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ORIGINAL ARTICLE

Epidemiology of forearm fractures in women and men in Norway 2008–2019

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Abstract

Summary The purpose of this paper is to describe rates of forearm fractures in adults in Norway 2008–2019. Incidence rate of distal forearm fractures declined over time in both sexes. Forearm fracture constitute a significant health burden and prevention strategies are needed.

Purpose To assess age- and sex-specific incidence rates, and time trends for forearm fractures in Norway, and compare these with incidence rates in other Nordic countries.

Methods Data on all patients aged 20–107 years with forearm fractures treated in Norwegian hospitals from 2008 to 2019 was retrieved from the Norwegian Patient Registry. Fractures were identified based on International Classification of Disease 10th revision code S52. Age- and sex-specific incidence rates and changes in incidence rates were calculated.

Results We identified 181,784 forearm fractures in 45,628,418 person-years. Mean annual forearm fracture incidence rates per 100,000 person-years were 398 (95% CI 390–407) for all, 565 (95% CI 550–580) for women, and 231 (95% CI 228–234) for men above 20 years. Mean annual number of forearm fractures was 15,148 (95% CI 14,575–15,722). From 2008 to 2019, age-adjusted total incidence rates of forearm fractures S52 diagnoses declined by 3.5% (incidence rate ratio (IRR) of 0.997 (95% CI 0.994–0.999)) in men. The corresponding decline in women was not significant (IRR: 0.999 (95% CI 0.997–1.002)). In the same period, the age-adjusted incidence rates of *distal* forearm fractures declined by 7.0% in men (IRR = 0.930; 95% CI 0.886–0.965) and 4.7% in women (IRR = 0.953; 95% CI 0.919–0.976). The incidence rates of distal forearm fractures were similar to rates in Sweden and Finland.

Conclusion Age-adjusted incidence rates of distal forearm fractures in both sexes declined over time.

Keywords Epidemiology · Forearm fractures · Fragility fractures · General population studies

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Introduction

Forearm fractures are common, especially in women, and distal forearm fractures contribute substantially to the burden of osteoporotic fractures [1, 2]. A forearm fracture results in morbidity for those affected, and especially a distal forearm fracture in patients 50 year or older is a risk factor for future fractures, including the more severe hip fracture with high associated mortality [3–6]. Therefore, evaluation of osteoporosis after distal forearm fracture is important to identify persons in need of osteoporosis treatment to reduce morbidity and mortality by preventing hip, vertebral, and proximal non-hip non-vertebral fractures [7].

Norway and the rest of Scandinavia have among the highest incidences of distal forearm fractures in the world [8]. Studies from both North America, Australia, and Scandinavia have shown increasing age-adjusted incidence rates until 1980, and declining rates thereafter [9–12]. The decline in incidence of distal forearm fractures was confirmed in data from Oslo, Norway in 2007, after showing no significant change in incidence rates between 1979 and 1998/99 [10, 13]. However, recent Swedish studies have shown increasing incidence rates of distal forearm fracture between 1999 and 2010 [2, 14, 15], but decreasing incidence of distal forearm fractures from 2001 and 2016 [11].

The incidence of forearm fractures has previously been estimated from small studies in many countries [2, 16]. The mean age- and sex-adjusted incidence rate of distal forearm fractures in adult over 18 years of age was 244 per 100,000 person-years (PY) in Norway from 2009 to 2014 in a study based on data from Norwegian Patient Registry (NPR) [17]. However, national age- and sex-specific forearm fracture incidence rates and time trends have not been studied in Norway.

Norway has a universal access single-payer health care system and fractures treated in secondary care are reported to NPR. Most forearm fractures in Norway are treated at hospitals, but in areas located far from hospitals uncomplicated forearm fractures may be treated in primary care only and these fractures are recorded in another register (Norwegian Control and Payment of Health Reimbursement). A study comparing forearm fractures registered both in primary and in secondary care found that 92.6% were detected by the NPR, whereas 7.4% were registered by primary health care alone [18]. The study also found that in remote areas, 80% of forearm fractures were treated in primary care on site, and a review of medical records showed that 60% of registrations in the remote primary care facilities were incident forearm fractures.

