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RESEARCH ARTICLE



The course and management of symptom diagnoses in general practice

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ABSTRACT

Background: In general practice, symptom diagnoses are commonly used when patients seek care for symptoms in which no specific disease or disorder can be diagnosed. These diagnoses are prevalent, yet little is known about how they evolve or how General Practitioners (GPs) manage them in daily practice.

Aim: To explore the course of symptom diagnoses and compare GPs' management strategies, both for symptom diagnoses that persisted for more than a year or changed into disease diagnoses.

Methods: A retrospective longitudinal cohort study was conducted using the Dutch Family Medicine Network (FaMe-Net) database. We included all episodes of care in which the diagnosis recorded at the first consultation was coded as a symptom diagnosis between 2008 and 2021. The course of each EoC was analyzed, comparing management strategies, such as GP contacts, interventions, referrals, and medication use, between symptom diagnoses that persisted and those that changed into disease diagnoses. Referrals to primary healthcare workers include referrals to nurses, social workers and therapists such as physiotherapists and occupational therapists.

Results: Out of the 12,532 EoC that started as symptom diagnoses, 9.4% changed into a disease diagnosis within a median of 22 days [2–239], 85.8% resolved within one year, and 4.3% persisted as symptom diagnoses. Within the course of the first year of care, a significantly higher number of management strategies were found for EoC that changed into a disease diagnosis. Referrals to primary healthcare workers were lower for EoC that changed into disease diagnoses (OR = 0.80, 95% CI [0.74, 0.87], $p < 0.001$).

Conclusion: Symptom diagnoses are more likely to resolve within a year, and only a few will persist or change into disease diagnoses. GPs can rapidly diagnose diseases. Our findings highlight the importance of reassurance in patient care when discussing the prognosis of symptom diagnoses, as most of these symptoms tend to resolve.

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Introduction

General Practitioners (GPs) provide care for patients having a wide range of somatic symptoms such as abdominal pain or fatigue [1]. Symptoms can be labelled as symptom diagnoses, a widely accepted term in general practice [1–4]. Symptom diagnoses are an umbrella term to define all symptoms for which patients request care, regardless of cause, and for which the highest level of diagnostic certainty is the symptom level [1–4]. Several related concepts exist, such as 'bodily distress syndrome' which refers to clusters of persistent and distressing physical symptoms without a clear medical explanation [5], and 'persistent physical symptoms,' which describes symptoms that continue over time regardless of cause [6]. While these concepts partially overlap with symptom diagnoses, they capture different aspects of symptom presentation and are not directly aligned with routine coding practices in general practice. In

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this study, we therefore focus on symptom diagnoses as recorded in routine primary care using the International Classification of Primary care (ICPC), ensuring conceptual clarity and alignment between the research question and the available data. Symptom diagnoses are highly prevalent [1]. In population-based studies, only about 3% of individuals with new-onset somatic symptoms consulted their GP within six weeks of symptom onset [7], while approximately 30% of participants experienced symptom deterioration or persistence over the two to three years of follow-up period [8,9]. In parallel, evidence from general practice indicates that more than half of the diagnoses made in general practice are symptom diagnoses [3], which highlights the importance of symptom research in general practice [1,10].

Research following patients from their first presentation with a symptom diagnosis in general practice and tracking their course over time is scarce. As far as we know, there is only one study that explored the views of GPs on the course of symptom diagnoses [1]. In this study, after each patient contact, GPs answered the question on how they would expect the presented symptoms to evolve [1]. GPs expected that only half of the symptoms would change into diseases, while the other half would remain at the symptom level [1].

However, it remains unclear what happens in routine care after a patient is first given a symptom diagnosis, and how many of these episodes subsequently change into a disease diagnosis within the following year. While we recognize that previous research has explored how specific symptoms evolve into certain diseases (e.g. cancer), similar insights are needed to understand the long-term prognosis of a broader range of symptom diagnoses. In fact, evidence shows that patients having symptom diagnoses that persist for over a year experience higher levels of burden compared to other primary care patients [11]. In addition, GPs are known to experience difficulties in the care for patients having persistent symptoms [1,12]. With the fear of underdiagnosing disease diagnoses [13], the problems in the management of symptom diagnoses are reflected into unnecessary additional investigations, which may be potentially harmful [14]. Therefore, we hypothesize that GPs provide more management strategies when the symptoms persist compared to when the symptoms changed into disease diagnoses.

Given the high prevalence of symptom diagnoses, the scarcity of studies about their course and the problems GPs experience, there is a need for more research on the course and management of symptoms in general practice.

