is accurate and complete and they understand that deliberate provision of inaccurate information or omission of data may be construed as scientific misconduct.*

*The record owner confirms that they will update the status of the review when it is completed and will add publication details in due course.*

Versions

11 July 2020

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PROSPERO

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