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Welfare benefit utilization for people with functional somatic disorder. A population-based cohort study

Marie Weinreich Petersen [a,b,*], Kaare Bro Wellnitz [a,b], Tina Birgitte Wisbech Carstensen [a,b], Thomas Meinertz Dantoft [c], Eva Ørnbøl [a,b], Anne Ahrendt Bjerregaard [c], Torben Jørgensen [c,d], Per Fink [a,b]

[a] Clinic for Functional Disorders, Aarhus University Hospital, Aarhus, Denmark
[b] Department of Clinical Medicine, University of Aarhus, Aarhus, Denmark
[c] Center for Clinical Research and Prevention, Bispebjerg/Frederiksberg Hospital, Capital Region, Denmark
[d] Department of Public Health, Faculty of Medical Sciences, Copenhagen University, Denmark

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ABSTRACT

Clinical studies indicate that functional somatic disorder (FSD), a condition characterized by persistent physical symptoms not attributable to other physical or mental conditions, imposes a high socioeconomic burden, but high-quality studies on its impact on welfare benefit utilization in the general population are lacking. This study investigated the use of sickness benefit, unemployment benefit, and disability pension for individuals with FSD using nationwide Danish registers.

This study included 9656 adults from the DanFunD study. FSD were identified via self-reported questionnaires and diagnostic interviews. Data on welfare benefits were sourced from The Danish Register for Evaluation of Marginalization, counting the mean number of weeks per year over 10 years before and 4 years after the DanFunD study. Analyses used sex- and age-adjusted regression with non-parametric bootstrap resampling (10,000 repetitions).

Compared to those without FSD, individuals with FSD received an annual average of 3.9 (95 % CI: 3.3–4.4) more weeks of sickness benefit, 1.3 (95 % CI: 1.0–1.6) more weeks of unemployment benefit, and 3.8 (95 % CI: 3.2–4.5) more weeks of disability pension in the 10 years before DanFunD. This pattern persisted in the 4 years after DanFunD and for those diagnosed by interviews. Individuals with questionnaire-defined FSD had higher welfare benefit use than individuals with other severe physical diseases.

Individuals with FSD use welfare benefits significantly more than those without FSD and those with other severe physical diseases. This study highlights FSD as a disabling condition with a substantial individual and societal impact, emphasizing the need for timely diagnosis and treatment.

Trial registration: ClinicalTrials.gov Identifier: NCT05611606

1. Background

Functional somatic disorder (FSD) is a common condition characterized by patterns of multiple persistent physical symptoms that cannot be better explained by other physical or mental conditions. The diagnosis can be established by a characteristic symptom pattern and considering relevant differential diagnoses [1]. The unifying diagnostic construct of bodily distress syndrome (BDS) may be used to operationalize the FSD diagnosis [2]. A range of other terms are also used for FSD such as irritable bowel, chronic widespread pain, chronic fatigue, and other functional somatic syndromes [1–3]. The disorders are debilitating for the affected patients who present with poor physical and mental health, lower social status, and poor labor market association [4–6].

A Danish primary care study has shown that patients with FSD have more days of sick leave and a higher frequency of newly awarded disability pension compared with patients with non-functional medical conditions [4]. Likewise, a Danish study including patients with a neck distortion after a whiplash trauma (in the chronic stage named whiplash-associated disorder; a functional somatic syndrome diagnosis)

* Corresponding author at: Clinic for Functional Disorders, Aarhus University Hospital, Palle Juul-Jensens Boulevard 11, 8200 Aarhus N, Denmark.
E-mail address: mawept@rm.dk (M.W. Petersen).

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showed that patients had a weaker attachment to the labour market 1 year after their whiplash trauma than a control group from the general population matched on sex, age, and municipality [5]. Other clinical studies have shown increased indirect health care costs in terms of productivity reduction, early retirement, and acute sickness absence in patients with FSD [6,7]. A study in the Norwegian working population revealed that receiving a diagnosis of fibromyalgia predicted ending up on disability pension 5 years later for workers with sickness absences lasting 8 weeks or more [8].

Despite their valuable contribution to the knowledge about FSD, these studies may be prone to selection bias due to their inclusion of selective samples. Studies examining the utilization of welfare benefits by individuals with FSD within the general population rather than solely in clinical samples are thus necessary for providing more accurate estimates of the societal impact of FSD.

Denmark and the other Nordic countries have a long tradition of registry-based research. A significant advancement in this field was the introduction of the personal registration number (CPR number) in Denmark in 1968 [9]. The CPR number has enabled individual-level data recording across various registries. Denmark boasts a comprehensive network of population-based registries and databases that routinely collect data from healthcare and labour market administration, among other sources. Compared to many other countries, this unique infrastructure has significantly enhanced the quality and scope of registry-based research in Denmark.

