SUPPLEMENTARY MATERIAL

COVER PAGE

1. TITLE
Burden, Treatment Patterns and Unmet Needs of Osteoarthritis in Dubai: A Retrospective Analysis of The Dubai Real-world Claims Database

Authors

Dr. Jamal A Al-Saleh: Dubai Health Authority, Dubai, UAE

Dr. Ali A Albelooshi: Mohammed Bin Rashid University, Dubai, UAE

Dr. Ammar A Salti: Cleveland Clinic, Abu Dhabi, UAE

Dr. Mohamed Farghaly: Dubai Health Authority, Dubai, UAE

Ahmed M Ghorab: Pfizer Gulf FZ LLC, Dubai, UAE

Sreenivasulu Linga: IQVIA, Dubai, UAE

Badarinath C Ramachandrarach: IQVIA, Dubai, UAE
Ashok Natarajan: IQVIA, Dubai, UAE

**Corresponding author**

Jean G Joury: Pfizer Gulf FZ LLC, Pfizer Building, Dubai Media City, PO Box 502749

Dubai, UAE

Tel: +971 50 352 8564

Jean.Joury@pfizer.com
Supplementary tables

Table S1: Table of ICD-10-CM codes

| ICD-10-CM codes | Description                                      |
|-----------------|--------------------------------------------------|
| M15             | Polyosteoarthritis                               |
| M16             | Osteoarthritis of hip                            |
| M17             | Osteoarthritis of knee                           |
| M18             | Arthrosis of first carpometacarpal joint         |
| M19             | Other arthrosis                                  |

ICD-10-CM: International Classification of Diseases, Tenth Revision, Clinical Modification
### Table S2: Algorithms Defined *A Priori*

| Patient Group | Algorithms |
|---------------|------------|
| OA of the hip and/or knee (Cohort 1) | 1. ≥2 medical (in-patient and/or out-patient) encounters resulting in diagnosis codes for OA of the hip and/or knee within 6 months (please see Error! Reference source not found. for an enumeration of relevant diagnosis codes)  
2. 1 inpatient admission resulting in a diagnosis of OA of the hip and/or knee (please see Error! Reference source not found. for relevant procedure and medication codes)  
3. A diagnosis of OA of the hip and/or knee from ≥1 out-patient visit (please see Error! Reference source not found. for relevant procedure and medication codes)  
4. A diagnosis of OA of the hip and/or knee from ≥2 out-patient visits in the same CY (please see Error! Reference source not found. for relevant procedure and medication codes)  
5. A diagnosis of OA of the hip and/or knee from ≥3 out-patient visits in the same CY (please see Error! Reference source not found. for relevant procedure and medication codes)  
6. A diagnosis of OA of the hip and/or knee from ≥4 out-patient visits in the same CY (please see Error! Reference source not found. for relevant procedure and medication codes)  
7. A diagnosis of OA of the hip and/or knee from ≥1 out-patient visit; and ≥1 X-rays of the hip and/or knee in the same CY (please see Error! Reference source not found. for relevant procedure and medication codes)  
8. A diagnosis of OA of the hip and/or knee from ≥2 out-patient visits; and ≥1 X-rays of the hip and/or knee in the same CY (please see Error! Reference source not found. for relevant procedure and medication codes)  
9. A diagnosis of OA of the hip and/or knee from ≥3 out-patient visits; and ≥1 X-rays of the hip and/or knee in the same CY (please see Error! Reference source not found. for relevant procedure and medication codes)  
10. A diagnosis of OA of the hip and/or knee from ≥4 out-patient visits; and ≥1 X-rays of the hip and/or knee in the same CY (please see Error! Reference source not found. for relevant procedure and medication codes)  
11. ≥2 out-patient visits resulting in diagnoses of OA of the hip and/or knee within 5 years (please see Error! Reference source not found. for relevant procedure and medication codes)  
12. ≥2 out-patient visits resulting in diagnoses of OA of the hip and/or knee within 2 years (please see Error! Reference source not found. for relevant procedure and medication codes)  
13. ≥2 out-patient visits resulting in diagnoses of OA of the hip and/or knee within 1 year (please see Error! Reference source not found. for relevant procedure and medication codes)  
14. 1 out-patient visit resulting in a diagnosis of OA of the hip and/or knee (please see Error! Reference source not found. for relevant procedure and medication codes)  
15. 1 diagnosis of OA of the hip and/or knee (please see Error! Reference source not found. for relevant procedure and medication codes)  
16. Diagnosis code for OA of the hip or knee plus ≥1 diagnosis code for joint pain (Error! Reference source not found.) ≥30 days apart  
17. 1 diagnosis code for OA of the hip or knee plus ≥1 administration of either Hyaluronic acid (HA) acid or IA... |
| Patients with moderate-to-severe OA of the hip and/or knee (Cohort 2) | Satisfaction of any algorithm for OA of the hip and/or knee and any one of the following: |
|---|---|
|  | 1. ≥1 code for any OA-related surgical procedures (Error! Reference source not found.) |
|  | 2. ≥2 medical encounters on different days resulting in diagnosis codes for a relevant psychiatric comorbidity (i.e., anxiety, depression; please see Error! Reference source not found. for definitions for each relevant condition), with at least two encounters for psychiatric comorbidities both occurring within 180 days of any OA hip and/or knee diagnosis. |
|  | 3. ≥2 medical encounters resulting in diagnosis codes for relevant psychiatric comorbidities, with at least two encounters for the psychiatric comorbidities within 90 days of any OA hip and/or knee diagnosis. |
|  | 4. ≥2 prescriptions for opioids (Error! Reference source not found.) within 90 days of any OA hip and/or knee diagnosis |
|  | 5. ≥2 prescriptions for oral NSAIDs (including COX-2 inhibitors) within 90 days of any OA hip and/or knee diagnosis |
|  | 6. ≥2 prescriptions for topical NSAIDs (including COX-2 inhibitors) within 90 days of any OA hip and/or knee diagnosis |
|  | 7. ≥1 administration of HA acid or IA corticosteroids |
|  | 8. ≥2 administrations of HA acid or IA corticosteroids at least 90 days apart |
|  | 9. ≥1 administration of a nerve block (Error! Reference source not found.) ≥30 days of any OA hip and/or knee diagnosis |
|  | 10. ≥1 claim for a mobility aid including walking cane, walker, and wheelchair, or crutch ≥30 days of any OA hip and/or knee diagnosis |
|  | 11. ≥1 code for physical and/or occupational therapy ≥30 days of any OA hip and/or knee diagnosis |
|  | 12. OA-related costs (defined as all medical care resulting in a diagnosis of OA, relevant surgical procedures, all mobility aids, all opioids and prescription NSAIDs, and all administrations of IA corticosteroids or HA acid) ≥30% greater than mean OA-related costs for the cohort |
|  | 13. OA-related costs ≥30% greater than mean OA-related costs for the cohort |
|  | 14. OA-related costs ≥50% greater than mean OA-related costs for the cohort |
15. MPR with opioids and prescription NSAIDs ≥80% over minimum of 90 days
16. ≥2 codes for X-ray examinations in a 1-year post index period of OA hip and/or knee

