Adoption, sustainability, and reach of GLA:D® Back - a structured patient education and exercise program for people with back pain. An observational implementation study.

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Abstract

Background: Interactive training of clinicians and support to sustain new activities show promise for implementation of guideline adherent care for musculoskeletal conditions. However, there is very sparse evidence regarding the extent to which new activities are sustained. This study investigated the adoption and sustained use over three years of a structured group-based patient education and exercise intervention for back pain, "GLA:D Back", after clinicians participated in an interactive training course. Further it investigated how many patients were reached, the reasons why eligible patients were not enrolled, and if the patient population enrolled changed over time.

Methods: Primary care physiotherapists and chiropractors were trained during 2018 - 2021 in the delivery of GLA:D Back. Patients were then enrolled in a clinical registry and completed surveys to capture individual characteristics and measures related to their back pain. Clinicians completed surveys 4 months after training about eligible participants not enrolled. Adoption was described as the number of patients enrolled per month after training and per calendar month; patient characteristics were described per 2-months periods after enrolment began in each clinic.

Results: Clinicians from 185/334 (55%) clinics attending the training courses adopted the program. Enrolment numbers topped 4 months after training and then gradually declined coincident with the COVID19 pandemic. Seasonal variation showed reduced activity around summer and Christmas time. Clinicians estimated that less than 50% of eligible patients chose to participate, mainly due to prize and time. A total of 3,626 patients were enrolled with no substantial change in patient profiles over time.

Conclusions: A structured intervention for back pain was adopted by around half of primary care clinical sites following a 2-days course, but implementation was not sustained over three years, which could partly be explained by the COVID-19 pandemic. Reach was negatively affected by price and logistics of participation, illustrating the importance of organization and system factors in making evidence-based care accessible.

Background

For scientific evidence to translate into altered clinical practice it needs to be available in a format that is useful and addresses both the needs of the involved stakeholders and the barriers of specific settings. [1] In back pain, single interventions aimed to facilitate implementation of recommendations from evidence-based guidelines are largely unsuccessful, and there is also considerable uncertainty about whether multifaceted implementation strategies are indeed effective in changing clinician behavior [2-4]. However, recent evidence suggests that the use of a mix of interactive education meetings or workshops combined with on-site activities such as monitoring procedures and performance over a period can lead to sustained implementation [5, 6].

The "GLA:D Back" program was developed to support implementation of patient education and supervised exercises for people with recurrent or persistent back pain based on recommendations in clinical guidelines[7-9]. GLA:D Back is a structured group-based intervention that was developed for use in primary care settings in collaboration with patients and clinicians from private physiotherapist and chiropractic clinics. The core elements of the implementation strategy are courses for clinicians consisting of general information about back pain and educating in delivering the GLA:D Back intervention. After having completed the course, participants have access to educational materials and exercise programs as well as promotional materials to launch the program in their community [10]. The content of the courses and the supporting material was informed by the Theoretical Domains Framework to support clinicians' capability, motivation, and opportunity for delivering the intervention [11].

From the onset in 2018, the GLA:D Back courses were in high demand with approximately 600 clinicians, representing more than 10% of physiotherapist in private clinics in Denmark, attending a course. Within three months, 28% of the clinics adopted the program and started patient enrollment [12]. Facilitators and barriers for implementations included the extent to which clinicians' attitudes to back pain care aligned with the program content as well as organizational factors related to the clinical settings and the health care system generally [13].

Sustained implementation of a new activity in clinical practice is different from initial adoption, and mechanisms behind sustained implementation are poorly understood. [14] For example we do not know the time span from implementation strategies are initiated to adoption begins, to which extent new activities are sustained in daily practice, the proportion of eligible patients reached, and if the patient population that is first offered a new intervention differs from the patient population when the program has become implemented as an integrated part of clinical practice. Such knowledge about the dynamic adoption of care programs over time will inform timing of initiatives that might increase adoption and support sustained implementation, and it will help define study populations and "wash-out" periods for studying patient-level effects of implementation initiatives. The objective of this paper is to describe the adoption, reach, and sustained use over three years of GLA:D Back among clinicians trained in delivering the program. Further, to investigate reasons why patients who are considered candidates for the program were not enrolled. Lastly, to describe changes over time in the patient population enrolled in GLA:D Back.

Methods

This is an observational study based on the GLA:D Back registry [10]. Adoption of the program was investigated from the time point when a health care provider from a clinic participated in a GLA:D Back course (first course March 2018) until end of March 2021. During this time clinical practice was affected by the COVID-19 pandemic, which then became part of the context for the implementation of GLA:D Back. The reporting of this study was guided by The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement (Appendix 1).

The GLA:D Back program and a protocol for the evaluation of the program has been described in detail previously [8, 10].

Setting

GLA:D Back is a non-profit implementation initiative from University of Southern Denmark where courses are offered to clinicians who are licensed to provide treatment for people with back pain. Participating clinicians are mainly physiotherapists from private clinics, but also chiropractors and clinicians from municipality rehabilitation units have participated. There are approximately

5,500 physiotherapists and 700 chiropractors working in private practices in Denmark. Most patients are referred to physiotherapists from general practitioners, whereas patients seeing chiropractors mainly self-refer.

The GLA:D Back intervention

The GLA:D Back intervention consists of 2 individual sessions with physical testing and goal setting and a structured group-based program consisting of 2 1-hour sessions of patient education and 8 weeks of twice weekly supervised exercises. When a patient is enrolled in the program, the clinician informs the patient that data collection is an integrated part of the program and generates a record in the GLA:D Back registry. As part of the registration, participants are asked if they consent to data being used for research. Clinicians are encouraged to form closed groups to facilitate group dynamics where participants learn from each other's' experiences, but a rolling uptake with patients entering an ongoing course as they come to the clinics is also an option.