The objectives of this longitudinal population-based cohort study were to investigate the use of welfare benefits (i.e., sickness benefit, unemployment benefit, and disability pension) for individuals with FSD and compare them with individuals without FSD as well as with individuals with other severe physical diseases such as heart, lung, liver, and kidney diseases.

2. Methods

2.1. Study participants

The present study included data from the Danish Study of Functional Disorders (DanFunD) baseline cohort [10] including participants who had been randomly drawn for inclusion from the Danish Civil Registration system [11]. The exclusion criteria were not born in Denmark, not being a Danish citizen, and pregnancy. DanFunD was approved by the Ethical Committee of the Capital Region (H-3-2011-081, H-3-2012-015), and all participants gave written informed consent.

The DanFunD baseline cohort comprises a total of 9656 (33.7 % of the invited participants) men and women aged 18–76 years born in Denmark and living in the Western part of greater Copenhagen. All participants completed questionnaires about their physical symptoms. A stratified subsample ($n = 2450$) including every tenth participant and all participants with high symptom scores on the DanFunD baseline symptom questionnaires were invited to participate in a diagnostic interview (the Research Interview for Functional somatic Disorders (RIFD)), performed by trained family physicians [12]; 1590 (64.9 %) participants accepted and participated in the interview.

2.2. Functional somatic disorders

For the primary operationalization of FSD, the unifying diagnostic construct of BDS was used [1,13,14]. It divides patients into two subgroups: a single-organ subgroup (i.e. patients with symptoms from one or two of four symptom clusters: cardiopulmonary, gastrointestinal, musculoskeletal, general symptoms/fatigue), and a multi-organ subgroup (i.e. patients with symptoms from at least three of four symptom clusters [16] The diagnostic construct has been validated and confirmed in several clinical and population-based studies and has been shown to encompass a range of functional somatic syndromes such as irritable bowel, chronic widespread pain, and chronic fatigue [15–18].

In this paper, we present data on FSD operationalized as both BDS and three commonly used functional somatic syndrome diagnoses: irritable bowel [21] chronic widespread pain [19,20] and chronic fatigue [21].

2.3. Assessment of functional somatic disorders

People with FSD were identified using the self-reported BDS Checklist [16], including bothersome somatic symptoms experienced in the past 12 months. Additionally, a subsample of participants with a clinical diagnosis of FSD was identified using the RIFD interview conducted by three trained primary care physicians over the telephone to assess whether symptoms were due to FSD or another condition [12].

Irritable bowel was defined using the criteria by Kay and Jørgensen [22]; chronic widespread pain was defined using the American College of Rheumatology [23] and the definition by White et al. ([19]); and chronic fatigue was defined using the definition by Chalder et al. [21]. All of these validated self-reported questionnaires measured bothersome symptoms experienced in the past 12 months.

2.4. Severe physical disease

Individuals with a self-reported severe physical disease was identified with a predefined 22-item list that covered lifetime diagnoses of physical diseases (“Has a doctor ever told you that you have/had…”). Within this list, five severe diagnoses (cancer, myocardial infarction, other heart disease, obstructive pulmonary disease, and stroke) were operationalized as severe physical diseases.

2.5. Welfare benefit register

Data on welfare benefits (i.e. per capita public expenses associated with occupational status and social benefits) were obtained from The Danish Register for Evaluation of Marginalization (DREAM). DREAM is administered by the Danish Ministry of Employment, the Ministry of Social Affairs and Integration, and the Ministry of Children and Education [24], and access to the register requires permission from the Danish Data Protection Agency. The registry contains weekly information on transfer payments for all citizens in Denmark since July 1991.

A welfare payment is registered in DREAM for a week if the individual has received welfare payment for at least 1 day during a week. Only sick leave periods exceeding 2 weeks are included in DREAM as the first 2 weeks are paid by the employer.

2.6. Welfare benefit variables

For this study, welfare benefits were measured as the number of weeks per year over a 10-year period before and a 4-year period after inclusion in DanFunD. Benefits were categorized into 3 groups: 1) Sickness benefit for employed or unemployed citizens currently ill, 2) unemployment benefit for unemployed citizens ready-to-work, and 3) disability pension for those unable to support themselves due to illness. Individuals not receiving any of these benefits were categorized as either self-supporting, receiving on old-age pension, having emigrated, or deceased. Detailed DREAM codes for each category are available in Supplemental Materials.

