

ORIGINAL ARTICLE

The prevalence, incidence and management of low back pain with radiating leg pain in Dutch general practice: A population-based cohort study in the Rijnmond Primary Care Database

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Abstract

Background: Radiating leg pain is common in patients with low back pain (LBP). In this study, we aimed to determine the prevalence and incidence of LBP with radiating leg pain in Dutch general practice, and to describe the prescribed medications and requested imaging diagnostics.

Methods: The Rijnmond Primary Care Database containing over 500,000 primary care patients was used to select patients ≥ 18 years with LBP with radiating leg pain between 2013 and 2021. Data on patient characteristics, LBP episodes, prescribed medication and requested imaging in the first 3 months of an episode was extracted. Descriptive statistics were used to present patient characteristics and diagnostic/therapeutic interventions.

Results: A total of 27,695 patients were included. The total number of LBP with radiating leg pain episodes in these patients was 36,268. In 2021, the incidence and prevalence were 19.1 and 25.7 per 1000 patient years, respectively. In 60% of patients, the episode duration was shorter than 1 month. In 62% of the episodes, patients visited the general practitioner (GP) one to two times. In 59% of the episodes, at least one medication was prescribed, non-steroidal anti-inflammatory drugs (NSAIDs) being the most common one (45%). In approximately 11% of the episodes, additional diagnostic imaging was requested.

Conclusion: LBP with radiating leg pain is common in Dutch general practice patients. About 2/3rd were prescribed pain medications. Dutch request few to none diagnostic imaging for these patients which is in line with clinical practice guidelines.

Significance: In this new study, we have gained insights into the incidence and prevalence of LBP with radiating leg pain in Dutch general practice. Both remained fairly stable over the study period of 9 years (2013–2021). Overall, the care burden regarding seeking contact with the GPs and the requested diagnostics seem not

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to be that high. In 62% of the care episodes, there were one or two consultations with the GP, and in 11% of the episodes a diagnostic imaging was requested. Pain medications frequently prescribed (i.e. 2/3rd of the episodes), with NSAIDs being the most common ones.

1 | BACKGROUND

Worldwide low back pain (LBP) is common, with a mean point prevalence of 11.9%, and a mean 1-month prevalence of 23.2% (Hoy et al., 2012). Among patients with LBP visiting primary care health professionals, approximately 36% also report low back-related leg pain (Hill et al., 2011). LBP-related radiating leg pain is either radicular or referred (non-specific) leg pain. In patients with lumbar radicular syndrome (LRS) a nerve root is involved (Verburg et al., 2015), while in patients with referred leg pain, the pain probably arises from activation of the nerve endings in lumbar structures such as ligaments, facet joints, muscles or the fascia (Merskey & Bogduk, 1994). The presence of radiating leg pain is a prognostic factor associated with poor outcomes in patients with LBP (Burton et al., 1995; Cherkin et al., 1996; Fransen et al., 2002; Kongsted et al., 2013; Shaw et al., 2001). These patients experience more pain and disability (Khorami, n.d.), their recovery time is longer and they have a higher probability of developing chronic pain as compared to patients with LBP without leg pain. Patients with radiating leg pain also utilize more health care compared to patients with LBP only (Hider et al., 2015). Therefore, an accurate assessment of these patients is fundamental to provide adequate management and treatment suggested by guidelines at an early stage of presentation.

A range of guidelines are available from different countries on the management of LBP; some of these include specific recommendations for LRS (Khorami et al., 2021). In the Netherlands, the general practitioners (GPs) are suggested to treat patients with LRS according to the guidelines of the Dutch College of General Practitioners (NHG) (Verburg et al., 2015). In the absence of red flags (e.g. cauda equina syndrome, severe paresis or malignancy in the background), the NHG guideline suggests for LRS conservative therapy. This consists of patient education, physiotherapy and pain medication in concordance to the World Health Organization (WHO) analgesic ladder, originally developed for management of cancer pain and now widely used for all types of pain. When imaging is indicated, GPs are advised to refer the patient to the neurologist for consultation.

