BMJ Open

Effects of socioeconomic status on patient-reported outcome after surgically treated trigger finger: a retrospective national registry-based study

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To cite: Lesand L, Dahlin LB, Rydberg M, *et al*. Effects of socioeconomic status on patient-reported outcome after surgically treated trigger finger: a retrospective national registry-based study. *BMJ Open* 2023;**13**:e077101. doi:10.1136/bmjopen-2023-077101

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (http://dx.doi.org/10.1136/bmjopen-2023-077101).

Received 26 June 2023
Accepted 17 November 2023

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ABSTRACT

Objectives To investigate if socioeconomic status impacts patient-reported outcomes after a surgically treated trigger finger (TF).

Design and setting Data on patients with TF treated with surgery were collected from the Swedish National Quality Registry of Hand Surgery (HAKIR) 2010–2019 with an evaluation of symptoms and disability before surgery and at 3 and 12 months after surgery, using the short version of the Disabilities of Arm, Shoulder and Hand (QuickDASH) questionnaire.

Data from HAKIR and the Swedish National Diabetes Registry (ndr.nu) were combined with socioeconomic data from Statistics Sweden (scb.sc), analysing the impact of marital status, education level, income, occupation, sickness benefits, days of unemployment, social assistance and migrant status on the outcome by a linear regression model.

Participants In total, 5477 patients were operated on for primary TF during the study period, of whom 21% had diabetes, with a response rate of 35% preoperatively, 26% at 3 months and 25% at 12 months.

Results At all time points, being born in Sweden (preoperatively B-coefficient: −9.74 (95% CI −13.38 to −6.11), 3 months postoperatively −9.80 (95% CI −13.82 to −5.78) and 12 months postoperatively −8.28 (95% CI −12.51 to −4.05); all p<0.001) and high earnings (preoperatively −7.81 (95% CI −11.50 to −4.12), 3 months postoperatively −9.35 (95% CI −13.30 to −5.40) and 12 months postoperatively −10.25 (95% CI −14.37 to −6.13); all p<0.0001) predicted lower QuickDASH scores (ie, fewer symptoms and disability) in the linear regression models. More sick leave during the surgery year predicted higher QuickDASH scores (preoperatively 5.77 (95% CI 3.28 to 8.25; p<0.001), 3 months postoperatively 4.40 (95% CI 1.59 to 7.22; p<0.001) and 12 months postoperatively 4.38 (95% CI 1.35 to 7.40; p=0.005)). No socioeconomic factors impacted the change in QuickDASH score from preoperative to 12 months postoperatively in the fully adjusted model.

Conclusion Individuals with low earnings, high sick leave the same year as the surgery and those born outside of Sweden reported more symptoms both before and after surgery, but the relative improvement was not affected by socioeconomic factors.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The use of large national registries enabled the inclusion of many treated individuals.
⇒ Socioeconomic data from Statistics Sweden is very robust and accurate, partially due to the unique personal identification numbers used in Sweden.
⇒ The response rate to the Swedish short version of the Disabilities of Arm, Shoulder and Hand questionnaire in the register was low, which may limit the generalisability of this study.

INTRODUCTION

Trigger finger (TF), also known as stenosing flexor tenosynovitis, is a common cause of hand dysfunction with a prevalence of approximately 1% in the general population.[1] It is characterised by painful clicking and loss of motion of the affected finger due to the inability to flex and extend the digit smoothly. The typical presentation of popping and locking of a TF is often sufficient for diagnosis. The trigger phenomenon is thought to be caused by a disproportion of the flexor tendon diameter and its tendon sheath, most often at the level of the A1-pulley, due to thickening and narrowing of the sheath,[2] as well as pathological tendinosis changes to the flexor tendon.[3]

TF can occur at any age but is most common at the age of 40–60 years and is 4–6 times more frequent in women.[2] The lifetime risk of developing TF is nearly 3% in the general population and increases to up to 10%–15% in persons with diabetes mellitus (DM).[4–6] Additionally, the risk of developing TF is higher in patients with carpal tunnel syndrome (CTS), de Quervain's disease, hypothyroidism and rheumatoid arthritis.[2 7]

Surgery is typically indicated for patients who continue to experience pain and

symptoms after treatment with conservative measures and corticosteroid injections.[2]

