DANISH MEDICAL JOURNAL

Original Article

Dan Med J 2021;68(6):A07200496

High incidence of lost workdays in patients with subacromial impingement syndrome

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Dan Med J 2021;68(6):A07200496

ABSTRACT

INTRODUCTION: Loss of workdays is the main societal cost related to shoulder disorders with nine lost workdays per six months on average. The most common shoulder disorder is subacromial impingement syndrome (SIS), but it remains unknown if SIS is also a leading cause of shoulder-related loss of worktime. We aimed to investigate the incidence of workdays lost due to SIS during the six months following a SIS diagnosis in specialised care.

METHODS: Among 157 consecutive patients diagnosed with SIS in secondary care, 129 (82%) completed a structured six-month follow-up interview. Job status, average working hours and sick leave due to SIS were recorded. Only patients holding a job (n = 58) and patients who lost their job due to SIS (n = 8) were considered to be at risk of losing workdays, leaving 66 patients in the at-risk group. The number of lost workhours due to SIS was calculated and normalised to full-time workdays, and incidences of lost workdays were estimated using Poisson regressions.

RESULTS: In total, 1,781 workdays were lost. The mean number of lost workdays per six months was 27 days (95% confidence interval (CI): 18-40) for patients at risk (n = 66), corresponding to 14 days on average (95% CI: 9-21 days) for the entire cohort (n = 129). A total of 33 patients were responsible for all loss of workdays.

CONCLUSIONS: We found that an average of 27 workdays (> 5 work weeks) were lost due to SIS during the first six months after the diagnosis in patients who were otherwise fit to work. This is three times higher than the nine days previously reported for shoulder problems in general, indicating that productivity loss in patients diagnosed with SIS is a major concern.

FUNDING: none.

TRIAL REGISTRATION: not relevant.

Loss of workdays is the main cause of societal expenses related to shoulder disorders [1, 2], with an average of nine workdays lost due to a shoulder disorder per six-month period [1, 2]. Being the most common shoulder disorder in both general practice [3] and secondary care [4, 5], subacromial impingement syndrome (SIS) may be the leading cause of shoulder-related loss of worktime. Existing evidence regarding the amount of lost worktime related specifically to SIS in specialised care settings is limited to outcome data from randomised clinical trials (RCT) [6, 7]. As the generalisability of such data is often limited due to inherent problems with trial effects (e.g., treatment effect, protocol effect and care effect) [8], the relevance of monitoring and addressing loss of

worktime due to SIS remains unknown. Therefore, we investigated the incidence of lost workdays among patients diagnosed with SIS in a specialised care setting.

METHODS

This retrospective observational study is a secondary reporting on six-month follow-up in a consecutive cohort counting 157 patients diagnosed with SIS [9], who were referred to an orthopaedic specialist department from March to June 2014. The patients completed a structured telephone interview on treatment, job status and sick leave due to the shoulder disorder since baseline. The present study is based on data concerning job status and sick leave. Details about patient flow and the baseline data for the full 157 patient cohort have been reported elsewhere [9, 10]. No formal ethical approval was required as evaluated by the Capitol Region Committee on Health Research Ethics in Denmark (H-3-2013-FSP29).

Data collection

Patient demographics, disease characteristics and surgery since baseline

Information on the following variables was collected at baseline: age, gender, affected side, duration of symptoms at baseline, Shoulder Pain and Disability Index (SPADI) score, pain during the past week and sick leave at baseline. Information on surgery since baseline was obtained during the follow-up telephone interview.

Work status

Data on the patient's job (description and status) were obtained during the ten-minute structured self-developed interview with approximately twelve questions about paid work (see **Table 1**). We further categorised all reported jobs according to the major group codes of the International Standard Classification of Occupations (ISCO) [11] based on the short job type descriptions recorded during the interview.

TABLE 1 Structured interview and calculation of lost full-time workdays.

No.	Question
1	
a	Do you currently have a paid job?: Yes/no
b	If no to Q1a: Is your shoulder problem the primary reason for you not having a job?: Yes/no
c	If yes to Q1b: Have > or ≤ 6 mo.s passed since you stopped working?
d	If ≤ 6 mo.s to Q1c: How many wks have passed since you stopped working?
2	
a	Is/was it a fulltime job or job at reduced hours?
b	If reduced hours: Are the reduced working hours due to your shoulder problem?
3	How many hours do you work per wk?
4	
a	Within the past 6 mo.s, have you had any sick leave for which the primary cause was your shoulder?
b	If yes, which of the following categories fits the number of days: 0-1, 2-5, 6-10, 11-15, 16-30, 31-60, > 60?
c	Precisely how many days of sick leave would you think you have lost?