An earlier study (Spijker-Huiges et al., 2015) in general practice in the Netherlands revealed a mean incidence and prevalence for patients with radiating leg pain of 9.4

and 17.2 per 1000 person years, respectively. However, this study population consisted only of 390 patients and the follow-up time was from 1998 to 2008. Larger studies on the epidemiology of LBP with radiating leg pain in primary care are missing. Additionally, most descriptive studies on LRS are performed in hospital settings and included a short follow-up time only. Up to date, little is known about the treatment strategies and diagnostic interventions carried out by Dutch GPs in patients with LBP and radiating leg pain. Providing a picture of the current clinical management of this patient population allows comparison with current evidence to identify diagnostic and therapeutic under- or over-performance.

Thus, the objectives of this study were to determine the incidence and prevalence rates of LBP with radiating leg pain in general practice in the Netherlands, and to describe the prescribed medications and requested diagnostics to these patients. Additionally, differences among different sex-, age- and socioeconomic status groups were explored.

2 | METHODS

2.1 | Database description

The Rijnmond Primary Care Database (RPCD) was used for this study. This database is a pseudo-anonymized collection of electronic patient files of GPs in the region of Rotterdam and its surroundings (Rijnmond region). The RPCD is a region-specific derivative of the Integrated Primary Care Information (IPCI) database, under the supervision of the Department of General Practice of the Erasmus Medical Center (de Ridder et al., 2022). The files contain all journal entries by the GP (free text), the diagnosis coded with International Classification of Primary Care (ICPC) codes, laboratory results, drug prescriptions (ATC-codes), referrals and correspondence letters. The RPCD contains the data of approximately 500,000 patients.

2.2 | Patient selection/study cohort

Patients aged 18 years or older who visited their GP with LBP with radiating leg pain between 1 January 2013 and 31 December 2021 were included. Patients who received the ICPC code L86.00 describing LBP with referred leg

pain or the ICPC code L86.01 describing lumbar hernia nucleus pulposus (HNP) were included. Patients with at least 12 months of valid database history available at study entry were included in the cohort. Furthermore, patients with at least 3 months of follow-up data after presentation were eligible for inclusion.

2.3 | Patient characteristics

From the database the following patient characteristics were collected: age at the start of the first episode, sex, area level social deprivation (SDA) index, and comorbidities (see Data S1—Table A for the group of comorbidities with ICPC codes). SDA is the sum of standardized scores derived from four indicators: benefit recipients, residents with low income, surrounding address density and non-western foreigners. The formula for the calculation of the SDA index is provided elsewhere (Deville & Wieggers, 2012).

2.4 | Consultation rate and management

A consultation was defined whenever there was a contact with a patient (face-to-face, telephone or home visit). The duration of an episode was defined as the duration from the first until the last consultation (in months). The term episode defines the period when patients have sought care to the GP. A new episode was defined when the patient did not visit the GP for LBP with radiating leg pain in the preceding 12 months. Patients could have one or multiple episodes of LBP with radiating leg pain during the follow-up time. Analgesic prescriptions in the first 3 months of the episode were extracted based on the Anatomical Therapeutic Chemical (ATC) codes. In the Data S1—Table B, the list and the categories of the included medication are provided. Medication prescribed in the preceding 6 months prior to the start of the episode was excluded in order to eliminate repeated prescriptions for other indications.

Imaging diagnostics were identified by creating search algorithms by combining different words and terms used by GPs indicating an X-ray, a CT or an MRI scan in the 'free text' of the patient's medical journal. The requested imaging diagnostics in the first 3 months of an episode were extracted. The search algorithm to extract imaging diagnostics is found in the Data S1—Table D.

2.5 | Statistics

The incidence rate was calculated as the number of new episodes per year divided by the number of person years

multiplied by 1000 grouped by age, gender and SDA. Year prevalence was calculated by dividing the number of unique ongoing episodes in a year by the number of patient years multiplied by 1000 grouped by age, gender and SDA. About 95% confidence intervals for incidence and prevalence were calculated, based on a Poisson distribution, by multiplying the estimated rate by the confidence factor associated with the number of events on which the rate is based. Descriptive statistics were used to describe the proportions of prescribed medications and requested imaging diagnostics. Frequencies of consultations were described by calculating percentages and presented as a histogram. Sunburst was used to illustrate the first two prescribed medications by using the frequencies of the medications. All analyses were performed using SPSS version 28.0.1.0.

