

Original Article

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# The effects of the extended physiotherapy examination scheme for patients with low-back pain

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## ABSTRACT

**INTRODUCTION:** The extended physiotherapy examination scheme (EES) was developed to assist general practitioners in their assessment of patients with complex low-back pain (LBP). The aim was to compare LBP patients in the EES and patients in current physiotherapy practice (CP) with respect to characteristics, healthcare utilisation and sick leave.

**METHODS:** Data from three cohorts were included, one covering the EES and two covering CP for LBP patients in Danish primary care physiotherapy. Baseline questionnaire data were collected, and 78-week follow-up was conducted in Danish registries. Patients were stratified according to their risk profile by the STarT Back Tool, and regression analyses were used to analyse healthcare utilisation and sick leave.

**RESULTS:** A total of 746 patients in the EES and 361 in CP were included. Patients in the EES had sick leave more often and were characterised by a longer pain duration and more disability than CP patients. The probability of contact to secondary care was doubled among patients in the EES with a high-risk profile and patients in the EES showed a trend towards a higher degree of sick leave.

**CONCLUSIONS:** LBP patients in the EES are more burdened than patients in CP. Consequently, for some subgroups in the EES, a higher referral rate and more sick leave were detected. These findings may be the result of vague referral criteria, lack of appropriate screening tools or inadequate monitoring of the EES.

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**TRIAL REGISTRATION:** not relevant.

In 1999, the Danish Healthcare authorities published a health technology assessment (HTA) report on back pain [1]. The HTA, in line with clinical guidelines, recommends early intervention for patients with low-back pain (LBP) in primary care to prevent chronicity [2]. The intervention should focus on active treatment strategies, the favourable prognosis of LBP and advice about returning to normal activities [2]. It also recommends that LBP patients are, to a large extent, managed and treated in primary care, and the treatment pathway often includes primary care physiotherapy evaluation and treatment. We know that patients with LBP account for approximately 10% of all contacts to general practitioners (GP) in Denmark [3]. Furthermore, Danish GPs refer almost 500,000 patients for primary care musculoskeletal physiotherapy annually [4] – around 30% of these

contacts are related to LBP which is equivalent to 150,000 patients [5]. Hence, the group of patients with LBP in primary care is large; and although many patients benefit from the general guideline recommendations, a group of LBP patients are in need of more extensive examination and treatment.

This has triggered the development of an extended LBP examination scheme in Danish primary care physiotherapy practice. The extended examination scheme (EES) is more comprehensive than a normal LBP examination and consists of a thorough initial one-hour examination and up to three optional follow-up consultations with specially trained physiotherapists. The EES serves several purposes. Firstly, to assist the GP in the clinical assessment of complex LBP patients, thereby enabling the GP to make an informed decision on an appropriate treatment strategy and/or further referral. Secondly, the EES meets the recommendations for early intervention in LBP patients in primary care, which is thought to prevent development of chronicity and maintain patients' labour market attachment [2]. Thirdly, the EES aims to give patients an individual clarification and understanding of their situation and provide them with tools for self-management.

The contents of the EES was updated in 2011 [6] to include screening for bio-psycho-social risk factors alongside other relevant patient-reported outcome measures [7-9], and the EES was included in the regional recommendations on LBP management in the Central Denmark Region [10] and the Region of Southern Denmark [11] in 2012. The updated EES has never been formally evaluated, and it is therefore unknown to which extent the right patients are referred to the scheme and how healthcare utilisation and sick leave differ between patients in the EES compared with patients undergoing ordinary physiotherapy treatment.

Therefore, the aim of the present study was to compare LBP patients referred to the extended scheme and patients receiving current practice (CP) in Danish primary care physiotherapy with respect to their characteristics, healthcare utilisation and sick leave.

## METHODS

### Study design and population

This was a prospective register-based cohort study. Patients were included from three separate cohorts; one covering the EES and two covering CP for LBP patients in Danish primary care physiotherapy.

#### *Extended LBP scheme*

Patients over 18 years of age who had been referred from the GP to the extended scheme from 1/1-2016 to 30/6-2017 in the Region of Southern Denmark and the Central Denmark Region. Information on all patients referred for the EES was entered into the electronic database FysDB. The physiotherapist is to report recommendations back to the GP (through EDI-FACT) within 14 days from the initial examination. This recommendation may include no further action, a course of treatment in primary care (physiotherapist or chiropractor) or referral for secondary care specialist evaluation.