Several studies have shown a profound impact of socioeconomic status (SES) on health, indicating that SES is an important determinant of morbidity and mortality in the general population.[8–10] SES is defined as the social status of an individual or a group in relation to others concerning education, income and occupation.[8] There is a higher incidence of CTS among socioeconomically deprived groups.[11] Also, the level of education, annual income, immigrant status, frequent sick leave, social assistance dependence and being widowed impact the symptoms of CTS both before and after treatment.[12] Furthermore, long-term sick leave impacts the results after treatment of ulnar nerve compression at the elbow.[13] Less is known about the association between SES and TF. A higher prevalence of TF has been associated with repetitive power grip and flexion, which implies that manual work could be a risk factor for TF.[14] Therefore, we aimed to investigate if SES impacts patient-reported outcomes after open TF release (OTFR).

METHODS

A national register-based study was performed with data on patients with TF (ICD-10 code M653) treated with surgery (KKÅ97 operation code NDM49) collected from the Swedish National Quality Registry of Hand Surgery (HAKIR; hakir.se). Patients who were operated on from 2010 to 2019 were included. All seven university hand surgery clinics in Sweden and two private hand surgery clinics report to the registry. This study included primary surgeries on patients aged ≥18 years with a Swedish personal identification number and the ability to provide informed consent. Participants were excluded from the study if they met any of the following exclusion criteria: being operated on for bilateral TF within the study period, being treated for another hand disorder on the same surgery date, missing data from Statistics Sweden (SCB) or if the personal identification number was reused; the most common reason for this was an immigrant receiving a personal identification number that previously belonged to a now deceased person.

The Swedish short version of the Disabilities of the Arm, Shoulder and Hand (QuickDASH) [15] was used to evaluate symptoms and disability before surgery and at 3 and 12 months after surgery. This was accomplished by email or traditional mail, with a reminder if not answered within 48 hours. QuickDASH contains 11 questions with a total score ranging from 0 to 100, where 100 represents the most significant disability.

Data regarding diabetes status was retrieved from the Swedish National Diabetes Registry (NDR; ndr.nu), initially as part of another study,[16] and used only to adjust for diabetes status.

Using personal identification numbers, data from HAKIR and NDR was combined with socioeconomic data from Statistics Sweden (SCB; scb.se). SCB retrieved data on the following: marital status, education level, income, occupation, sickness benefit, days of unemployment, social assistance and migrant status.

Income data were available from 2010 to 2019. We used the annual income from the year of surgery. A binned variable was created based on percentiles.

Sick leave included sickness benefits because of a disability preventing the individual from working. In Sweden, the first 14 sick days are paid by the employer. If the period exceeds 14 days, the Swedish social system offers a sickness benefit. Therefore, only sick leave exceeding 14 days is included in this study. A variable was created based on whether the patient received sickness benefits at least 1 day during the same year as the surgery. Data were collected from 2010 to 2019.

Unemployment data were calculated as mean days per year. Data were available from 2010 to 2019. A variable corresponding to whether the patient was unemployed or employed during the year of surgery was created.

Social assistance data were available from 2010 to 2019 and used to determine whether the patient or a family member of the patient had received paid social assistance during the year of the surgery.

Marital status data included if the patient was married, widowed, divorced or living without a partner (unmarried) during the year of the surgery. Participants living with a partner without being married were included as married. Data were available from 2010 to 2019.

Educational level was divided into three groups based on the education level that the patient had during the year of surgery. We used the International Standard Classification of Education (ISCED).[17] The first group included ISCED 0, 1 and 2 (≤9 years of education; ie, compulsory school), the second group included ISCED 3 (9–12 years of education) and, lastly, the third group included ISCED 4, 5 and 6 (>12 years of education).

Migrant status data involved the country of birth for each patient. A binned variable was created based on whether the patient was born in Sweden.

This population has been previously used to study patient-reported outcomes in relation to diabetes; hence, some of the population characteristics and QuickDASH scores have already been published.[18]

Statistics

The study population was divided into groups based on age (18–49 years, 50–69 years and ≥70 years) for the descriptive statistics. Continuous data are presented as the median (IQR). Nominal data are presented as numbers (%) and compared using the χ^2 test. The Mann-Whitney U-test was used to compare non-normally distributed data between two groups. The Kruskal-Wallis test was used for comparisons between three or more groups. The Bonferroni correction was used to adjust p-values for multiple testing in further pairwise comparisons.