2.7. Data analysis

Statistical analyses were conducted on the Statistics Denmark server using Stata Statistical Software, version 18 [25]. Separate analyses for each time period (10 years before and 4 years after inclusion in the DanFunD baseline investigation) were performed in order to ensure that both participation in DanFunD and the passage of time did not influence the association with welfare benefits. Descriptive statistics were presented as medians and interquartile ranges (IQRs) for continuous variables. Categorical variables were presented as frequencies with percentages.

In all analyses, we used information about death, emigration, and age as sample weights in order to only include information from participants who were old enough to receive welfare benefit payments (i.e. at least 18 years), alive, and living in Denmark in the study time periods.

To compare the odds of having received at least 1 week of sickness benefit, unemployment benefit, or disability pension, logistic regression analyses were performed with welfare benefit variables as the dichotomous dependent variable and a dichotomous FSD status variable as the primary independent variable. Odds ratio with 95 % CI was used as a measure of association. Non-parametric bootstrap resampling with 10,000 repetitions was performed. Significance was judged from 95 % bootstrapped CI of ORs not overlapping with 1.

To compare the differences of the annual mean number of weeks receiving welfare benefits, linear regression analyses on each of the three main welfare variables (sickness benefit, unemployment benefit, disability pension) were performed with welfare benefit variables as the continuous dependent variable and the dichotomous FSD variables as the primary independent variable. To account for the positive skew and outliers in the welfare variables, non-parametric bootstrap resampling with 10,000 repetitions was performed. Mean differences with percentile-based bootstrapped confidence intervals (CIs) were used as measure of association. Significance was judged from the percentile-based bootstrapped CI of differences not overlapping with 0. Normality of the bootstrapped regression coefficients was checked with QQ-plots.

All the above analyses were adjusted for sex and age with an interaction term between these two variables in order to take account for a possible variation of sex on the effect of age on the dependent variables. Furthermore, age was modelled as natural cubic splines with five knots at the 5th, 27.5th, 50th, 72.5th, and 95th percentiles as recommended by Harrel [26].

3. Results

3.1. Study participants

The median age of the 9656 DanFunD study participants was 54 years (IQR = 44–64). A total of 53.9 % were women and 67.2 % were employed at the time of investigation (Table 1). The median age of the stratified subsample of 1590 participants who participated in the diagnostic research interview was 54 years (IQR = 44–63). A total of 59.3 % were women and 63.5 % were employed at the time of investigation.

At a glance, individuals with FSD had a higher use of welfare benefits than individuals without FSD (Fig. 1).

Table 1
Characteristics of study participants.

	Women N (%)	Age Median (IQR)	Employed N (%)
Questionnaire sample (n = 9656)			
Total	5203 (53.9)	54 (44–64)	6488 (67.2)
Overall FSD (n = 1543)	1041 (67.5)	55 (43–63)	875 (56.7)
Single-organ (n = 1447)	967 (66.8)	55 (47–63)	831 (57.4)
Multi-organ (n = 96)	74 (77.1)	51 (42–58)	44 (45.8)
Irritable bowel (n = 337)	252 (74.8)	50 (40–60)	217 (64.4)
Chronic widespread pain (n = 442)	342 (77.4)	58 (50–65)	217 (49.1)
Chronic fatigue (n = 823)	576 (70.0)	50 (40–59)	503 (61.1)
Interviewed sample (n = 1590)			
Total	942 (59.3)	54 (44–63)	1009 (63.5)
Overall FSD (n = 412)	299 (72.6)	51 (42–59)	243 (59.0)
Single-organ (n = 326)	228 (69.9)	51 (42–60)	196 (60.1)
Multi-organ (n = 86)	71 (82.6)	48.5 (39–57)	47 (54.7)

Abbreviations: FSD, functional somatic disorder; IQR, Interquartile range.

3.2. Welfare benefits for individuals with functional somatic disorder

During the entire time period (10 years before and 4 years after inclusion in DanFunD), individuals with questionnaire-defined FSD (ie, fulfilled criteria for at least one of the following: overall FSD, irritable bowel, chronic widespread pain, chronic fatigue) had significantly higher odds of having received at least 1 week of sickness benefit (OR = 2.60, 95 % CI: 2.34–2.88), unemployment benefit (OR = 1.51, 95 % CI: 1.35–1.69), and disability pension (OR = 8.32, 95 % CI: 6.63–10.45) than individuals without FSD. The same pattern was seen for overall FSD diagnosed with the diagnostic interview where the OR were 2.01 (95 % CI: 1.57–2.57), 1.62 (95 % CI: 1.26–2.08), and 2.54 (95 % CI: 1.73–3.74), respectively.