3 | RESULTS

3.1 | Patient characteristics

Table 1 shows the characteristics of the included patients. A total of 27,695 patients were included having one or multiple LBP episodes. The mean number of years of all patients' contribution to the cohort is 6.6 years. The majority of the patients are female (57%), age is between 40 and 59 years (42%), and patients do not live in SDA (67%). Osteoarthritis is the most common comorbidity (21%) in LBP patients with radiating leg pain.

3.2 | Incidence and prevalence

Figure 1 shows the incidence and year prevalence of LBP with radiating leg pain between 2013 and 2021.

The incidence and year prevalence in 2013 was 21.0 and 26.4, per 1000 patient years, respectively. In 2021, the incidence and prevalence were 19.1 and 25.7, respectively. In general, both the incidence and prevalence remain stable during our study time (Figure 1). Tables 2 and 3 present the incidence and year prevalence per year for different sex, age and SDA groups. Females have higher incidence and year prevalence compared to males. In general, the incidence and year prevalence increase by age. Moreover, people living in SDA have higher incidence and year prevalence compared to those not living in SDA.

3.3 | Episodes

Figure 2 and Table 4 show the characteristics of the episodes. The total number of the episodes for the included

patients is 36,267. In the majority of the episodes (62%) the patients visited the GP one or two times (Figure 2). However, in 8% of the episodes, there are more than 10

TABLE 1 Patients' characteristics and comorbidities of patients with low back pain and radiating leg pain in Dutch general practice.

	N (%)
Total	27,695
Sex	
Male	11,803 (43)
Female	15,892 (57)
Age categories	
18–39	5434 (20)
40–59	11,677 (42)
60–74	7199 (26)
≥75	3385 (12)
Socially deprived area	
No	18,555 (67)
Yes	5582 (20)
Missing	3558 (13)
Comorbidities	
Osteoarthritis (back, knee, hip and other joints)	5713 (21)
COPD/asthma	4793 (17)
Back complaints in the last year	4365 (16)
Diabetes	3751 (14)
Cardiovascular diseases	3696 (13)
Depression	3652 (13)
Anxiety	2088 (8)
Neck complaints in the last year	1625 (6)
Osteoporosis	1414 (5)
Rheumatoid arthritis	850 (3)
Fibromyalgia	416 (2)

consultations. More than half of the episodes (60%) had a duration shorter than a month followed by higher than 6 months (21%). A large proportion (76%) of the patients had only one LBP episode during the study time. No large differences among the subgroups were seen compared to the results of the entire group (Data S1—Table C).

4 | MANAGEMENT

4.1 | Medication

Figure 3 shows a sunburst of the most frequently prescribed medications. Non-steroidal anti-inflammatory drugs (NSAIDs) are most frequently prescribed (23%) followed by weak opioids (12%). Data S1—Table D provides detailed information of the sunburst. Data S1—Table E presents the total prescribed medication in the first 3 months after the start of an LBP episode with radiating leg pain. Only the top 10 most frequently prescribed medications have been included. From the total of the prescriptions, NSAIDs are most commonly prescribed (43%) followed by weak opioids (25%) and strong opioids (10%). In total, in 59% of the episodes, at least one type of medication was prescribed.