The prize for participation is decided by the clinics individually and amounts to approximately 2,500 DKK (330 Euro), of which up to 40% is reimbursed if the clinic is part of the contract with the Danish universal health insurance. For details about the intervention development and content please refer to [8].

Implementation strategy

The main element of the implementation strategy was a 2-day (14 hours) interactive course that combined lectures and workshops [10]. Prior to the course, clinicians received reading materials and had access to videos about the theoretical underpinning of the program. After the course they were provided with PowerPoint slides including a manuscript and a patient pamphlet to support their delivery of patient education. They also had access to exercise programs to be printed to patients, and posters where key messages from the intervention could be displayed in the clinics. In addition, they got access to the clinical registry, their clinic was listed as a "GLA:D Back Unit" at the GLA:D Back website [8], and they received newsletters with updates and reminders regarding procedures and outcomes of the program (6 newsletters and three annual reports 2018 – 2020) [10]. As part the implementation strategy, the GLA:D Back program was promoted in professional journals, seminars, and via social media [12].

Participating clinics, clinicians, and patients

Participating clinics were private physiotherapy and chiropractic practices and municipality rehabilitation units from which one or more clinicians participated in one of 13 GLA:D Back courses conducted between March 2018 and March 2020, and where at least one clinician opted in for a user profile in the GLA:D Back registry. Because of the COVID-19 pandemic, courses planned for after March 2020 were cancelled. Clinics starting the program as part of the pilot study conducted in 2017 were not included in this study [15].

Patients enrolled through included clinics and consenting to their data being used for research constituted the patient population. To be candidates for GLA:D Back, patients should be aged 18 or older, report persistent or recurrent back pain, and have a need for improved self-management. There were no strictly defined inclusion criteria, and the decision about participation was based on a dialogue between the patient and clinician.

Data collection

Data was collected electronically using REDCap hosted by the Open Patient data Explorative Network [16], and obtained from four sources: 1) Forms completed by clinicians as part of the course registration, 2) clinician completed surveys right after the course and 4 months later, 3) individual patient data registered by the clinicians at enrolment, and 4) patient reported data collected at pre-determined intervals by emailing a survey link to the patient.

Variables

Information about the clinic (name and address) was obtained from the course registration and used to link clinicians to clinics. Further clinicians were asked about type of clinical setting (physiotherapy, chiropractic, mixed, or municipality), and if the clinic offered the GLA:D Knee/Hip program that was launched in Denmark in 2013 [17]. Clinics were registered as GLA:D Back clinics from the date when the first clinician from the clinic attended a GLA:D Back course (referred to as clinic start date).

The survey completed right after the course asked if clinicians wanted a user profile in the register as needed to start offering the program.

Clinician surveys 4 months after the course inquired about the proportion of potential GLA:D Back participants enrolled ("How many of the patients you have suggested to participate in GLA:D Back do you reckon have decided to enroll?" (<25%; 25-50%; app. 50%; 50-75%; >75%; Has not suggested it yet)) and reasons for not wanting to participate ("What are the most common reasons why patients do not want to participate? Please indicate all relevant options" (Price; Time; Too comprehensive for their problem; Do not want supervised exercises; Do not want patient education; Other)).

Patient-level information registered by clinicians included results of four physical performance tests (forward bending, abdominal muscle endurance, extensor muscle endurance, and sit-to-stand) (Table 1).

Patient reported data at inclusion included information about demographics, work situation, STarT Back risk profile, previous LBP history, comorbidities, illness perceptions, perceived physical fitness, fear of movement, self-efficacy, pain intensity, activity limitation, and quality of life (Table 1).

Analyses

Descriptive characteristics of clinics were presented as means with standard deviations (SD) and proportions (%).

Adoption of GLA:D Back over time

The number of clinics enrolling patients was described as numbers per calendar month from April 2018 to March 2021 (seasonal variation), and as numbers per month since the clinic start date (adoption pattern after clinician training). The total number of patients enrolled was described the same way and both were illustrated in time series graphs. Number of patients enrolled on average per clinic per month was illustrated in a time series graph with the date of the clinics first patient registration defining time zero.

The time until clinics could potentially form groups was estimated as number of days (medians with 10 – 90th percentiles) from the clinic start date until the last patient record was created in the registry in the first 60-days' time slot of patient enrollment.

To investigate the potential for forming group-based sessions with participants starting at the same time (rather than a rolling uptake), we describe the prevalence of at least 4 patients being enrolled within a 60-days period in a clinic.

Reasons why patients were not enrolled

Clinicians' reporting of patients not accepting an invitation to be enrolled in GLA:D Back and reasons why were described as proportions of clinicians choosing each response option.

Patient population description

The baseline characteristics of the patient population was described as means with standard deviations (SD) for continuous and ordinal scales, and as proportions for categorical variables. Change in patient profiles over time was examined by plotting means with 95% confidence intervals (CI) (continuous and ordinal scales) and stacked bar charts (categorical variables) across 60 days' time periods since the clinic's enrollment of the first patient in the registry.

Analyses were performed with STATA (StataCorp LLC, Texas, US).