Regardless of the assessment method and FSD definition, individuals with FSD, irritable bowel, chronic widespread pain, and chronic fatigue received a significantly higher number of weeks on sickness benefit, unemployment benefit, and disability pension than individuals without (Tables 2 and 3). Generally, the FSD multi-organ type had a high use of welfare benefits compared with individuals without FSD: individuals with questionnaire-defined multi-organ FSD received annually 7.1 (95 % CI: 4.8–9.6) more weeks of sickness benefit, 4.0 (95 % CI: 2.1–6.4) more weeks of unemployment benefit, and 8.5 (95 % CI: 5.1–12.3) more weeks of disability pension in the 10-year period before study inclusion (Table 2). Chronic widespread pain also stood out with a higher use of sickness benefit and disability pension; however, with some overlap with chronic fatigue (Table 3).

3.3. Welfare benefits for individuals with functional somatic disorders compared with individuals with a severe physical disease

Individuals with FSD defined with self-reported questionnaires received a higher number of weeks of all three welfare benefits than individuals with severe physical disease (Table 4). The group of individuals with both an FSD and a severe physical disease stood out with a higher use of disability pension compared with individuals with a severe physical disease: They received annually 6.5 (95 % CI: 4.9–8.1) more weeks on disability pension in the 10-year period before study inclusion (Table 4). For individuals with interview-diagnosed FSD, results were less pronounced although the same tendencies were seen. Especially, individuals with FSD *and* a severe physical disease received annually 5.6 (95 % CI: 1.2–10.2) more weeks of disability pension in the 10-year period before study inclusion compared with individuals with a severe physical disease only, and in the 4-year period after study inclusion, the same tendency was found, although not significant (Table 4).

4. Discussion

To our knowledge, this is the first study incorporating data from a randomly sampled general population to examine welfare benefit use in FSD, using national complete register-based data. Our findings indicate a significantly elevated use of welfare benefits in individuals with FSD compared with those without. This trend persisted to a large degree even when compared to individuals with other severe physical diseases. Our findings highlight that FSD imposes a significant economic burden on society through welfare benefit payments. For instance, individuals with the multi-organ type of FSD (identified via questionnaires) receive approximately 9 to 11 more weeks of disability pension per year than those without FSD, resulting in an estimated annual cost difference of 5000–6000 € per individual. However, an estimate of the total societal cost of FSD is beyond the scope of this paper and would preferably be further explored in future research.

The current study underlines that FSD is costly for society in terms of welfare utilization which falls in line with what have been found by previous studies in primary care [4] medical specialized setting [5–7], and selected working populations [8]. One Danish population-based