A multivariate linear regression analysis was used to investigate the effect of socioeconomic factors on QuickDASH scores. The first model was unadjusted; the second

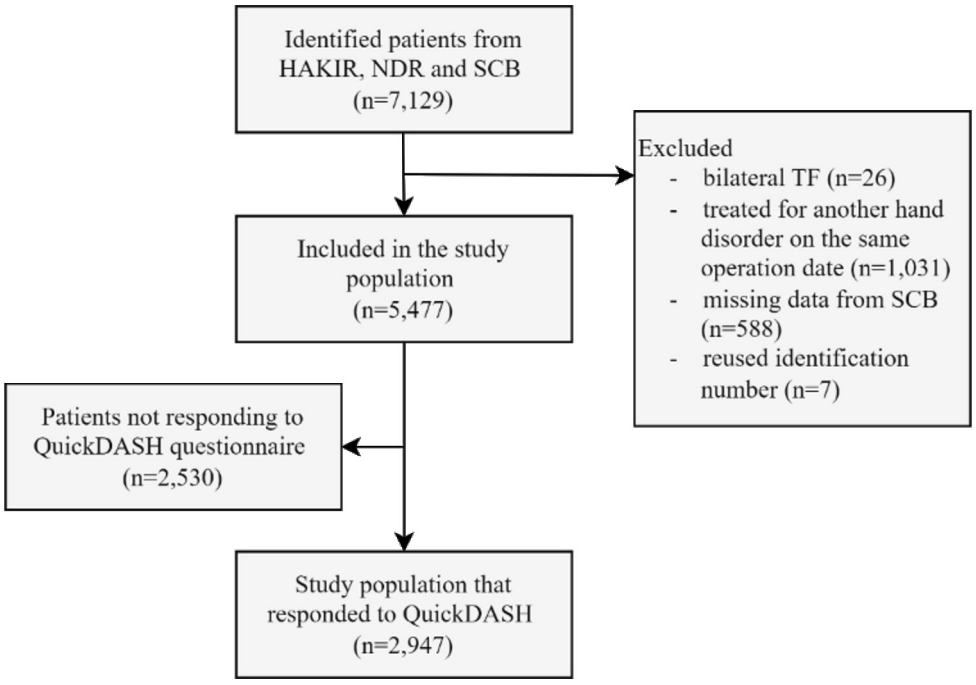

Figure 1 Flowchart illustrating the inclusion of the study population. HAKIR, Swedish National Quality Registry of Hand Surgery; NDR, National Diabetes Registry; QuickDASH, Swedish version of the Disabilities of the Arm, Shoulder and Hand; SCB, Statistics Sweden; TF, trigger finger.

model was adjusted for sex, age and diabetes, and the third model included all variables.

A p-value of <0.05 was considered statistically significant. All calculations were performed using IBM SPSS Statistics V.24 or V.25 (SPSS, Chicago, IL, USA).

Patient and public involvement

None.

RESULTS

We identified 7129 patients in HAKIR with surgically treated TF in 2010–2019. In total, 1652 patients were excluded, including 5477 individuals in the study population (figure 1). Of these, 1935 (35%) patients responded to the QuickDASH questionnaire preoperatively, 1447 (26%) responded 3 months postoperatively, and 1350 (25%) responded 12 months postoperatively. When including all participants, the median preoperative QuickDASH score was 34 (IQR 18–48), at 3 months postoperatively 9 (5–25) and at 12 months postoperatively 5 (0–20) (table 1). Further characteristics of the study population are presented in table 1.

Preoperative assessment

In the regression model, male sex predicted a lower preoperative QuickDASH score, and DM predicted a higher preoperative QuickDASH score (table 2). Manual work and social assistance predicted higher preoperative QuickDASH scores in the first two models but not in the fully adjusted last model. Marital status did not significantly affect preoperative QuickDASH scores in the regression models (table 2). Unemployment and sick leave predicted higher scores. Being born in Sweden and having high earnings predicted lower QuickDASH scores preoperatively.

Postoperative assessment at 3 months

At 3 months postoperative, DM and sick leave predicted higher QuickDASH scores, whereas higher earnings and being born in Sweden predicted lower QuickDASH scores in the regression models (online supplemental table 1).