Table 1. Patient level variables collected

Construct	Instrument
Work situation	Job type (Ordinary job or study; Retired; Flexjob / light duties; Early retirement; Unemployed; Other)
Risk profile	The START Back screening tool (low risk, medium risk, high risk)[18]
LBP history	Pain duration (0-2 weeks; 2-4 weeks; 4-12 weeks; 3-12 months; >1 year) Time since beginning treatment for the current LBP problem (<1, 1-2, 2-4, > 4 weeks) Number of visits to GP, physiotherapist, chiropractor, or other health care provider for LBP within the last month (1, 2-5, 6-10, >10)
Illness perceptions	The Brief Illness Perceptions Questionnaire; sum score 8 items (0-80). Higher scores indicating more negative perceptions [19, 20]
Physical back performance*	Standing forward bending (normal mobility pain free; restricted pain free; normal mobility with pain; restricted with pain) [21] The Ito back extensor endurance test (seconds (0-180)) [22, 23] Trunk flexor endurance test (seconds (0 – 120)) [23, 24] Sit-to-stand test (number of stands for 30 seconds)[25]
Perceived physical fitness	Self-assessed physical capacity (0-10; 5 = average for my sex and age) [26] Freedom in movement (How unhindered and naturally do you move?) added to original scale
Fear of movement	Fear Avoidance Beliefs Questionnaire, physical activity (0-24) [27, 28]
Self-efficacy	The Arthritis Self-efficacy Scale (subscales pain (1-10) + other symptoms (1-10)) [29]
Pain	Pain intensity: Numeric Rating Scale 0-10 for LBP and leg pain [30] Pain medication: Any medication for LBP (y/n), prescribed medication for LBP (y/n)
Disability	Oswestry Disability Index 0 - 100 (0 = No disability to 100 = bed bound) 0 -20 = Minimal; 21 – 40 = Moderate; 41 – 60 = Severe; 61 – 80 = Crippling; 81 -100 = Bed bound [31, 32]
Quality of life	SF-36 general health (5-point scale from poor to excellent)[33]
Work ability	Work ability index (Current work ability compared with lifetime best; 0 = Unable to work 10 = work ability at its best) Number of days with LBP related sick leave within last 3 months (0 – 90)

*Clinician reported

Results

Participating clinics and clinicians

A total of 597 (94%) of 638 participating clinicians from 334 clinical units opted in for a user profile after the course, and 185/334 (55%) units enrolled at least one patient in the program. Most clinical units were physiotherapy clinics and most offered the GLA:D program for knee and hip pain when starting GLA:D Back. Interdisciplinary clinics with chiropractors and physiotherapists working together enrolled the largest number of patients per clinic (Table 2).

Table 2. Characteristics of clinics adopting GLA:D Back (n = 185) and number of patients enrolled

Number of patients enrolled per clinic, mean (SD)	20 (22)	
Number of clinicians per clinic, mean (range)	2.0 (1-6)	
Clinical Setting	No. of sites	Mean (sd) no. of patients
Municipality	6	17 (9)
Physiotherapy	158	19 (22)
Chiropractic	16	20 (24)
Combined physiotherapy + chiropractic	5	45 (26)
Offer GLA:D Knee/Hip, %		
Yes	77%	
No	14%	
Missing	9%	

Adoption of GLA:D Back over time

Clinics adopting the program enrolled on average 19.6 patients during the study period (Table 2).

The total numbers enrolled in the program per calendar month were below 50 for 4 months after the first GLA:D Back course was initiated, and first exceeded 100 patients in the fifth month. Low activity was revealed in July (Danish summer holidays) and December each year, and generally lower activity was observed after February 2020 than the preceding years (concurrent with COVID19 restrictions) (Figure 1).

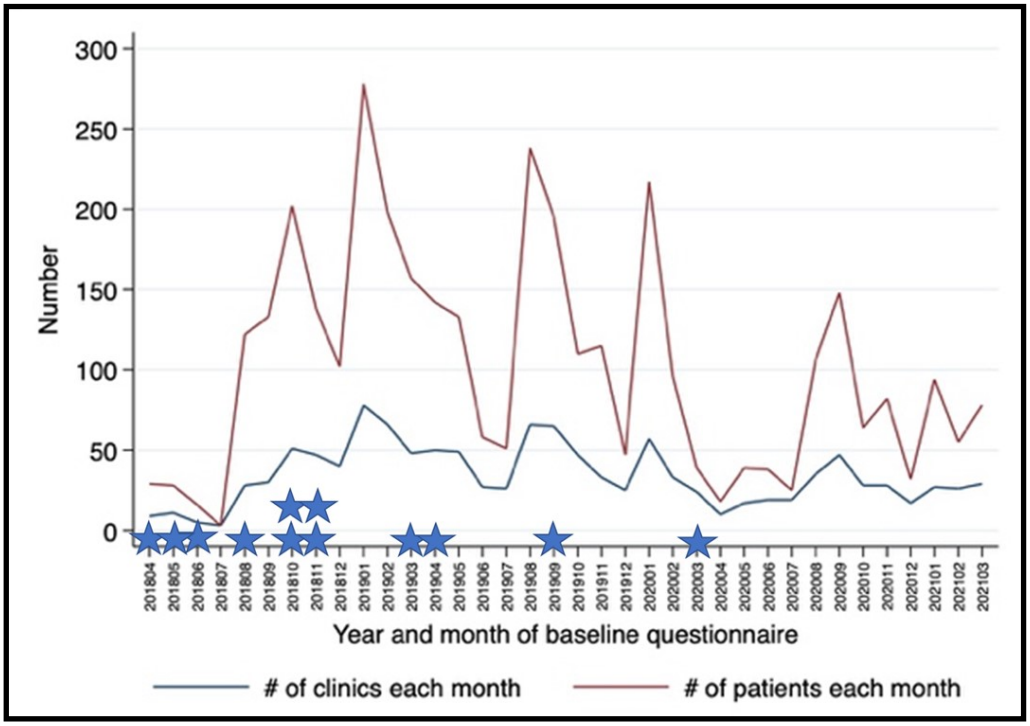

Figure 1. Number of clinics and patients in the GLA:D Back program per month after the first clinician training course. Star = Clinician course

Within clinics, the time from the first clinician was trained to a group could be formed was median 127 (95% CI 106 – 141) days with some clinics starting enrollment more than one year after the first clinician training (Figure 2). Enrolment of patients peaked four months after the clinics enrolled the first patient, when 88 clinics enrolled at least one patient and a total of 300 patients were enrolled. This was followed by a decline in uptake, which paralleled a decline in the number of active clinics (Figure 3). The average number of patients per clinic enrolling any patients was two to three during most of the study period (Figure 4).

