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Published in:
International journal of eating disorders

DOI:
10.1002/eat.24064

Received: 24 July 2023 | Revised: 11 September 2023 | Accepted: 12 September 2023

DOI: 10.1002/eat.24064

ORIGINAL ARTICLE

International Journal of EATING DISORDERS WILEY

Increase in incidence of anorexia nervosa among 10- to 14-year-old girls: A nationwide study in the Netherlands over four decades

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Funding information
Ministerie van Volksgezondheid, Welzijn en Sport, The Netherlands

Action Editor: Ruth Striegel Weissman

Abstract

Objective: This primary care study examined time trends in the incidence of anorexia nervosa (AN) and bulimia nervosa (BN) in the Netherlands across four decades.

Methods: A nationwide network of general practitioners, serving approximately 1% of the total Dutch population, recorded newly diagnosed patients with AN and BN in their practices from 1985 to 2019 (2,890,978 person-years). DSM-IV diagnostic criteria were consistently used and the same psychiatrist was responsible for the final diagnostic decision. Incidence rates (IRs) were calculated for: the total population (all ages), females overall, and females per 5-year age category. Time trends in IRs were analyzed using JoinPoint regression analyses.

Results: In four decades, the incidence of AN among 10- to 14-year-old females increased significantly from 8.6 to 38.6 per 100,000 person-years (average period percentage change [APPC] = 56.7; 95% confidence interval [CI] = 6.5–130.6. The overall incidence of AN was stable, with IRs ranging from 6.0 (95% CI = 4.3–8.1) to 8.4 (95% CI = 6.4–10.8). The IR of BN decreased significantly from 8.7 (95% CI = 6.7–11.0) to 3.2 (95% CI = 2.0–4.9) in the 2000s, before leveling off in the 2010s (IR 3.2; 95% CI = 2.0–4.8).

Discussion: The incidence of AN among 10- to 14-year-old girls increased significantly over four decades. Both biological and sociocultural factors, for example, early pubertal timing and the impact of social media, might explain this. In other age groups and overall, the incidence of AN remained stable. The significant decrease of the incidence of BN in the previous decades halted in the last decade.

Public Significance: An important finding of the present study is that for 10- to 14-year-old girls, the risk for developing anorexia nervosa has increased significantly over 40 years. More healthcare facilities for younger people are needed, and prevention programs could include social media use. For bulimia nervosa, the general decrease in the occurrence of new cases has halted in the 2010s.

KEYWORDS
anorexia nervosa, bulimia nervosa, eating disorders, epidemiology, incidence, primary care, time trends

1 | INTRODUCTION

Eating disorders (EDs) are severe psychiatric disorders. Their etiology is complex and not fully understood. EDs often run a chronic course and have many negative outcomes, including mental health disorders and an increased mortality risk (Arcelus et al., 2011; Micali et al., 2015; van Eeden et al., 2021; van Hoeken & Hoek, 2020). The high burden of EDs emphasizes the need for further research in this field. The study of differences in incidence (i.e., new occurrences) between groups and over time provides clues for risk factors and advances our knowledge of etiology. Furthermore, incidence studies allow for the prediction of events in the future, and thereby provide important information for policymaking, like the planning of healthcare services and prevention programs. Ideally, the frequency of a disorder is studied at the population level. However, population-based studies in EDs are costly and ineffective, because EDs are relatively rare in the community. In the Netherlands, primary care is the first level of formal detection within the healthcare system, because general practitioners (GPs) function as "gatekeepers" to specialized care (van Eeden et al., 2021).

For anorexia nervosa (AN), overall incidence rates (IRs) are considerably stable, while for bulimia nervosa (BN), there has been a decline in the overall IR over time (van Eeden et al., 2021). To determine time trends in incidence, long-term studies that use diagnostic criteria and research methods that are consistent over time are necessary. There is a lack of these studies in the field of EDs. So far, most time trend studies of AN or BN have covered a short period of <10 years, for example, Reas and Ro (2018), limiting the detection and interpretation of changes in incidence. Also, most studies were healthcare register-based (Martinez-Gonzalez et al., 2020), representing an underestimation of the incidence of EDs in the general population, as help-seeking is often avoided and not all patients are referred to (psychiatric) healthcare facilities. To our knowledge, there has been no recent incidence study of EDs on all age groups in primary care.