4.2 | Imaging diagnostics

Table 5 shows the requested imaging in the first 3 months after the first consultation for the LBP with radiating leg pain. In 89% of the episodes, no diagnostic imaging has been requested by the GP. In case imaging was requested (11%), an X-ray is the most requested imaging (7%) compared to MRI (4%) and CT scan (0.1%). The large majority

Incidence and year prevalence LBP per 1000-patient years

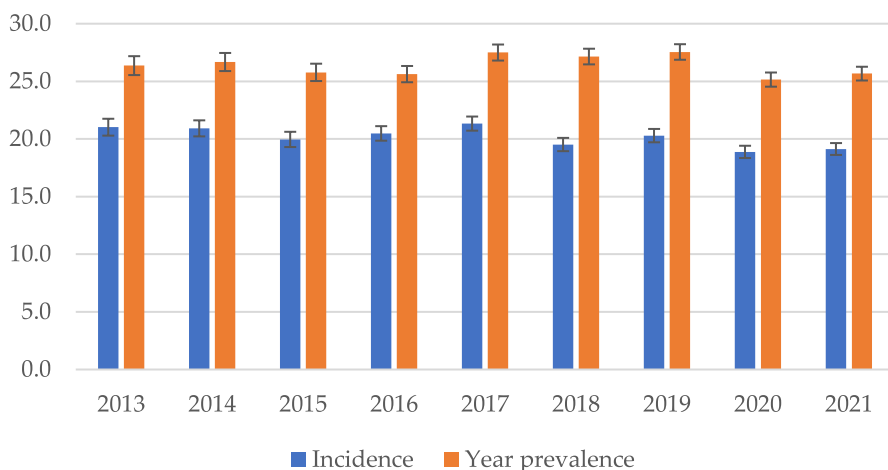


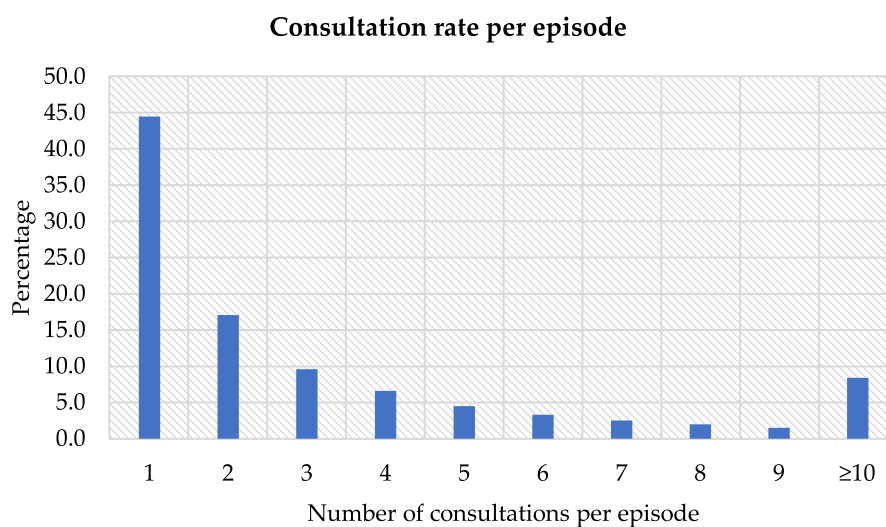
FIGURE 1 Incidence and year prevalence (with 95% CIs) of low back pain with radiating leg pain in Dutch general practice.

TABLE 2 Incidence per 1000 person-years of patients with low back pain and radiating leg pain in Dutch general practice ($n = 36,268$).

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	Mean
Total	21.0	20.9	20.0	20.5	21.3	19.5	20.3	18.9	19.1	20.2
Sex										
Male	19.0	18.7	17.5	17.3	19.5	18.2	18.3	16.8	16.3	18.0
Female	22.9	23.0	22.3	23.3	23.0	20.7	22.1	20.7	21.7	22.2
Age categories										
18–39	12.0	12.0	11.4	11.5	10.8	10.3	10.8	10.8	9.2	11.0
40–59	25.3	25.9	24.2	23.5	26.3	22.7	23.8	22.1	22.1	24.0
60–74	26.4	24.7	23.3	26.2	26.9	25.7	25.7	23.7	26.4	25.4
≥75	25.3	25.4	26.8	27.6	27.7	25.4	27.6	23.9	27.2	26.3
Socially deprived area										
No	20.3	19.9	18.8	19.6	20.6	18.8	20.1	19.1	18.5	19.5
Yes	24.2	26.0	25.5	23.1	24.1	22.3	22.5	20.6	22.7	23.4

TABLE 3 Year prevalence per 1000 person-years of patients with low back pain and radiating leg pain in Dutch general practice ($n = 36,268$).

