ACTA ODONTOLOGICA SCANDINAVICA
2022, VOL. 80, NO. 3, 169–176
https://doi.org/10.1080/00016357.2021.1974936

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ORIGINAL ARTICLE

Reporting suspicion of child maltreatment - a 5 yr follow-up of public dental health care workers in Norway

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ABSTRACT

Objective: This study examined stability and change of Norwegian dental health care workers' mandated reporting of suspected child maltreatment from 2014 to 2019 as well as the influence on reporting practices from regional, sociodemographic- and attitudinal factors. It was hypothesised that those factors associate independently with reporting practices across the survey period.

Methods: In 2014 a census of 1542 dental health care workers employed in the public dental health care service (PDHS) were invited to participate in an electronic survey and 1200 (response 77.8%) consented to participation. Corresponding figures in 2019 were 1791 and 1270 (response 70.9%). Of the 1200 participants in 2014, 591 participated in 2019 (follow up 49.3%).

Results: A total of 58% and 25.7% of the dental health care workers confirmed ever reporting and avoidance of reporting in both survey years whereas 24.6% and 17.2% changed the status of ever- and avoiding reporting across time. The likelihood of being a stable reporter was greatest in experienced participants, those living in eastern parts of Norway and confirming professional obligations to report. At the population level, 59.6% and 79.5% confirmed ever reporting of suspected maltreatment in 2014 and 2019. Corresponding figures for confirmed avoidance of reporting were 33.9% and 37.9%.

Conclusion: Reporting of suspected child maltreatment is maintained at a relatively high level and varies by socio-demographic and attitudinal concerns.

ARTICLE HISTORY
Received 7 June 2021
Revised 11 August 2021
Accepted 26 August 2021

KEYWORDS:
Children; maltreatment; oral health care services; oral health care workers

Introduction

Child maltreatment is the act or omission by caregivers, regardless of intent, that results in the threat of harm or actual harm to children, encompassing physical abuse, sexual abuse, psychological or emotional abuse, neglect, and intimate partner violence [1]. Neglect includes failure to meet a child's basic needs, including physical-, emotional-, educational-, medical- and dental needs [1]. Globally, about 40 million children experience abuse or child maltreatment annually with about 25% reporting physical-, 30% sexual - and 36% emotional abuse, and 16% physical neglect at some point during their childhood [2]. International studies have shown that the prevalence of children experiencing different forms of maltreatment range between 10% and 36% [3–8]. An earlier population-based study of Norwegian adolescents revealed prevalence rates of sexual abuse amounting to 6% and 1.6% in girls and boys, respectively [9]. In a recent Danish population-based study, the prevalence of various child maltreatments before the age of 12 years varied from 3% to 5% [7].

It is widely recognised that child maltreatment is not only underestimated and underreported but acts as a social determinant of health, constituting an international public health problem that contributes to morbidity and mortality [6,10]. Many studies have identified associations between child maltreatment and subsequent poor mental- and physical health-, health risk behaviours, injuries, missed health care appointments, and poor oral health [3,11–13]. Children who experience direct abuse or neglect have shown a higher prevalence of early childhood caries than non-abused children [14,15]. A systematic review summarised a delay in seeking care, failure to follow dental advice and provide basic oral care as key behavioural patterns in parent/care characteristics of children with dental neglect [16]. Åstrøm et al. [17] and Bernabee et al. [18] reported on long-term negative consequences of early adverse childhood experiences for dental attendance patterns and poor oral health. Felitti [19] called for secondary prevention of the long-term poor health effects of adverse childhood experiences.

In most European countries, health personnel is obliged by law to report suspected child maltreatment to the child welfare services, CWS [20]. In Norway, the public dental health care service, PDHS, is mandated to prioritise the prevention of oral diseases and to offer children and adolescents free dental check-ups and treatment. Thus, almost all Norwegian children and adolescents 0–19 years of age are regularly seen by the PHDS. Child abuse associated with strong orofacial signs and injuries to the exposed part of face, neck, and ears as well as rampant caries may easily be

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This article has been corrected with minor changes. These changes do not impact the academic content of the article.
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observed during routine extra- and intraoral examinations in dental care settings. Evidence suggests, however, that a gap between suspected and actual reporting of child maltreatment seems to persist [20]. In Norway, about 33% of dental health care workers admitted to having failed to report suspected maltreatment to the CWS in 2014 [3,21]. Consistently, a key finding from a study in Israel has shown that health care personnel do not report according to legislation every child for a condition that invokes reasonable suspicion of maltreatment [22]. A Swedish study revealed that in both specialists- and general dentistry, suspicion of maltreatment occurs more often than reports are filed to CWS [8]. Among dental health care workers in Faroe Island, only 39% of those who suspected child maltreatment at some point in their career had reported their suspicion [4]. In Denmark, dental health care workers reported that of 38% who confirmed suspected child maltreatment, 34% had filed a report of concern [5]. Nevertheless, according to a Dutch study, public child health care workers were more likely to look for signs of abuse, report suspected maltreatment, and was also more comfortable talking to parents about child maltreatment as compared to other childcare workers [23].