The aims of the present study are to examine the incidence of AN and BN in primary care in the Netherlands in 2015–2019, and to investigate time trends over four decades by combining these data with those of our previous studies covering the periods 1985–1989, 1995–1999, and 2005–2009 (Hoek, 1991; Hoek et al., 1995; Smink et al., 2016; van Son et al., 2006a), using the same diagnostic criteria and methodology.

2 | METHODS

2.1 | Procedure

In the Netherlands, a Primary Care Database is in effect since 1970, filled with data provided by GPs participating in a Dutch network of Sentinel Practices, integrated with the Nivel (the Netherlands Institute for Health Services Research). The participating GPs continuously register data with regard to specific illnesses (including EDs), events, and procedures in their practices. They are financially compensated for their time.

Dutch healthcare insurers only compensate for specialized healthcare costs with a written referral from the GP. This means that the GP is always notified, even if a person contacts a medical specialist directly. Until 2006, health insurance through so-called "sickness funds" was obligatory for low-income groups; higher-income groups had private insurance. Since 2006, according to Dutch legislation, everyone who lives or works in the Netherlands is obliged to obtain basic health insurance.

GPs from the Nivel Sentinel Practices considered whether each patient who consulted them might be suffering from an ED. To guarantee consistency over the whole study period, during all four study periods, information on EDs (eating pathology in general and the characteristics of AN and BN in particular) was provided to the GPs through a presentation and information sheets, the same data on their patients were gathered from the GPs, and the same DSM-IV case definition criteria for AN and BN were used by the research team. For each possible ED patient, the GP registered sex (female/male), age, ED symptoms, height, weight, comorbidity, information regarding referral to specialized healthcare, and the date of first detection of the ED by a healthcare professional (including, but not only, the GP). Data on gender, race, and ethnicity were not registered. Until 2015, the GPs filled out an information sheet by hand. Since 2015, the data have been electronically registered on an online sheet triggered by a recording of the International Classification for Primary Care code (World Health Organization, 2003) for a possible ED in the electronic GP patient information system. Yearly, Nivel delivers all pseudonymized sheets on the previous year to the research team.

Based on the information provided by the GPs, the research team made diagnoses of AN and BN according to DSM-IV criteria. If necessary, the GP was asked for additional information. During all four study periods, the same psychiatrist (senior author HWH) was responsible for the final diagnostic decision, to ensure consistency in the diagnostic assessment. For the same reason, records of two years after the study period (i.e., 2020 and 2021) were additionally screened for cases newly detected between 2015 and 2019 but not reported during that period because of a delay in the information process, for example, an ED diagnosis mentioned in a letter from specialized healthcare services, which they have to send at least annually to the GP of the patient. During the four study periods, there have been changes in the DSM criteria from DSM-III-R to DSM-IV to DSM-5. To eliminate bias by these transitions, the GP records of all possible cases from 1985 to 1989, which had originally been classified with DSM-III-R criteria, had already been re-evaluated according to DSM-IV criteria

(more stringent DSM-IV criteria for BN in comparison to DSM-III-R) before the current study (Hoek et al., 1995; van Son et al., 2006a). Furthermore, we classified the GP records of possible cases from 2015 to 2019, which were registered after the release of the DSM-5 in 2013, according to both DSM-5 and DSM-IV criteria (more stringent DSM-IV criteria for AN and BN in comparison to DSM-5). Since 2015, feeding and eating disorder diagnoses that were first introduced in the DSM-5 (binge eating disorder [BED], pica, rumination disorder [RD], avoidant/restrictive food intake disorder [ARFID], other specified feeding or eating disorder [OSFED], and unspecified feeding or eating disorder [UFED]) have been registered in the practices as well. However, our focus is on AN and BN diagnosed according to DSM-IV criteria.