**Note:** E-claims data does not have the prescription duration for all the claims hence MPR cannot be calculated.

**Note:** Index date will be the first date of diagnosis of OA patients during the index identification period (01 January 2015 through 31 May 2019)

| OA of the hip and/or knee who experience inadequate response or inability to tolerate ≥3 pain-related medications (Cohort 3) | Satisfaction of any algorithm for OA of the hip and/or knee and any one of the following:
1. Receipt of HA acid, IA corticosteroid, and/or nerve block preceded by receipt of 2 different classes of analgesics (i.e., NSAIDs [including COX-2 inhibitors], opioids)
2. Prescription for ≥3 analgesic classes
3. Receipt of knee or hip arthroplasty (partial or complete; original or revision)
4. Receipt of nerve block
5. Receipt of ≥2 different opioids within a 90-day period
6. Receipt of a mobility aid (as described above) within 90-day period subsequent to receipt of an opioid |
| OA of the hip and/or knee with inadequate response to ≥2 pain-related medications (Cohort 4) | 1. Patients with OA of hip and/or knee with NSAIDs contraindications |

**Note:** A priori algorithms are defined based on those in literature, treatment guidelines and reported characteristics of patients with OA, and expert opinion. In-table citations are provided for algorithms found in the current literature, and those generated based on treatment guideline and reported characteristics of patients with OA. Where no citation is provided the algorithm has been defined based on expert opinion.