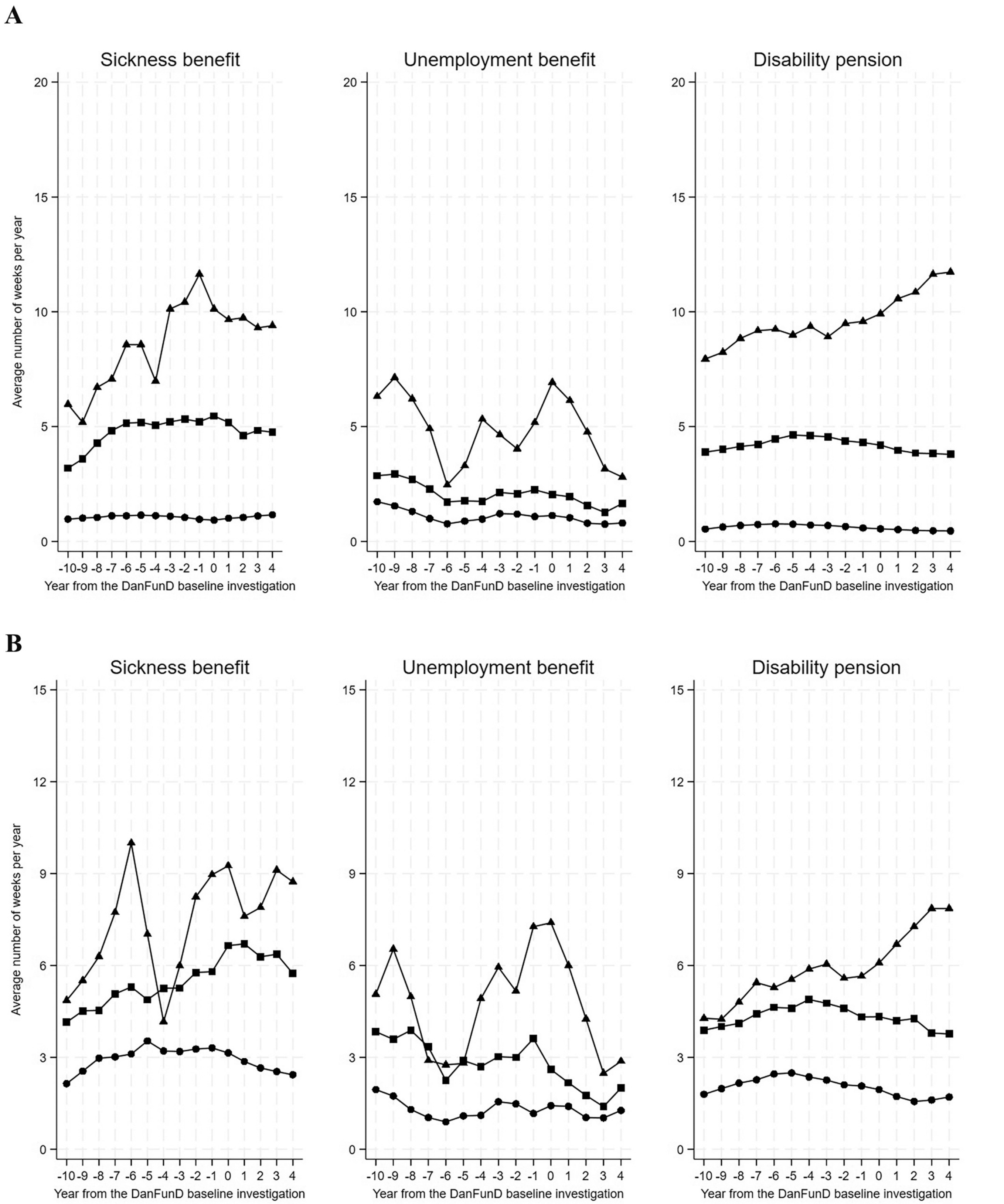

Fig. 1. Annual average number of weeks of welfare benefit payments in the period 10 years before and 4 years after inclusion in the DanFunD baseline investigation (0).

[a] Questionnaire-defined functional somatic disorder (FSD). Circle: No FSD; Square: single-organ FSD; Triangle: multi-organ FSD:

[b] FSD according to interviews. Circle: No FSD; Square: single-organ FSD; Triangle: multi-organ FSD:

[c] Questionnaire-defined irritable bowel, chronic widespread pain, and chronic fatigue. Circle: No FSS; Square: Irritable bowel; Cross: Chronic widespread pain; Triangle: Chronic fatigue.