To date, several international studies have examined dental health care workers' mandated child maltreatment reporting [15,24]. Longitudinal studies addressing stability and change of dental health care workers' reporting practices are however at the best generally scarce. In addition, changes in attitudes across time regarding reported suspected child maltreatment remains relatively unexplored [24]. To implement effective education and training programs for health care personnel, there is a need to monitor the patterns of their reporting behaviour and to identify associated regional-, sociodemographic- and attitudinal factors.

Focusing a cohort of dentists and dental hygienists employed in the public dental health care services, PDHS, in Norway, this study examined stability and change in mandated reporting of suspected child maltreatment across time from 2014 to 2019. Moreover, this study investigated the influence on dental health care workers' reporting practices across time from regional-, sociodemographic- and attitudinal factors. It was hypothesised that regional, sociodemographic- and attitudinal factors associate independently with reporting practices across the 5-year survey period.

Methods

The present work is based on data emanating from a prospective cohort of Norwegian dental health care workers employed in the PDHS, in Norway. In 2014, a census of dentists and dental hygienists were invited to participate in an electronic survey. Follow-up reminders were sent to non-responders after two, four, and seven weeks. Information was collected regarding dental health care workers' experience with reporting suspected child maltreatment, organisational aspects of the PDHS and sociodemographic- and attitudinal characteristics of the employees. In 2014, 1542 dental health care workers were invited to participate and 1200 (response rate 77.8%) consented to participate [3]. In 2019, a census of dentists and dental hygienists employed in the PDHS were invited to participate in a follow-up electronic survey. A total of 1791 dental health care workers received an invitation and 1270 consented to participate (70.9%). Of the 1200 participants at baseline in 2014, a total of 591 also participated in 2019 (follow up rate 49.3%). Electronic questionnaires with similar content and ways of administration at each survey ensured comparability of the data across time. On both survey occasions, the chiefs of the PDHS provided names and email addresses of their employees and provided permission to answer the electronic survey during working hours. The Ombudsman and Norwegian Social Science Data Services (NSD) approved and registered the surveys and NSD was responsible for its administration. The present study is based on data generated by the follow-up cohort of 591 dental health care workers (i.e. those who participated both in 2014 and 2019) employed in the Norwegian PDHS.

Measurements

Outcome variables

Ever reported suspicion of maltreatment was assessed repeatedly in 2014 and 2019 as a time-variant binary variable using the question 'During your time as a dental professional have you ever filed a report of concern due to suspicion of child abuse or neglect' with response categories No = 0 and Yes = 1. A transition (combined) variable was created from the binary variables in each survey year and measured (0) stable not ever reporting in 2014 and 2019 (answering no in both survey years), (1) change from not ever reported in 2014 to ever reporting in 2019 (i.e. answering no in 2014 and yes in 2019), (2) stable ever reporting in 2014 and 2019 (answering yes in both survey years). For analyses. a dummy variable was created in terms of (1) stable ever reporting in 2014 and 2019, (0) stable not ever reporting/change from not ever- to ever reporting. Respondents who confirmed ever reporting in 2014 and 2019 were followed up by the question 'How many times have you filed a report of concern'?

Recently reported suspicion of maltreatment was assessed by asking – 'Were some of the reports that you have sent during your career filed during the previous 3 years' with response categories No = 0 and Yes =1. A transitional variable was created in terms of (0) stable no recent reporting in 2014 and 2019, (1) change from recent reporting in 2014 to no recent reporting in 2019, (2) change from no recent reporting in 2014 to recent reporting in 2019 (3) stable recent reporting in 2014 and 2019. For analyses, a dummy variable was created in terms of (1) stable recent reporting in 2014 and 2019 and (0) stable no recent reporting/change from no recent reporting to recent reporting/change from recent reporting to no recent reporting. Respondents who confirmed recent reporting during the previous 3 years in 2014 and 2019 were followed up by asking 'How many times have you reported suspicion of maltreatment the previous 3 years'.

Avoidance of sending report of concern was assessed at each survey year by asking 'During your time as a dental professional, have you ever failed to send a report of

concern due to suspicion of child abuse or neglect'. Response categories were No = 0 and Yes = 1. A transitional variable (combined) was created in terms of (0) stable not ever avoidance (i.e. answering no in each survey year), (1) from not ever avoidance to ever avoidance (i.e. answering no in 2014 and yes in 2019) and (2) stable ever avoidance (i.e. answering yes in both survey tears). For analyses, a dummy variable was created in terms of (1) stable ever avoidance and (0) stable not ever avoidance/change not ever avoidance to ever avoidance. Respondents who confirmed having avoided reporting suspicion of child maltreatment in 2014 and 2019 were followed up by asking' How many times have you failed to send a report of concern due to suspicion of child abuse or neglect'.