COX-2, cyclooxygenase-2; CY, calendar year; HA, hyaluronic; IA, intra-articular; MPR, medication possession ratio; MRI, magnetic resonance imaging; NSAID, nonsteroidal anti-inflammatory drug; OA, osteoarthritis
Table S3: Consultation-based prevalent cases of OA and OA of hip and/or knee in locals and expats during the study period (January 01, 2014 – May 31, 2020)

|        | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|--------|------|------|------|------|------|------|
| Locals | 1.8% | 2.1% | 2.0% | 2.3% | 2.1% | 2.3% |
| Expats | 1.8% | 2.0% | 2.2% | 2.3% | 2.2% | 2.3% |
|        | 1.3% | 1.5% | 1.3% | 1.5% | 1.4% | 1.6% |
|        | 1.3% | 1.4% | 1.6% | 1.5% | 1.4% | 1.7% |
|        | 1.3% | 1.6% | 1.4% | 1.6% | 1.6% | 1.8% |

OA: osteoarthritis, Expats: Expatriates

Table S4: Prescription pattern by specialty (most commonly visited) in overall and subgroup cohorts

| Pharmacological treatments by specialty (n) | Overall cohort | Cohort 1 | Cohort 2 | Cohort 3 | Cohort 4 |
|-------------------------------------------|---------------|----------|----------|----------|----------|
| Orthopaedics                              | n=11,651      | n=8,879  | n=3,728  | n=1,612  | n=597    |
|                                           | 5441 (46.7%)  | 4231 (47.7%) | 2,570 (68.9%) | 1,122 (69.6%) | 318 (53.3%) |
| General practice/family medicine          | 1,915 (16.4%) | 1,271 (14.3%) | 552 (14.8%) | 435 (27.0%) | 61 (10.2%) |
| IM- Others                                | 834 (7.2%)    | 554 (6.2%)  | 266 (7.1%) | 171 (10.6%) | 50 (8.4%) |
| Rheumatologist                            | 477 (4.1%)    | 290 (3.3%)  | 179 (4.8%) | 67 (4.2%)  | 32 (5.4%) |

Cohort 1: Patients with OA hip and/or knee (n=8,879); Cohort 2: Patients with moderate-to-severe OA of the hip and/or knee OA (n=3,728); Cohort 3: Patients with OA hip and/or knee with inadequate response or inability to tolerate ≥3 pain-related medications (n=1,612); Cohort 4: Patients with OA hip and/or knee with contraindications to NSAIDs (n=597).
Table S5: Healthcare cost per patient (All-cause claims) during 12-month follow-up by visit type in overall cohort (Case and control group)

|                      | Case group                               | Control group                              |
|----------------------|------------------------------------------|---------------------------------------------|
|                      | Number of patients in 1-year follow-up   |                                             |
|                      | 8,556                                    | 8,555                                      |
| Inpatient            |                                          |                                             |
|                      | n = 750                                  | n = 880                                    |
| Annual gross cost per patient (USD) | 4,543.77±7,476.65 | 3,505.79±5,907.96 |
| Outpatient           |                                          |                                             |
|                      | n = 8,555                                | n = 8,555                                  |
| Annual gross cost per patient (USD) | 2,496.12±3,326.07 | 2,103.74±4,011.44 |
| Emergency            |                                          |                                             |
|                      | n = 1,205                                | n = 1,129                                  |
| Annual gross cost per patient (USD) | 303.61±442.75  | 294.08±347.99 |

n, total number of patients; USD, United States Dollar; SD, Standard deviation
Table S6: Healthcare cost per patient (All-cause claims) during 12-month follow-up by activity type in overall cohort (Case and control group)

| Activity Type | Case group n = 8,556 | Control group n = 8,555 |
|---------------|----------------------|-------------------------|
| Medications   |                      |                         |
| n             | 8,475                | 8,322                   |
| Mean ± SD, USD| 918.18±1847.52       | 856.90±2643.70          |
| CPT (Procedures) |                  |                         |
| n             | 8,323                | 8,140                   |
| Mean ± SD, USD| 1433.63±2,567.46     | 1,180.93±2,678.83       |
| HCPCS (Consumables) |            |                         |
| n             | 1,179                | 1,033                   |
| Mean ± SD, USD| 831.59±1,974.95      | 617.56±1,680.05         |
| Services      |                      |                         |
| n             | 8,402                | 8,206                   |
| Mean ± SD, -USD| 493.39±1,099.52     | 450.65±804.63           |

n, total number of patients; SD, Standard deviation; USD, United States Dollar; CPT, current procedural terminology; HCPCS, Healthcare common procedure coding system

