GLA:D® Denmark and the COVID-19 pandemic

A descriptive study of patient profiles and outcomes across the pandemic

Dorte T. Grønne
Ewa M. Roos
Alice Kongsted
Søren T. Skou
Jan Hartvigsen
James J. Young

SDU 🍎 🏃 GLA:D®
DENMARK

November 2022

GLA:D® Denmark and the COVID-19 pandemic

A descriptive study of patient profiles and outcomes across the pandemic

Dorte T. Grønne, Center for Muscle and Joint Health, SDU

Ewa M. Roos, Center for Muscle and Joint Health, SDU

Alice Kongsted, Center for Muscle and Joint Health, SDU

Søren T. Skou, Center for Muscle and Joint Health, SDU and Department of Physiotherapy and Occupational Therapy, Næstved-Slagelse-Ringsted Hospitals

Jan Hartvigsen, Center for Muscle and Joint Health, SDU

James J. Young, Center for Muscle and Joint Health, SDU and Kembil Research Institute, Toronto Western Hospital

Introduction

Coronavirus disease 2019 (COVID-19) has disrupted healthcare service delivery across the globe. For example, some services were postponed for periods of time or even indefinitely, others changed to virtual or telehealth delivery mechanisms, while some continued to be delivered in-person but with accommodations for social distancing and other measures to reduce disease transmission. Within individual countries, regional variations in service delivery existed, reflecting the changing COVID-19 situations locally. In Denmark, the first person tested positive for COVID-19 at the end of February 2020 and from mid-March the country had full lockdown of all non-critical functions, such as elementary-schools and higher educations, non-essential shops and non-essential health care services including physical therapy and chiropractic clinics. However, at this time possibilities to arrange physical therapy treatment via telehealth was introduced. Most physical therapy clinics were able to provide group-based on-site treatment again from June 2020, but with some restrictions and precautions taken such as small group size and social distancing. In the following winter-periods (2020-2021 and 2021-2022) the country also was assigned to periods of lock-down, but on-site delivery of physical therapy was allowed. Since the end of March 2022, all restrictions in Denmark have been lifted.

Prior to the COVID-19 pandemic, the Good Life with osteoArthritis in Denmark (GLA:D®) programs for Knee/Hip Osteoarthritis (OA) and Back were being offered across Denmark. Like other health services in Denmark, the COVID-19 pandemic caused major disruptions to the delivery of GLA:D®. Clinics offering GLA:D® were forced to close for a period of time and the option for virtual delivery of GLA:D® was introduced. However, it is unclear if there were systematic differences in patients participating in GLA:D® during these uncertain periods. For example, it may be that those with less risk of severe disease if infected with COVID-19 i.e., younger patients and those with no comorbidities were more likely to participate in GLA:D® during these periods. It may also be that those with more severe OA and back disease profiles and symptoms participated in GLA:D® during these periods, whereas those with less severe symptoms preferred to self-manage without health care support when possible. Finally, patient outcomes may differ in these periods due to differences in program delivery conditions and possible differing patient profiles or simply due to external pandemic-related factors (e.g., social isolation, stress).

In this report we have described patient profiles of those participating in the GLA:D® programs for Knee/Hip OA and Back and their key treatment outcomes in various stages of the COVID-19 pandemic. The findings of this report are meant to inform future research projects and analyses regarding the inclusion of patients in the Danish GLA:D® registries during the pandemic periods.

Three patient cohorts were created from the GLA:D® Knee/Hip OA and GLA:D® Back programs: 1) knee OA; 2) hip OA; 3) back pain. Baseline and outcome analyses were conducted separately for each cohort. To account for yearly trends in GLA:D® data, only data collected after 2019 were included in these analyses.

Methods

Three patient cohorts were created from the GLA:D® Knee/Hip OA and GLA:D® Back programs: 1) knee OA; 2) hip OA; 3) back pain. Baseline and outcome analyses were conducted separately for each cohort. To account for yearly trends in GLA:D® data, only data collected after 2019 were included in these analyses.