2.2 | Sample

From 1985 to 2021, the nationwide network of GPs (approximately 40 practices including 70 GPs per year) registered the occurrence of EDs in their patients. The GPs served an average of 148,326 persons (1.0% of the total Dutch population) from 1985 to 1989, 149,797 (1.0%) from 1995 to 1999, 136,854 (0.8%) from 2005 to 2009, and 136,008 (0.8%) from 2015 to 2019. The study populations represented the total Dutch population regarding sex, age, regional spread, and population density (Donker, 2016, 2017, 2018, 2019; Jansen et al., 2022). For example, in 2015–2019, 50.4% of the Dutch population was female; in the same period, the total percentage of females in the study population was 50.2%.

2.3 | Medical ethical considerations

Participating GPs are contractually obliged to inform their patients about their participation in the Nivel Primary Care Database and to inform patients about the option to opt-out for inclusion of their data in the database. Data are pseudonymized before leaving the practices and do not contain any directly identifying personal information. The study meets the requirements for exemption from approval by a medical ethics committee under the Dutch Medical Research Involving Human Subjects Act (WMO) and is in accordance with the Dutch Medical Treatment Act (WGBO) and the European Union General Data Protection Regulation (GDPR).

2.4 | Statistical analysis

The incidence rate (IR) was calculated by dividing the number of newly detected ED cases by the number of person-years in the participating practices and expressed per 100,000 person-years. 95% confidence intervals (CIs) were based on the Poisson distribution (Frome & Checkoway, 1985). Incidence was based on the time when the ED was detected. Patients with an ED newly detected from 1985 to 1989, 1995 to 1999, 2005 to 2009, or 2015 to 2019 were considered incident cases. IRs were calculated for the total population, for females overall, and for females per 5-year age category. Analysis of variance (ANOVA) analysis was used to compare age at first detection between the four periods. All analyses were conducted using Stata/SE (Standard Edition) version 13.1 (StataCorp, 2013), and significance levels were set at .05.

To identify time trends, the incidence data for the total population, for females overall, and for females per 5-year age category were fitted using Joinpoint regression models. The Joinpoint Regression Program (2021) is a trend analysis software program originally developed by the US National Cancer Institute to analyze time trends in cancer rates and is now regularly used in the field of ED research as well (Reas & Ro, 2018; Steinhausen & Jensen, 2015; Tseng et al., 2020; Wu et al., 2022). The regression procedure fits observed time trend data to linear functions. Rather than estimating one linear trend, so-called "joinpoints" are identified: breaks in the data where the period percentage changes (PPCs) in incidence differ compared to the previous specified joinpoint, segmenting the interpolation line. The Monte Carlo Permutation method (4,499 permutations) is used to evaluate whether an apparent (change in) trend is statistically significant (α of .05) (Kim et al., 2000). The average period percentage change (APPC; weighted average of the PPCs) in incidence is also calculated to provide a summary statistic of trends over the entire period. If there is no change in the trend direction (i.e., no joinpoints), the APPC is equal to the PPC.

3 | RESULTS

A full description of the study populations from 1985 to 2009 can be found elsewhere (Hoek et al., 1995; Smink et al., 2016; van Son et al., 2006a). From 2015 to 2019, 83 incident cases of AN and BN (according to DSM-IV criteria) were identified. The GPs reported a total of 228 possible new cases of an ED. Of these, 145 patients were excluded from the present study because 87 patients proved to be prevalent cases, 44 patients (incident cases) were not diagnosed with AN or BN, but with another ED (BED, pica, RD, ARFID, OSFED, or UFED), 9 patients (incident cases) fulfilled DSM-5 but not DSM-IV criteria of BN (lower required frequency of binge eating and compensatory behavior in DSM-5 compared to DSM-IV), and 5 patients did not have an ED.

3.1 | Anorexia nervosa

Table 1 presents the IRs of AN over the four decades.

From 2015 to 2019, a total of 60 patients (including four males, all in the 10- to 14-year-old age group) were first diagnosed with AN. This yielded an overall IR of 8.4 per 100,000 person-years (95% CI = 6.4–10.8), which is in the same range as the rates in previous periods. The mean age at detection of AN in 2015–2019 was 20.2 years ($SD = 7.9$, median = 18.5 years, range = 11.0–50.0), which is somewhat lower, although not significant, in comparison

TABLE 1 Incidence anorexia nervosa DSM-IV per 100,000 person-years.