Therefore, the aim of this study was (1) to explore the course of symptom diagnoses and whether these symptoms changed into disease diagnoses and (2) to compare GPs' management strategies in patients with symptom diagnoses that (i) changed into disease diagnoses or (ii) persisted for more than a year as symptom diagnoses.

Methods

Study design and setting

We performed a retrospective cohort study. We extracted data from the Family-Medicine Network (FaMe-Net) database. The FaMe-Net is a primary care registration network using electronic health records that currently includes over 40,000 patients registered in six general practices from the region of Nijmegen and Amsterdam in the Netherlands [15]. The FaMe-Net population is representative for the Dutch population in terms of age, sex and social class [16]. To improve reliability of the registration, the FaMe-Net GPs have regular training opportunities [15]. The GPs participating in this network follow the ICPC-2, a coding system widely used in primary care settings to code all contacts with patients [17]. ICPC-2 is divided into 17 different chapters (20, 21): 15 chapters on somatic problems, one chapter on psychological problems (P) and one chapter on social problems (Z) [18,19]. Each chapter consists of seven different components: (1) symptoms and complaints, (2) diagnostic, screening and prevention procedures, (3) medication and treatment procedures, (4) test results, (5) administrative procedures, (6) referrals, and (7) diseases [20]. Medication is classified following the Anatomical Therapeutic Chemical Classification (ATC).

All contacts in the FaMe-Net database are registered within an Episode of Care (EoC) structure (Figure 1). An EoC is defined as a health problem in a patient from the first until the last contact [15]. The EoC structure includes (1) the Reason For Encounter (RFE), (2) the diagnosis, and (3) the process. The RFE is

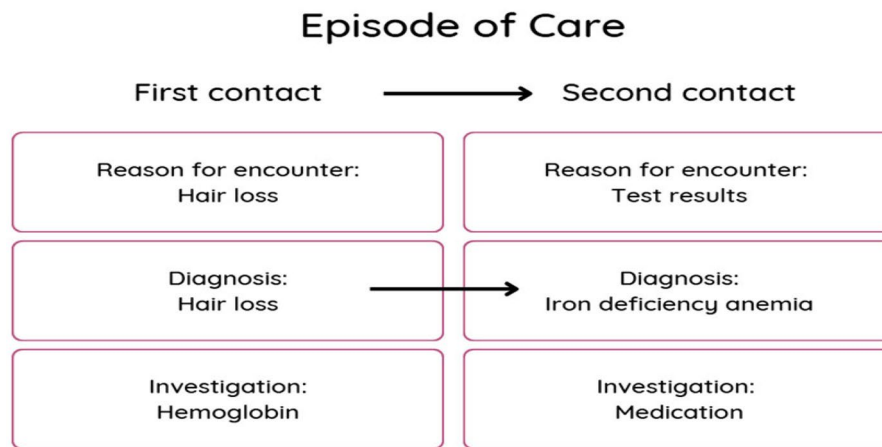


Figure 1. An Episode of Care structure consisting of two contacts.

the literal utterance of the initial presentation of the illness to the GP, for example 'I have pain in my stomach' or 'I want a prescription'. The diagnosis is made by the GP according to ICPC-2 criteria and can be adjusted during the follow-up contacts. As such, the diagnosis could change from 'fatigue' to 'anaemia' based on incoming laboratory results, and from 'anaemia' to 'colorectal cancer' based on incoming results of additional investigations. The process or investigation contains coded information about diagnostic interventions, treatment and referrals [15]. All the three parts of the EoC including RFE, diagnosis and process/investigation must be completed during consultations. As a result, the data extracted from this database have no missing values. The EoC structure represents the best available method for tracking the illness trajectory over time in general practice, as GPs consistently code the contacts regarding a specific health problem within the same EoC. In the Netherlands, GPs act as gatekeepers, and all residents are registered with a single GP practice. Within FaMe-Net, the EoC structure enables longitudinal tracking of patient information. Changes such as a patient being seen by a different GP within the same practice or experiencing long-term hospitalisation are recorded within the Dutch healthcare system and are, in principle, available to GPs and integrated into the registration system.

Data collection

Evolution of episodes

We selected all EoC that started with a symptom diagnosis during the study period 2008 to 2021. For EoC that started in 2021, we followed the EoC up to December 2022. We didn't include episodes that started in 2022 in the analysis to have at least one follow-up period of a year in all EoC. An overview of the included ICPC-2 codes for symptom diagnoses is summarized in [Appendix A](#). For each EoC, we calculated the duration of the EoC as the time difference in days between the first contact and the last contact.