Baseline patient profile analysis

To investigate potential differences in patient profiles during the COVID-19 period, patients were stratified into a pre-pandemic or mid-pandemic group according to the date of program enrolment:

- Pre-pandemic group included all patients enrolled before 01 March 2020 (i.e., enrolled prior to start of the pandemic period)
- Mid-pandemic group included all patients enrolled between 01 March 2020 and 31 March 2022 (i.e., enrolled during the pandemic period)

Baseline characteristics in this analysis included: age, sex, body mass index, symptom duration, pain intensity, and function. Due to differences in data collection between GLA:D® Knee/Hip OA and GLA:D® Back, symptom duration was categorized as either <1 year, ≥1 year and <2 years, and ≥2 years (knee and hip OA) or ≤4 weeks, >4 weeks and ≤1 year, and >1 year (back pain); pain intensity was measured on the Visual Analogue Scale (VAS;0-100; knee and hip OA) or Numeric Pain Rating Scale (NPRS;0-10; back pain); and function was measured on the Knee injury and Osteoarthritis Outcome Score 12-item short-form (KOOS-12) function subscale (knee OA), Hip disability and Osteoarthritis Outcome Score 12-item short-form (HOOS-12) function subscale (hip OA), or Oswestry Disability Index (ODI; back pain). Descriptive statistics including the mean and 95% confidence interval (CI) for continuous data and the proportion and 95% CI for categorical data were calculated.

Outcome analysis

To investigate the potential impact of the COVID-19 pandemic on patient outcomes, patients with complete data (baseline, 3-month follow-up, and 12-month follow-up, plus 6-month follow-up in back pain cohort)

were stratified into a pre-pandemic group, pandemic mid-lockdown group, or pandemic post-lockdown group according to the date of program enrolment and date of 3-month follow-up:

- Pre-pandemic group included all patients with a 3-month follow-up before 01 March 2020 (i.e., the program was completed prior to the start of the pandemic period)
- Pandemic mid-lockdown included all patients enrolled before 01 June 2020 and 3-month follow-up after 01 March 2020 (i.e., all or part of the program occurred during the lockdown period)
- Pandemic post-lockdown included all patients enrolled after 01 June 2020 and 3-month measurement before 31 March 2022 (i.e., the program occurred after the lockdown period, but during the COVID-19 pandemic)

Mean differences from baseline to 3-, 6- (back pain only) and 12-month follow-up were calculated for pain intensity (VAS for knee and hip OA; NPRS for back pain) and function (KOOS-12 function subscale for knee OA; HOOS-12 function subscale for hip OA; ODI for back pain). Within-group effect sizes were also calculated. Program adherence was described for each patient cohort using the proportion and 95% CI for each category of number of education and exercise sessions attended.

Results

Since program inception, trends in patient enrolment (Figure 1) and number of active GLA:D® clinics (Figure 2) are presented. A notable decrease in both the number of patients (for all patient cohorts) and active clinics (OA and Back) was observed in the 2020 and 2021 calendar years, corresponding to the COVID-19 pandemic period.

COVID-19 impact on patient profiles

During the pandemic period, 8263, 3777, and 1758 patients with knee OA, hip OA, and back pain were enrolled in GLA:D®, respectively. Baseline characteristics are presented in Table 1. Overall, no differences in baseline characteristics were found between the pre-pandemic and mid-pandemic groups in any of the patient cohorts, except for a slightly lower proportion of females enrolling during the mid-pandemic period in the back pain cohort (62.4% mid-pandemic versus 68.0% pre-pandemic).