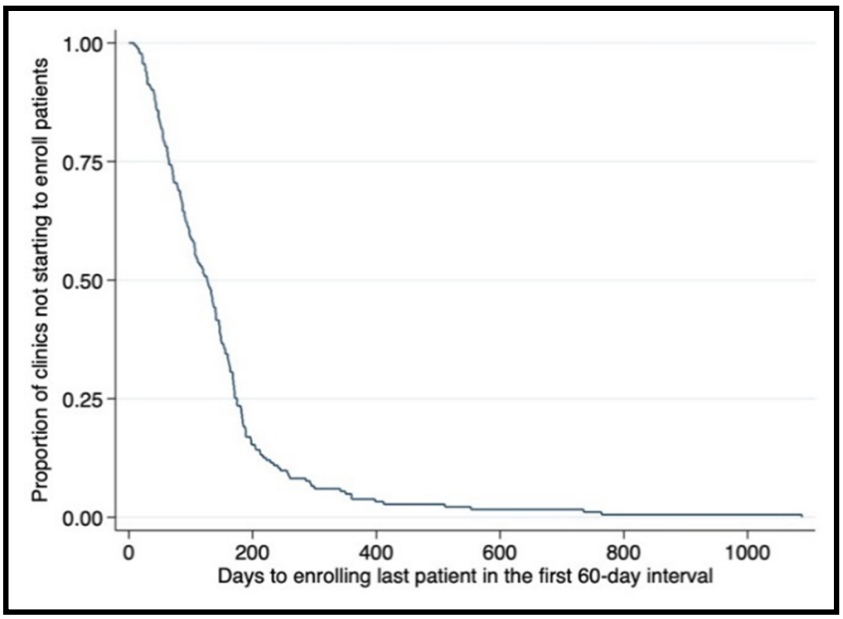

Figure 2 Kaplan-Meier curve of the time from course participation to groups could be formed. Time to enrollment is time to enrollment of the last patient in the clinics first 60-days period with any activity.

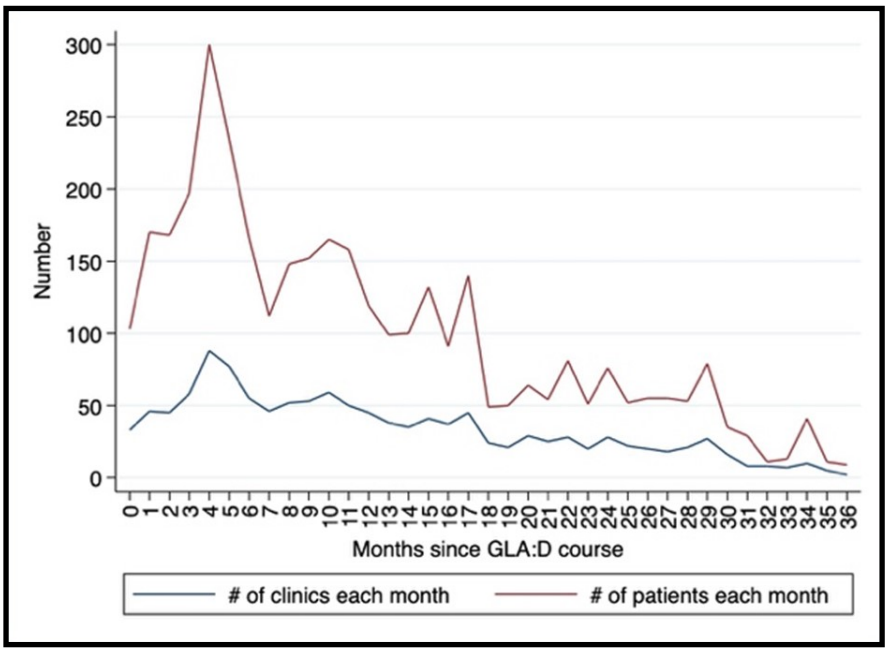

Figure 3. Number of patients enrolled per month in GLA:D Back and number of clinics enrolling patients from the clinic's enrollment of the first patient.

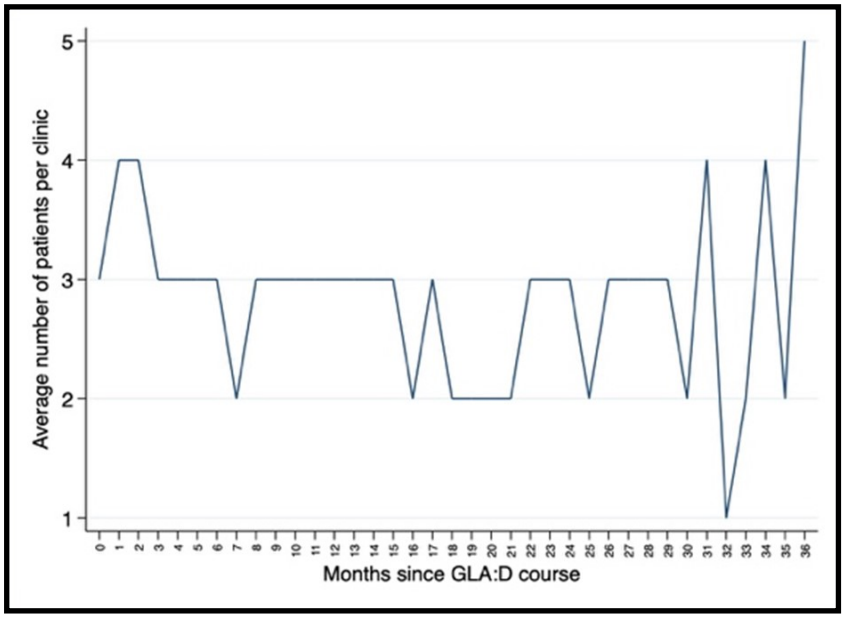

Figure 4. Average number of patients per clinic enrolled in each month from the clinic's enrollment of the first patient.