The aim of this study was to investigate nationwide overall numbers and age-standardized incidence rates of forearm fractures between 2008 and 2019 in Norway among women and men over 20 years of age. Comparisons were made by year, age, sex, and seasons. In addition, we wanted to examine overall numbers and age-specific incidence rates of distal and proximal forearm fractures, as distal forearm fracture are associated with osteoporosis and is an important risk factor for subsequent osteoporotic fractures. We compared overall incidence rates of forearm fractures during summer and winter (by sex and age). Lastly, we compared the standardized incidence rates of distal forearm fracture in Norway to standardized incidence rates from previous studies from other Nordic countries.

Materials and methods

Study population

Women and men over the age of 20 years treated for a forearm fracture between January 1, 2008, and December 31, 2019, in Norway were included. De-identified patient-level data from the NPR on all fractures treated in Norwegian hospitals and large emergency units was retrieved, both in- and outpatients (main or additional diagnosis).

Data on background population demographics on January 1, of the years 2008–2020, were retrieved from Statistics Norway. Mid-year populations were calculated as the mean of the population with the age X of the respective year, and the population with the age $X+1$ the following year.

Forearm fracture diagnoses

The International Classification of Disease 10th revision codes (ICD-10) S52 with subgroups were used to define forearm fractures. Proximal forearm fractures were identified with the ICD-10 codes S52.0 and S52.1 and distal forearm fractures with ICD-10 codes S52.5 and S52.6. Shaft fractures were defined as fractures with the ICD-10 codes S52.2, S52.3, and S52.4, and fractures with the ICD-10 codes S52.7, S52.8, and S52.9 were classified as other forearm fractures. The ICD-10 codes for follow-up visits and Nordic Medico-Statistical Committee (NOMESCO) Classification of Surgical Procedures (NCSP) [19] for reduction, treatment with a cast, and reoperation were used to separate between incident and prevalent forearm fractures; see supplementary Table S1 and S2 for full list of codes used for this classification. We excluded registrations with ICD-10 codes for follow-up visits, except for first-time fracture registrations with a code for follow-up visit. This was done because some patients with fractures receive initial treatment in primary care (not reporting to the NPR) before being referred to hospital, and therefore the incident fracture is sometimes coded as a follow-up visit in secondary care (reporting to the NPR). Fractures with NCSP code for reoperation were excluded.

Validation and wash-out period

The validity of the S52.1 through S52.9 diagnosis was examined in the patient administrative systems (reporting to the NPR) in five Norwegian hospitals in 2015 [20]. A washout period of 6 months was used for patients with more than one fracture registration, and a maximum of two forearm fractures per person in the study period was allowed. A maximum of two forearm fractures was chosen to limit the risk of counting prevalent forearm fractures as incident forearm fractures.

Statistical analyses

We calculated age- and sex-specific incidence rates per 100,000 person-years (PY), using mid-year populations in 1-year age groups as approximations for population at risk each year. Age-standardization was performed by the direct method, using the mean of the age distribution in Norway in 1-year age groups as standard population. This was done separately for women and men. To investigate time trends, we used linear regression to evaluate change in age at first fracture over time (retrieving β with 95% confidence interval (CI)), and negative binomial regression (incidence rate ratios (IRRs) with 95% CI) to evaluate change in age-adjusted incidence rates over time. For calculations of median age at first fracture, patients experiencing fractures in the period 2008–2010 were excluded to make sure that we counted the first forearm fracture starting from 2011. Mean age-specific incidence rates of forearm fractures in summer (June, July, and August) and winter (December, January, and February) months were compared in women and in men.