COVID-19 impact on outcomes

Mean differences and effect sizes for each patient cohort are presented in Table 2. Generally, outcomes were similar across the COVID-19 pandemic periods. Smaller short-term pain intensity effect sizes in the pandemic mid-lockdown hip OA (3-month follow-up) and back pain (3- and 6-month follow-up) groups were observed compared to the respective pre-pandemic and pandemic post-lockdown groups. Similarly, a smaller function effect size at 3-months was observed in the pandemic mid-lockdown hip OA group compared to the pre-pandemic and pandemic post-lockdown groups. A slight decrease in the number of exercise sessions attended in the knee and hip OA pandemic groups was observed with relatively no change in education session attendance. A notable drop in exercise session attendance in the back pain mid-lockdown group was found, with no change in education session attendance.
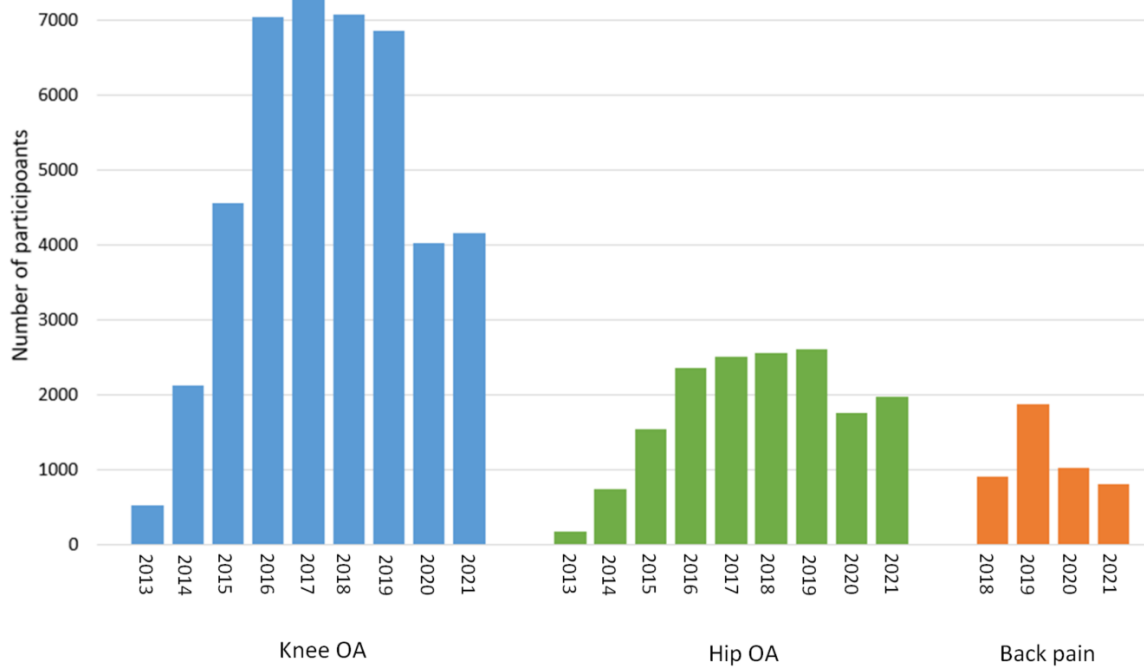
Figure 1. Yearly uptake of new patients

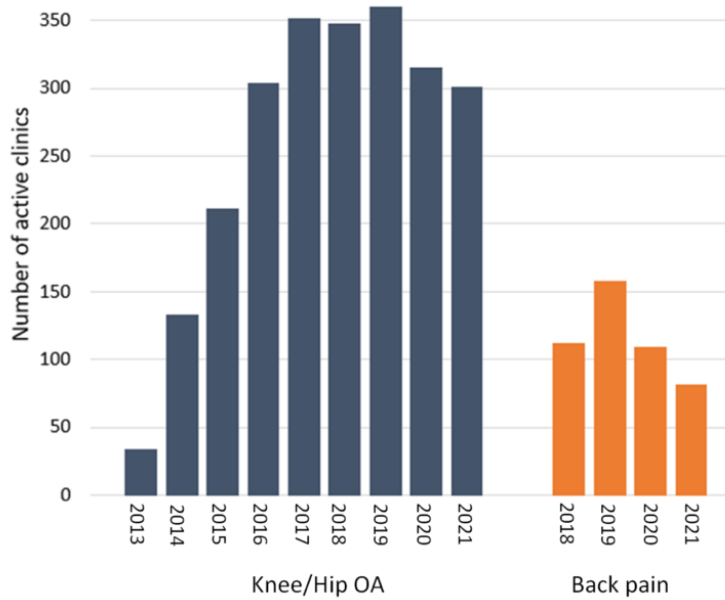*Figure 2. Yearly number of active clinics*