Outcomes

For each patient, the number of paid full-time workdays lost due to SIS was calculated from the answers to the structured interview. The total number of full-time workdays lost was defined as the sum of working hours lost due to SIS from sick leave, reduced working hours and lost jobs, normalised to the Danish norm for full-time workdays of 7.4 hours (37 hours per week).

Workdays lost to sick leave

The number of full-time workdays lost due to sick leave was defined as: (average daily working hours (Q3/5) × self-reported number of days on sick leave (Q4c))/standard workhours per day (7.4 hours per workday).

Workdays lost to part-time

The number of full-time workdays lost due to patients working part-time was defined as: (hours lost per day (7.4 hours per working-day – average daily working hours (Q3a/5)) × possible workdays (weeks from baseline to interview × 5 workdays per week))/standard workhours per day (7.4 hours per work day).

Workdays lost due to loss of a job

The number of workdays lost because patients lost their job due to SIS was calculated differently for those who

had lost their job at baseline and after baseline, as patients could be without a job because of SIS at baseline and still be without job at follow-up or they could have lost their job between baseline and follow-up. For patients who had already lost their job due to SIS at baseline, the number of full-time workdays lost was defined as: (possible workdays (weeks from baseline to interview × 5 workdays per week) × average daily working hours (Q3/5))/standard workhours per day (7.4 hours per workday). For patients losing their job after baseline due to SIS, the number of full-time workdays lost was defined as: (workdays since lost job (weeks since job discontinued (Q1d) × 5 workdays per week) × average daily working hours (Q3/5))/standard workhours per day (7.4 hours per workday).

Statistical analyses

Demographics, baseline values and descriptive data on job status, sick leave and lost working hours at follow-up interview are presented as means (± standard deviation (SD)) or numbers and proportions for patients who participated in the interview. Patients were categorised as being at-risk of losing workdays due to SIS if they were currently working or had lost a previous job due to SIS. Poisson regression analyses were used to estimate the incidence of full-time workdays lost due to SIS during the follow-up period as well as the incidence rate ratio (IRR) for patients having undergone surgery versus those who had not. Negative binomial regression was used to investigate differences in the incidence of lost workdays according to job category, and to estimate the incidence separately for each job category. A significance level of 0.05 was applied for all statistical tests. Data were analysed with IBM SPSS Statistics v. 22.

Trial registration: not relevant.

RESULTS

In total, 129 of the 157 patients (82%) completed the telephone interview. The average age was 55 years (SD: ± 13 years), 80% reported having experienced symptoms for more than three months at baseline and 57% were females. The mean SPADI score was 59 (SD: ± 19) and the mean average pain during the past week was 5.1 (SD: ± 2.0). Patients who did not complete the telephone interview were similar to those who did with respect to age (mean diff. 3.2 years 95% confidence interval (CI): –2.1 to 8.6 years), SPADI score (mean diff. 5.2 95% CI: –2.9 to 13.8), gender distribution (53% versus 57%) and proportion on sick leave at baseline (10.7% versus 8.5%). Sixty-six patients were at risk of losing workdays due to SIS as they had a full-time job (n = 47), reduced hours (n = 11), or had lost their job due to SIS (n = 8). In total, 1,781 workdays were lost due to sick leave (851 days), lost jobs (647 days) and reduced hours (283 days). Thirty-three of the 66 patients at risk were responsible for all lost workdays. The incidence of lost full-time workdays was 27 days (95% CI: 18.4 to 39.6 days) for the at-risk group, corresponding to 13.8 days on average (95% CI: 9.1 to 21.0 days) when estimated for the full cohort. The incidence of lost full-time workdays was three times higher for patients who had undergone surgery than for patients who had not (IRR = 3.0, $p < 0.01$), both in the full cohort and the at-risk group. The 50 patients in the at-risk group who had not undergone surgery accounted for 51% (912 of 1,781) of the lost workdays. For further details, see **Table 2**. The incidence of lost workdays differed significantly among job categories ($p < 0.001$). The highest rates were found for Elementary Occupations (76.5 days, 95% CI: 41.3 to 141.7 days) and Services and Sales Workers (48.9 days, 95% CI: 30.2 to 79.2 days), with rates that were significantly higher than all or most of the other job categories (see **Table 3**).