To facilitate comparison with other studies, number of fractures (comparable with our data and person-years in 10-year age groups) was obtained from published studies where this information was available. Comparison of standardized incidence rates was performed by the direct method using the mean age distribution of all included studies as the reference. Incidence rates from the different studies were compared using negative binomial regression.

We performed a sensitivity analysis including the additional 7% of forearm fractures not registered in NPR [18], to examine whether the time trend in incidence of forearm fractures changed. We also presented overall rates adjusted for registrations of approximately 5% of forearm fractures that were registered only in primary care. There are two reasons for not including the primary care data in all analyses. Firstly, data registered in primary care is less specific and does not allow analyses of fracture subgroups, because it is based on ICPC codes. Secondly, less is known about the validity of the primary care registrations, and our attempt to identify the missing fractures treated in primary care in a pilot study suggested that the registration is less accurate than the NPR data, due to a high amount of tentative diagnosis (Dahl & Omsland). Thirdly, the registrations exclusively in primary care occur more often among men and younger patients, which complicates age-specific overall adjustments. Consequently, in the main analysis, we used data only from secondary care, and included first-registration fractures even if they had a follow-up control code. To examine whether the time trends changed when including fractures form primary care, we performed two sensitivity analyses using data from Dahl et al. [18]: (a) secondary care data, without fractures coded as follow-up visits and without those treated exclusively in primary care, and (b) secondary care data with first fracture registrations coded as follow-up visits, and with those treated exclusively in primary care.

All statistical analyses were performed in STATA (Version 16, StataCorp LP, TX, USA). We considered a two-sided alpha = 0.05 to be statistically significant.

Results

During the study period, we identified a total of 181,784 forearm fractures in 45,628,418 PY after the age of 20 years and 131,390 forearm fractures in 20,572,100 PY after the age of 50 years. Women accounted for 71% of all fractures and 80% of the fractures over the age of 50 years. Median age at first forearm fracture was 64 (20–106) years for women and 50 (20–103) years for men. During the calendar years 2011–2019, the mean age at first fracture declined significantly for women by 0.11 years (95% CI −0.16; −0.07), while it increased for men by 0.12 years (95% CI 0.04–0.19).

Overall number and incidence rates (all S52 codes)

The mean number of all forearm fractures per year, in the period from 2008 to 2019, was 15,148 (95% CI 14,575–15,722), (Table 1). Number of forearm fractures by types, i.e., proximal (S52.0, S52.1), shaft (S52.2, S52.3, S52.4), distal (S52.5, S52.6), and others (S52.7, S52.8, S52.9), are shown in Supplementary Table S3. The mean annual incidence rates per 100,000 PY of all forearm fractures (all S52 codes) after the age of 20 years were 398 (95% CI 390–407) for both sexes, 565 (95% CI 550–580) for women, and 231 (95% CI 228–234) for men (Table 1, Fig. 1). The corresponding rates per 100,000 PY adjusted for 5% of forearm fractures that were calculated to be treated only in primary care were 593 in women and 240 in men. Mean annual incidence rates of all forearm fractures after the age of 50 were 981 (95% CI 956–1006) for women and 268 (95% CI 264–273) per 100,000 PY for men.

Table 1 Age-adjusted annual incidence of all forearm fractures (ICD-10 code S52) per 100,000 person-years

Years	Midyear population[a]	N S52[b]	Incidence women	Incidence men	Incidence women > 50 years	Incidence Men > 50 years
2008	3,509,624	14,264	579	236	1024	281
2009	3,561,006	14,072	557	236	961	263
2010	3,613,231	14,709	577	238	992	271
2011	3,672,577	14,837	580	230	1005	276
2012	3,734,076	14,517	552	228	960	268
2013	3,791,489	15,566	588	236	1025	273
2014	3,845,937	14,043	508	224	890	256
2015	3,896,213	15,157	549	230	953	260
2016	3,940,147	15,484	560	225	970	260
2017	3,981,378	15,973	573	225	995	269
2018	4,020,643	16,722	591	233	1,020	274
2019	4,062,097	16,440	570	229	986	271
Total	45,628,418	181,784				
Mean (95% CI)			565 (551–580)	231 (228–234)	982 (957–1006)	268 (264–273)