Table 1. GLA:D® program participants baseline characteristics

	Knee OA		Hip OA		Back pain	
	Enrolled pre-pandemic (*n*= 8024)	**Enrolled mid-pandemic** (*n*= 8263)	**Enrolled pre-pandemic** (*n*= 3108)	**Enrolled mid-pandemic** (*n*= 3777)	**Enrolled pre-pandemic** (*n*= 2218)	**Enrolled mid-pandemic** (*n*= 1758)
Age (years), mean (95% CI)	65.7 (65.5; 66.0)	65.8 (65.6; 66.0)	67.1 (66.7;67.4)	67.0 (66.7; 67.4)	58.1 (57.6; 58.7)	57.1 (56.5; 57.7)
Sex (female), % (95% CI)	68.6 (67.6; 69.6)	68.2 (67.2; 69.2)	67.8 (66.1; 69.4)	67.5 (65.5; 68.5)	68.0 (66.1; 70.0)	62.4 (60.1; 64.7)
BMI (kg/m², mean (95% CI	29.0 (28.9; 29.2)	29.1 (29.0; 29.3)	27.2 (27.0; 27.4)	27.4 (27.3; 27.6)	27.6 (27.4; 27.8)	27.7 (27.4; 28.0)
Symptom duration, % (95% CI)					-	-
<1 year	43.0 (42.0; 44.1)	44.9 (44.3; 46.5)	38.5 (36.7; 40.2)	40.5 (39.0; 42.1)		
≥1 and <2years	17.2 (16.4; 18.1)	17.3 (16.5; 18.1)	21.6 (20.1; 23.1)	22.0 (20.7; 23.3)		
≥2 years	39.7 (38.7; 40.8)	37.8 (36.8; 38.9)	40.0 (51.1; 56.7)	37.5 (36.0; 39.1)		
Symptom duration, % (95% CI)	-	-	-	-		
≤4 weeks					6.1 (5.1; 7.3)	7.8 (6.4; 9.3)
>4 weeks and ≤1 year					35.0 (32.8; 37.3)	33.3 (30.9; 35.9)
>1 year					58.9 (56.6; 61.2)	58.9 (56.3; 61.5)
Pain intensity, mean (95% CI)	48.1 (47.5; 48.6)	47.6 (47.1; 48.2)	47.8 (46.9; 48.6)	48.9 (48.1; 49.7)	5.5 (5.4; 5.6)	5.5 (5.3; 5.6)
K/HOOS-12 function, mean (95% CI)	56.8 (56.4; 57.3)	57.9 (57.4; 58.3)	59.2 (58.5; 60.0)	59.0 (58.4; 59.8)	-	-
ODI, mean (95% CI)	-	-	-	-	25.6 (25.0; 26.2)	23.9 (23.2; 24.5)

Enrolled pre-pandemic (before 01 March 2020); Enrolled mid-pandemic (after 01 March 2020). Pain intensity is measured by the Visual Analogue Scale (0 best – 100 worst) in the Knee and Hip OA cohorts, and by the Numeric Rating Scale (0 best – 10 worst) in the Back cohort. KOOS-12 function = Knee injury and Osteoarthritis Outcome Score 12-item short-form function subscale (0 worst – 100 best). HOOS-12 function = Hip disability and Osteoarthritis Outcome Score 12 item short-form function subscale (0 worst – 100 best). ODI = Oswestry Disability Index (0 best – 100 worst).