Study period	1985–1989				1995–1999				2005–2009				2015–2019			
	N	PY	IR	95% CI	*N*	PY	IR	95% CI	*N*	PY	IR	95% CI	*N*	PY	IR	95% CI
Females – Age range																
5–9	0	21,649	-	-	1	22,334	4.5	0.1–25.0	0	20,739	-	-	0	19,309	-	-
10–14	2	23,245	8.6	1.0–31.1	4	21,862	18.3	5.0–46.9	4	20,352	19.7	5.4–50.3	8	20,745	38.6	16.7–76.0
15–19	17	30,155	56.4	32.8–90.3	25	22,097	113.1	73.2–167.0	20	20,622	97.0	59.2–149.8	23	21,254	108.2	68.6–162.4
20–24	13	32,900	39.5	21.0–67.6	10	28,275	35.4	17.0–65.0	7	20,252	34.6	13.9–71.2	15	22,316	67.2	37.6–110.9
25–29	13	31,700	41.0	21.8–70.1	9	33,493	26.9	12.3–51.0	3	20,839	14.4	3.0–42.1	4	24,307	16.5	4.5–42.1
30–34	2	29,300	6.8	0.8–24.7	1	31,752	3.2	0.1–17.6	1	22,923	4.4	0.1–24.3	2	22,604	8.9	1.1–32.0
35–64	3	133,055	2.3	0.5–6.6	8	142,504	5.6	2.4–11.1	6	145,577	4.1	1.5–8.1	4	141,140	2.8	0.8–7.3
Overall females	50	373,975	13.4	9.9–17.6	58	381,399	15.2	11.6–19.7	41	347,764	11.8	8.5–16.0	56	358,143	15.6	11.8–20.3
Overall males + females	55	740,091	7.4	5.6–9.7	59	752,117	7.8	6.0–10.1	41	684,860	6.0	4.3–8.1	60	713,910	8.4	6.4–10.8

Abbreviations: 95% CI, 95% confidence interval; IR, incidence rate; N, number of cases; PY, person-years.

to the previous periods ($F = 1.4$, $df = 3$, $p = .3$) (Smink et al., 2016; van Son et al., 2006a). In all four study periods, the highest age-specific incidence was in the 15- to –19-year-old age group. In 2015–2019, 73% of the patients diagnosed with AN had been referred to specialized mental healthcare.

Figure 1 displays the time trends over the four study periods of the IRs of AN (overall females, females 10- to 14-year-old) and BN (overall females) with the corresponding (average) period percentage changes ((A)PPCs). No joinpoints (changes in direction) were observed and therefore the APPC is equal to the PPC.

The trend analysis showed no change in the APPC of AN in the total population across the four periods (APPC = PPC = 1.8%; 95% CI = −25.1 to +38.4). The IR in females overall remained stable as well (IR = 15.6, 95% CI = 11.8–20.3; APPC = 2.6%, 95% CI = −22.3 to +35.6). The one exception to stable age-specific IRs of AN in females over four periods, was a significant APPC increase of 56.7% (95% CI = 6.5–130.6) among females aged 10–14 years with IRs increasing from 8.6 (95% CI = 1.0–31.1) during 1985–1989 to 38.6 (95% CI = 16.7–76.0) during 2015–2019 (Figure 1).

3.2 | Bulimia nervosa

Table 2 shows the IRs of BN over the four decades.

From 2015 to 2019, a total of 23 patients were first diagnosed with BN (including two males, aged 26 and 31 years at detection), yielding an overall IR of 3.2 per 100,000 person-years (95% CI = 2.0–4.8). The mean age at detection in the total sample during 2015–2019 was 27.1 years ($SD = 9.8$, median = 24.0 years, range = 18.0–58.0), which is comparable to the mean ages in previous periods ($F = 0.5$, $df = 3$, $p = .7$) (Smink et al., 2016; van Son et al., 2006a). From 1985 to 1989, the age-specific incidence was highest in the 25- to 29-year-old age group; during both 1995–1999 and 2005–2009, the highest incidence was in the 15- to 19-year-old age group; and during 2015–2019, the 20- to 24-year-old age group had the highest incidence. From 2015 to 2019, 87% of the BN patients were referred to specialized mental healthcare.