We distinguished four different courses of symptom diagnoses: (1) symptom diagnoses that changed into disease diagnoses at some point in the EoC, (2) symptom diagnoses that resolved within the course of one year (non-persistent symptom diagnoses), (3) symptom diagnoses that persisted for longer than one year (persistent symptom diagnoses), and (4) symptom diagnoses that changed into other health problems such as social and psychological problems. For EoC classified as transient, the term 'resolved' does not imply confirmed clinical recovery. Rather, it indicates the patient did not seek further help from their GP for that problem. Based on previous research [3], persistent symptom diagnoses were defined as symptom diagnoses with a duration of more than 1 year. This threshold of one year appeared from the data as we explored the distribution of symptom durations within our data and aggregated these findings with the outcome of discussions with GPs with expertise in the field of symptom research and clinical practice.

We visualized the course of the top 10 symptom diagnoses that changed into persistent symptom diagnoses in an alluvial diagram. This diagram shows how a diagnostic label of a symptom diagnosis

may change at 1-year follow up and at the last contact of each EoC. A quality check analysis from a comparable FaMe-Net study with similar inclusion criteria demonstrated a stable distribution of symptom diagnoses across study years (data not shown).

Number of contacts and management strategies

For each EoC, we counted the number of contacts with the GP and the number of management strategies for the whole duration of the EoC and during a follow up period of 1 year. For the number of contacts, we included face-to-face contacts, out-of-hour contacts, telephone and e-mail consultations. For the number of management strategies, we counted the number of referrals including the number of referrals to other primary care providers or primary healthcare workers (i.e. for example, nurses, physiotherapists, occupational therapists, dieticians and social workers), and referrals to specialist care. Additionally, we counted the number of diagnostic and therapeutic interventions including the number of laboratory exams and imaging. An overview of ICPC-2 codes of the included types of management strategies is summarized in [Appendix B](#). Additionally, we selected three digits of the ATC classification (ATC- 3 digits) to count the types of medication and identify the top five subcategories of medication.

Statistical analysis

Descriptive statistics were reported to summarize the different courses of symptoms and the patients' characteristics (standard deviation [SD]), median (25/75 percentile [25%–75%pct]) or number and frequencies (%) as appropriate. We counted the frequency of episodes to estimate the most frequent symptom and disease diagnosis types. When the number of management strategies was unbalanced towards the null value, we dichotomized the variable into a binary variable (yes/no). To assess differences in patients' characteristics in the persistent symptom diagnosis group and the disease diagnosis group, we performed independent T-tests for continuous variables and Chi-Square tests for categorical variables.

We counted the number of contacts and management strategies during 1-year follow-up for EoC that evolved into persistent symptoms and episodes that changed into disease diagnoses. Because of the hierarchical structure of the study (episodes nested within GP practices), multilevel analyses were performed that accounted for the variability associated with GP practice. Then, we performed a multilevel negative binominal analysis for continuous variables and multilevel binominal logistic regression for categorical variables. Incidence rate ratios (IRR) and Odds Ratios (OR) were reported respectively.

A *p*-value of < 0.05 was considered statistically significant, based on two-sided testing. All statistical analyses were performed using Statistical Package for Social Science (SPSS) version 29.0.0.0.

Pre-registration, network and ethical consideration

The current study was pre-registered (<https://doi.org/10.17605/OSF.IO/TNQH4>) and has been performed according to open science principles. The current study is part of the innovative training network ETUDE (Encompassing Training in fUnctional Disorders across Europe; <https://etude-itn.eu/>), a network that aims to improve the understanding of mechanisms, diagnosis, treatment and stigmatization of functional disorders [21]. The Radboudumc Medical Ethics Review Committee in Nijmegen in the Netherlands gave permission to use the FaMe-Net for research purposes (CMO declaration number: 2020 to 6871). Participating patients have the option to opt-out for participation in research studies. Data analysed in this study are pseudonymized in accordance with European Union guidelines on the use of medical data for research.