Out of the 185 clinics, 142 clinics (77%) enrolled 4 patients or more within a 60-day period on at least one occasion, 46 clinics did this once during the three-year period, and 9 clinics enrolled at least 4 patients 10 or more times during the three year study period (Figure 5).

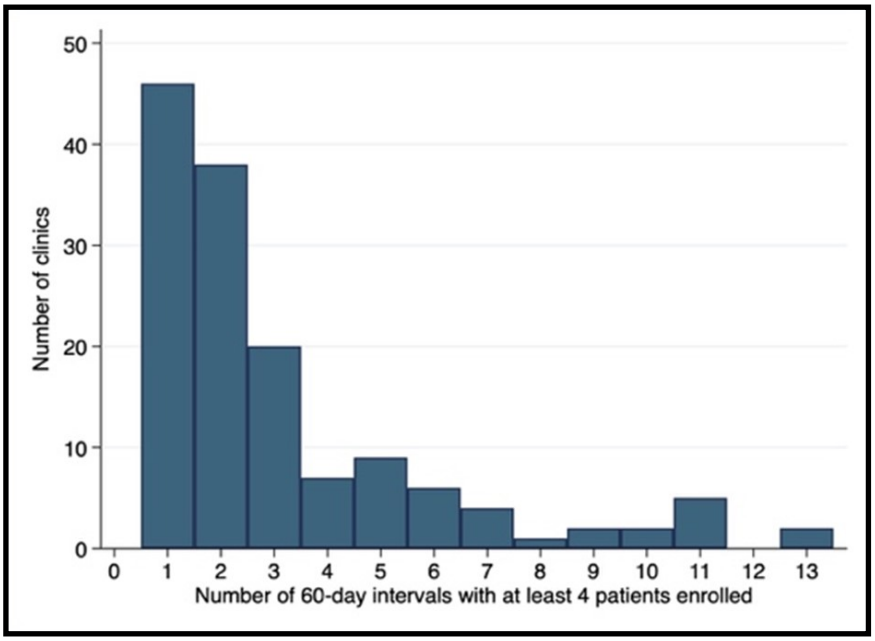

Figure 5. Frequency of enrolling at least 4 patients within a 60-day period (proxy for being able to conduct group-based sessions). Only clinics enrolling 4 patients on at least one occasion are included (n = 142).

Reasons why patients were not enrolled

Most clinicians reported that 50% or less of invited patients had decided to participate in GLA:D Back. Main reasons for not wanting to participate were time and price, and around one third found the program too comprehensive for their problem (Table 3).

Patient population description

The patient sample (n = 3,626) consisted of 67% females, mean age 58 years. Most reported LBP for more than a year, had on average severe pain related disability, and many (71%) had treatment for more than 4 weeks prior to entering the program. Self-assessed physical fitness was slightly below what participant considered average for their age (see Table 4 for other sample characteristics).

Table 3. Clinicians' reporting of approximate proportion of invited people accepting the program and reasons why not accepting. n = 219 (**59% of clinicians in clinics adopting the program)**

	n (%)
Proportion of invited patients deciding to participate	
<25%	38 (17%)
25-50%	39 (18%)
app. 50%	49 (22%)
50-75%	42 (19%)
>75%	44 (20%)
Have not suggested it yet	7 (3%)
Most common reasons why patients did not want to participate	
Price	112 (51%)
Time	121 (55%)
Too comprehensive for their problem	69 (32%)
Do not want supervised exercises	14 (6%)
Do not want patient education	16 (7%)
Other	39 (18%)

Patient characteristics did not change systematically over time on a group level from the clinics began enrolment to end of study period but estimates at the end of the study period were uncertain due to low numbers (Figures 6 – 7). Individual scores varied substantially on all parameters in all time periods (Appendix 2).

Table 4. Baseline characteristics of the patient sample (n = 3,626)

Baseline Characteristics	**Mean (SD) / Proportion**
Age (years), Mean (SD)	58.4 (13.1)
Sex (% females)	67.3%
Education, %	
No qualifying	14.5%
Vocational training	26.6%
Higher education 2-4 years	42.9%
Higher education > 4 years	10.9%
Other	5.1%
Job type, %	
Ordinary job or study	47.8%
Retired	31.9%
Flexjob / light duties	5.1%
Early retirement	4.4%
Unemployed	3.4%
Other	7.4%
Body Mass Index, Mean (SD)	27.6 (5.3)
Back pain intensity (NRS 0-10), Mean (SD)	5.4 (2.3)
Leg pain intensity (NRS 0 -10), Mean (SD)	3.3 (2.8)
Disability (ODI 0-100), Mean (SD)	45.2 (12.6)
Risk profile (STarT Back Tool), %	
Low	46.4%
Medium	28.8%
High	24.9%
Pain duration, %	
0 - 4 weeks	6.1%
4 – 12 weeks	11.7%
3 – 12 months	22.6%
> 12 months	59.7%
Time since treatment began, %	
<1 week	9.3%
1 -2 weeks	8.2%
2 – 4 weeks	11.2%
> 4 weeks	71.3%
Number of health care visits last month, %	
1	32.0%
2-5	50.8%
6-10	11.1%
>10	6.1%
Pain medication (yes/no), %	57.9%
General Health (SF-36), %	
Excellent	1.8%
Very good	22.0%
Good	46.0%
Fair	27.5%
Poor	2.7%
Illness Perceptions (IPQ 0-80), Mean (SD)	42.6 (11.3)
Self-efficacy pain symptoms (ASES 1-10), Mean (SD)	6.7 (1.9)
SD = Standard Deviation; NRS = Numeric Rating Scale; ODI = Oswestry Disability Index; IPQ = Illness Perceptions Questionnaire; ASES = Arthritis Self-Efficacy Scale;	