Over the four periods, there was a significant APPC decline (see Figure 1) of 30.9% (95% CI = −48.8 to −6.6), which can be ascribed to a decline for females, considering that the number of male incident BN cases was consistently low during the four periods (one to two cases per period). The female IR showed a significant decreasing time trend (APPC = −32.3%, 95% CI = −51.6 to −5.3) with IRs decreasing from 16.6 (95% CI = 12.7–21.3) in 1985–1989 to 5.8 (95% CI = 3.5–8.9) in 2005–2009 and 5.9 (95% CI = 3.6–9.0) in 2015–2019. Age-stratification showed declining trends of the IRs among most female age groups over the four periods.

4 | DISCUSSION

This nationwide study in the Netherlands is unique in that it investigated the incidence of AN and BN registered in primary care — the

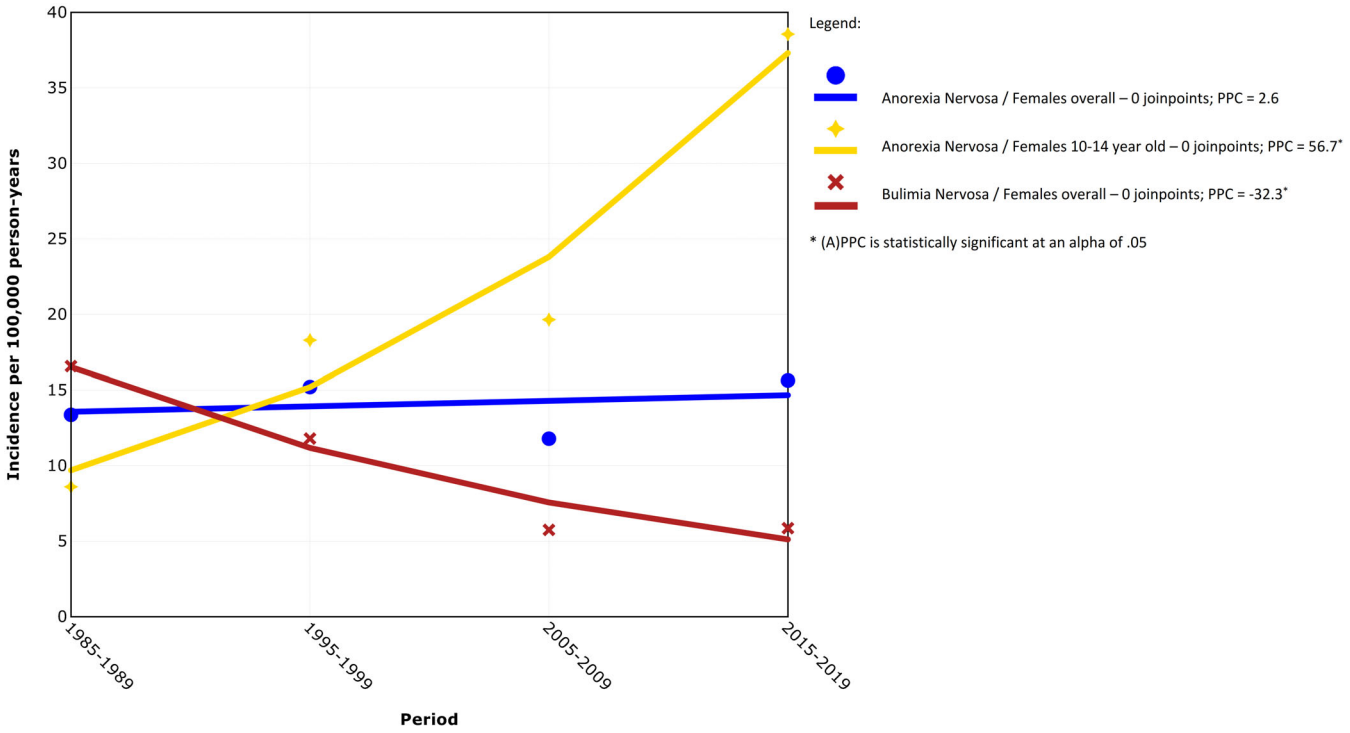

FIGURE 1 Period percentage change (PPC) in the incidence rates (per 100,000 person-years) of anorexia nervosa (AN) and bulimia nervosa (BN) among females. Three joinpoint models are depicted by observations (symbols) and modeled time trends (lines).