Table 2. GLA:D® program outcomes

	Pre-pandemic				Pandemic mid-lockdown				Pandemic post-lockdown		
	n	Mean (95% CI)	Change from baseline (95% CI)	Effect size	n	Mean (95% CI)	Change from baseline (95% CI)	Effect size	n	Mean (95% CI)	Change from baseline (95% CI)	Effect size
Knee OA cohort	2853				817				2435			
Pain intensity												
Baseline		46.8 (46.0;47.7)	-	-		47.1 (45.6; 48.7)	-	-		46.9 (46.0; 47.8)	-	-
3m		33.1 (32.3; 34.0)	-13.7 (-14.6; -12.8)	0.63		34.5 (32.9; 36.0)	-12.7 (-14.4; -11.0)	0.56		33.0 (32.1; 33.9)	-13.9 (-14.8; -13.0)	0.63
12m		32.4 (31.5; 33.2)	-14.5 (-15.5; -13.5)	0.66		32.0 (30.4; 33.7)	-15.1 (-16.9; -13.3)	0.67		33.1 (32.1; 34.1)	-13.8 (-14.8; -12.7)	0.63
KOOS-12 function												
Baseline		57.6 (57.0; 58.3)	-	-		59.4 (58.2; 60.7)	-	-		58.7 (58.0; 59.5)	-	-
3m		67.0 (66.3; 67.7)	9.3 (8.7; 10.0)	0.51		67.5 (66.3; 68.8)	8.1 (6.9; 9.3)	0.44		67.9 (67.2; 68.7)	9.2 (8.5; 9.9)	0.49
12m		69.1 (68.4; 69.8)	11.5 (10.8; 12.2)	0.63		69.9 (68.5; 71.2)	10.4 (9.1; 11.8)	0.57		67.9 (67.1; 68.7)	9.2 (8.4; 9.9)	0.49
Hip OA cohort	1060				354				1179			
Pain intensity												
Baseline		46.4 (45.1; 47.7)	-	-	-	46.4 (44.1; 48.7)	-	-		48.0 (46.8; 49.2)	-	
3m		36.5 (35.1; 37.9)	-9.9 (-11.3; -8.5)	0.47		40.0 (37.4; 42.5)	-6.4 (-8.9; -3.9)	0.29		36.5 (35.2; 37.9)	-11.5 (-12.9; -10.1)	0.54
12m		34.3 (32.9; 35.8)	-12.0 (-13.7; -10.4)	0.57		31.9 (29.3; 34.5)	-14.5 (-17.5; -11.4)	0.66		33.1 (31.7; 34.6)	-14.9 (-16.5; -13.3)	0.70
HOOS-12 function												
Baseline		60.4 (59.2; 61.6)	-	-	-	61.9 (59.8; 64.0)	-	-		60.6 (59.5; 61.7)	-	
3m		67.3 (66.0; 68.5)	6.9 (5.8; 7.9)	0.36		65.9 (63.7; 68.1)	4.0 (2.0; 6.0)	0.20		68.6 (67.4; 69.7)	7.9 (6.9; 8.9)	0.42
12 m		69.9 (68.6; 71.1)	9.5 (8.1; 10.8)	0.49		72.5 (70.2; 74.7)	10.6 (8.1; 13.1)	0.54		69.9 (68.6; 71.1)	9.3 (8.0; 10.5)	0.49
Back cohort	660				134				404			
Pain intensity												
Baseline		5.3 (5.1; 5.4)	-	-		5.0 (4.7; 5.5)	-	-		5.1 (4.9; 5.3)	-	-
3m		3.6 (3.4; 3.7)	-1.8 (-1.9; -1.6)	0.76		3.9 (3.5; 4.3)	-1.2 (-1.6; -0.8)	0.51		3.7 (3.5; 3.9)	-1.4 (-1.6; -1.2)	0.61
6m		3.8 (3.6; 4.0)	-1.5 (-1.7; -1.3)	0.67		4.0 (3.6; 4.5)	-1.0 (-1.5; -0.6)	0.44		3.9 (3.7; 4.1)	-1.2 (-1.5; -1.0)	0.53
12m		3.9 (3.7; 4.0)	-1.5 (-1.7; -1.3)	0.63		3.8 (3.3; 4.2)	-1.3 (-1.7; -0.9)	0.56		3.8 (3.5; 4.0)	-1.3 (-1.6; 1.1)	0.59
ODI												
Baseline		24.4 (23.4; 25.3)	-	-		24.3 (22.3; 26.2)	-	-		22.3 (21.2; 23.5)	-	-
3m		17.9 (17.0; 18.9)	-6.5 (-7.2; -5.7)	0.52		19.2 (17.0; 21.3)	-5.1 (-6.8; -3.4)	0.44		17.8 (16.6; 19.0)	-4.4 (-5.3; -3.5)	0.37
6m		18.4 (17.4; 19.4)	- 5.9 (-6.7; -5.1)	0.47		18.8 (16.6; 21.1)	-5.4 (-7.2; -3.6)	0.47		17.7 (16.5; 19.0)	-4.4 (-5.3; -3.4)	0.37
12m		18.6 (17.6; 19.7)	-5.7 (-6.5; -4.8)	0.45		18.2 (16.0; 20.4)	-6.2 (-8.2; -4.2)	0.54		17.2 (15.9; 18.4)	-5.0 (-6.0; -4.1)	0.42