Results

Evolution of EoC that started with a symptom diagnosis

We identified 287,532 EoC that started with a symptom diagnosis between 2008 and 2021. Among these EoC, the vast majority resolved within one year ($n=246,573$, 85.8%) ([Figure 2](#)). The median number of contacts for episodes that resolved was 1 [1–2] ([Table 1](#)). The rest of the EoC changed into disease

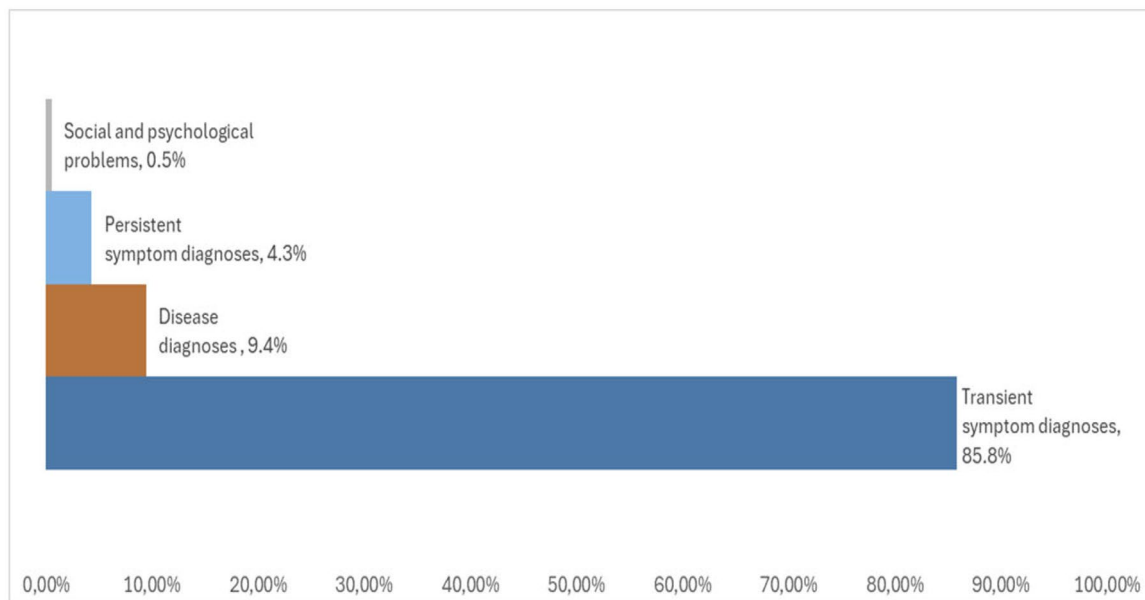


Figure 2. Evolution of episodes that start with a symptom diagnosis ($N=287,532$, duration 2008–2021).

Table 1. Patients' characteristic and management strategies during the episodes of care that started with a symptom diagnosis (four groups $N=287,532$).

	Symptom diagnoses that lasted less than a year	Symptom diagnoses that persisted for more than a year	disease diagnoses	Other health problems
n (%)	246,573 (85.8%)	12,533 (4.3%)	27,3076 (9.4%)	1350 (0.5%)
Median duration of the episode of care in days, Median [25%–75%pct] ^a	0 [0–1]	845 [547–1419]	22 [2–239]	30 [1–361]
Sex (females) n (%)	152,837 (62.0%)	8,296 (66.0%)	15,826 (58.5%)	784 (58.1%)
Age, mean (SD)	40 (24)	46 (23)	44 (25)	37 (22)
Number of contacts, Median, [25%–75%pct]	1 [1–2]	3 [2–5]	4 [2–7]	3 [2–5]
Number of interventions, Median, [25%–75%pct]	2 [1–3]	4 [2–7]	4 [2–7]	3 [0–6]
Laboratory (yes) n, (%)	46,198 (18.7%)	3,586 (28.6%)	7,239 (26.0%)	353 (26.1%)
Imaging (yes) n, (%)	13,749 (5.6%)	1,546 (12.3%)	4,251 (15.7%)	95 (7.0%)
Number of referrals, Median, [25%–75%pct]	0 [0–0]	1 [0–2]	2 [0–3]	1 [0–3]
Primary care referrals (yes) n, (%)	12,598 (5.1%)	1,816 (14.5%)	2,210 (8.2%)	227 (16.8%)
Specialists referrals (yes) n, (%)	18,432 (7.5%)	3,392 (27.1%)	10,610 (39.2%)	299 (22.1%)
Number of types of medication Median, [25%–75%pct]	Anti-inflammatory 0 [0–0]	1 [0–1]	1 [0–1]	0 [0–1]
Top 5 medications	Anti-inflammatory and antirheumatic products Drugs for constipation Drugs for acid related disorders Cough and cold preparation Analgesics	Drugs for constipation Drugs for acid related diseases Anti-inflammatory and antirheumatic products Sex hormones and modulators of the genital system Analgesics	Anti-bacterials for systemic use Anti-inflammatory and antirheumatic products Drugs for acid related disorders Analgesics Drugs for constipation	Psycholeptics Psychoanaleptics Anti-bacterials for systemic use Anti-inflammatory and antirheumatic products Sex hormones and modulators of the genital system