first level of formal detection within the healthcare system — in the 1980s, 1990s, 2000s, and 2010s. This enables the detection of long-term patterns in the development of EDs at a level that comes closest to the true incidence in the population. Our data on the most recent period uncovered that overall study periods, the incidence of AN had increased significantly among 10- to 14-year-old girls, while — similar to the previous three decades — there were no systematic changes for the other age groups or for the overall incidence of AN. For BN, the significant decrease between the 1980s and 2000s came to a halt in the 2010s.

Our finding of an increase in the incidence of AN among girls aged 10–14 years in primary care over a long period of four decades is supported by increased rates for AN among girls in a Norwegian study (Reas & Ro, 2018), covering a much shorter time period (2010–2016) and at a less accessible level of healthcare (specialist healthcare services).

There is a longstanding and ongoing debate on the role of biological versus sociocultural factors in the development of AN (Hoek et al., 1998, 2005). Both factors could explain the increase in the development of AN at an earlier age. Historically, AN has been considered to be less prone to sociocultural influences than BN (Keel & Klump, 2003), which is supported by its remarkably constant incidence overall in our study in the past four decades in contrast with the incidence of BN, which significantly decreased over time. Other support for a relative insensitivity of AN to sociocultural influences comes from a lack of association between the occurrence of AN and the degree of urbanization, which is in sharp contrast with a strong positive association between the occurrence of BN and the degree of urbanization (Hoek et al., 1995; van Son et al., 2006b). This suggests that in general AN might be more driven by biological factors, such as puberty, than by sociocultural factors. Pubertal status and timing have a significant impact on the risk of AN in girls, for example, precocious pubertal development is associated with increased rates of AN (Klump, 2013). Research showed that age at thelarche (Eckert-Lind et al., 2020) and menarche (Brix et al., 2019), markers of pubertal development in girls, have gone down over the last century; for example, age at thelarche decreased almost 3 months per decade from 1977 to 2013 (Eckert-Lind et al., 2020). This suggests that the earlier start of puberty, in an age period critical for the development of AN, might be associated with an earlier onset of AN.

Although the former findings support the hypothesis that AN is especially driven by biological factors, based on our current age-specific findings, we hypothesize that AN is less biologically driven than historically has been thought, and that sociocultural factors do play a more prominent role in the development of AN. Regarding sociocultural influences, the great surge in the use of social media in the last decades might affect the occurrence of AN; particularly in (pre)adolescence. One of the central features of AN is a disturbance in the way in which one's body weight or body shape is experienced, with an undue influence of body weight or shape on self-evaluation. (Pre)adolescents are particularly susceptible to external influences like social media, which is supported by the findings of a large cohort study among US adolescents that revealed a heightened risk for mental health problems in those who spend

TABLE 2 Incidence bulimia nervosa DSM-IV per 100,000 person-years.

Study period	1985–1989				1995–1999				2005–2009				2015–2019			
	N	PY	IR	95% CI	N	PY	IR	95% CI	N	PY	IR	95% CI	N	PY	IR	95% CI
Females – Age range																
5–9	0	21,649	-	-	0	22,334	-	-	0	20,739	-	-	0	19,309	-	-
10–14	1	23,245	4.3	0.1–24.0	0	21,862	-	-	1	20,352	4.9	0.1–27.4	0	20,745	-	-
15–19	9	30,155	29.9	13.7–56.7	9	22,097	40.7	18.6–77.3	8	20,622	38.8	16.8–76.4	4	21,254	18.8	5.1–48.2
20–24	15	32,900	45.6	25.5–75.2	11	28,275	38.9	19.4–69.6	1	20,252	4.9	0.1–27.5	8	22,316	35.9	15.5–70.6
25–29	19	31,700	59.9	36.1–93.6	10	33,493	29.9	14.3–54.9	2	20,839	9.6	1.2–34.7	3	24,307	12.3	2.6–36.1
30–34	4	29,300	13.7	3.7–35.0	5	31,752	15.8	5.1–36.8	7	22,923	30.5	12.3–62.9	2	22,604	8.9	1.1–32.0
35–64	14	133,055	10.5	5.8–17.7	10	142,504	7.0	3.4–12.9	1	145,577	0.7	0.0–3.8	4	141,140	2.8	0.8–7.3
Overall females	62	373,975	16.6	12.7–21.3	45	381,399	11.8	8.6–15.8	20	347,764	5.8	3.5–8.9	21	358,143	5.9	3.6–9.0
Overall males + females	64	740,091	8.7	6.7–11.0	46	752,117	6.1	4.5–8.2	22	684,860	3.2	2.0–4.9	23	713,910	3.2	2.0–4.8