Postoperative assessment at 12 months

At 12 months postoperative, sick leave predicted higher QuickDASH scores, whereas male sex, being born in Sweden and having higher earnings predicted lower QuickDASH scores in the regression models (table 3).

Change in assessment from preoperative to 12 months postoperative

In the linear regression model, investigating the effect of socioeconomic factors on the change in QuickDASH score from preoperative to 12 months postoperative, no socioeconomic factors were statistically significant in the fully adjusted model. DM predicted a more considerable improvement in the QuickDASH score, and the male sex predicted a more minor improvement in the QuickDASH score (table 4).

DISCUSSION

The present study suggests that some socioeconomic factors are associated with perceived disability before and after surgery for TF up to a follow-up of 12 months. When adjusted for confounders and other socioeconomic

Table 1 Socioeconomic status in patients surgically treated for trigger finger divided into age categories

	All	Age 18–49 years	Age 50–69 years	Age ≥70 years
	n=5477	n=888	n=3183	n=1405
Female sex	3400 (62)	534 (60)	2060 (65)	806 (57)
Diabetes*	1178 (22)	224 (25)	657 (21)	297 (21)
Highest education level*	1685 (31)	268 (30)	1039 (33)	378 (27)
Unemployment*	308 (<1)	108 (12)	200 (6)	N/A
Manual work	1672 (31)	361 (41)	1145 (35)	166 (12)
Born outside Sweden	906 (17)	191 (22)	549 (17)	166 (12)
Received social assistance*	198 (4)	54 (6)	131 (4)	13 (1)
Sick leave*	1693 (31)	462 (52)	1228 (39)	3 (1)
Married or living with partner*	3783 (69)	618 (70)	2277 (72)	888 (64)
High income (>322 000 SEK/year*)	1363 (25)	329 (37)	1002 (32)	12 (1)
Preoperative QuickDASH score	34 (18–48)	34 (23–41)	32 (18–50)	36 (18–48)
3 months postoperative QuickDASH score	9 (5–25)	11 (5–25)	9 (5–25)	10 (2–26)
12 months postoperative QuickDASH score	5 (0–20)	2 (0–11)	5 (0–21)	7 (0–26)
Change in QuickDASH score 0–12 months postoperative	20 (9–34)	25 (9–34)	20 (9–34)	20 (7–34)

Cases treated with surgery for trigger finger divided into age categories. Data presented as the median (IQR) or number (%). Kruskal-Wallis test with subsequent Bonferroni corrections was used to calculate statistical significance. It was not possible to calculate unemployment in the group >70 years since the retirement age in Sweden is 65 years.
*Same year as surgery.
QuickDASH, Swedish short version of the Disabilities of the Arm, Shoulder and Hand; SEK, Swedish Krona.

factors, we found that the perceived result after surgery is affected by income, sick leave the same year as surgery and migrant status.

Patients with longer sick leave in the same year as the OTFR reported worse disability before and after the surgery. Patients receiving sickness benefits may have more comorbidities, including conditions affecting the upper extremities. One earlier study on patients with back pain demonstrated that more comorbidities delayed return to work.[19] In another study on TF, DM, present in 22% of our population, was associated with higher QuickDASH scores both before and after surgical treatment, indicating that comorbidities are important for surgical outcomes.[20] Comorbidities, such as DM, are associated with a greater risk of complications following TF release.[21]

Higher earnings were associated with a lower QuickDASH score before and after OTFR. The mean income for the whole population in Sweden aged between 20 and 64 years was 243 000 Swedish Krona (SEK) per year in 2019. Our study population had a lower mean income than the Swedish population, with 178 000 SEK yearly.[22] This might be partly explained by the income data in the present study, which includes patients aged from 18 to 99 years, whereas the income data for the Swedish population only includes citizens aged 20–64 years. In Sweden, it is common to retire when turning 65 years old; hence, the high proportion of retired individuals in our study population. However, the association between high income and a lower QuickDASH score remained after adjusting for sex and age at all time points.

The present group of patients with higher education was 31% of the study population, which is above average compared with the general population. In 2019, 25% of Swedes aged 25–74 had an education over 12 years.[23] In this study, education was a significant predictor of postoperative QuickDASH scores at 3 and 12 months in the two first models but not in the last. This indicates that the effect is mediated through other factors, such as earnings.