^aThe duration of the episode of care is defined as the difference between the first and the last contact for the same episode of care. The duration can be 0 when there is only one first contact.

diagnoses ($n=27,076$, 9.4%), persisted as symptom diagnoses ($n=12,533$, 4.3%) and rarely changed into other health problems ($n=1,350$, 0.5%). The median duration for making a diagnosis of a disease diagnosis was 22 days [2–239]. Females constituted a higher proportion of patients in the persistent symptom diagnosis group (66.0%) than in the other diagnostic trajectory groups combined. (Table 1). Patients with an EoC that persisted as a symptom diagnosis were older (Mean = 46 years, SD = 23) compared to patients who had EoC that changed into the other three groups (Table 1).

The course of EoC that started with a symptom diagnosis and persisted for more than a year or changed into disease diagnoses

Episodes that started with a symptom diagnosis were likely to persist under the same symptom diagnosis label at 1 year follow up and at the last contact of each EoC, translating the stability of the diagnostic label of a symptom diagnosis during the course of the EoC (Figure 3).

For symptom diagnoses that changed into disease diagnoses, the most common disease diagnoses were cystitis/urinary infection ($n=1,690$, 6.2%), acute upper respiratory infection ($n=934$, 3.4%) and back syndrome with radiation pain ($n=538$, 2.0%).

Number of management strategies and contacts

The number of contacts with the GP during the first-year follow-up period of the EoC was significantly higher in episodes that changed into disease diagnoses compared to episodes that evolved into