#### *Current practice*

Patients were included from two separate studies; a project on monitoring of physiotherapy practice [12] and the control group from a randomised controlled trial receiving standard physiotherapy care [13]. Further information about these two cohorts is provided elsewhere [12, 13]. Both studies were conducted in the Region of Southern Denmark and the Central Denmark Region in the period from 1/1-2016 to 30/6-2017. The included patients were over 18 years of age and were referred from the GP to physiotherapy treatment due to LBP. CP varies significantly between practises but most often consists of an initial examination and a combination of exercise therapy and manual therapy.

All participants signed an informed consent form before entering in the respective cohorts. Under Danish law, this study did not require ethics approval (Act on Research Ethics Review of Health Research Projects, October 2013).

## Questionnaire and clinical data

All questionnaire and clinical data were collected electronically using the same approach in the three included cohorts. Patients who agreed to participate were asked to complete a baseline questionnaire 1-2 days prior to their first physiotherapy consultation. The questionnaire included items on gender, age, occupational status, duration of pain, radiating pain and also validated scales such as the STarT Back Screening Tool (SBT) [8], pain intensity, the Roland Morris Questionnaire [7], the Örebro Musculoskeletal Pain Screening Questionnaire [14] and the WHO-5 Well-Being Scale [9].

## Outcome

Outcomes were 1) primary and secondary healthcare utilisation obtained from the Danish National Health Service Register (NHSR) and the National Patient Register (NPR) and 2) sick leave (sickness benefits) obtained from the Danish Register for Evaluation of Marginalisation (DREAM). Within 78 weeks of the patients' first contact with a physiotherapist (in EES or CP), we extracted all records from consultations with primary care GPs, private rheumatologists or orthopaedic surgeons, chiropractors and physiotherapists and all secondary healthcare contacts with relevant diagnoses within the International Classification of Diseases, tenth edition (ICD-10) Chapter XIII: Diseases of the musculoskeletal system and connective tissue, subclassification Dorsopathies (M40-M54) and operations related to the back (ICD-10 code KNA). For the same period, we extracted data from DREAM on weekly sickness benefits as well as information on withdrawal from the labour market because of retirement or disability pension.

## Analysis

The flow of participants was presented graphically, and characteristics were presented with descriptive statistics. Differences between patients in the EES and CP were analysed using t-test, Wilcoxon rank sum or chi-squared test. Logistic regression was used to analyse differences in secondary care contacts between patients in the EES and CP. The median number of days (interquartile range (IQR)) from the first contact with a physiotherapist until a diagnosis in secondary care was estimated and the likelihood of one or more secondary healthcare contacts was analysed using generalised linear regression models with application of pseudo-values. All regression analyses were adjusted for gender, age, socioeconomic position (based on longest education (divided into short (less than three years)/long from the Danish Education Registries) and equivalised household income (from the Danish Registries on Personal Income and Transfer Payments)), duration of pain (below/above three months) and regional affiliation. Due to interaction between the STarT sub-group categories, all analyses were stratified into low-, medium- and high-risk estimates with 95% confidence intervals (CI). A sensitivity analysis was performed excluding patients from the EES if the physiotherapist had recommended referral for secondary care evaluation at the first consultation. The median (IQR) number of weeks in the follow-up period in which the patients received sickness benefits was estimated. Negative binomial regression was used to analyse differences in weeks on sickness benefits between the groups. Patients on permanent social benefits (retired or disability pension) were excluded from the analysis (n = 274).