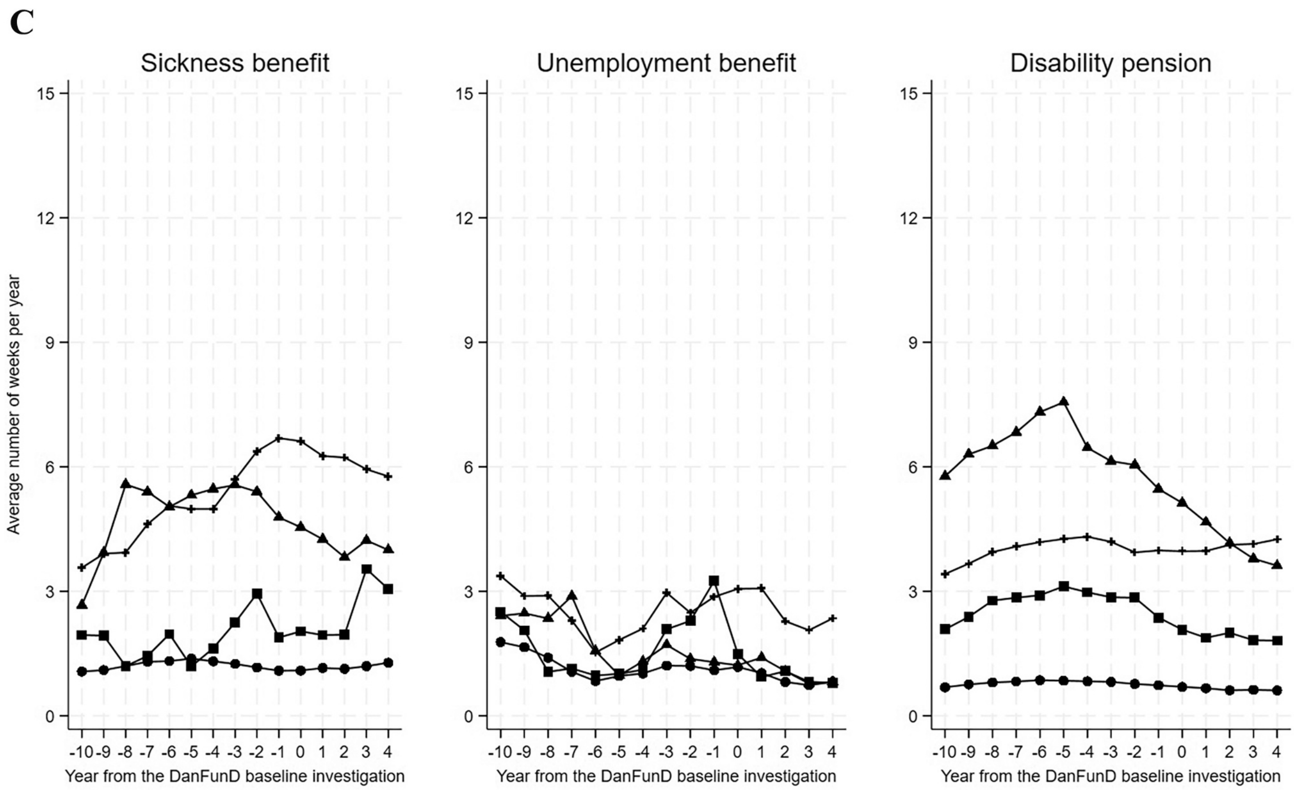

Fig. 1. (*continued*).

Table 2
Difference in welfare benefit payments between individuals with and without a functional somatic disorder.

	Sickness benefit Diff. (95 % CI)	Unemployment benefit Diff. (95 % CI)	Disability pension Diff. (95 % CI)
10-year period before inclusion in the DanFunD baseline investigation			
Questionnaire-defined FSD			
Overall FSD	**3.9 (3.3–4.4)**	**1.3 (1.0–1.6)**	**3.8 (3.2–4.5)**
Single-organ	**3.7 (3.1–4.2)**	**1.1 (0.8–1.5)**	**3.5 (2.9–4.2)**
Multi-organ	**7.1 (4.8–9.6)**	**4.0 (2.1–6.4)**	**8.5 (5.1–12.3)**
FSD diagnosed with interview			
Overall FSD	**2.5 (1.3–3.7)**	**2.2 (1.4–3.05)**	**2.9 (1.6–4.4)**
Single-organ	**2.1 (0.8–3.4)**	**1.8 (1.0–2.8)**	**2.6 (1.1–4.2)**
Multi-organ	**4.0 (1.7–6.8)**	**3.7 (1.7–6.2)**	**3.9 (1.1–7.1)**
4-year period after inclusion in the DanFunD baseline investigation			
Questionnaire-defined FSD			
Overall FSD	**4.2 (3.5–4.8)**	**1.1 (0.7–1.5)**	**3.9 (3.2–4.8)**
Single-organ	**3.9 (3.3–4.6)**	**0.9 (0.5–1.2)**	**3.5 (2.7–4.4)**
Multi-organ	**8.1 (5.0–11.5)**	**4.2 (2.1–6.8)**	**10.7 (6.8–14.9)**
FSD diagnosed with interview			
Overall FSD	**3.7 (2.2–5.2)**	**1.2 (0.5–2.1)**	**2.9 (1.5–4.5)**
Single-organ	**3.3 (1.8–5.1)**	0.7 (−0.002–1.4)	**2.2 (0.7–3.8)**
Multi-organ	**5.2 (2.1–8.6)**	**3.6 (1.4–6.3)**	**5.7 (2.3–9.5)**

Abbreviations: Diff., mean difference per year; CI, percentile-based confidence interval resulting from bootstrap with 10,000 number of repetitions; FSD, functional somatic disorder. Adjusted for sex and age. Bold numbers indicate significant results, i.e., the percentile-based CIs do not contain 0.

Table 3
Difference in welfare benefit payments between individuals with and without a functional somatic syndrome.