	2013	2014	2015	2016	2017	2018	2019	2020	2021	Mean
Total	26.4	26.7	25.8	25.6	27.5	27.1	27.5	25.1	25.7	26.4
Sex										
Male	23.2	23.9	22.5	21.8	24.7	24.9	24.9	22.4	22.1	23.4
Female	29.2	29.3	28.8	29.0	30.1	29.2	30.0	27.6	29.0	29.1
Age categories										
18–39	13.9	13.8	13.9	13.5	13.2	12.6	13.3	12.9	11.7	13.2
40–59	31.7	33.1	31.0	29.4	33.2	32.0	32.2	29.2	29.3	31.3
60–74	33.4	33.0	30.9	33.3	35.4	36.6	36.0	32.9	35.3	34.1
≥75	35.7	34.3	36.7	36.8	38.8	38.0	40.2	34.8	39.8	37.2
Socially deprived area										
No	25.3	25.3	24.1	24.7	26.9	26.2	27.0	24.8	24.8	25.5
Yes	31.1	33.2	33.6	29.4	31.7	32.7	32.4	29.1	30.3	31.5

FIGURE 2 Consultation rate per episode of patients with low back pain and radiating leg pain in Dutch general practice (from total of episodes $n = 36,268$).

of all three imaging diagnostics (81%) have been requested in the first 4 weeks after the start of an episode.

5 | DISCUSSION

5.1 | Summary

In our study in Dutch general practice, the incidence and prevalence of people with LBP with radiating leg pain remained fairly stable over the study time. In 2021, the incidence and prevalence were 19.1 and 25.7 per 1000

TABLE 4 Duration and frequency of episodes per patient of patients with low back pain and radiating leg pain in Dutch general practice (from total of episodes $n = 36,268$).

	N (%)
Duration of an episode	
<1 month	21,892 (60)
1–3 months	3593 (10)
3–6 months	3062 (9)
>6 months	7721 (21)
Number of episodes per patient	
1	21,023 (76)
2–4	6642 (24)
≥5	30 (NA)

Note: NA: percentage <1%.

Abbreviation: NA, not applicable.

patient years, respectively. The incidence and year prevalence both increased by age (Tables 2 and 3). Incidence and prevalence are higher in females and people living in SDA. In 62% of the episodes, patients had one or two consultations with the GP indicating a relatively low range of care utilization in these patients. More than half of the episodes (60%) had a duration shorter than a month regarding seeking consultation with the GP. In almost 2/3rd of the episodes (59%), the patients were prescribed medications. NSAIDs were the most commonly prescribed medications for LBP with radiating leg pain (43%) followed by weak opioids (25%). Strong opioids were less frequently prescribed by GPs (11%). In 11% of the patients, diagnostic imaging was requested with X-ray being the most common choice (7%). The majority of these imaging were requested in the first 4 weeks after the start of an episode.

5.2 | Strengths and limitations

One of the strengths of our study is the wide range of real-world data available from GP electronic files and the high number of included patients ($n = 27,695$). The collected data is a good representation of the primary care population and how GPs in the Netherlands manage this population on a daily basis. However, there are also some limitations in our study. Our study is based on the use of ICPC codes. Depending on how strictly or loosely the GP used these codes, this could have led to an underestimation or overestimation on the incidence and