A higher QuickDASH score at all time points was found in the group of patients born outside of Sweden compared with those born in Sweden. The immigrant proportion in our study population (17%) is similar to the general population in Sweden (18%).[24] In previous studies, no association has been found between immigrant status and the outcome of similar hand disorders, such as CTS and ulnar nerve compression.[12 13] In hip arthroplasty, a large Swedish study did not find an impact of migrant status on the risk of short-term reoperation or long-term revision.[25] However, in patient-reported outcomes, the immigrant group had more pain before and after the surgery and more problems with anxiety and depression.[26] Psychosocial factors, such as depression, anxiety and self-efficacy, have a significant effect on pain intensity and disability after minor hand surgery.[27] In surgically treated CTS and ulnar nerve compression, there is an increased risk of the use of psychotropic drugs, indicating impaired psychological health.[28] Further studies are needed to investigate associations between socioeconomic and psychosocial factors in relation to surgery results.

Table 2 Linear regression model of the effect of socioeconomic factors on the preoperative QuickDASH score in people with surgically treated trigger finger

	B-coefficient (95% CI)	P-value	B-coefficient, adjusted for sex, age and diabetes (95% CI)	P-value	B-coefficient, full model (95% CI)	P-value
Female sex (reference)						
Male sex	−10.41 (−12.21 to −8.62)	**<0.001**	−10.51 (−12.30 to −8.73)	**<0.001**	−9.50 (−11.81 to −7.20)	**<0.001**
Age	−0.02 (−0.09 to 0.10)	0.57	0.01 (−0.06 to 0.08)	0.71	−0.01 (−0.12 to 0.11)	0.93
No diabetes (reference)						
Diabetes	5.40 (3.19 to 7.61)	**<0.001**	5.62 (3.48 to 7.76)	**<0.001**	4.80 (2.22 to 7.39)	**<0.001**
No social assistance (reference)						
Social assistance	12.90 (6.73 to 19.07)	**<0.001**	12.06 (6.08 to 18.04)	**<0.001**	5.78 (−4.91 to 16.48)	0.29
Born outside Sweden (reference)						
Born in Sweden	−9.79 (−12.56 to −7.01)	**<0.001**	−10.33 (−12.99 to 7.66)	**<0.001**	−9.74 (−13.38 to −6.11)	**<0.001**
Sick leave	4.42 (2.51 to 6.33)	**<0.001**	4.53 (2.50 to 6.56)	**<0.001**	5.77 (3.28 to 8.25)	**<0.001**
Non-manual occupation (reference)						
Manual occupation	4.46 (2.23 to 6.69)	**<0.001**	4.00 (1.83 to 6.18)	**<0.001**	1.53 (−0.74 to 3.81)	0.19
Employed						
Unemployed	5.68 (1.57 to 9.79)	**0.007**	5.55 (1.52 to 9.57)	**0.007**	5.00 (0.10 to 9.89)	**0.046**
Marital status						
Not married (reference)						
Married	−1.98 (−4.00 to 0.05)	0.06	−0.47 (−2.43 to 1.50)	0.64	2.00 (−1.41 to 5.42)	0.25
Divorced	3.03 (0.13 to 5.93)	**0.04**	2.11 (−0.70 to 4.91)	0.14	1.79 (−2.73 to 6.30)	0.44
Widowed	5.87 (2.10 to 9.63)	**0.002**	3.85 (0.04 to 7.66)	0.05	0.56 (−6.11 to 7.23)	0.87
Education level						
Primary (reference)						
Upper	1.72 (−0.10 to 3.53)	0.06	1.60 (−0.16 to 3.36)	0.07	−0.95 (−4.25 to 2.36)	0.58
Tertiary	−4.43 (−6.32 to −2.53)	**<0.001**	−4.62 (−6.44 to −2.80)	**<0.001**	−3.71 (−7.31 to −0.11)	**0.04**
Income						
Low (reference)						
Low–middle (<109 000 SEK/year)	−1.50 (−4.10 to 1.78)	0.44	−0.58 (−3.42 to 2.27)	0.69	−3.38 (−8.10 to 1.34)	0.16
Middle–high (109 000–322 000 SEK/year)	2.43 (0.37 to 4.48)	**0.02**	0.59 (−1.53 to 2.71)	0.59	−6.62 (−10.49 to −2.76)	**<0.001**
High (>322 000 SEK/year)	−6.60 (−8.54 to −4.66)	**<0.001**	−5.03 (−7.04 to −3.03)	**<0.001**	−7.81 (−11.50 to −4.12)	**<0.001**

Data are presented as B-coefficient with 95% CI. A p-value of <0.05 was considered statistically significant and marked bold. All variables were recorded during the year of surgery.
QuickDASH, Swedish version of the Disabilities of the Arm, Shoulder and Hand; SEK, Swedish Krona.