Abbreviations: 95% CI, 95% confidence interval; IR, incidence rate; N, number of cases; PY, person-years.

more than 3 hours per day on social media (Riehm et al., 2019). In two large Australian studies, respectively, $n = 996$, mean age 13.1 (Wilksch et al., 2020) and $n = 4,209$, mean age 15.0 (Lonergan et al., 2020), a clear pattern of association was found between social media use and ED risk in (pre)adolescents. In a recent review of studies on internet and social media use and ED risk, the authors concluded that risk for ED behaviors and concerns among youth is particularly related to the use of photo-based social media applications such as Instagram (Saul et al., 2022). The use of devices with social media access has become increasingly common at an early age. A recent report on media use in the Netherlands revealed that 90% of 11- to 12-year-olds use a mobile or smartphone (Netwerk Mediawijsheid, 2021). According to the same report at least 54% of 7- to 12-year-olds spend time on social media on a daily basis, and girls spend more time on social media than boys.

The increase in the incidence of AN among 10- to 14-year-old girls is a worrisome trend. It has important implications for future research into causes and options for turning the tide, such as prevention programs and the planning of healthcare services for younger people. Furthermore, our finding that during 2015–2019, all males diagnosed with AN ($n = 4$) were in the 10- to 14-year-old age group emphasizes the need for research in younger subjects, including males.

Regarding BN, our study showed a decline in IRs over time, which has also been found in other recent studies (Reas & Ro, 2018; Wood et al., 2019). What is new in our findings over four decades, is that this decrease has come to a halt in the last decade. Different explanations have been suggested for the decreased incidence of BN between the 1980s and 2000s (Smink et al., 2016): sociocultural influences (e.g., increasing obesity rates and normalization of being overweight), and increases in availability of prevention programs and alternative sources of help (i.e., self-help books and treatment programs on internet). The leveling off of the decreasing trend in the 2010s runs parallel with stabilizing rates of overweight in the Netherlands. In the 1980s, about a third of the adults were overweight. This increased dramatically to 50% in the 1990s and 2000s. However, in the last decade, the percentage of overweight in Dutch people has been rather stable (CBS, 2022). Being overweight has become more common, and more overweight adults are satisfied with their bodies (CBS, 2021), which might reduce the need to counteract the effects of binge eating aggressively by means of purging. It is also possible that a decrease over time in the frequency of purging as compensation for binge eating leads to fewer patients fulfilling the diagnostic criteria for BN (and hypothetically to increasing numbers of BED or OSFED-BN).

4.1 | Strengths and limitations

Our study has a number of strengths, including its design covering four decades, and its large study population (2,890,978 person-years) which is representative of the total Dutch population. The same case definition criteria were used and the same psychiatrist was

responsible for the final diagnostic decision during all study periods, which is a methodological strength for time trend analyses. Furthermore, the use of an extended questionnaire in our primary care study provided more detailed information and a more complete picture in comparison with data from register-based studies. Our study is based on data from primary care, allowing for the study of a broad group of patients including those who do not enter secondary/tertiary care. This avoids issues regarding referral bias. For instance, a meta-analysis of time trends across secondary healthcare register-based studies suggested an increase in the incidence of AN overall (Martinez-Gonzalez et al., 2020). This could be explained by changes in referral rates from primary care to mental healthcare over time, as we observed an increase in referral percentages for AN from 63% in 1985 to 1989, to 73% in 2015 to 2019. When comparing incidence studies, one must bear in mind that IRs depend on the methodology, the type of population, and the diagnostic criteria used (Martinez-Gonzalez et al., 2020; van Eeden et al., 2021).