[a]Mid-year population obtained from statistics Norway

[b]Both main and additional diagnosis codes from the patient register

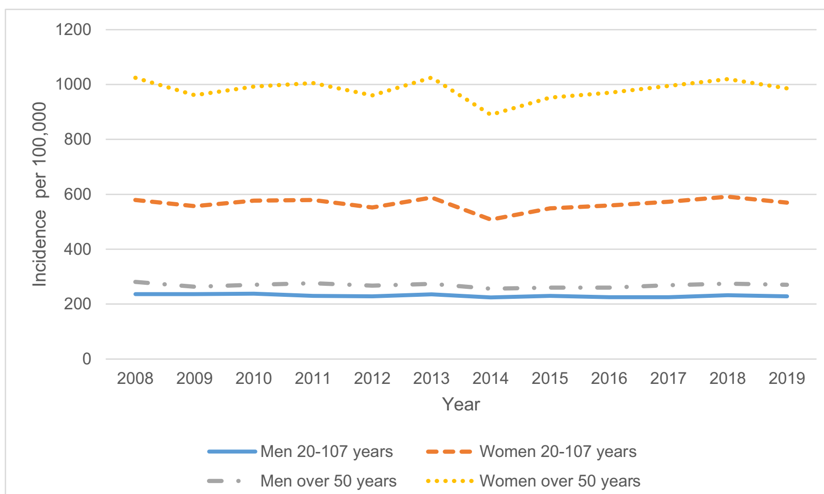


Fig. 1 Incidence rates of all forearm fractures per 100,000 person-years for women and men by year

Age-specific incidence rates

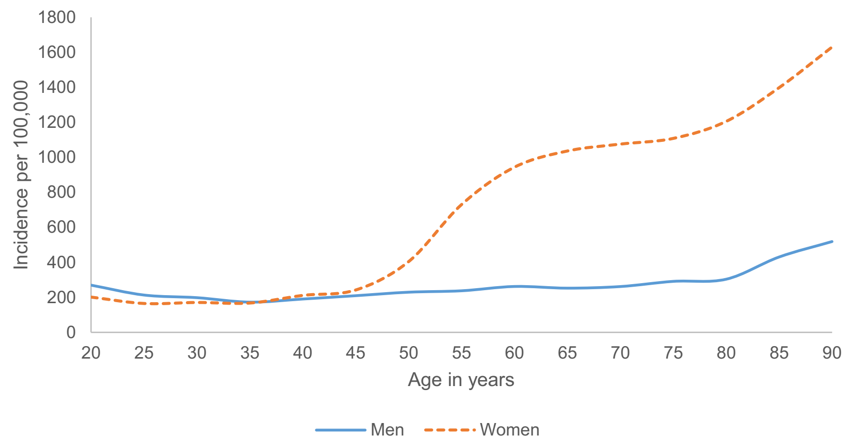
Incidence rates increased steeply after the age of 50 in women, whereas in men incidence rates were slightly higher in the early twenties, declined until the early thirties and thereafter increased slowly until the age of 80 years where there was a steeper increase in rates (Fig. 2). The crude annual incidence rates by age groups are shown in Supplementary Table S4.

Time trends in incidence rates

The age-adjusted incidence rates of all forearm fractures were stable during the study period for women but declined by 3.5% for men. The IRRs were 0.999 (95% CI 0.997–1.002) for women and 0.997 (95% CI 0.994–0.999) for men.

The mean annual number of distal and proximal forearm fractures is shown in Supplementary Table S5. Women accounted for 75% of the distal and 58% of the proximal forearm fractures.