TABLE 2 Baseline characteristics and incidence of lost workdays.

	At-risk group[a] (N_a = 66)	Not at-risk group (N_n = 63)	Full cohort (N_f = 129)
Baseline characteristics			
Gender, female, n (%) (n_f = 129)	32 (48)	41 (65)	73 (57)
Age, mean (± SD), yrs (n_f = 129)	47.9 (± 10.6)	62.2 (± 10.4)	55 (± 13)
Dominant side affected, n (%) (n_f = 125)	36 (55)	37 (59)	73 (57)
Duration of symptoms, n (%) (n_f = 127):			
0-1 mo.	-	2 (3.2)	2 (2)
1-3 mo.s	11 (17)	11 (17)	22 (17)
3-6 mo.s	14 (21)	14 (22.2)	28 (22)
> 6 mo.s	39 (59)	36 (57)	75 (58)
SPADI score[c], total, mean (± SD) (n_f = 128)	54 (± 17)	63.1 (± 20)	59 (± 19)
Average pain[d] past week, mean (± SD) (nf = 121)	4.7 (± 2.0)	5.5 (± 2.0)	5.1 (± 2.0)
On sick leave at baseline, n (%)	10 (1%)	1 (2)[b]	11 (9)
Surgery since baseline, n (%)	16 (24)	15 (24)	31 (24)
Incidence lost workdays in 6 mo.s, n (95% CI)			
Total lost workdays	27.0 (18.4-39.6)	-	13.8 (9.1-21.0)
Sick leave	12.9 (7.8-21.4)	-	6.6 (3.9-11.3)
Part-time	4.3 (1.6-11.4)	-	2.2 (0.8-5.9)
Lost job	9.8 (4.7-20.5)	-	5.0 (2.4-10.7)
Total incidence of lost workdays in subgroups			
Incidence of lost workdays in 6 mo.s, n (95% CI):			
Surgery since baseline	54.3 (37.7-78.2), n = 16		28.0 (17.0-46.2), n = 31
No surgery since baseline	18.2 (10.0-33.4), n = 50		9.3 (5.0-17.5), n = 98
Incidence rate ratio: surgery vs no surgery	3.0 (1.5-6.0), p < 0.01		3.0 (1.3-6.8), p < 0.01

CI = confidence interval; SD = standard deviation; SIS = subacromial impingement; SPADI = Shoulder Pain and Disability Index.
a) Patients were categorised as being at risk of losing workdays due to SIS if they currently had a job or if they had lost their previous job due to SIS.
b) 1 patient reported being on sick leave due to the shoulder disorder at baseline but did not meet the criteria for being in the at-risk group at follow-up, as he/she was unemployed (not due to the shoulder) and had not lost his/her job due to the shoulder disorder.
c) Range: 0-100 (best-worst).
d) Range: 0-10 (no pain-worst imaginable pain).

TABLE 3 Incidence of lost workdays for each job category.

Job category from ISCO codes	Lost workdays, n (95% CI)	Patients: surgery/no surgery, n
Managers	23.5 (8.9-62.2)[a]	2 (2/0)
Professionals	15.0 (5.7-39.4)[a, b]	12 (3/9)
Technicians and associate professionals	2.3 (0.6-8.9)[a, b]	7 (1/6)
Clerical support workers	6.3 (1.7-23.5)[a, b]	9 (2/7)
Services and sales workers	48.9 (30.2-79.2)	18 (6/12)
Skilled agricultural, forestry and fishery workers	-	0
Craft and related trades workers	1.2 (0.4-3.9)[a, b]	5 (0/5)
Plant and machine operators and assemblers	19.4 (6.4-59.3)[a]	7 (2/5)
Elementary occupations	76.5 (41.3-141.7)	6 (0/6)

CI = confidence interval; ISCO = International Standard Classification of Occupations.
a) Significantly lower incidence rate than elementary occupations (p < 0.05).
b) Significantly lower incidence rate than services and sales workers (p < 0.05).

DISCUSSION

We found an incidence of 27 full-time workdays lost during six months in patients who were at risk of losing workdays, corresponding to > 5 full-time working weeks. The incidence was three times higher in patients undergoing surgery (54.3 days) than in patients undergoing non-operative care (18.2 days).