Cohort 1: Patients with OA hip and/or knee (n=8,879); Cohort 2: Patients with moderate-to-severe OA of the hip and/or knee OA (n=3,728); Cohort 3: Patients with OA hip and/or knee with inadequate response or inability to tolerate ≥3 pain-related medications (n=1,612); Cohort 4: Patients with OA hip and/or knee with contraindications to NSAIDs (n=597).
Table S7: Healthcare cost per patient (all-cause-related claims) during 12-month follow-up by activity type in overall cohort and subgroup cohorts

| Activity Type          | Overall Cohort | Cohort 1 | Cohort 2 | Cohort 3 | Cohort 4 |
|------------------------|----------------|----------|----------|----------|----------|
|                        | n = 11,651     | n = 8,877| n = 3,728| n = 1,612| n = 597  |
| Medications            |                |          |          |          |          |
| n                      | 11,547         | 8,801    | 3,699    | 1,610    | 594      |
| Mean ± SD, USD         | 1,088.63±2,489.31| 1,078.83±2,255.96| 1,382.16±2,621.64| 1,544.45±2,810.89| 1,813.21±2,977.26|
| CPT (Procedures)       |                |          |          |          |          |
| n                      | 11,342         | 8,627    | 3,667    | 1,581    | 586      |
| Mean ± SD, USD         | 1,620.96±3,157.25| 1,565.15±3,018.38| 2,124.71±3,564.33| 1,985.57±4,203.68| 3,005.30±4,827.23|
| HCPCS (Consumables)    |                |          |          |          |          |
| n                      | 1,716          | 1,299    | 673      | 279      | 141      |
| Mean ± SD, USD         | 969.64±2,289.99| 972.36±2,415.25| 1,173.59±2,751.53| 1,856.77±3,790.33| 1,637.85±3,896.25|
| Services               |                |          |          |          |          |
| n                      | 11,443         | 8,710    | 3,672    | 1,576    | 593      |
| Mean ± SD, USD         | 569.91±1,788.43| 528.25±981.07 | 698.16±1,261.54 | 658.40±1,430.90 | 1,104.97±2,110.82 |

n, total number of patients; SD, Standard deviation; USD, United States Dollar; CPT, current procedural terminology; HCPCS, Healthcare common procedure coding system

Cohort 1: Patients with OA hip and/or knee (n=8,879); Cohort 2: Patients with moderate-to-severe OA of the hip and/or knee OA (n=3,728); Cohort 3: Patients with OA hip and/or knee with inadequate response or inability to tolerate ≥3 pain-related medications (n=1,612); Cohort 4: Patients with OA hip and/or knee with contraindications to NSAIDs (n=597).
Table S8: Healthcare cost per patient (OA-related claims) during 12-month follow-up by activity type in overall cohort and subgroup cohorts

| OA-specific annual healthcare cost per patient by activity type | Overall Cohort n = 8,173 | Cohort 1 n = 6,118 | Cohort 2 n = 3,239 | Cohort 3 n = 1,511 | Cohort 4 n = 437 |
|---|---|---|---|---|---|
| Medications | n | 6,902 | 5,188 | 2,805 | 1,470 | 361 |
| Mean ± SD, USD | | 345.27±833.49 | 309.05±575.08 | 419.06±669.29 | 495.30±749.63 | 400.82±760.52 |
| CPT (Procedures) | n | 5,464 | 4,227 | 2,702 | 1,239 | 320 |
| Mean ± SD, USD | | 554.12±1,683.87 | 517.90±1,647.92 | 693.26±2023.42 | 765.14±2,822.87 | 666.57±1,575.22 |
| HCPCS (Consumables) | n | 280 | 205 | 177 | 95 | 22 |
| Mean ± SD, USD | | 1,516.40±3,283.32 | 1,568.95±3,612.25 | 1,744.31±3,847.24 | 2,993.32±4,850.65 | 3,120.49±6,559.56 |
| Services | n | 5,171 | 4,031 | 2,371 | 1,319 | 297 |
| Mean ± SD, -USD | | 146.49±602.04 | 130.15±407.89 | 179.44±521.44 | 208.03±677.47 | 228.18±802.99 |

n, total number of patients; SD, Standard deviation; USD, United States Dollar; CPT, current procedural terminology; HCPCS, Healthcare common procedure coding system

Cohort 1: Patients with OA hip and/or knee (n=8,879); Cohort 2: Patients with moderate-to-severe OA of the hip and/or knee OA (n=3,728); Cohort 3: Patients with OA hip and/or knee with inadequate response or inability to tolerate ≥3 pain-related medications (n=1,612); Cohort 4: Patients with OA hip and/or knee with contraindications to NSAIDs (n=597).