Table 4. Baseline characteristics of the patient sample (n = 3,626) (continued)

Baseline Characteristics	Mean (SD) / Proportion
Self-efficacy other symptoms (ASES 1-10), Mean (SD)	6.5 (1.8)
Fear avoidance physical activity (FABQ 0 – 24), Mean (SD)	9.4 (5.5)
Work ability (WAI 0-10), Mean (SD)	6.2 (2.4)
Number of days with sick leave last months (0-90), Mean (SD)	6.2 (16.7)
Self-assessed physical capacity (0-10), Mean (SD) Aerob fitness Strength Endurance Flexibility Balance Freedom in movement	 4.3 (1.8) 4.4 (1.9) 4.1 (1.9) 4.1 (2.1) 4.3 (2.1) 4.6 (1.9)
Abdominal endurance test (seconds 0 – 120), Mean (SD)	53.5 (36.0)
Extensor endurance test (seconds 0 – 180), Mean (SD)	87.1 (60.2)
Sit-to-stand test (no. of repetitions), Mean (SD)	12.2 (3.9)
SD = Standard Deviation; NRS = Numeric Rating Scale; ODI = Oswestry Disability Index; IPQ = Illness Perceptions Questionnaire; ASES = Arthritis Self-Efficacy Scale;	

Discussion

This study evaluated the adoption of a structured intervention for LBP into Danish routine primary care over a three-year period. The implementation strategy was based on interactive face-to-face interactive clinician courses, which were attended by approximately 10% of private practice physiotherapists and chiropractors in Denmark. Half of the clinics taking part in the courses adopted the GLA:D Back program and started patient enrollment on average 4 months after the training. The number of patients enrolled in the program increased for 4-5 months whereafter it declined gradually. Whether this was because clinicians stopped offering the program, stopped entering patients into the clinical registry, or the patients did non consent is not known. Patient enrolment was lower during 2020 than the preceding years, which was at least partly a result of COVID-19 restrictions. Clinician estimated that less than 50% of eligible patients wanted the intervention, with prize and time being main reasons for not wanting to participate. The profiles of those enrolled did not change over time.

We did not pre-define a success-criteria for the adoption of the program as there was little and highly varied experience to build on but we consider 50% of clinics adopting a new intervention highly satisfactory. For example, in a large-scale roll out of a group-based cognitive behavioural approach for patients with LBP, 17% of participating National Health Service (NHS) trusts in UK implemented the program after online training of clinicians [34]. On a smaller scale, seven out of 13 trained clinicians implemented a 6-weeks group-based self-management intervention for osteoarthritis and LBP after online training [35]. Other studies to investigate implementation strategies have mainly evaluated effects on clinicians' believes, attitudes, and clinical reasoning based on surveys and vignettes [5].

Interestingly, some clinics started offering the program more than one year after course participation. Thus, continued support to ensure that clinicians do not forget the training while preparing for implementation in clinical practice might be needed. This aligns well with results reported by Mesner et al who systematically reviewed papers from 14 studies dealing with implementation of interventions aiming to improve the management of LBP. They concluded that the most successful implementation interventions used sustained strategies with repeated reminders or other activities [6]. In the GLA:D Back program, initiatives to support sustained implementation included providing slides with a manuscript for patients education, exercise programs, and posters to help integrate patients education in exercise sessions, which was followed by newsletters, annual reports, and PR-materials to help the clinics promote the program. [8]