Pre-pandemic (enrolment and 3 month measurement before 11th of March 2020); Mid-pandemic mid-lockdown (3 month measurement after 1th of March 2020 and enrolment before 1st of June 2020); Mid-pandemic post-lockdown (enrolment after 1st of June 2020 and 3 month measurement before 31 March 2022). Outcomes in each cohort are collected at baseline, 3 months, and 12 months, plus at 6 months in the Back cohort. Pain intensity is measured by the Visual Analogue Scale (0 best – 100 worst) in the Knee and Hip OA cohorts, and by the Numeric Rating Scale (0 best – 0 worst) in the Back cohort. KOOS-12 function = Knee injury and Osteoarthritis Outcome Score 12-item short-form function subscale (0 worst – 100 best). HOOS-12 function = Hip disability and Osteoarthritis Outcome Score 12 item short-form function subscale (0 worst – 100 best). ODI = Oswestry Disability Index (0 best – 100 worst).

Table 3. GLA:D® program adherence

	Pre-pandemic		Pandemic mid-lockdown		Pandemic post-lockdown	
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)
Knee OA cohort	2890		550		2698	
Exercise sessions completed						
>12 sessions	43.5	(41.7; 45.4)	38.7	(34.6; 43.0)	36.8	(35.0; 38.6)
10-12 sessions	38.0	(36.2; 39.8)	35.6	(31.6; 39.8)	39.4	(37.6; 41.3)
7-9 sessions	10.9	(9.8; 12.1)	12.6	(9.9; 15.6)	13.2	(11.9; 14.5)
1-6 sessions	5.6	(4.8; 6.5)	7.8	(5.7; 10.4)	7.0	(6.1; 8.1)
Did not attend	2.0	(1.5; 2.6)	5.3	(3.6; 7.5)	3.6	(2.9; 4.4)
Patient education sessions completed						
Theory session 1	84.8	(83.4; 86.1)	84.2	(80.9; 87.1)	81.1	(79.5; 82.5)
Theory session 2	80.4	(78.9; 81.8)	78.0	(74.3; 81.4)	77.4	(75.8; 79.0)
Hip OA cohort	1070		229		1311	
Exercise sessions completed						
>12 sessions	44.2	(41.2; 47.2)	38.0	(31.7; 44.6)	35.8	(33.2; 38.4)
10-12 sessions	40.9	(38.0; 44.0)	41.5	(35.0; 48.2)	42.0	(39.3; 44.7)
7-9 sessions	9.2	(7.5; 11.1)	9.2	(5.8; 13.7)	12.3	(10.6; 14.2)
1-6 sessions	3.6	(2.6; 5.0)	6.1	(3.4; 10.0)	6.1	(4.9; 7.5)
Did not attend	2.0	(1.3; 3.1)	5.2	(2.7; 9.0)	3.9	(2.9; 5.1)
Patient education sessions completed						
Theory session 1	86.6	(84.5; 88.6)	80.4	(74.6; 85.3)	81.4	(79.1; 83.4)
Theory session 2	83.0	(80.6; 85.2)	75.6	(69.5; 81.0)	77.1	(74.7; 79.3)
Back cohort	981		211		742	
Exercise sessions completed						
>15 sessions	34.1	(31.1; 37.1)	17.1	(12.3; 22.8)	37.1	(33.6; 40.7)
11-15 sessions	43.6	(40.5; 46.8)	37.4	(30.9; 44.4)	39.8	(36.2; 43.4)
6-10 sessions	17.7	(15.4; 20.3)	32.7	(26.4; 39.5)	16.9	(14.2; 19.7)
1-5 sessions	4.6	(3.4; 6.1)	12.8	(8.6; 18.1)	6.3	(4.7; 8.3)
Patient education sessions completed						
1 session	27.0	(24.2; 30.0)	25.3	(19.4; 31.8)	25.9	(22.6; 29.3)