Fig. 2 Incidence rates of all forearm fractures per 100,000 person-years by age and sex



Mean annual incidence rates per 100,000 PY for distal forearm fractures for all patients, women, and men over 20 years were 274 (95% CI 265–284), 415 (95% CI 402–428), and 136 (95% CI 133–139), respectively. For proximal forearm fracture, the mean annual incidence rates per 100,000 PY were 70 (95% CI 66–72) for women and 51 (95% CI 50–53) for men. For patients over 50 years, the mean annual incidence rates per 100,000 PY for distal forearm fractures was 747 (95% CI 724–769) for women and 178 (95% CI 174–183) for men.

Age-adjusted incidence rates of distal forearm fractures significantly declined from 2008 to 2019 by 4.7% for women (IRR = 0.953 (95% CI 0.919–0.976)) and 7.0% for men (IRR = 0.930; 95% CI 0.886–0.965). The age-adjusted incidence rates of proximal forearm fractures from 2008 to 2019 increased for both women (IRR = 1.010 (95% CI 1.005–1.015)) and men (IRR = 1.010 95% CI (1.005–1.015)).

Comparison of mean incidence rates of forearm fracture by season

In women, the mean forearm fracture incidence rate per 100,000 PY during 2008–2019 was higher in winter 1142 (95% CI 1068–1215) than summer 802 (95% CI 752–853), $p < 0.001$, whereas difference observed in men was less pronounced, 462 (95% CI 361–562) vs. 362 (95% CI 291–434), $p = 0.11$ (Fig. 3).

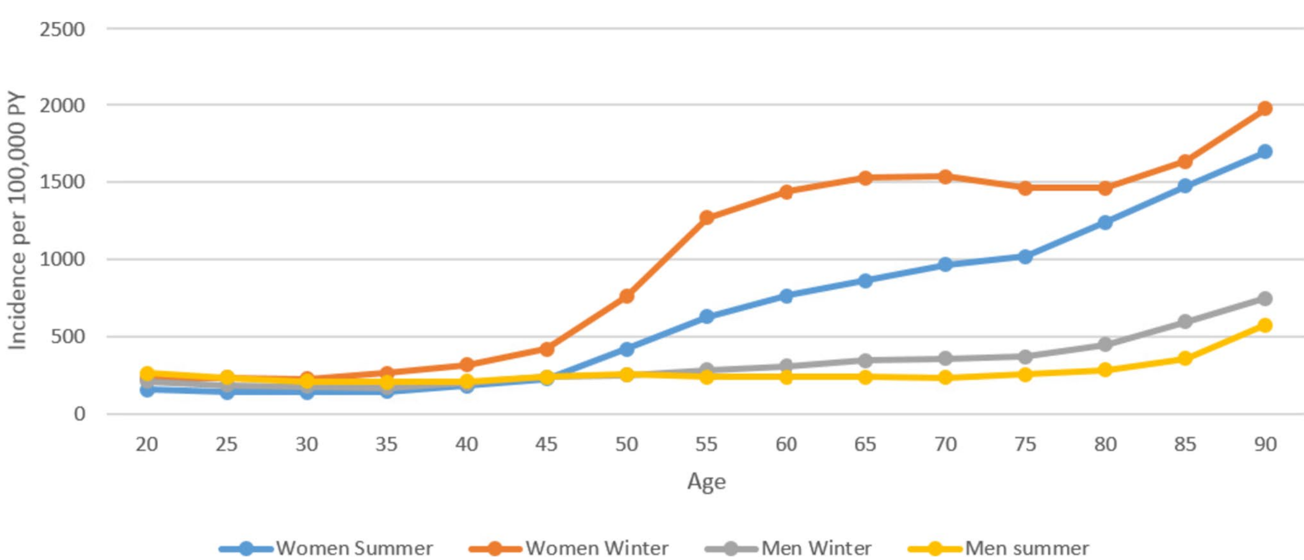


Fig. 3 Incidence rates of all forearm fractures per 100,000 person-years (PY) by age and sex in winter (December-February) and summer (June–August)

Comparison of age-standardized rates of distal forearm fractures by country

The incidence rates of distal forearm fractures in the current study from Norway among patients 20 years and older were not significantly different compared to incidence rates in studies from Sweden and Finland, but lower in women ($p < 0.001$) not in men ($p = 0.072$) compared to a study from Denmark (Table 2).