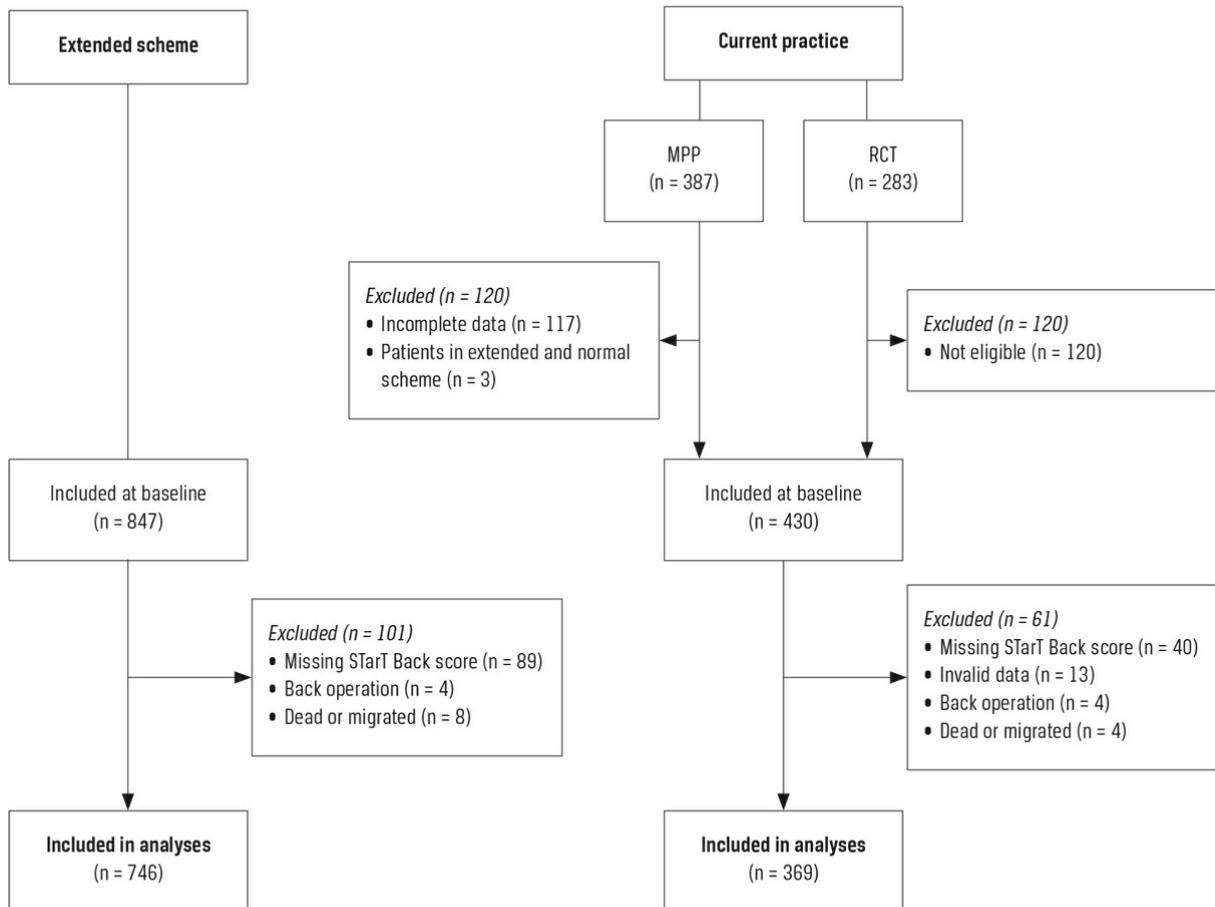
*Trial registration:* not relevant.

## RESULTS

The flow of participants is presented in **Figure 1**. A total of 746 patients from the EES and 369 from CP were

included in the analysis. Excluded CP patients with a missing STarT score (n = 40) were older and more often female than excluded EES patients (n = 89).

**FIGURE 1** / Flow of the participants through the study.



MPP = monitoring physiotherapy practise, RCT = randomised controlled trial.

Patients from the EES were more likely to have had sick leave during the past month or to be in the high-risk STarT Back category, have a pain duration exceeding three months, radiating pain and a higher degree of disability (Table 1). Missing values comprised less than 1% for all included variables.