There are also several limitations to consider. One limitation is that our IRs are based on the time of detection and not on the time of onset of the ED. This is common in ED research, because of patient delay in seeking help (Goldberg & Huxley, 2001). Although the overall IRs are not expected to be influenced by the difference between age at onset and age at detection, the age distribution could be affected by this difference. Another limitation is that the number of males with an ED was low in the four study periods, which did now allow for time trend analysis on men. Furthermore, IRs were investigated at primary care level and not at population level. Population-based IRs are much higher, reflecting two selection filters on the pathway to primary care (Goldberg & Huxley, 2001; van Eeden et al., 2021). The first filter relates to the decision of the patient to consult the GP. Help-seeking is often avoided or delayed, for example, for reasons of denial (particularly in AN) or stigma and shame (particularly in BN). These cases have unavoidably been missed in our primary care study, and our IRs should therefore be interpreted as underestimates of the incidence in the community. The second filter on the pathway to primary care represents the detection skills of the GP. Healthcare workers, including GPs, experience difficulties in the recognition of EDs (Fursland & Watson, 2014). However, in our study, the GPs received written and oral information on EDs to enhance their diagnostic skills. Although the GPs in our study may have been better informed than their colleagues, they will inevitably have missed some cases, in particular in males, because of the unawareness and double stigma of EDs as not only being a mental disorder, but also a "female-specific" disorder. Furthermore, it is possible (but unlikely) that a GP may occasionally have forgotten to fill out the information sheet. This highlights another limitation: the study was dependent on the information provided by the GPs and did not include a diagnostic interview by a trained ED clinician. The reported IRs should therefore be interpreted as minimum estimates of the true IRs in the community. In general, patients with AN are more easily detected because of their underweight than patients with BN. As a result, rates for AN are probably closer to the true IR than those for BN. Finally, our sample is from the Dutch population. Our findings might not automatically be generalizable to countries with different sociodemographic constitutions or to other healthcare systems.

4.2 | Conclusion

The incidence of AN among 10- to 14-year-old girls increased significantly over four decades. In other age groups and overall, it remained stable. The trend of a decreasing incidence of BN leveled off in the last decade. Possible explanations for the increased incidence of AN among 10- to 14-year-old girls over time may be found in both biological factors, like the start of puberty at an earlier age, and in a specific sensitivity of this group to recent sociocultural developments, such as the rise of social media use.

AUTHOR CONTRIBUTIONS

Annelies E. van Eeden: Conceptualization; data curation; formal analysis; methodology; writing – original draft. **Daphne van Hoeken:** Formal analysis; methodology; supervision; writing – review and editing. **Janneke M. T. Hendriksen:** Data curation; writing – review and editing. **Hans W. Hoek:** Conceptualization; methodology; supervision; writing – review and editing.

ACKNOWLEDGMENTS

The authors are grateful to the general practitioners who participated in this research. The authors would like to thank Gé Donker and Cathrien Kager for their previous and recent contributions in the coordination of the Nivel Primary Care Database and Sentinel Practices. The authors would like to thank Judith Offringa-Rodenburg for her editorial assistance. Nivel Primary Care Database, Sentinel Practices is funded by the Ministry of Health, Welfare and Sport of The Netherlands.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on reasonable request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ETHICS STATEMENT

The study meets the requirements for exemption from approval by a medical ethics committee under the Dutch Medical Research Involving Human Subjects Act (WMO) and is in accordance with the Dutch Medical Treatment Act (WGBO) and the European Union General Data Protection Regulation (GDPR).

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How to cite this article: van Eeden, A. E., van Hoeken, D., Hendriksen, J. M. T., & Hoek, H. W. (2023). Increase in incidence of anorexia nervosa among 10- to 14-year-old girls: A nationwide study in the Netherlands over four decades. *International Journal of Eating Disorders*, *56*(12), 2295–2303. https://doi.org/10.1002/eat.24064