Table 3 Linear regression model of the effect of socioeconomic factors on QuickDASH scores 12 months postoperative in people with surgically treated trigger finger

	B-coefficient (95% CI)	P-value	B-coefficient, adjusted for sex, age and diabetes (95% CI)	P-value	B-coefficient, all variables (95% CI)	P-value
Female sex						
Male sex	−6.12 (−8.31 to −3.91)	**<0.001**	−6.30 (−8.49 to −4.06)	**<0.001**	−4.42 (−7.21 to −1.64)	**0.002**
Age	0.01 (−0.08 to 0.10)	0.78	0.05 (−0.04 to 0.14)	0.31	−0.11 (−0.25 to 0.04)	0.16
No diabetes (reference)						
Diabetes	2.56 (−0.22 to 5.13)	0.07	2.76 (0.11 to 5.42)	**0.04**	2.47 (−0.56 to 5.50)	0.11
No social assistance (reference)						
Social Assistance	16.60 (9.19 to 24.02)	**<0.001**	17.09 (9.69 to 24.50)	**<0.001**	7.98 (−3.79 to 19.74)	0.18
Born outside Sweden (reference)						
Born in Sweden	−9.42 (−12.81 to −6.03)	**<0.001**	−10.00 (−13.35 to −6.64)	**<0.001**	−8.28 (−12.51 to −4.05)	**<0.001**
Sick leave	2.19 (−0.20 to 4.57)	0.07	2.43 (−0.20 to 5.07)	0.07	4.38 (1.35 to 7.40)	**0.005**
Non-manual occupation						
Manual occupation	2.66 (0.13 to 5.20)	**0.04**	2.39 (−0.14 to 4.91)	0.06	−0.07 (−2.82 to 2.68)	0.96
Employed (reference)						
Unemployed	5.89 (0.42 to 11.35)	**0.04**	6.87 (1.40 to 12.35)	**0.01**	3.68 (−2.64 to 10.0)	0.25
Marital status						
Not married (reference)						
Married	−3.98 (−6.35 to −1.61)	**<0.001**	−2.91 (−5.31 to −0.52)	**0.02**	−1.71 (−5.97 to 2.55)	0.43
Divorced	4.77 (1.23 to 8.31)	**0.008**	3.99 (0.48 to 7.50)	**0.03**	0.79 (−4.72 to 6.31)	0.78
Widowed	3.61 (−0.16 to 7.39)	0.06	2.17 (−1.79 to 6.13)	0.28	−4.78 (−11.68 to 2.13)	0.18
Education level						
Primary (reference)						
Upper	0.37 (−1.77 to 2.51)	0.74	0.38 (−1.75 to 2.51)	0.73	−2.41 (−6.07 to 1.26)	0.20
Tertiary	−3.26 (−5.48 to −1.04)	**0.004**	−3.38 (−5.57 to −1.19)	**0.003**	−3.12 (−7.19 to 0.95)	0.13
Earnings						
Low (reference)						
Low–middle (<109 000 SEK/year)	−0.40 (−3.75 to 2.95)	0.81	0.17 (−3.16 to 3.50)	0.92	−2.89 (−7.95 to 2.16)	0.26
Middle–high (109 000–322 000 SEK/year)	1.29 (−1.22 to 3.80)	0.31	0.65 (−2.06 to 3.36)	0.64	−7.02 (−11.32 to −2.71)	**0.001**
High (>322 000 SEK/year)	−8.23 (−10.63 to −5.82)	**<0.001**	−7.80 (−10.36 to −5.23)	**<0.001**	−10.25 (−14.37 to −6.13)	**<0.001**

Data are presented as a B-coefficient with a 95% CI. A p-value of <0.05 was considered statistically significant and marked bold. All variables were recorded during the year of surgery.
QuickDASH, Swedish version of the Disabilities of the Arm, Shoulder and Hand; SEK, Swedish Krona.