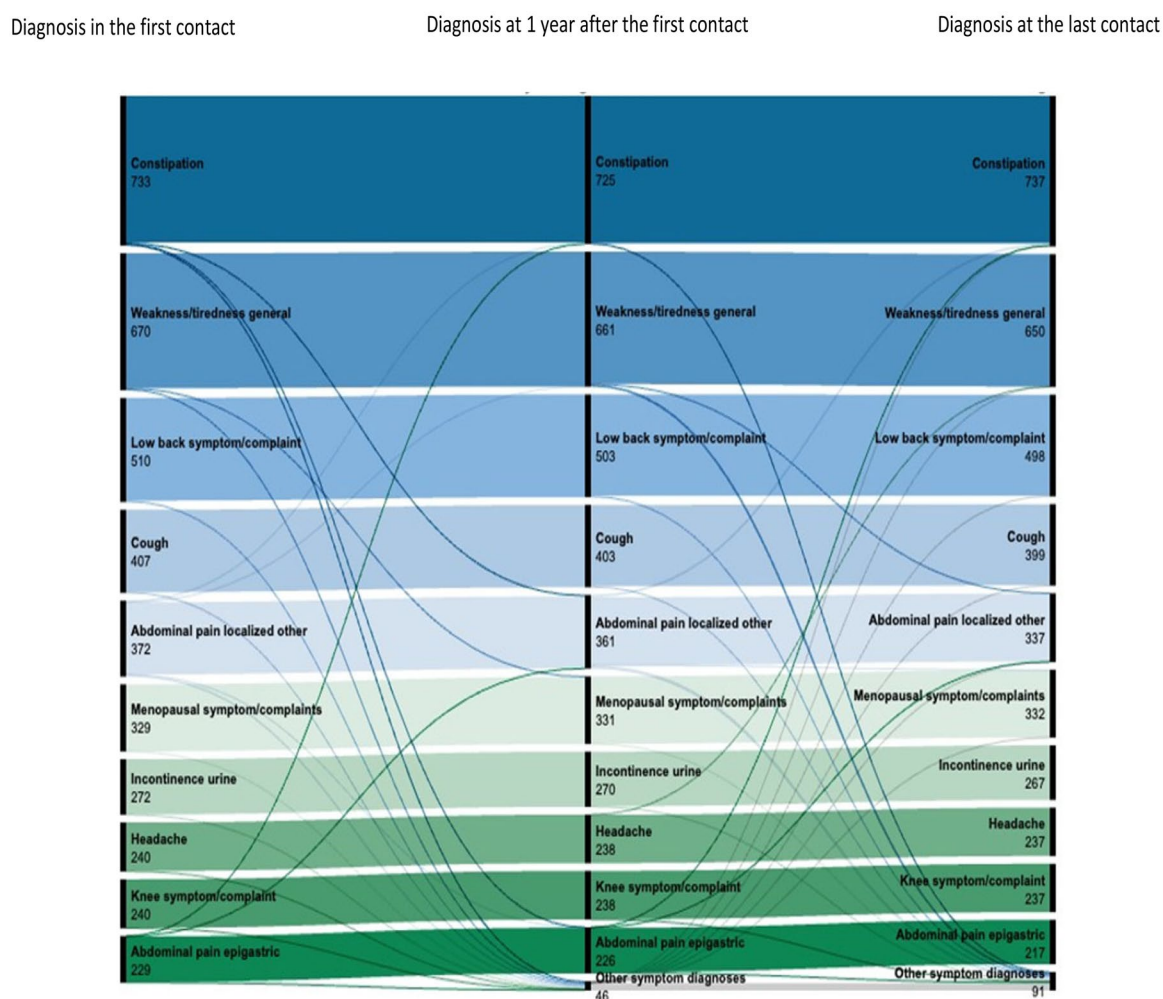


Figure 3. Alluvial diagram of the top 10 most frequent symptom diagnoses for episodes that started and persisted for more than a year as a symptom diagnosis.

*Other symptom diagnoses from the included symptom diagnoses codes of the 2nd edition of the International Classification of Primary Care (ICPC-2) (in Appendix A) and outside the top 10 symptom diagnoses.

persistent symptom diagnoses (IRR = 1.50, 95% CI [1.48, 1.54], $p < 0.001$) (Table 2). Additionally, the number of interventions (IRR = 1.51, 95% CI [1.48, 1.55], $p < 0.001$) including imaging (OR = 2.15, 95% CI [1.99, 2.32], $p < 0.001$) and laboratory exams (OR = 1.33, 95% CI [1.26, 1.40], $p < 0.001$) and the number of referrals (IRR = 2.58, 95% CI [2.50, 2.66], $p < 0.001$) were significantly higher in episodes that changed into disease diagnoses compared to episodes that persisted as symptom diagnoses. However, there were less referrals to primary health care workers (OR = 0.80, 95% CI [0.74, 0.87], $p < 0.001$) in episodes that changed into disease diagnoses compared to episodes that persisted as symptom diagnoses.

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GPs prescribed a significantly higher number of different types of medication in the disease diagnoses group compared to the persistent symptom diagnoses group (IRR = 1.36, 95% CI [1.32, 1.40]). The most common category of medication prescribed in episodes that changed into disease diagnoses were systemic anti-bacterial drugs (i.e. for example antibiotics), whereas for episodes that persisted as symptom diagnoses longer than a year, drugs for constipation was the most common category prescribed. The top 5 most common medications prescribed were similar in both groups (Table 1).

Discussion

Summary of the main findings

Most episodes that started with a symptom diagnosis, resolved within a year, less than 10% of the episodes changed into disease diagnoses and only a small minority persisted as symptom diagnoses. GPs were able to rapidly diagnose disease diagnoses. A significantly higher number of management strategies and contacts were observed during the first year of care for episodes that changed into disease diagnoses compared to those that persisted as symptom diagnoses. The only exception was observed for referrals to primary health care workers which were significantly higher in the persistent symptom diagnosis group compared to the disease diagnosis group.

Comparison to previous literature

As far as we know, this is the first study that explored the longitudinal course of symptom diagnoses in general practice.

A Danish study explored GPs' expectations on the final outcome of symptoms in patients who visited for symptom diagnoses [1]. GPs anticipated that approximately 50% of symptoms would change into a

Table 2. Patients, number of contacts and differences in management strategies for 1-year follow-up period between episodes that evolved into persistent symptom diagnosis and episodes that changed into disease diagnosis.

	Symptom diagnoses that persisted for more than a year (n = 12,533)	Disease diagnoses (n = 27,076)	OR/IRR ^a 95% CI	P
Duration of the EoC in days (Median, IQR)	845 [547–1419]	22 [2–239]	–	–
Sex (females) (n, %)	8,296 (66.0%)	15,826 (58.5%)	–	< 0.001 ^b
Age (SD)	46 (23)	44 (25)	–	< 0.001 ^c
Number of contacts (mean, SD)	2.33 [0.25]	3.53 [0.24]	1.50 [1.48, 1.54]	< 0.001 ^d
Number of interventions (mean, SD)	2.81 [0.22]	4.24 [0.33]	1.51 [1.48, 1.55]	< 0.001 ^d
Laboratory (yes) (n, %)	2,430 (19.4%)	6,394 (23.6%)	1.33 [1.26, 1.40]	< 0.001 ^e
Imaging (yes) (n, %)	955 (7.6%)	3919 (14.5%)	2.15 [1.99, 2.32]	< 0.001 ^e
Number of referrals (mean, SD)	0.74 [0.4]	1.92 [0.1]	2.58 [2.50, 2.66]	< 0.001 ^d
Primary care referrals (yes) (n, %)	988 (8.0%)	1742 (6.4%)	0.80 [0.74, 0.87]	< 0.001 ^e
Specialists referrals (yes) (n, %)	1827 (14.6%)	9579 (35.4%)	3.41 [3.22, 3.61]	< 0.001 ^e
Number of types of medication (mean, SD)	0.54 [0.022]	0.74 [0.017]	1.36 [1.32, 1.40]	< 0.001 ^d

