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

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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. 1 out-patient visit and ≥2 diagnoses of OA of the hip and/or knee from out-patient visits within 5 year 12. ≥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 13. ≥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 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. 1 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

	corticosteroids (please see **Error! Reference source not found.** for relevant procedure and medication codes) 18. 1 diagnosis of OA of the hip or knee plus ≥1 relevant scans (i.e., X-ray, MRI) of knee or hip ±2 years of the OA diagnosis (please see **Error! Reference source not found.** for relevant procedure and medication codes) 19. 1 diagnosis of OA of the hip or knee plus ≥1 procedure code for knee or hip arthroplasty (partial or full; initial or revision; **Error! Reference source not found.**) 30 days after OA diagnosis 20. 1 diagnosis of OA of the hip or knee plus ≥1 mobility aid (e.g., cane, walker, wheelchair; please see **Error! Reference source not found.** for relevant codes) ±30 days of OA diagnosis 21. ≥2 medical encounters resulting in diagnoses of OA of the hip and/or knee ≤90 days apart (please see **Error! Reference source not found.** for relevant procedure and medication codes)
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	**Expats**	**Locals**	**Expats**	**Locals**	**Expats**	**Locals**	**Expats**	**Locals**	**Expats**	**Locals**	**Expats**
Consultation-based prevalent cases of OA											
1.8%	1.8%	2.1%	2.0%	2.3%	2.2%	2.3%	2.1%	2.3%	2.2%	2.3%	2.4%
Consultation-based prevalent cases of OA hip and/or knee											
1.3%	1.2%	1.5%	1.3%	1.6%	1.4%	1.5%	1.4%	1.7%	1.6%	1.6%	1.8%

OA: osteoarthritis, Expats: Expatriates

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

	Overall cohort	Cohort 1	Cohort 2	Cohort 3	Cohort 4
Pharmacological treatments by specialty (n)	**n=11,651**	**n=8,879**	**n=3,728**	**n=1,612**	**n=597**
Orthopaedics	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) (mean ± SD)	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) (mean ± SD)	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) (mean ± SD)	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)

All-cause HCRU cost by 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

	All-cause annual healthcare cost per patient				
	Overall Cohort n = 11,651	Cohort 1 n = 8,877	Cohort 2 n = 3,728	Cohort 3 n = 1,612	Cohort 4 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).