Exposures

Socio-demographics (in italic) were assessed in terms of age dichotomised into (1) 20–39 years and (2) 40 years and above, sex (1) female (2) male, the number of patients below 18 years treated the last 12 months was dichotomised into (1) 0–500 patients and (2) above 500 patients, region of employment categorised into (1) Northern Norway, (2) Mid Norway, (3) West Norway, (4) southeast Norway and (5) Eastern Norway with capital – according to the categorisation of Statistics Norway. For analyses, the region was recoded to (1) Western Norway, (2) Northern/Mid Norway, (3) Eastern Norway with Capital/South-Eastern Norway. *Attitudes in terms of professional obligations* were assessed by asking 'As a dental health care worker I feel professional obligations to send a report upon suspected maltreatment' assessed on a 5-point Likert scale ranging from (1) complete disagree to (5) complete agree. For analyses, this variable was dichotomised into (0) disagree/either agree nor disagree and (1) agree. *Attitudes in terms of ethical obligations* were assessed on a 5-point Likert scale ranging from (1) complete disagree to (5) complete agree by asking 'Personally I feel an ethical obligation to report suspicion of maltreatment'. For analyses, this variable was dichotomised into (0) disagree and (1) agree. Summary scores (0–3) of professional and ethical obligations were constructed across the survey years in terms of (0) stable disagreement of professional/ethical obligations in 2014 and 2019, (1) change in agreement/disagreement professional/ethical obligations in 2014 or 2019, (2) stable agreement professional/ethical obligations in 2014 and 2019.

Statistical analyses

Data were analysed using SPSS version 22.0 (IBM Corp. Released 2013, IBM SPSS Statistics for Windows, Armonk NY: IBM Corp). Baseline characteristics (2014) were described across all participants at baseline ($n = 1200$), the cohort followed-up ($n = 591$), and those lost to follow-up ($n = 609$). All further analyses were based on the follow-up cohort of 591 study participants. Proportions of participants who reported ever reporting suspected maltreatment, reporting suspected maltreatment recent 3 years, ever avoiding reporting suspected maltreatment, ethical obligations and professional obligations across the survey years were assessed using Cochranes' *Q* test for several related samples. At each survey year, outcome variables, ethical and professional obligations were compared between men and women and between dentists and dental hygienists using chi-square statistics. Bivariate variable analyses with stable ever reporting, stable recent reporting, and stable avoided reporting as outcome variables were conducted using chi-square statistics. Multiple variable analyses were conducted using logistic regression analyses with odds ratios (OR) and 95% Confidence intervals (CI). In addition, ever reporting and recent reporting the previous 3 years were modelled using binomial generalised estimating equation (GEE). GEE is a robust approach accounting for the dependency of observations between repeated measurements over time in the same individual. The binomial GEE models included time-invariant and time-variant exposure variables. For model building, a series of adjusted binomial GEE models were fitted. The GEE model fit was assessed in terms of corrected quasi-likelihood under the independence model criterion (QICC). For multiple variable analyses, independent variables that were statistically significantly associated with reporting behaviour ($p < .05$) in bivariate analyses were entered into multiple variable analyses.

Results

Table 1 depicts baseline sociodemographic- and attitudinal characteristics of baseline participants ($n = 1200$), that followed up from 2014 to 2019 ($n = 591$) and those lost to follow-up ($n = 609$). Based on their reporting in 2014 and compared to participants lost to follow-up, cohort participants were more likely than those lost to follow-up to be in the oldest age group (50.3% vs. 44.9%), less likely to be males (15.6% vs. 23.7%), less likely to confirm ethical obligations (72.7% vs. 75.5%) and less likely to confirm professional obligations (76.8% vs. 78.0%).

Of the cohort participants ($n = 591$), 17.3% were stable regarding not having ever reported suspected maltreatment in 2014 and 2019, 24.6% changed from not ever reported in 2014 to ever reporting in 2019 and 58.1% were stable regarding ever reporting of suspected child maltreatment in both survey years. Of the cohort participants ($n = 591$), 12.2%, 18.5%, 17.9%, and 51.4% reported respectively, stable not recently reporting, change from not recently reporting in 2014 to recent reporting in 2019, change from recently reporting in 2014 to not recently reporting in 2019 and were stable recently reporting in both survey years. Regarding avoidance of reporting suspected child maltreatment, the prevalence of the cohort participants being stable avoiders, changing from not ever avoiding to ever avoiding and being stable no avoiders were respectively, 25.7%, 17.2%, and 57.1% (not in table).

As depicted in Table 2, the proportion of the follow-up cohort ($n = 591$) being stable ever reporters (i.e. confirmed having reported in both survey years) differed statistically significantly ($p < .05$) across regions being largest in the eastern/south-eastern- (62.7%) and lowest in the western part

Table 1. Baseline characteristics of participants in 2014 according to follow up status.