**TABLE 1 /** Patient characteristics.

	Extended scheme (N = 746)	Current practice (N = 369)	p-value
Age, yrs, mean (± SD)	48 (± 15)	47 (± 16)	0.14
Females, n (%)	403 (54)	201 (55)	0.89
<i>Length of education, n (%)</i>			0.003
Short	526 (71)	229 (63)	
Long	212 (29)	137 (37)	
<i>Occupational status, n (%)</i>			0.086
Employed	397 (53)	210 (57)	
Unemployed	57 (8)	24 (7)	
Retired/early retirement/flex job/disability pension	237 (32)	95 (26)	
Student/on leave	55 (7)	38 (10)	
Equivalised household income, DKK/yr, mean ± SD	248,427 ± 132,591	247,438 ± 144,205	0.91
<i>Regional affiliation, n (%)</i>			< 0.001
Central Denmark Region	240 (32)	182 (49)	
Region of Southern Denmark	506 (68)	187 (51)	
<i>Sick leave, ≥ 1 day the past mo., n (%)<sup>a</sup></i>			0.009
Yes	245 (43)	53 (32)	
No	319 (57)	112 (68)	
<i>STarT Back Tool score, n (%)</i>			< 0.001
Low risk	161 (22)	129 (35)	
Medium risk	217 (29)	109 (29)	
High risk	368 (49)	131 (36)	
<i>Duration of pain, n (%)</i>			< 0.001
≤ 3 mo.s	319 (43)	220 (60)	
> 3 mo.s	427 (57)	149 (40)	
Radiating pain	619 (83)	279 (76)	0.003
<i>Back pain intensity<sup>b</sup>, median (IQR)</i>			
With radiation	7 (5-8)	7 (5-8)	0.21
Without radiation	5 (3-7)	5 (4-7)	0.14
<i>Disability<sup>c</sup>, median (IQR)</i>	14 (9-17)	12 (8-17)	0.003
<i>Fear avoidance<sup>d</sup>, median (IQR)</i>	13 (8-17)	12 (9-16)	0.25
<i>Psychological well-being<sup>e</sup>, median (IQR)</i>	52 (32-68)	52 (36-68)	0.50

IQR = interquartile range; SD = standard deviation.

a) Does not include patients from the randomised controlled trial, retired patients or patients on leave.

b) Numeric Rating Scale, score 0-10.

c) Roland Morris Questionnaire, score 0-23.

d) Örebro Musculoskeletal Pain Screening Questionnaire, score 0-20.

e) WHO-5 Well-Being Scale, score 0-100.

Within 78 weeks, patients in the EES had a median of four (IQR: 3-9) contacts to a physiotherapist and seven (IQR: 4-11) contacts to a GP. Patients in CP had a median of four (IQR: 2-9) contacts to a physiotherapist and six (IQR: 3-9) contacts to a GP (data not shown). Merely 4% of the patients had a contact to a chiropractor or rheumatologist or orthopaedic surgeon, with no differences between patients in the EES and CP.

A total of 220 patients (20%) had contact to secondary care, among whom 171 patients (23%) were from the EES and 49 patients (13%) from CP.

Patients from the EES in the high-risk category had twice as high a probability of contact with secondary care as patients in CP (Table 2). A similar difference was not observed for the low- or medium-risk groups.

**TABLE 2 /** Contact to secondary care, median number of days until contact and probability of contact over time for patients in the extended scheme and current practice.

STarT category	Extended scheme		Current practice		OR		RR	
	n (%)	days, median (IQR)	n (%)	days, median (IQR)	unadjusted	adjusted (95% CI)	unadjusted	adjusted (95% CI)
<i>Contact to secondary care</i>								
Low risk, (n = 290)	19 (11)		9 (7)		1.78	1.57 (0.68-3.68) <sup>a</sup>		
Medium risk, (n = 326)	41 (19)		18 (17)		1.18	1.15 (0.60-2.23) <sup>b</sup>		
High risk, (n = 499)	111 (30)		22 (16)		2.14	1.99 (1.18-3.38) <sup>b</sup>		
<i>Time until contact + probability of contact over time</i>								
Low risk, (n = 290)		130 (64-253)		157 (88-487)			1.69	1.83 (0.68-4.97) <sup>a</sup>
Medium risk, (n = 326)		77 (53-179)		219 (48-319)			1.14	1.23 (0.52-2.93) <sup>b</sup>
High risk, (n = 499)		94 (49-169)		75 (30-191)			1.80	1.81 (1.12-2.93) <sup>b</sup>

CI = confidence interval; IQR = interquartile range; OR = odds ratio; RR = risk ratio.

a) Adjusted for gender, age, duration of pain and regional affiliation.

b) Adjusted for gender, age, duration of pain, socioeconomic position and regional affiliation.

In the sensitivity analysis, excluding patients from the EES if the physiotherapist had recommended referral did not change the result. There was a clear trend towards a higher degree of sickness benefits among patients in the EES (Table 3).