	Sickness benefit Diff. (95 % CI)	Unemployment benefit Diff. (95 % CI)	Disability pension Diff. (95 % CI)
10-year period before inclusion in the DanFunD baseline investigation			
Irritable bowel	**1.84 (1.14–2.64)**	**1.44 (0.75–2.21)**	**2.56 (1.37–3.92)**
Chronic widespread pain	**5.01 (3.94–6.19)**	**1.17 (0.62–1.78)**	**6.48 (5.02–8.06)**
Chronic fatigue	**3.92 (3.21–4.66)**	**1.28 (0.85–1.75)**	**3.43 (2.59–4.34)**
4-year period after inclusion in the DanFunD baseline investigation			
Irritable bowel	**2.77 (1.66–3.95)**	**1.23 (0.49–2.11)**	**2.74 (1.49–4.14)**
Chronic widespread pain	**5.88 (4.51–7.33)**	**0.72 (0.24–1.26)**	**5.15 (3.74–6.69)**
Chronic fatigue	**4.90 (3.98–5.89)**	**1.46 (0.95–2.02)**	**3.53 (2.63–4.48)**

Abbreviations: Diff., mean difference per year; CI, percentile-based confidence interval resulting from bootstrap with 10,000 number of repetitions; FSD, functional somatic disorder. Adjusted for sex and age. Bold numbers indicate significant results, i.e., the percentile-based CIs do not contain 0.

study from 2015 including the Danish Work Environment Cohort found an increased risk of long-term sickness absence and unemployment in individuals with medically unexplained symptoms during a 10-year follow-up period. They did, however, not find an increased risk of disability pensioning [27]. A reason for this discrepancy in results between their study and ours may be that medically unexplained symptoms were defined as having at least three symptoms during the last month. Physical symptoms manifest on a continuum from a few mild symptoms to many severely invalidating and persisting symptoms in the characteristic pattern that qualifies for an FSD diagnosis. Hence, the group of medically unexplained symptoms may consist of less severely affected individuals compared to the current study using validated diagnostic criteria of FSD. Furthermore, in 2013 Denmark implemented a reform that tightened the criteria for disability pension in order to keep more persons attached to the labour market. After this reform, access to disability pension decreased for individuals with FSD [28]. This decrease is, however, not apparent in the current study obtaining results during a 14-year time frame encompassing years before and after the reform. From our study it is, however, not apparent when disability

Table 4
Difference in welfare benefit payments between individuals with FSD or another severe physical disease.

	Sickness benefit Diff. (95 % CI)	Unemployment benefit Diff. (95 % CI)	Disability pension Diff. (95 % CI)
10-year period before inclusion in the DanFunD baseline investigation			
Questionnaire-defined FSD			
Physical disease only	1 (Ref.)	1 (Ref.)	1 (Ref.)
FSD only	**1.7 (1.0–2.4)**	**0.6 (0.2–1.0)**	**2.5 (1.7–3.4)**
FSD and severe physical disease	**2.9 (1.9–3.9)**	**0.6 (0.1–1.2)**	**6.5 (4.9–8.1)**
FSD diagnosed with interview			
Physical disease only	1 (Ref.)	1 (Ref.)	1 (Ref.)
FSD only	0.3 (−2.2–2.7)	1.4 (0.4–2.6)	0.2 (−2.4–2.8)
FSD and severe physical disease	0.2 (−2.4–2.9)	1.2 (−0.1–2.9)	**5.6 (1.2–10.2)**
4-year period after inclusion in the DanFunD baseline investigation			
Questionnaire-defined FSD			
Physical disease only	1 (Ref.)	1 (Ref.)	1 (Ref.)
FSD only	**1.9 (1.1–2.6)**	**0.5 (0.1–0.9)**	**2.1 (1.3–2.9)**
FSD and severe physical disease	**2.6 (1.5–3.7)**	**0.5 (0.1–1.1)**	**5.5 (3.7–7.9)**
FSD diagnosed with interview			
Physical disease only	1 (Ref.)	1 (Ref.)	1 (Ref.)
FSD only	1.4 (−1.2–4.0)	0.7 (−0.2–1.6)	−0.5 (−3.2–2.1)
FSD and severe physical disease	2.0 (−1.2–5.4)	0.4 (−0.6–1.7)	4.0 (−0.05–8.2)

Abbreviations: Diff., mean difference per year; CI, percentile-based confidence interval resulting from bootstrap with 10,000 number of repetitions; FSD, functional somatic disorder. Adjusted for sex and age. Bold numbers indicate significant results, i.e., the percentile-based CIs do not contain 0.

pension was granted.

Few studies have compared welfare benefit use between individuals with FSD and individuals with other severe physical disease. One Danish study found no difference in risk of disability pension between patients with FSD and patients with ischemic heart disease during a 5-year follow-up period. For flexi job holders (i.e. people with permanently reduced work capacity employed in flexible job schemes) with FSD or ischemic heart disease, respectively, there was no difference in employment time before disability pension either. However, unemployment benefit recipients with ischemic heart disease were employed fewer weeks than those with FSD before disability pension [29].