	Total sample (n = 1200) % (n)	Followed-up (n = 591) % (n)	Lost to follow up (n = 609) % (n)
Gender			
Female	80.3 (895)	84.4 (470)	76.3 (425)
Male	19.7 (219)	15.6 (87)	23.7 (132)
Age group			
20–39 yr	52.4 (584)	49.7 (277)	55.1 (307)
40 and above	47.6 (530)	50.3 (280)	44.9 (250)
Professional group			
Dental hygienists	31.1 (346)	37.0 (206)	25.1 (140)
Dentist	68.9 (768)	63.0 (351)	74.9 (417)
Patients treated below 18 yr last 12 months			
0–500	40.2 (447)	39.0 (217)	41.4 (230)
500+	59.8 (666)	61.0 (340)	58.6 (326)
Number of reports sent			
0–2	71.4 (808)	70.9 (398)	71.9 (410)
3–20	28.6 (323)	29.1 (163)	28.1 (160)
Region of employment			
Western	26.2 (292)	30.9 (172)	21.5 (120)
Northern/Mid	32.7 (364)	30.7 (171)	34.6 (193)
Eastern/South Eastern	41.1 (458)	38.4 (214)	43.8 (2
Ethical obligations			
No	25.9 (310)	27.3 (161)	24.5 (149)
Yes	74.1 (889)	72.7 (429)	75.5 (460)
Professional obligations			
No	22.6 (271)	23.2 (137)	22.0 (134)
Yes	77.4 (929)	76.8 (454)	78.0 (475)
Ever reported suspicion of maltreatment throughout career			
Yes	60.0 (689)	59.6 (340)	60.3 (349)
No	40.0 (460)	40.4 (230)	39.7 (230)
Reported recent two years			
No	29.2 (201)	30.6 (104)	27.8 (97)
Yes	70.9 (488)	69.4 (236)	72.2 (252)
Ever avoided reporting throughout career			
Yes	32.6 (368)	33.9 (191)	31.7 (177)
No	67.4 (761)	66.1 (372)	68.7 (389)

Table 2. Percentages (*n*) of participants who were stable reporters, stable recent reporters (last three years) and stable avoiding reporters in 2014/2019 vs. all others by socio-demographic characteristics at baseline (2014) and change in attitudinal characteristics ($n = 591$).

	Stable reporting vs. all others % (*n*)	Stable recent reporter vs. all others % (n)	Stable avoiding reporting vs. all others % (n)
Gender			
Female	56.5 (255)	53.7 (137)	27.3 (111)
Male	61.2 (52)	32.7 (17)**	15.1 (11)*
Age group			
20–39 yr	56.8 (154)	59.7 (92)	21.4 (52)
40 and above	57.7 (153)	40.5 (62)**	29.7 (70)*
Professional group			
Dental hygienists	56.9 (111)	51,4 (57)	29.7 (52)
Dentist	57.5 (196)	49.5 (97)	23.0 (70)
Number of patients below 18 treated			
0–500	52.9 (111)	39.6 (44)	23.9 (47)
501+	60.1 (196)	56.1 (110)**	26.6 (75)
Region of employment			
Western	48.8 (81)	48.1 (39)	26.2 (39)
Northern /mid	59.0 (98)	45.9 (45)	26.0 (40)
Eastern/South Eastern	62.7 (128)*	54.7 (70)	24.4 (43)
Ethical obligations			
Stable disconfirmed	48.4 (31)	38.7 (12)	29.5 (18)
Changed	54.7 (75)	50.7 (38)	26.4 (32)
Stable confirmed	61.3 (212)*	53.8 (114)	24.4 (73)
Professional obligations			
Stable disconfirmed	41.5 (22)	40.9 (9)	28.0 (14)
Changed	50.9 (59)	49.2 (29)	22.9 (24)
Stable confirmed	63.0 (238)**	51.4 (164)	26.2 (85)

** $p < .001$, *$p < .05$.

Table 3. Logistic regression: stable ever reporters vs. all others and stable recent reporters (2014 and 2019) vs. all others regressed on socio-demographic characteristics at baseline and attitudinal characteristics ($n = 591$).

	Stable ever reporters OR (95% CI)	Stable recent reporters OR (95% CI)s
Gender (time invariant)		
Female	1	1
Male	1.2 (0.7–1.9)	0.5 (0.2–0.9)
Age group		
20–39 yr	1	1
40 and above	1.1 (0.8–1.7)	0.5 (0.3–0.8)
Professional group (time invariant)		
Dental hygienists	1	1
Dentist	1.1 (0.7–1.7)	1.0 (0.6–1.7)
Number of patients below 18 treated 14)		
0–500	1	1
501+	1.5 (1.0–2.2)	1.6 (1.0–2.8)
Region of employment		
Western	1	1
Northern/mid	1.6 (1.0–2.5)	1.0 (0.5–1.9)
Eastern/South Eastern	1.7 (1.1–2.6)	1.3 (0.8–2.4)
Ethical obligations 14–19		
Stable disconfirmed	1	1
Changed	0.9 (0.4–2.1)	1.2 (0.3–3.6)
Stable confirmed	0.7 (0.3–1.6)	1.4 (0.4–4.3)
Professional obligations 14–19		
Stable disconfirmed	1	1
Changed	1.4 (0.6–3.6)	1.1 (0.3–4.5)
Stable confirmed	3.3 (1.3–8.6)	1.1 (0.2–4.3)

(48.8%) of Norway. This proportion was significantly higher among participants who had treated more than 500 patients below 18 years and those who confirmed ethical- and professional obligations across time. The proportion of dental health care workers being stable regarding recently reporting varied statistically significantly with sex (53.7% women vs. 32.7% men), age group (59.7% younger vs. 40.5% older) and a number of patients treated (39.6% treated 0–500 patients vs. 56.1% treated above 500 patients). Avoiding reporting suspected child maltreatment varied only by sex and age group being most prevalent among women and in the oldest age group.