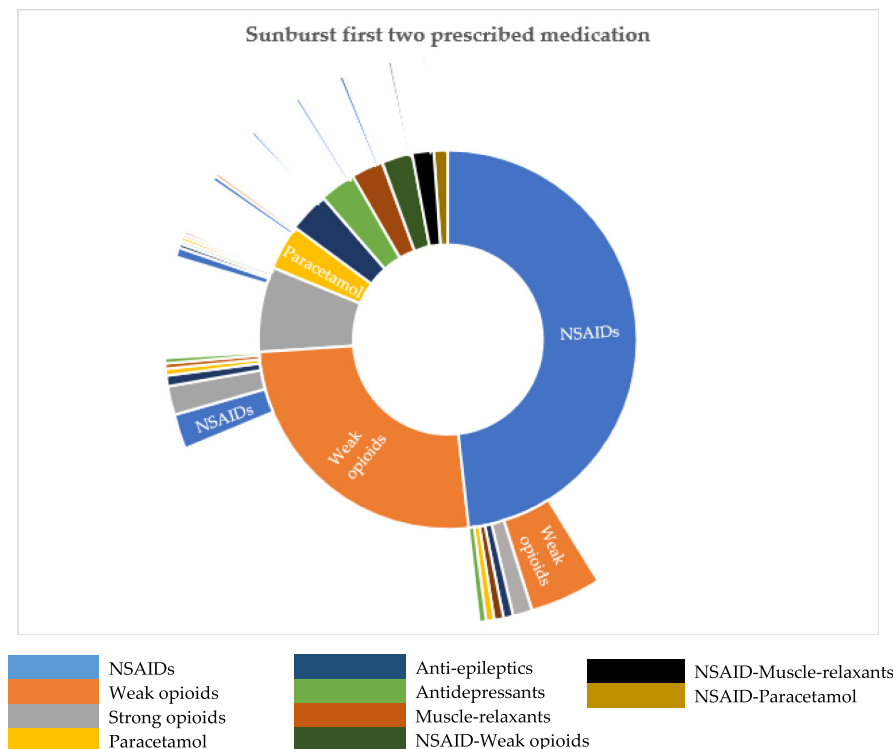


FIGURE 3 Sunburst of first two prescribed medications in patients with low back pain and radiating leg pain in Dutch general practice.

TABLE 5 Requested imaging diagnostics in the first 3 months of low back pain and radiating leg pain episodes in Dutch general ($n = 36,268$).

Type imaging diagnostics	Total N (%)	X-ray N (%)	MRI scan N (%)	CT scan N (%)
Requested	4078 (11)	2503 (7)	1555 (4)	20 (NA ^a)
Not requested	32,190 (89)	33,765 (93)	34,719 (96)	36,248 (100%)
Weeks until applying imaging				
1–4	3299 (81)	2100 (84)	1187 (76)	12 (60)
4–8	459 (11)	240 (10)	215 (14)	4 (20)
8–12	320 (8)	163 (6)	153 (10)	4 (20)

Abbreviation: NA, not applicable.

^aNA: percentage <1%.

prevalence of LBP with radiating leg pain. Nevertheless, primary care databases using different diagnostic coding (e.g. READ or ICPC) are widely used for observational studies (Häyrynen et al., 2008; Jordan et al., 2004; Lix et al., 2012; Morris et al., 2003) making RPCD a suitable database for research. Moreover, in the Netherlands separated ICPC codes are used for LBP only (ICPC L02: back symptoms/complaints and ICPC L03; LBP without radiation) and LBP with radiation (ICPC L86.00; LBP with radiating leg pain and ICPC L86.01; lumbar hernia nucleus pulposus [HNP]). By combining the ICPC codes L86.00 and L86.01, we have captured all types of LBP with radiating leg pain which is the focus of our study. Therefore, the calculated incidence and year prevalence of LBP and radiating leg pain in our study is a proper presentation of the actual numbers. However, no separate ICPC code is available for lumbar spinal stenosis (causing LBP and radiating leg pain) and GPs apply L86.00 for this condition. In older aged patients, lumbar spinal stenosis could be more common than disc herniation. Another limitation concerns the allocated data on medications. We have assumed that medications were prescribed for LBP with radiating leg pain in the first 3 months after the first consultation. However, in the health care registry system, medications are not obliged to be linked to a diagnostic code. Repeated prescriptions were excluded to minimize the chance that medication was prescribed for other reasons, but we cannot rule out that analgesics were prescribed for other reasons than LBP with radiating leg pain. Another downside of eliminating repeated prescriptions in the preceding 6 months of the episode could lead to underestimation in cases where a specific medication was firstly prescribed for one condition and then restarted for LBP. This could lead to underestimation of the prescribed medication for LBP. However, by applying this strict definition, on the

other hand, we have increased the probability that the prescribed medication is indeed for LBP.