4.1. Implications

The apparent negative consequences of FSD for patients and society clearly emphasize the imperative for developing preventive measures and enhancing diagnostic and treatment modalities for patients with FSD. As an initial stride towards bridging this gap, the Danish Health Authorities have established specialized clinics for patients with FSD in all five Danish regions [30].

The significance of our current findings and the establishment of these specialized clinics are based on the notion that individuals with severe debilitating FSD not only stand to attain heightened functionality and improved health-related quality of life through intensive treatment, but also that society stands to reap substantial financial savings, which could then be channelled into the treatment of other FSD patients. Thus, prioritizing the management of these patients in health care planning would yield not only individual but also societal dividends. Nevertheless, it is crucial to acknowledge that the specialized clinics for FSD are still in their nascent stages, with varying treatment protocols among them. Efforts should, however, not be confined to specialized settings but should also extend to primary care. This includes enhancing education and increasing knowledge about the disorder among general practitioners to enable faster diagnosis and treatment within these general healthcare environments. Bearing these organizational hurdles in mind, further research and concerted efforts, including political initiatives, are imperative to enhance the management of FSD within the Danish health care framework.

4.2. Strengths and limitations

The use of the DREAM database for obtaining information about the participants' welfare benefit payments constituted a major strength of the current study. The DREAM database provides valid and objective data without missing data (i.e. participants declining to participate or non-completion of questionnaires) or information recall or response bias. The use of questionnaire data providing a large sample size and case groups combined with diagnostic interviews ensuring verification of clinical relevant cases also constitutes a strength. Other methodological strengths are the use of longitudinal register-based data within a time frame of 14 years in total (i.e. 10 years before and 4 years after DanFunD inclusion) as well as the approach of incorporating weighed analyses taking account for emigration, death, and age below eighteen.

The current study does, however, also have some limitations. Recording welfare payments weekly, even for partial weeks, might overestimate associations although this applies across all groups. The response rates were 33.7 % for the questionnaire sample and 64.9 % for the interviewed sample, potentially introducing selection bias although a non-responder analysis suggested minimal impact on social parameters [31]. We cannot be certain that high welfare benefit utilization is solely due to FSD rather than other conditions. However, validation through diagnostic interviews and comparison with other severe physical diseases supports a link between FSD and increased welfare usage. Further, as the current study's primary aim was to estimate the use of welfare benefits among individuals with FSD, the analyses were only adjusted for sex and age. There may be other relevant confounders to adjust for, e.g. educational level, mental health etc. This would provide answer to questions such as whether the increased use of welfare benefits among individuals with FSD is driven by disparities in social factors or present mental health issues. Future research could preferably investigate more into these aspects. Further, we did not account for working status in our analyses on unemployment and sickness benefit which may have had some impact since the participants cannot receive these benefits if they were on disability pension. However, the results showed that individuals with FSD received more weeks on disability pension than those without FSD. If taking into account weeks on disability benefit this would result in a higher annual average number of weeks on unemployment and sickness benefit, respectively, and thereby an increased difference between individuals with FSD and individuals without FSD. We therefore argue that such analyses would only strengthen the associations with employment and sickness benefit when comparing individuals with and without FSD. The presented differences in the current form are therefore conservative estimates. Despite the use of longitudinal register-based data, FSD was measured only once, preventing determination of direction of causality. More longitudinal studies with multiple FSD assessments are needed to establish causality.

5. Conclusions

Individuals with FSD have a pronounced higher use of welfare benefits than individuals without FSD and – for questionnaire-based FSD - individuals with other severe physical disease. This study suggests that FSD is a disabling condition with a substantial impact on the individual and a socioeconomic burden for society.

Ethics approval and consent to participate

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethical Committee of the Capital Region (H-3-2011-081, H-3-2012-015. Written informed consent was obtained from all individual participants included in the study.

Consent for publication

Not Applicable.

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CRediT authorship contribution statement

Marie Weinreich Petersen: Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Kaare Bro Wellnitz:** Writing – review & editing, Methodology, Investigation, Formal analysis, Conceptualization. **Tina Birgitte Wisbech Carstensen:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Thomas Meinertz Dantoft:** Writing – review & editing, Investigation, Data curation. **Eva Ørnbøl:** Writing – review & editing, Methodology, Investigation, Formal analysis, Conceptualization. **Anne Ahrendt Bjerregaard:** Writing – review & editing, Validation. **Torben Jørgensen:** Writing – review & editing, Investigation, Funding acquisition, Data curation. **Per Fink:** Writing – review & editing, Supervision, Methodology, Investigation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jpsychores.2025.112073.

Data availability

The datasets generated and/or analysed during the current study are not publicly available due Danish legislation but are available from the corresponding author on reasonable request.

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