Table 4 Linear regression model of the effect of socioeconomic factors on change in QuickDASH score from preoperative to 12 months postoperative in people with surgically treated trigger finger

	B-coefficient (95% CI)	P-value	B-coefficient, adjusted for age, sex and diabetes (95% CI)	P-value	B-coefficient, all variables included (95% CI)	P-value
Female sex (reference)						
Male sex	−4.87 (−8.02 to −1.71)	**0.003**	−4.82 (−7.99 to −1.64)	**0.003**	−4.82 (−9.51 to −0.18)	**0.04**
Age	−0.06 (−0.19 to 0.08)	0.42	−0.02 (−0.16 to 0.11)	0.73	−0.01 (−0.26 to 0.24)	0.92
No diabetes (reference)						
Diabetes	5.12 (1.32 to 8.92)	**0.008**	5.14 (1.36 to 8.92)	**0.008**	5.58 (0.66 to 10.51)	**0.03**
Social Assistance	−0.49 (−13.02 to 12.05)	0.94	−0.42 (−12.92 to 12.08)	0.95	−6.22 (−29.08 to 16.64)	0.59
Born outside Sweden (reference)						
Born in Sweden	−4.18 (−9.62 to 1.26)	0.13	−4.11 (−9.50 to 1.28)	0.14	−3.95 (−12.08 to 4.19)	0.34
Sick leave	2.92 (−0.44 to 6.27)	0.09	2.32 (−1.37 to 6.00)	0.22	2.25 (−2.65 to 7.15)	0.37
Non-manual occupation (reference)						
Manual occupation	−0.73 (−4.71 to 3.25)	0.72	−1.06 (−5.02 to 2.91)	0.60	−1.93 (−6.47 to 2.62)	0.41
Employed (reference)						
Unemployed	7.40 (−0.93 to 15.74)	0.08	7.67 (−0.64 to 15.97)	0.07	2.09 (−9.56 to 13.73)	0.73
Marital status						
Not married (reference)						
Married	2.64 (−0.77 to 6.06)	0.13	3.53 (0.08 to 6.99)	0.05	2.96 (−3.85 to 9.78)	0.39
Divorced	−1.67 (−6.91 to 3.58)	0.53	−2.38 (−7.61 to 2.85)	0.37	1.88 (−7.20 to 10.96)	0.68
Widowed	−2.80 (−8.48 to 2.88)	0.33	−3.74 (−9.74 to 2.26)	0.22	−3.17 (−14.67 to 8.33)	0.59
Education level						
Primary (reference)						
Upper	3.85 (0.82 to 6.88)	**0.01**	3.80 (0.78 to 6.82)	**0.01**	4.55 (−1.72 to 10.82)	0.16
Tertiary	−2.16 (−5.27 to 0.95)	0.17	−2.31 (−5.39 to 0.77)	0.14	0.37 (−6.47 to 7.22)	0.91
Earnings						
Low (reference)						
Low–middle (<109 000 SEK/year)	−2.60 (−7.36 to 2.16)	0.28	−1.80 (−6.56 to 2.96)	0.46	−1.91 (−11.52 to 7.70)	0.70
Middle–high (109 000–322 000 SEK/year)	0.72 (−2.88 to 4.31)	0.70	−0.70 (−4.53 to 3.13)	0.72	−0.05 (−7.46 to 7.35)	0.99

Continued

Table 4 Continued

	B-coefficient (95% CI)	P-value	B-coefficient, adjusted for age, sex and diabetes (95% CI)	P-value	B-coefficient, all variables included (95% CI)	P-value
High (>322 000 SEK/year)	1.65 (−1.70 to 4.99)	0.33	2.66 (−0.94 to 6.26)	0.15	1.88 (−5.12 to 8.87)	0.60

Data are presented as B-coefficient with 95% CI. A p-value of <0.05 was considered statistically significant and marked bold. All variables were recorded during the year of surgery.
QuickDASH, Swedish short version of the Disabilities of the Arm, Shoulder and Hand; SEK, Swedish Krona.