As presented in Table 3, multiple variable logistic regression models were fitted with stable ever reporting- and stable recently reporting of suspected maltreatment as outcome variables and regional-, socio-demographic- ethical- and professional obligation (attitudinal) as covariates. In the final model, dental health care workers having treated more than 500 patients were more likely to be stable ever reporters than their counterparts having treated fewer patients. The corresponding OR was 1.5 (95% CI 1.0–2.2). Participants employed in the eastern region and those who confirmed professional obligations across the survey years were more likely to be stable ever reporters. Corresponding odds ratios were OR 1.7 (95% CI 1.1–2.6) and OR 3.3 (95% CI 1.3–8.6). Males and older health care workers were less likely and participants having treated more than 500 patients were more likely to be stable recent reporters. Corresponding ORs were OR 0.5 (95% CI 0.2–0.9), OR 0.5 (95% CI 0.3–0.8) and OR 1.6 (95% CI 1.0–2.8), respectively.

As shown in Table 4, the proportion of dental health care workers in the total intact cohort ($n = 591$) who confirmed ever reporting suspected maltreatment throughout their career increased statistically significantly from 59.6% in 2014 to 79.5% in 2019. There were no sex and professional group differences at either survey year. The mean number of reports per ever experienced reporter increased from 3.5 (sd 3.2) in 2014 to 4.8 (sd 4.3) in 2019 ($p < .001$) (not shown in Table 4). Of those who confirmed ever reporting, the proportions who confirmed recent (previous 3 years) reporting did not change between 2014 and 2019. In both survey years, the proportion who confirmed recent reporting were larger in women than in men ($p < 05$). The mean number of reports sent recently increased from 2.6 (sd 1.8) to 2.8 (sd 2.3) ($p < .05$) (not shown in Table 4). Cochranes' Q revealed a statistically significantly increase in the proportion of dental health care workers who reported to have ever failed to report suspected maltreatment from 33.9% in 2014 to total 37.9% in 2019. Larger proportions of women than men confirmed ever avoidance of reporting in both survey years. The mean number of times having failed to send a report were 2.4 (sd 1.7) and 2.3 (sd 3.2) in 2014 and 2019, respectively (not shown in Table 4).

For analyses at the population level, binomial GEE models were fitted forever reporting and recently reporting across time with sociodemographic- and attitudinal factors as exposure variables (Table 5). Model fit in terms of QIC amounted to 1314,198 and 924,484 forever reporting and recent reporting, respectively. Time (survey year), having treated 501 patients or above, and confirming professional obligations across time were positively associated with ever reporting across time. Compared to workers treating less than 500 patients, those who had treated more were 1.6 times (OR = 1.6, 95% CI 1.2–2.2) more likely to be ever reporters across time. Compared to those who disconfirmed professional obligations – those who confirmed were 2.1 times (OR = 2.1, 95% CI 1.4–3.1) more likely to confirm ever reporting across the survey years. Older participants, those having treated more than 500 patients, who were employed in Eastern part of Norway and confirmed ethical obligations across time were more likely than their counterparts to confirm recently reporting across time.

Discussion

This study is one of few assessing stability and change in Norwegian dental health care workers' mandatory reporting of suspected child maltreatment across time. Stability at the individual level indicates the extent to which an individual's absolute level on reporting remains the same across time. Throughout a 5-year survey period, relatively high proportions (above 50%) of Norwegian dental health care workers remained stable with respect to ever reporting and recent reporting, whereas 25% were stable regarding avoidance of reporting suspected child maltreatment. Moreover, a quarter of the cohort participants changed from disconfirming to confirming ever reporting whereas the proportions changing status with respect to recent- and avoiding reporting were below 20%. The findings present a mixed picture of stability and change suggesting that at the individual level the majority of the dental health care workers or half of the

Table 4 Percentages and numbers of participants who confirmed ever, recent, and avoided report of suspected maltreatment at each survey wave in total and according to gender and professional group ($n = 591$).