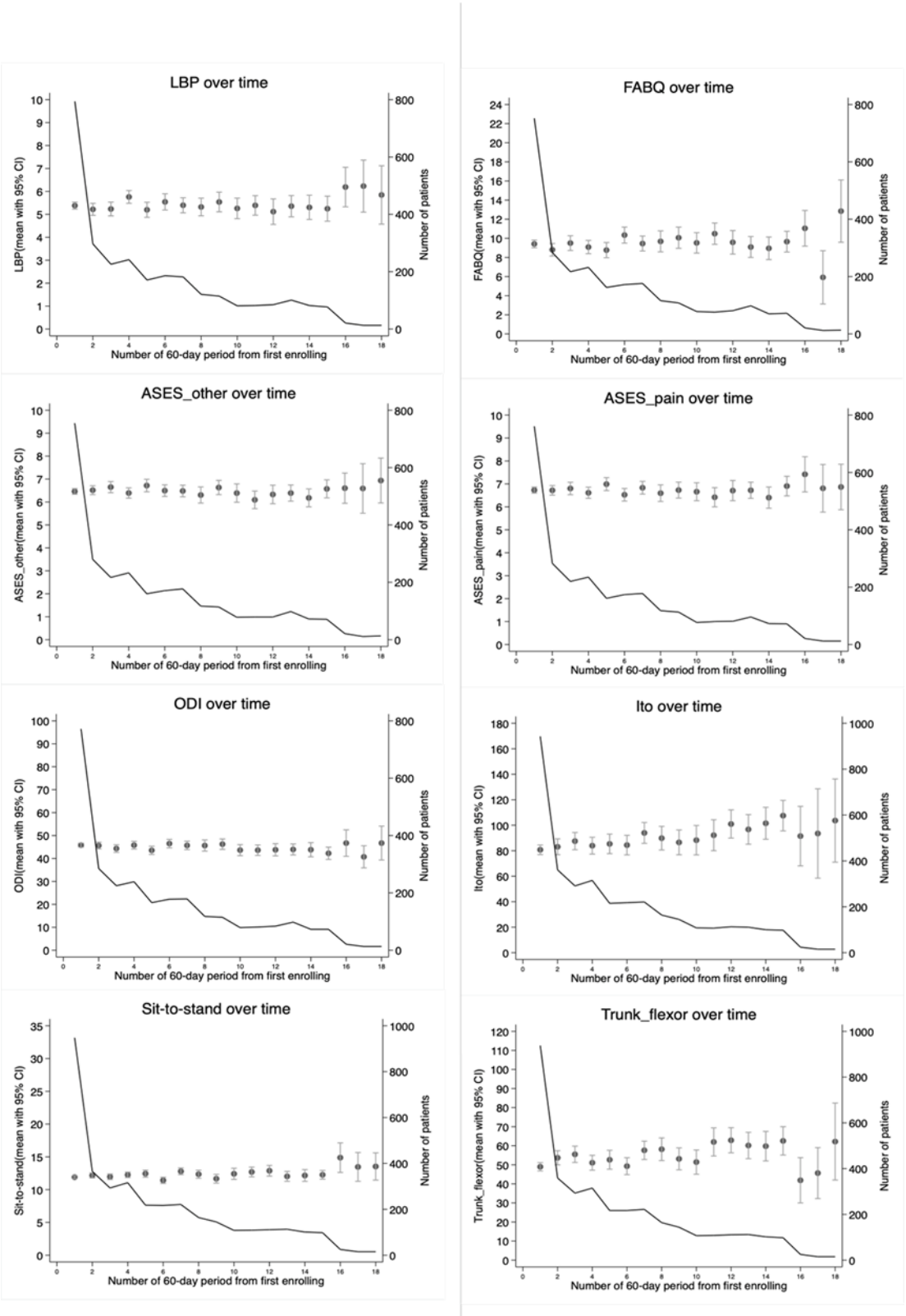

Figure 6. Baseline characteristics of enrolled patients (means with SD for continuous measures) and number of patients within 60-days' periods after clinics' enrolment of the first patient (solid line)
LBP: low back pain; FABQ: fear avoidance beliefs questionnaire; ASES: arthritis self-efficacy scale; ODI: Oswestry disability index; Ito: Ito back extensor endurance test; CI: confidence interval

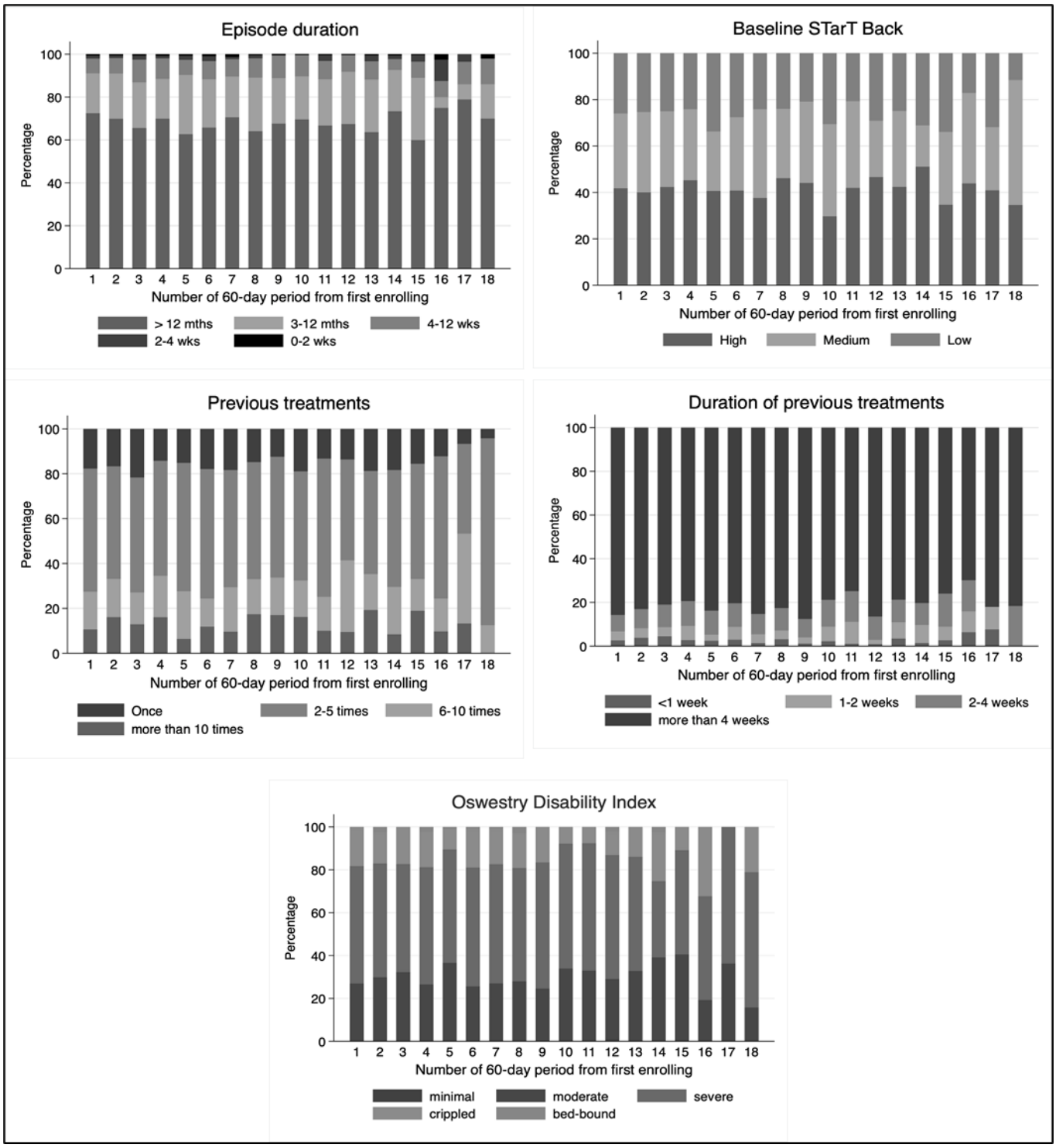

Figure 7. Baseline characteristics of enrolled patients within 60-days' periods after clinics' enrolment of the first patient (categorical measures).