Validation and sensitivity analyses

With the algorithm used to define fractures in the current study, we have estimated a positive predictive value of 91%. The patient administrative system covered 90% of the verified S52-fractures identified by the x-ray/CT searches.

The sensitivity analysis showed that including forearm fractures treated in primary care increased the overall incidence rate by approximately 6% (Supplementary Table S6). Additionally, the sensitivity analyses showed no essential changes in the incidence rates of all forearm fracture by time.

Discussion

This is the first study on age- and sex-specific nationwide incidence rates and time trends of forearm fractures in Norway. For the study period of 12 years, we identified a total of 181,784 forearm fractures during 45,628,418 PY in women and men over 20 years of age. The mean annual incidence rate was 565 and 231 per 100,000 PY for women and men, respectively. The overall age-standardized incidence rates of all forearm fractures declined by 3.5% for men and remained unchanged for women during the study period. Age-adjusted incidence rates of distal forearm fractures slightly declined from 2008 to 2019 for both women and men. The mean age at first forearm fracture decreased for women and increased for men. Mean incidence rates of forearm fractures were higher in winter compared to summer in women, but no difference was observed in men.

Comparison to other studies

A distal forearm fracture is important because it is known to be associated with osteoporosis and is associated with an increased risk of a subsequent osteoporotic fracture [21]. When focusing solely on distal forearm fractures, it was possible to compare results to other Nordic countries. However, comparison to other studies should be done cautiously. The different studies included patients from different age groups and the ICD-10 codes used for identification of forearm fractures and the procedure codes used to separate prevalent from incident cases varied in these studies. Furthermore, the age and sex distribution differed between studies from the Nordic countries. To correct for differences in these demographic compositions, we performed a standardized comparison of incidence rates of distal forearm fractures, where we calculated standardized incidence rates of distal forearm fractures (S52.5 and S52.6).

Table 2 Age-standardized distal forearm fractures, crude, and adjusted incidence rates per 100,000 person-years in women and men over 20 years and over 50 years of age

Author[a]	Year(s)	Country	ICD-10 codes/fracture type	Crude incidence rates, women	Adjusted incidence rates[b] (95% CI), women	Crude incidence rates, men	Adjusted incidence rates[b] (95% CI), men
20 + years							
Current study	2008–2019	Norway	S52.5, S52.6	415	421 (418–424)	137	137 (135–138)
Lofthus et al	1998/1999	Norway	S52.5, S52.6	560	603 (567–638)	192	244 (213–275)
Jerrhag et al	1999–2010	Sweden	S52.5, S52.6, S52.8	412	385 (380–390)	143	141 (137–144)
Abrahamsen et al	2010	Denmark	S52.5 S52.6	530	519 (509–528)	152	152 (146–157)
Flinkkilä et al	2008	Finland	S52.5, 52.6	381	416 (359–473)	167	167 (129–205)
+ 50 years							
Current study	2008–2019	Norway	S52.5, S52.6	746	750 (745–755)	178	179 (176–181)
Lofthus et al	1998/1999	Norway	S52, S62.8	1098	1062 (992–1131)	221	234 (197–271)
Diamantopoulos et al	2004/2005	Norway	S52.5, S52.6	796	796 (737–854)	216	216 (183–245)
Jerrhag et al	1999–2010	Sweden	S52.5, S52.6	712	688 (679–698)	172	168 (163–174)
Abrahamsen et al	2010	Denmark	S52.5, S52.6	926	932 (913–950)	203	205 (195–214)
Flinkkila et al	2008	Finland	S52.5, S52.6	710	725 (614–836)	223	232 (160–304)