To the best of our knowledge, no previous study has reported the extent of lost workdays related to SIS in non-trial settings, nor specifically for patients who are considered to be at-risk of losing workdays. In a population-based sample from specialised care, we found an incidence of 9.3 lost workdays due to SIS, which is similar to the 7.3 [12] and eight days [6] previously reported for a comparable population of non-surgically treated patients in RCT settings. However, when comparing groups that had or had not undergone surgery separately, the incidence of lost workdays found in our study (no surgery: 9.3 days; surgery: 28 days) was comparable to that reported by Ketola et al [6] in an RCT setting (no surgery: eight days; surgery: 33 days). To put the difference between nine and 28 lost workdays into perspective, the cost of 19 lost workdays is approximately 29,000 DKK (1,530 DKK per day [2]), whereas the combined cost of all healthcare services during one year in patients allocated to surgery or active follow-up amounts to ≈ 26,000 DKK (£ 3,147) and ≈ 12,000 DKK (£ 1,451), respectively [7].

Loss of worktime therefore constitutes approximately 50-70% of the societal costs related to SIS in this population. In contrast to our findings, Kromer et al [13] reported an average of 2.9 lost workdays during a one-year follow-up, a low rate even considering that all patients underwent non-surgical treatment. However, this disagreement is likely a consequence of differences in study population as Kromer et al [13] recruited patients from primary care [14], whereas the present study and Ketola et al [6] recruited patients from specialised care. This difference is also reflected in a higher level of shoulder disability in the present study (mean SPADI = 58.5) than in the study by Kromer et al [13] (mean SPADI = 40), which is, in turn, linked to higher costs and more shoulder-related sick leave [1, 2]. Collectively, this indicates that loss of workdays due to SIS is mainly a concern in more specialised care settings, where the level of shoulder disability is generally higher and surgery is considered.

When investigating the amount of lost workdays specifically in patients considered at risk, we found a high incidence of 27 lost workdays due to SIS (95% CI: 18.4 to 39.6 workdays) during six months, corresponding to > 5 full-time working weeks. In addition, we found that loss of workdays in this population was more of a concern in specific job categories, and less so in others. As was also the case for the full cohort, shoulder surgery was related to a three times higher incidence of lost workdays (54 versus 18 days, IRR = 3.0, $p < 0.05$). Importantly, the incidence of lost workdays was also noteworthy in patients undergoing non-operative care who are otherwise fit for work; a group which constituted more than one third of the full cohort (50 out of 129) and accounted for more than half of all lost workdays. These findings are novel and underpin that loss of worktime is a specific concern when persons who are otherwise fit to work suffer from persistent SIS, regardless of treatment strategy but possibly more so for patients working in service and sales and in elementary occupations.

Strength and limitations

The use of consecutive sampling and a high response rate (82%) increase the external validity of our findings in the context of secondary care for SIS. It should be noted, however, that this study was conducted in a single region of Denmark, why the results may not be generalisable to other regions and countries. There is a risk of recall bias related to the estimates of lost workdays, which may lead to an underestimation compared with workplace-registered sick leave [15]. The gold standard for measuring absenteeism is company-based registers [15], skewing our results towards a more conservative estimate. Nevertheless, such registries are unlikely to detect lost work time due to changes in job status [16] which accounted for 16% of the total number of lost

workdays in this cohort. Therefore, it seems relevant to investigate the impact of SIS on lost workdays using self-reported data, as these data are easily accessible, highly correlated with register-based data on absenteeism [17] and allow for data collection on the impact of lost jobs. In summary, the use of structured interviews that allowed us to capture more detailed data on lost worktime positively affects the internal validity of the results.

CONCLUSIONS

We found a high incidence of 27 lost workdays due to SIS during the six-month period following the diagnosis in patients who were otherwise fit to work. The incidence of lost workdays per six months was three times higher for the small group of patients who had undergone surgery, compared to those who had not, but the total amount of lost workdays was distributed evenly between patients undergoing surgery and nonoperative care. In summary, loss of workdays seems a relevant concern in relation to both surgical treatment and non-operative care patients with SIS.

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Accepted 12 April 2021

Conflicts of interest none. Disclosure forms provided by the authors are available with the article at ugeskriftet.dk/dmj

References can be found with the article at ugeskriftet.dk/dmj

Cite this as Dan Med J 2021;68(6):A07200496

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