**TABLE 3 /** Weeks on sickness benefits.

STarT-category	Extended scheme, n (%)	Current practice, n (%)	IRR	
			unadjusted	adjusted (95% CI)
<i>Low risk (n = 222)</i>			1.21	1.56 (0.50-4.89) <sup>a</sup>
0 wks	82 (71)	83 (78)		
1-3 wks	8 (7)	8 (8)		
3-12 wks	15 (13)	6 (6)		
12-78 wks	11 (9)	9 (8)		
<i>Medium risk (n = 249)</i>			2.30	2.75 (1.07-7.08) <sup>b</sup>
0 wks	105 (64)	62 (74)		
1-3 wks	10 (6)	5 (6)		
3-12 wks	15 (9)	10 (12)		
12-78 wks	35 (21)	7 (8)		
<i>High risk (n = 370)</i>			1.28	1.17 (0.59-2.31) <sup>b</sup>
0 wks	159 (59)	62 (63)		
1-3 wks	20 (7)	7 (7)		
3-12 wks	27 (10)	12 (12)		
12-78 wks	65 (24)	18 (18)		

CI = confidence Interval, IRR = incidence rate ratio

a) Adjusted for gender, age, duration of pain and regional affiliation.

b) Adjusted for gender, age, duration of pain, socioeconomic position and regional affiliation.

## DISCUSSION

This study compared patients in the EES and CP with respect to characteristics, healthcare utilisation and sick leave. Overall, patients in the EES were more often at risk of chronicity, had sick leave, a longer pain duration and a higher degree of disability. There were no differences in primary healthcare utilisation between the groups, but the probability of contact with secondary care was doubled for patients in the group of high-risk

patients in the EES compared to those in CP. Also, a trend towards a higher degree of sick leave was detected among patients in the EES.

## Strengths and limitations

The study was based on three separate cohorts which we believe to be comparable, because patients from all three cohorts were included in the same time period, came from the same geographical area and we used comparable methods for data collection and validated scales. Also, we stratified the patients into risk profiles when comparing the EES and CP. It should be noted that this resulted in a lower number of cases – especially in the low-risk categories which resulted in wider CIs and therefore lowered our trust in these estimates. There may also be some differences in the recruitment of patients as some were recruited at the GP [13], whereas others were recruited at the physiotherapist [12]. Furthermore, the number of non-participants in the project on monitoring of physiotherapy practice was relatively large, which may have resulted in selection problems. This would not be associated with the outcomes and therefore not cause any selection bias. It remains unknown how many patients referred to the EES were not registered in the FysDB database. However, we expect this number to be small, because the database is a vital part of the EES and the physiotherapist receive an extra fee for the first consultation. Furthermore, because our follow-up data were completely register-based with 100% follow-up, no attrition bias was present. Misclassifications in the NHR are thought to be minimal because there is an economic incentive to register consultations correctly, i.e. reimbursement depends on these registrations. Such economic incentive does not exist for the NPR, and misclassifications of diagnosis are likely to occur in this registry. The DREAM registry is valid when measuring sick leave exceeding three weeks. Unfortunately, short-term sick leave is not registered, and we would expect a high degree of short-term sick leave in this population. DREAM contains any public transfer payment, and misclassifications in this registry are unlikely. However, any misclassifications in the mentioned registries would be non-differentiated resulting in bias towards no association. Although we used validated scales in the questionnaires, misclassifications could still occur and cause bias towards no association. Furthermore, the study has a societal perspective as it only relies on registry data during follow-up. It would be interesting to include patient-reported outcome measures in future studies.

## Interpretation

The patient characteristics for the CP sample are similar to previously published patient profiles in Danish primary care physiotherapy [5, 15]. It therefore seems that the group of patients referred to the EES is more burdened. This supports the original intent of the EES and suggests that the right patients are referred. Unfortunately, it remains unclear what the criteria for referral should be. For now, the criteria are partially based on the SBT risk profiles, meaning that only medium- and high-risk patients should be referred. However, the patient characteristics in the EES suggest that 22% are in the low-risk category. It remains unclear whether this means that the wrong patients are referred or that SBT is not appropriate as a screening tool for the EES. Further studies into who should be referred and how referral should be managed are warranted. The EES remains a decentralised treatment offer for one of the largest groups of patients in primary care. Patients and GPs report very high satisfaction rates with the EES [16, 17] and a thorough revision of the EES would be beneficial to ensure that it follows the newest available standards.

## CONCLUSIONS

LBP patients referred for the EES are more burdened than patients in CP. Also, for some subgroups, referral to the EES may be associated with a higher degree of healthcare utilisation and sick leave. These findings may be rooted in relative vague referral criteria, a lack of appropriate screening tools or inadequate monitoring of this primary care initiative.

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