[a] Data from studies with available published data

[b] Age-standardized by the direct method

However, the studies differed in the method for identification of distal forearm fractures and calendar year. We found lower incidence rates of forearm fractures in the current study [10] compared to a study from Oslo, Norway, where true fractures were verified manually from medical records and x-ray reports from 1999 [10]. However, the higher incidence rates in the Oslo study [10] could also partly be explained by actual higher incidence rates in urban areas (compared to in our nationwide study), and/or be a result of declining incidence rates of distal forearm fracture over time [22, 23]. The crude incidence rates in the current study were comparable to those shown in Akershus county in 2010–2011 and South of Norway in 2004–2005 [13, 24]. Comparing our results in the current study to the Finnish and the Swedish studies, incidence rates for both women and men were not significantly different, whereas the Danish rates were significantly higher in women but not in men [2, 14, 25]. The total annual number of proximal and distal forearm fractures in our study was markedly lower than those in Denmark from 2010. However, standardized incidence rates were comparable; thus, the crude differences may be due to different underlying population distributions in the two countries [16].

Despite somewhat different criteria for the definition of forearm fracture cases, we report very similar incidence rates of distal forearm fracture as a previous nationwide Norwegian study based on the same data source, where mean age- and sex-adjusted incidence rates from 2009 to 2014 were 244 per 100,000 PY (versus 274 in the present study) [17].

Women sustained the majority of the fractures, and the male-to-female ratio of 1:4 for those over 50 years were comparable to previous studies [13, 24]. Furthermore, we found the same increase in incidence rates for women after the age of 50 years as shown in previous studies and similar incidence rates for men [10, 13, 23, 24]. The mean age at the first forearm fracture was significantly higher for women compared to men. The pattern of the incidence rates by age in women and men were strikingly different, with progressively increased risk of forearm fracture after age 50 in women. In men, rates peak at age 20, declined, and thereafter slowly increased all the way into old age after age 35. The observed mean ages and the differences are in line with previous studies [10, 23, 26].

A decline in incidence rates of distal forearm fractures in Norway based on significantly lower incidence rates in South Norway in 2004–2005 compared to the Oslo study from 1998/99 has previously been shown [10, 13]. The decline in age-adjusted incidence rates of distal forearm fractures (S52.5 and S52.6) for both women and men during 2008–2019 in our study suggests a continued decline after 2005. Unfortunately, it is not possible to study nationwide incidence rates before 2008 as this was the first year with person identifiable data in the Norwegian Patient Register. Danish studies showed a decline in incidence rates of forearm fractures between 1995 and 2010 [12]. However, the Danish and Finnish studies showed no change in nationwide incidence rates of distal forearm fractures between 2013 and 2019 [27, 28]. Swedish studies showed an increase of the incidence rate of distal forearm fractures between 1999 and 2010 and a decrease between 2001 and 2016 [2, 11, 14, 15]. The increase in incidence rates is from studies in the same region in Sweden (Skåne) including fractures from 1999 to 2010 [2, 14]. However, a study on residents in the north-eastern part of this region (Skåne) showed decreasing incidence rates of distal forearm fractures from 2001 and 2016 [11]. Furthermore, the incidence rate of distal forearm fractures decreased for both children and those over 65 in Stockholm between 2004 and 2010 [15].

The observed decline in incidence rates could have multiple explanation. Firstly, changes in lifestyle with reduced smoking, which is a known risk factor for osteoporotic fractures, as well as an increase in body mass index in the population, which have shown to reduce the risk of distal forearm fractures in women [29, 30]. Secondly, an increase in usages of anti-osteoporotic drugs, although we know from a regional Norwegian study that osteoporosis is undertreated [31].