	Women % (*n*)	Men % (*n*)	Dental hygienist % (*n*)	Dentist % (*n*)	Total % (*n*)
Any report of concern through career/yes ($n = 591$)					
2014	58.3 (274)	62.1 (54)	59.2 (122)	58.7 (206)	59.6 (340)
2019	78.1 (367)	86.2 (75)	79.6 (164)	79.2 (278)	79.5 (470)$^{++}$
Number of reports of concern (mean, sd)					
2014 ($n = 331$)	3.3 (2.9)	4.2 (3.9)	3.5 (2.9)	3.4 (3.3)	3.5 (3.2)
2019 ($n = 463$)	4.9 (4.5)	4.2 (3.7)*	4.8 (4.6)	4.7 (4.2)	4.8 (4.3) $^{++}$
Ever avoided reporting concerns ($n = 591$)					
2014	34.5 (162)	27.6 (24)	35.4 (73)	32.2 (113)	33.9 (191)
2019	41.2 (185)	22.4 (19)**	41.8 (82)	36.1 (122)	37.9 (212) $^{+}$
Number of times avoided report of concern					
2014 ($n = 161$)	2.4 (1.6)	2.6 (2.1)	2.4 (1.8)	2.4 (1.5)	2.4 (1.7)
2019 ($n = 72$)	2.5 (3.4)	2.2 (1.2)	2.6 (3.7)	2.3 (2.9)	2.3 (3.2)
Reports of concern sent recently (previous 3 years) yes					
2014	71.2 (195)	55.6 (30)*	72.1 (88)	66.5 (137)	69.4 (236)
2019	71.1 (261)	50.7 (38)**	69.5 (114)	66.5 (185)	68.7 (323)
Number of reports sent recently (mean, sd)					
2014 ($n = 235$)	2.5 (1.8)	2.5 (1.8)	2.6 (1.8)	2.5 (1.8)	2.6(1.8)
2019 ($n = 323$)	2.9 (2.5)	2.4 (1.7)	3.0 (2.2)	2.7 (2.5)	2.8 (2.3) $^{+}$
Ethical obligation					
2014inc	73.3 (344)	67.8 (59)	72.7 (149)	72.4 (254)	72.7 (429)
2019	77.2 (362)	77.0 (67)	74.8 (154)	78.6 (275)	77.3 (456)$^{+}$
Professional obligation					
2014	77.9 (366)	73.6 (64)	75.2 (155)	78.3 (275)	76.8 (454)
2019	80.3 (376)	82.8 (72)	79.0 (162)	81.7 (286)	80.6 (475)

Differences within the group across survey years $^{++}p < .001$, $^{+}p < .05$.
Difference between groups at each survey year $^{**}p < .001$.

Table 5. Sending any report of concern throughout career and sending the report in recent 3 years in 2014 and 2019 according to time-invariant socio-demographics and time-variant ethical and professional obligations (GEE analyses).

	Ever reporter 2014/2019 OR (95% CI)	Recent last 3 years reporter 2014/2019 OR (95% CI)
Time		
2014	1	1
2019	2.7 (2.2–3.3)	0.9 (0.6–1.2)
Gender (14)		
Female	1	1
Male	1.3 (0.8–2.1)	0.5 (0.3–0.8)
Age group (14)		
20–39 yr	1	1
40 and above	1.1 (0.8–1.5)	0.5 (0.3–0.6)
Professional group (14)		
Dental hygienists	1	1
Dentist	1.1 (0.8–1.5)	0.9 (0.6–1.3)
Number of patients below 18 treated (14)		
0–500	1	1
501+	1.6 (1.2–2.2)	1.6 (1.1–2.2)
Region of employment (14)		
Western Norway	1	1
Northern /mid Norway	1.4 (1.1–1.8)	1.3 (0.9–1.8)
Eastern/South eastern	1.6 (1.2–2.2)	1.6 (1.1–2.1)
Ethical obligations 14/19		
No	1	1
Yes	0.8 (0.5–1.2)	1.2 (0.7–1.8)
Professional obligations 14/19		
No	1	1
Yes	2.1 (1.4–3.1)	1.5 (0.9–2.4)
Model fit QICC	1314,198	924,484

participants remained stable regarding various reporting modalities although considerable proportions changed in a more- or less favourable direction. The present evidence of stability accords with the notion of Sutton [25] that the best predictor of future behaviour is often a previous measure of that very behaviour. Several studies from both industrialised and non-industrialised countries have provided support for this general assumption [26,27]. Finally, this study confirmed disparities in the patterns of stable ever- and recent mandated reporting according to selected sociodemographic- and attitudinal factors. As hypothesised, the region of employment, the number of children treated as well as professional obligations contributed independently to the prediction of stability in ever- and recent reporting across the survey year. This study was less successful in identifying predictors of stable avoided mandated reporting.

Participants being most experienced in terms of a number of children treated, those employed in eastern parts of Norway and those who were stable confirming professional obligations were most likely to be stable regarding ever reporting suspected child maltreatment across the survey years. Similar covariates were identified for stable recent reporting. These sociodemographic gradients are difficult to explain however, professionals who treat more children might be the most likely to discover maltreatment and probably also most likely to report their suspicion. Thus, in spite of being legally mandatory, reporting suspected child maltreatment seemed to be as much an ethical- and professional- as well as a social and demographic concern [8]. The fit of the adjusted regression models (10% explained variance) suggests that other characteristics of the dental workforce, the dental health care system, and the workplace environment not accounted for in the present analyses might be important influencing factors. Prevalence of participants' ethical and professional obligations was high across the survey years indicating that most of those investigated convey a sense of responsibility, ethically and professionally to make a correct assessment to safeguard the welfare of children. This reflects that the PDHS provides its workforce

with resources and conditions to address mandatory reporting and reinforces what has previously been identified as a factor influencing decision-making emotions [28]. Findings from a recent US study revealed consistently that health care professionals were committed to their mandatory reporting role and did not perceive substantial potential negative consequences accruing from reporting [24].