Still, sustainability proved to be very challenging with decreasing patient enrollment and decreasing number of active clinics during the study period. It is unknown to what extent this was due to COVID19, but restrictions, which during some months did not allow for group-based interventions, clearly affected adoption. In a previous study, we asked clinicians who never initiated GLA:D Back for reasons why, and they ascribed it to economical and organizational factors, as well as to the intervention not being aligned with their views and attitudes. [13] Whether not continuing to offer the program in the clinic after having adopted it happens for the same reasons is unknown.

GLA:D Back reached less than half of the target population, according to clinicians. Price and logistics were identified as barriers for participation, which illustrates the need to not only consider individual patient and clinician determinants of implementation but also organization and the outer setting including reimbursement structures [36, 37]. In the interpretation of these findings, it should be recognized as a limitation that reasons for non-participation were based on clinicians' recall of main reasons during a 4-months period. Interestingly, clinics where physiotherapists and chiropractors practice together enrolled more patients than monoprofessional clinics, which may indicate that clinical organization has an impact on adoption. Importantly, a low reach may be unproblematic if other evidence-based options were available in the clinics. We know that some clinics had well implemented pre-existing group-based exercise interventions for patients with LBP, but a previous study indicated that clinicians adopting GLA:D Back valued the patient education part as an important supplement to the existing offers in the clinic. [13].

The low number of patients enrolled per clinic, on average 2-3 patients per month, indicates that group-based delivery was a challenge. There are several possible reasons for this finding. In some clinics, patients have the initial individual consultation and are entered in the registry as they are identified as candidates for GLA:D Back, and then wait until the clinic has enough patients for a group, which means that the enrolment date did not match the date when a patient started the intervention. Other clinics were unable to form closed groups and have a rolling uptake with an ongoing program that patients enter and leave as they are ready. Although not intended, it is also possible that some clinics use GLA:D Back as an individual rather than a group-based program or they form groups without entering data on all participants in the register. The main limitation of the study was that we were not able to closely monitor this large-scale data collection that took place as part of routine clinical practice. Thus, it is unknown to what extent patient records in the clinical registry represent all or just some patients participating in GLA:D Back. However, the annual patterns of enrollment (low rates around summer vacation and Christmas) and the marked reduction in registrations coinciding with COVID-19 provides support to the validity of data.

The profile of patients enrolled did not change over time suggesting that clinics did not enroll an existing pool of patients when they began offering the program, who had another profile than those later considered candidates. This implies that the entire cohort can be used for future studies without excluding patients from the initial phase.

The study investigated implementation of one specific intervention in a Danish primary care setting and findings may not be generalizable to other situations. However, similar implementation initiatives should prepare for the situation where clinicians may adopt new activities quite long time after training, and the study stressed the importance of following adoption over time to be able to address sustainability.

Conclusion

Around half of physiotherapy and chiropractic clinical sites adopted a structured program of patient education and supervised exercises following a 2-days course, but many did not continue using the program during a period of three years. This was partly due to the COVID-19 pandemic, and efforts are needed to boost initiatives that were started but not fully integrated prior to the pandemic. According to the clinicians, reach was limited to less than half of the patient target group and it appeared difficult to achieve sufficient volume of patients in the clinics to deliver a group-based intervention. Reach was negatively affected by price and logistics, illustrating the importance of organization and system factors for making evidence-based care accessible. The decreasing number of patients during the study period did not result in a shift towards enrolling patients with another profile than first invited. In summary, adoption of GLA:D Back was successful among clinicians but not

Declarations

Ethics approval and consent to participate

The data collection was approved by the Danish Data Protection Agency (DPA) as part of the University of Southern Denmark's institutional authorisation (DPA no. 2015–57-0008 SDU no. 17/30591). The Regional Committees on Health Research Ethics for Southern Denmark decided that the study did not need ethical approval (file number S-20172000-93). Participating clinicians and patients provided consent that their data can be used for research purposes.

Consent for publication

The manuscript does not include any individual person's data.

Availability of data and materials

Data is available from the corresponding author in reasonable request.

Competing interests

The authors declare the following in relation to potential competing interests: AK, IR, PK, and JH are co-developers of GLA:D Back, which is a non-profit initiative, the researchers do not have any personal financial benefits from working with the project. AK's position at the University of Southern Denmark is financially supported by the Foundation for Chiropractic Research and Postgraduate Education, and IR's position is supported by income from the GLA:D Back clinician courses. GLA:D® is a non-profit initiative hosted at the University of Southern Denmark and the GLA:D® trademark is property of the University of Southern Denmark. The GLA:D initiative is developed in close collaboration with the SDU Research & Innovation Organisation, including legal reviews.

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Authors' contributions

AK, IR, PK, and JH developed the GLA:D Back intervention and the implementation strategy. AK, IR, EB, PK, and JH all contributed to study design. EB conducted the analyses. AK outlined the first draft of the manuscript. AK, IR, EB, PK, and JH all contributed to the manuscript and approved the final version.

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