The NPR did not include registrations of the personal identification number before 2008, and for that reason fractures that year and the years after might have been underreported. Consequently, the true decline in incidence rates could be somewhat greater than what we have shown in this study. The low number of fractures in 2014 can probably be explained by an unusually mild winter and spring in Norway in 2014, as outdoor temperature has been found to be associated with forearm fracture incidence in Norway, particularly in women [32]. Also, we observed higher mean incidence of forearm fractures for women in winter compared to summer and women sustained the majority of the fractures in the study.

The increase of the aging population will increase the workload on hospitals, as well as the fracture-related costs.

For patients, forearm fractures are painful and may lead to long-term disability and sick leave [33, 34]. Distal forearm fractures are common fractures in Norway, especially during sub-zero temperatures, and they are highly associated with osteoporosis [32, 35, 36]. Nonetheless, treatment of osteoporosis after fractures has been suboptimal in Norway; only 11.2% of women and 2.7% of men used AOD the first year after a first forearm fracture [37]. A first fracture increases the risk of new fractures, and a fracture liaison service, which includes patient-specific advice and treatment with anti-osteoporosis drugs (AOD), may reduce this risk [7, 34, 38]. The results of this study warrant attention to preventive strategies such as fracture liaison service to minimize the risk of subsequent fractures in patients with forearm fracture.

Our study has strengths and limitations. This is the first nationwide study reporting age- and sex-specific incidence rates of forearm fractures in Norway. We included all forearm fractures in patients 20 years and older. The main analysis focused on fractures treated in secondary care, and we included additional fractures exclusively treated in primary care in sensitivity analysis. The sensitivity analysis showed no differences in time trends of incidence rates of forearm fractures compared to the main analysis. The use of patient registers, such as the NPR, has both advantages and disadvantages. It allows large populations to be studied over an extended period of time. However, some degree of misclassification is likely to occur in patient register data and we performed a validation study to investigate this. Given the algorithm used to define outcomes, we estimated a positive predictive value of 91% and the sensitivity was 90%. In studies of incidence rates, false negative cases should balance the false positive cases in order to obtain estimates near true values. If anything, we might have underestimated the true incidences slightly based on these data. Still, there is some underestimation of incidence rates, as up to 7% of all cases are treated by the primary care only [18].

In conclusion, nationwide age- and sex-specific incidence rates of forearm fractures are high in Norway. During 2008–2019, there was a decline in the overall age-standardized incidence rates of all forearm fractures for men, but not for women. However, the age-standardized incidence rates of distal forearm fractures declined in both sexes in the period. Even though very high incidence rates of forearm fracture have been reported in Oslo previously, rates in the current study were not significantly higher compared to other Nordic countries.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s00198-023-06990-6.

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Data availability Due to protection of privacy under General Data Protection Regulation and Norwegian law, the individual-level data can only be made available after approval by the Regional Committee for Medical and Health Research Ethics.

Declarations

Ethical approval The study was approved by the Regional Committee for Medical and Health Research Ethics. The University of Oslo performed a Data Protection Impact Assessment (DPIA) in agreement with the General Data Protection Regulation. The study on validation of the S52 diagnosis was approved by the Norwegian Directorate of Health and Norwegian Agency for Shared Services in Education and Research. In addition, the University of Oslo performed a separate DPIA.

Disclaimer The funders had no role in the design or conduction of the study, as well as collection, analyses, or data interpretation.

Conflict of interest CA, CD, LBS, TW, JMS, FIN, LN, ÅB, and TKO report no support from any organization for the submitted work; TTB reports speaker fees from UCB, Amgen, Roche, and Pharma Prim. Advisory board for UCB; JEG reports speaker fees from Ortomedic Norway and LINK Norway; WF reports speaker fees from Ortomedic and Zimmer Biomet; FF reports speaking fees from UCB and Amgen.

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