We did not find an association between manual occupation and the outcome after surgery for TF. A higher prevalence of TF is associated with repetitive power grip and flexion,[14] but we found no indications that manual work affects outcomes after surgery.

In total, some of the characteristic socioeconomic factors in the present population differ from the general population in Sweden. The study population had longer sick leave the same year as surgery and lower income, indicating a socioeconomic depravity in these factors compared with the general population. Regarding migrant status, the number of individuals born outside of Sweden was comparable. However, compared with the general population, the unemployment rate was lower, the educational level was higher, and the study population was less dependent on social assistance. Apart from the fact that our population consists of many retired individuals, data from a large American study suggest that socioeconomically deprived patients are less likely to proceed with surgery.[29]

Sick leave, higher income, and migrant status affected the total QuickDASH score before and after surgery for TF. After adjusting for age, sex, diabetes, and other socioeconomic factors, the results remained significant. However, when comparing the relative change in QuickDASH score before and after surgery for TF, we found no difference in the change in QuickDASH score. This implies that more deprived patients perceive their disability worse than patients who are not as deprived before and after surgery but that the effect of the treatment is the same for any of the socioeconomic groups. One recent study using the Michigan Hand Outcomes Questionnaire with a similar population found that postoperative improvement depended on baseline scorings. Patients with worse scores at baseline had a larger improvement.[30] Related studies confirm an association between lower SES and higher perceived disability before and after treatment for CTS and ulnar nerve compression at the elbow, however, with as much improvement following surgery regardless of SES.[12 13] Low income is associated with worse patient-reported outcomes after total joint arthroplasty and orthopaedic trauma surgery.

Furthermore, the morbidity and complication rates are higher in this group.[31] Numerous studies have found associations between higher educational levels and better outcomes after total joint arthroplasty, orthopaedic trauma and hand surgery.[31–33]

One of the major strengths of this study is the large number of participants and the robust data from the included registries. There are limitations to the study. The response rate in HAKIR may have an impact on the present results. The QuickDASH questionnaire was sent out to the participants on three occasions, and they had a limited time to respond on each occasion. The response rate on each of these occasions was around 30%. Improvements have been seen regarding the response rate in HAKIR since it started in 2010, but further improvement is required.

The QuickDASH questionnaire is not disease-specific, which might impact associations between socioeconomic factors and perceived disability. We tried to address this by adjusting for known confounders and only including patients who were solely treated for TF and not a combination of diagnoses simultaneously. A disease-specific questionnaire might provide more accurate outcomes. However, the HAKIR registry design does not permit disease-specific questionnaires at present.

CONCLUSION

Earnings, sick leave the same year as surgery and migrant status affect patient-reported outcomes following TF surgery. Socioeconomically deprived patients report more symptoms before and after surgery, but socioeconomic factors do not affect the relative improvement.

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Acknowledgements We want to thank Andreas Rasku at Statistics Sweden, Caddie Zhou at NDR and Marianne Arner at HAKIR for her excellent help with data extraction. We are also very grateful to participating units, staff and patients, with whom this research was only possible. We would also like to thank Tina Folker for her administrative help.

Contributors MZ and LD designed the study. MZ compiled the data file. LL wrote the first draft and did the statistical analysis together with MZ. MR and LD contributed to data analysis, discussion, and manuscript writing. MZ acts as the guarantor of this work.

Funding This work was supported by the Swedish Research Council (#2022-01942, principal investigator LD), the Swedish Diabetes Foundation (#DIA2020-492), the Regional Agreement on Medical Training and Clinical Research (ALF; PI Dahlin) between Region Skåne and Lund University (#2018-Projekt 0104; PI Dahlin and Yngre-ALF; MZ) and Funds from Skåne University Hospital (#2019-659; PI Dahlin), Elly Olsson's Foundation for scientific research, Stig and Ragna Gorthon Foundation (MZ and MR), Almroth Foundation, Kockska foundation (MZ), the Magnus Bergvall Foundation (2020-03612, MZ).

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Patients provide written informed consent before inclusion in NDR and HAKIR.

Ethics approval This study involves human participants and was approved by the Regional Ethical Review Board in Lund, Sweden (2016/931, 2018/57 and 2018/72). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data may be obtained from a third party and are not publicly available. Researchers can apply for the data by contacting HAKIR, NDR, and SCB after ethical approval from the Swedish Ethical Review Authority.

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