^aIncident Rate Ratios (IRR) for continuous discrete variables and Odds Ratios (OR) for categorical dichotomous variables, OR and IRR reflect episodes that changed into disease diagnoses compared to episodes that evolved into persistent symptom diagnoses.

^bChi-square test.

^cIndependent T-test.

^dMultilevel negative binominal analysis; correcting for nesting episodes within General Practitioner practices.

^eMultilevel binary logistic regression analysis; correcting for nesting episodes within General Practitioner practices.

somatic condition, around 40% would resolve, and roughly 10% would persist or develop into Medically Unexplained Symptoms (MUS) [1]. In contrast, in our study, around 86% of symptoms were resolved within a year, and only 5% evolved into persistent symptoms. However, it is important to note that the two studies are different in terms of study designs and populations, so the comparison should be interpreted cautiously. Other longitudinal studies have explored the course of symptoms in general practice but focused on related concepts, such as patients with Medically Unexplained Symptoms (MUS), defined as 'complaints with an unclear origin' [17], as the MUS label has a long publication history [22]. For instance, a systematic review, gathering data from a diverse range of sources, found that 10 to 30% of patients presenting with MUS in primary or secondary care settings evolve into persistent MUS after a follow up period ranging from 6 to 15 months [23]. This percentage is higher than in our study, probably because of the inclusion of patients from secondary care settings and differences in diagnostic criteria between MUS and symptom diagnosis. For instance, some of the included studies in the systematic review require a duration of three months to define MUS with a limited number of symptoms, whereas in our study we included all patients with all symptom diagnoses newly presented to the GP, a diagnostic category to describe a wide range of symptoms for which patients request care regardless of the cause. Similar to our findings, a second study on the course of MUS found that almost half of the patients presenting with MUS at baseline still experienced the same type of symptoms after one year [22]. This suggests that once a symptom persists, its specific type is less likely to change over time. Furthermore, it suggests that the persistence of the same symptoms may be understood through the predictive coding framework, a theory in which the brain continuously anticipates the recurrence of a symptom based on previous experiences. In this context, if the brain has frequently encountered a particular symptom, it may begin to expect that symptom to occur again, thereby reinforcing its persistence [24].

A limited number of studies have explored GPs' management strategies in patients with persistent symptoms. Most of this literature focused on management strategies in patients with MUS [25]. In line with our findings, a small-scale Dutch study including only 77 patients found that GPs most frequently prescribed medication and performed follow-up consultations [25]. However, referrals were less frequent as this study found that only 4.5% referrals to other healthcare providers in general practice and 4.4% referrals to medical specialists in consultations about persistent MUS [25]. In contrast to these findings, we found more referrals to primary healthcare workers and medical specialists when symptom diagnoses persisted. These differences could be explained by differences in the definitions between MUS (Robin's list, a list of 23 symptoms to construct 5 clusters of frequently observed functional syndromes) and symptom diagnosis (the ICPC classification definition, including a broader range of symptoms). It could also be explained by a longer follow-up period which was one year in our study and only three months in the Dutch study.

Unexpectedly, we found that patients who received a disease diagnosis underwent more investigations than those with persistent disease diagnoses. A possible explanation is that GPs do not base investigations only on whether symptoms persist. Instead, they conduct investigations when they suspect a specific disease or when symptoms change over time. As a result, patients who ultimately receive a disease diagnosis may undergo a higher number of investigations than those with persistent symptom diagnoses.

Strengths and limitations

The main strength of this study is the inclusion and follow up of a high number of EoC over 13 years from highly structured routine primary care electronic health records [16]. The analysis of real-word data allowed the identification of management strategies and contacts in daily practice.

However, study limitations should be considered. Firstly, even though the FaMe-Net GPs are regularly trained to unify the coding system between them and update the diagnosis between different contacts to the highest level of diagnostic certainty, it is difficult to accurately estimate whether diagnostic coding errors are made by analyzing such a large primary care data registry especially for episodes that evolved into persistent symptom diagnoses as most of the symptoms are managed in general practice. Additionally, while FaMe-Net captures most episodes of care, recent events like patients changing GP practices can occasionally result in incomplete long-term tracking.