At the population level, the prevalence of reporting across time reflects overall trends but disguise individual changes [29]. We observed a 20% and 4% increase in respectively, the prevalence of ever reporting and avoidance of reporting across the survey period (Table 4). In contrast, the prevalence who confirmed recent reporting remained high in both survey years. In both survey years, the prevalence of dental health care workers confirming ever reporting (59% and 79%), as well as the prevalence of those who confirmed to have reported in the previous 3 years (about 69%), were higher than the prevalence of reported child maltreatment observed in previous cross-sectional studies elsewhere, ranging from 11–39% [for review see 3–5]. Direct comparisons of prevalence rates might be problematic, however, since the time frames for reporting varies across studies. The increase in ever reporting observed in this study suggests that, in spite of the inherent complexity associated with abuse identification, PDHS dental health care workers, based on their extended experience of treating child patients, have become more aware of child maltreatment and have improved their ability to report cases to the CWS. A previous study from our own research group revealed that reports of concerns were sent due to multiple reasons but most frequently due to repeated failure to attend dental appointments [20]. In accordance with the present findings, a national survey from Netherland reported on an increase in reports to the child protective service between 2005 and 2010, although no difference in the overall prevalence of child maltreatment was observed throughout that period [30].

About one-quarter of the cohort investigated reported to have failed to send a report of suspected child maltreatment in both survey years. This reflects that cases of suspected maltreatment occur more often than reports are filed to CWS and accords with findings in other studies [8,21,24,30,31]. Previous research has shown that health care personnel's avoidance of reporting reflects uncertainty about the diagnosis and lack of confidence about how to manage a case within the health care system [15,21,22]. In this study, the prevalence of avoiding mandatory reporting was largest in females indicating sex differences in dental care personnel's uncertainty regarding whether maltreatment has occurred or not and worry about the consequences of making a false report.

Some methodological weaknesses of this study should be acknowledged. The pattern of development in various modalities of reporting child maltreatment might be attributed to ageing or period effects. We cannot uniquely distinguish between those two effects without making additional assumptions. An important concern is not having data for all Norwegian dental health care workers at each survey occasion. Although a census of Norwegian PDHS dental health care workers was included at baseline, loss to follow-up might have biased the cohort investigated. Nevertheless, a comparison of the distribution of baseline socio-demographic characteristics across cohort participants and those lost to follow-up revealed overall similar findings, although a bias towards females in the participating cohort, might have kept avoided reporting and recent reporting unrealistically high. Nevertheless, we consider that the present findings might be representative of Norwegian dental health care workers employed in PDHS. Moreover, it is unclear whether the crude measures of reporting behaviour accurately reflect reality. Studies that rely on retrospective accounts might be affected by various kinds of recall bias. Social desirability bias might be particularly true with behaviours being mandatory according to known regulations and rules. Nevertheless, the caution urged against retrospective reports appears more directed towards studies considering causation of disease than estimations of population prevalence. Additional variance within and between persons introduced by repeated measures was adjusted for in the GEE analyses providing similar findings regarding covariates as the ordinary logistic regression models. A degree of inaccuracy in the outcome measures is also possible as the cohort members might have changed their reporting behaviour between the survey occasions.

In summary, there are few nationwide follow-up studies of dental health care workers' reporting of suspected child maltreatment leaving substantial gaps in our knowledge about how this legally mandated practice develops across time. The present findings suggest that the reporting rates among employees in the Norwegian PDHS are maintained at a relatively high level across a 5-year period both at the individual and population levels but varies according to socio-demographic characteristics as well as ethical and professional concerns. This indicates that PDHS keeps up with fulfilling their mandatory obligations to report although various proportions changed in a more or less favourable direction. Despite a commitment to the reporting role, dental health care workers also avoided to routinely report suspected maltreatment. Additional information and training efforts should be prioritised in the curriculum of dental schools and in continuous education for dental health personnel to limit avoidance of child protection behaviour.

Acknowledgements

Authors acknowledge the participants from the Public dental health care service for their efforts to complete the questionnaires.

Disclosure statement

No potential conflict of interest was reported by the author(s).

References

[1] Gilbert R, Widom CS, Browne K, et al. Burden and consequences of child maltreatment in high-income countries. Lancet. 2009; 373(9657):68–81.