2 sessions	44.6	(41.4; 47.9)	50.5	(43.4; 57.6)	50.2	(46.3; 54.0)
3 or more sessions	28.3	(25.4; 31.4)	24.3	(19.4; 31.8)	24.0	(20.8; 27.4)

The GLA:D® Hip and Knee program consists of two education sessions and 12 exercise sessions. Completion of education and exercise sessions are collected separately. The GLA:D® Back program consists of two education sessions in addition to education sessions during the exercise sessions and 16 exercise sessions.

Discussion and conclusion

Discussion

We found little to no evidence that the COVID-19 pandemic impacted the profiles of patients enrolled in GLA:D® Knee/Hip OA or GLA:D® Back, but did find some evidence that short-term pain and function outcomes in patients with hip OA and short-term pain outcomes in patients with back pain may be slightly worse in those enrolled during the lockdown phase of the pandemic. The observed differences were relatively small in magnitude and disappeared at 12-month follow-up. It may be that slightly worsened outcomes were due to worse program adherence during the lockdown phase, especially observed in the GLA:D® Back program, but other pandemic and lockdown-related factors may also explain these differences.

The findings presented in this report are a preliminary description of the key baseline characteristics and outcomes in the GLA:D® programs. We did not assess all available baseline characteristics or outcomes, meaning there may be differences in other data, such as comorbidities. Likewise, we did not perform detailed statistical analyses on the included data, meaning complex relationships between baseline characteristics, outcomes, and the COVID-19 enrolment periods may have been missed. Therefore, we recommend that any future analyses of GLA:D® registry data use the findings of this report to inform the need for a more robust analysis of the impact of the COVID-19 pandemic on key data for the analysis of interest and to aid decisions on whether to include patients attending the GLA:D® programs during the COVID-19 pandemic. For example, sensitivity analyses excluding patients enrolled during the COVID-19 periods could help to increase confidence in future study findings.

Conclusion

Overall, no differences in baseline patient profiles related to the COVID-19 pandemic were observed in any of the GLA:D® programs and only a small impact was found on some key short-term treatment outcomes and program attendance. Future studies using data from the GLA:D® registries should consider the need to perform more detailed analyses to assess the impact of the COVID-19 periods on specific research objectives.