Secondly, it could be possible that some symptoms are undiagnosed disease diagnoses, which could influence the distribution of episodes. Nevertheless, our findings reflect the work of the GP in daily practice. It is crucial to emphasize that our study focuses on diagnoses made in general practice, rather than on illness trajectories. This distinction means that a resolved symptom diagnosis does not necessarily imply that the patient's symptoms have fully resolved. Instead, it reflects the diagnostic outcome within general practice, which may not always capture the ongoing experience of symptoms.

Future research and practical implications

Previous literature indicated that GPs often anticipate that most symptom diagnoses would eventually develop into disease diagnoses [1]. This tendency to overestimate the progression into disease diagnoses is unsurprising, given that medical education primarily focuses on identifying and treating such conditions [26]. With such education, the challenge in daily practice remains in ensuring that underlying disease diagnoses are not missed. However, we found in our study that most episodes that started with a symptom diagnosis were resolved within a year and only a minority changed into disease diagnoses. Interestingly, we found that GPs were able to quickly identify disease diagnoses. Our findings highlight the importance of reassurance in patient care when discussing the prognosis of symptom diagnosis, as most of these symptoms tend to resolve. Instead of promoting unnecessary diagnostic and therapeutic interventions, the focus should be on strengthening the doctor-patient relationship and implementing early interventions to prevent persistent symptoms.

It is known that GPs experience difficulties in the care for persistent symptoms and that the initial care is important for the course of the symptoms [1,12]. In our study, we found that more management strategies are conducted in episodes that changed into disease diagnoses compared to episodes that persisted as symptom diagnoses for more than a year. Is this due to undertreatment in persistent symptoms? Or good practice as it is advised to decrease the number of unnecessary interventions when the symptoms persist? [27] Or does that simply mean that more management strategies are needed in disease diagnoses? Future research is needed to identify which factors motivate the GPs to indicate management strategies in persistent symptoms and disease diagnoses. As we found that most symptom diagnoses that persist for more than a year are managed in primary care settings and only a small minority of the patients with symptom diagnoses are referred to secondary care, future research should focus on exploring how management strategies interfere with the persistence of the symptoms, and developing interventions in general practice for managing symptom diagnoses to prevent an evolution into persistent symptoms.

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Author contributions

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Disclosure statement

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Appendix A: Overview of the international classification of primary care, 2nd edition (ICPC-2) codes of the included symptom diagnoses [3]

Selected ICPC-2 codes: Chapters A to Y: All the codes from 1 to 29

Non-selected ICPC-2 codes:

Risk factors and euthanasia

Chapter A: A20 (Euthanasia Request/ decision), A21 (Risk factor for malignancy), A23 (Risk factor NOS)

Chapter K: K22 (Risk factor cardiovascular disease)

Diseases

Chapter S: S03 (Warts), S09 (Infected finger/toe) S10 (Boil/carbuncle), S11 (Skin infection post-traumatic), S12 (Insect bite/sting), S13 (Animal/human bite), S14 (burn/scald), S15 (Foreign body in the skin), S16 (Bruise /contusion), S17 (Abrasion/scratch/blister), S18 (Laceration/cut), S19 (Skin injury/other), S20 (Corn/ Collosity)

Family planning

Chapter W: W10 (contraception postcoital), W11 (Contraception oral), W12 (Contraception Intrauterine), W13 (Sterilization), W14 (Contraception other)

Chapter Y: Y13 (Sterilization male), Y14 (family planning male other)

Abbreviations: NOS=Not Otherwise Specified.

Appendix B: Overview of the international classification of primary care, 2nd edition (ICPC-2) codes of the included management strategies [3]

Interventions type	ICPC-2	Name of the Interventions
Diagnostic interventions	Laboratory exams	–32 Sensitivity Test
		–33 Microbiological/ immunological Test
		–34 Blood Test
		–35 Urine Test
		–36 Faeces Test
		–38 Other Laboratory Test NEC
	Imaging	–41 Diagnostic Radiology/Imaging
	Other diagnostic interventions	–42 ECG
		–39 Physical Function Test
		–40 Diagnostic Endoscopy
Therapeutic Interventions		–50 Medical prescription/ Request/Renew/Injection
		–58 Therapeutic Counselling/Listening
Referrals	General Practice	–66 Referrals to Other Provider (EXCL. M.D): nurses, therapists and social workers
	Specialists	–67 Referrals to Physician/ Specialist/ Clinic/ Hospital.