[2] Stoltenborgh M, Bakermans-Kranenburg M, Alink LRA, et al. The prevalence of child maltreatment across the globe: review of a series of meta analyses. Child Abuse Rev. 2015;24(1):37–50.
[3] Brattabø IV, Iversen AC, Åstrøm AN, et al. Experience with suspecting child maltreatment in the Norwegian public dental health services, a national survey. Acta Odontol Scand. 2016; 74(8):626–632.
[4] Jakobsen U, Fjallheim AS, Gislason H, et al. Dental professionals' experience with and handling of suspicion of child maltreatment in a small-scale society, the Faroe Islands. Clin Exp Dent Res. 2019;5(2):145–150.
[5] Uldum B, Christensen HG, Welbury R, et al. Danish dentists' and dental hygienists' knowledge of and experience with suspicion of child abuse or neglect. Int J Paediatr Dent. 2010;20(5):361–365.
[6] Mathews B, Pacella R, Dunne MP, et al. Improving measurement of child abuse and neglect: a systematic review and analysis of national prevalence studies. PLOS One. 2020; 15(1):e0227884.
[7] Christoffersen MN, Armour C, Lasgaard M, et al. The prevalence of four types of childhood maltreatment in Denmark. Clin Pract Epidemiol Ment Health. 2013;9:149–156.
[8] Kvist T, Wickstrøm A, Miglis I, et al. The dilemma of reporting suspicions of child maltreatment in pediatric dentistry. Eur J Oral Sci. 2014;122(5):332–338.
[9] Schou L, Dyb G, Graff-Iversen S. "Voldsutsatt ungdom i Norge – resultater fra helseundersøkelser i seks fylker". Folkehelseinstituttet, 2007. rapport nr 8.
[10] World Health Organization. Global status reports on violence against children. 2020. Available from https://www.who.int/teams/social-determinants-of-health/violence-prevention/global-status-report-on-violence-against-children-2020
[11] Harris CM, Welbury R, Cairns AM. The Scottish dental practitioner's role in managing child abuse and neglect. Br Dent J. 2013;214(9):E24.
[12] Kvist T, Annerback EM, Sahlqvist L, et al. Association between adolescents' self-perceived oral health and self-reported experiences of abuse. Eur J Oral Sci. 2013;121(6):594–599.
[13] Montecchi PP, Di Trani M, Sarzi A, et al. The dentists' role in recognizing childhood abuses: study on the dental health of children victims of abuse and witnesses to violence. Eur J Pediatric Dent. 2009; 10:185–187.
[14] Royal College of Paediatrics and Child Health. Child Protection evidence -dental neglect. Clinical standards and quality improvement team. 2015 [cited 2021 May 6]. Available form https://www.rcpch.ac.uk/resources/child-protection-evidence-dental-neglect
[15] Sarkar R, Ozanne-Smith J, Bassed R. Mandatory reporting of child physical abuse and dental neglect by Australian dentists. Forensic Sci Med Pathol. 2020;16(1):134–142.
[16] Bhatia SK, Maguire SA, Chadwick BL, et al. Characteristics of child dental neglect: a systematic review. J Dent. 2014;42(3):229–239.
[17] Åstrøm AN, Smith ORF, Sulo G. Early-life course factors and oral health among young Norwegian adults. Eur J Oral Sci. 2020; 00: e12778.
[18] Bernabe E, Lie SA, Mastrovito B, et al. Childhood negative dental experiences and toothloss in later life: a 25 year longitudinal study in Sweden. J Dent. 2019;89:1–6.
[19] Felitti V. Adverse childhood experiences and adult health. Acad Pediatr. 2009;9(3):131–132.
[20] Brattabø IV, Bjørknes R, Åstrøm AN. Reasons for reported suspicion of child maltreatment and responses from the child welfare - a cross-sectional study of Norwegian public dental health personnel. BMC Oral Health. 2018;18(1):29.
[21] Bjørknes R, Iversen AC, Åstrøm AN, et al. Why are they reluctant to report? A study of the barriers to reporting to child welfare services among public dental healthcare personnel. Health Soc Care Community. 2019;27(4):871–879.
[22] Nouman H, Alfandari R, Enosh G, et al. Mandatory reporting between legal requirements and personal interpretations: community healthcare professionals' reporting of child maltreatment. Child Abuse Negl. 2020;101:104261.
[23] Schols MWA, de Ruiter C, Öry FG. How do public child healthcare professionals and primary school teachers identify and handle child abuse cases? A qualitative study. BMC Public Health. 2013; 13(1):807.
[24] Foster RH, Olson-Dorff D, Reiland HM, et al. Commitment, confidence, and concerns: assessing health care professionals' child maltreatment reporting attitudes. Child Abuse Negl. 2017;67: 54–63.
[25] Sutton S. The past predicts the future: interpreting behaviour relationships in socio-psychological models of health behaviour. In: Rutter DR, Quine L, editors. Social psychology and health: European perspectives. Aldershot: Avebury; 1997. p. 71–88.
[26] Rise J, Åstrøm AN, Sutton S. Predicting intentions and use of dental floss among adolescents. An application of the theory of planned behaviour. Psychology And Health. 1998;13(2):223–236.
[27] Masalu JR, Åstrøm AN. Predicting intended and self-perceived sugar restriction among Tanzanian students using the theory of planned behavior. J Health Psychol. 2001;6(4):435–445.
[28] Gunn VL, Hickson GB, Cooper WO. Factors affecting pediatricians' reporting of suspected child maltreatment. Ambul Pediatr. 2005; 5(2):96–101.
[29] Twisk JWR, Kemper HVG, van Mechelen W, et al. Tracking of risk factors for coronary heart disease over a 14-year period: a comparison between lifestyle and biologic risk factors with data from the Amsterdam Growth and Health Study. Am J Epidemiol. 1997; 145(10):888–898.
[30] Euser S, Alink LRA, Pannebakker F, et al. The prevalence of child maltreatment in The Netherlands across a 5-year period. Child Abuse Negl. 2013;37(10):841–851.
[31] Hye-Mi L, Soo JJ. Predictors of intention of reporting child abuse among emergency nurses. J Pediatr Nurs. 2018;38:47–52.