Furthermore, in the Netherlands, paracetamol and NSAIDs can be bought over the counter. Therefore, the results of medications in our study could be an underestimation on the actual use of these medications. Another point of discussion is the methodology used to identify the applied diagnostics. By building search algorithms in 'free text' of the medical journals (Data S1—Table D), we have tried to extract as much as possible the applied diagnostics. However, in cases of misspelling the applied diagnostic could have been missed. Therefore, the actual percentage of applied diagnostics might be higher than 11%. However, we expect this percentage would not be much higher because the chance of correct spelling is higher than misspelling.

5.3 | Comparison with literature

Earlier studies have been conducted on the incidence and prevalence of LBP without radiating leg pain. However, to our knowledge, data on the incidence and prevalence of LBP with radiating leg pain in the primary care is limited. An explanation might be the variation regarding the methodology of the studies and diverse definitions for LBP with radiating leg pain. Higher prevalence in females and increasing prevalence with age of LBP (with and without radiating leg pain) shown by the Global Burden of Disease 2107 study (Wu et al., 2020) is in line with our findings. The prevalence rate of health-care utilization for management of LBP in general differs between geographic regions (Beyera et al., 2019) making it challenging to compare our results with the literature. The NSAIDs being the most commonly prescribed medication in our study are in concordance with the WHO analgesic ladder strategy to prescribe a NSAIDs as second medication after paracetamol. However, NICE (2020) guideline recommends antidepressants (amitriptyline or duloxetine) or anti-epileptics (gabapentin or pregabalin) as the initial choice for neuropathic pain (Neuropathic pain in adults: pharmacological management in non-specialist settings, 2020) in case of radicular pain. Other guidelines are inconsistent regarding using medications such as NSAIDs, opioids, anti-epileptics, muscle relaxants or anti-depressants for LBP with radicular leg pain (Khorami et al., 2021). To our knowledge, no specific recommendations have been provided for LBP with referred leg pain (somatic-referred pain). These inconsistencies in guidelines and limited recommendations for the choice of medication for LBP with radiating leg pain (radicular and referred) make it for GPs challenging to make better choices in

prescribing any medication for these patients. In our study in 89% of the episodes, no diagnostic imaging has been requested by the GP in the first 3 months of an episode. This percentage indicates that Dutch GPs act close to the national (Verburg et al., 2015) and international guidelines (Khorami et al., 2021) where routinely prescribing imaging in LBP with radiating leg pain in the absence of red flags is not recommended.

5.4 | Implications for research and practice

In most of the LBP episodes with radiation, the consultation rate and duration seem to be low; however, there is a small group of patients who consult the GP frequently and do have a high burden of care. GPs are suggested to be aware of these patients in order to better provide adequate care. More research is needed to identify these patients and investigate which factors contribute to frequently consulting their GPs. Many patients in our study used pain medication while the evidence for most of these medications in the literature is limited. Hence, GPs could be more careful in prescribing pain medication for LBP with radiating leg pain taking the evidence into account. In our patient population, NSAIDs are mostly prescribed. At the same time, the most recent Cochrane review suggested that NSAIDs are not more effective than placebo for pain reduction in patients with sciatica, and presented low-quality evidence that NSAIDs are somewhat better than placebo for global improvement (Rasmussen-Barr et al., 2017). Research is needed to determine which patients with sciatica will benefit from taking NSAIDs versus those who do not (or hardly) benefit.

6 | CONCLUSION

In summary, in our study, we have presented the incidence and year prevalence of LBP with radiating leg pain in a primary care population consulting their GP. LBP with radiating leg pain is common in general practice. The burden of care utilization for this problem per patient in terms of seeking contacts with GP and the requested imaging diagnostics seems to be not that high. In more than half of the episodes, there were one to two consultations with the GP, and in only 11% a diagnostic imaging was requested. NSAIDs were the most commonly prescribed pain medications. In general, Dutch GPs act in concordance with the guidelines regarding the prescriptions of diagnostics for this condition.

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CONFLICT OF INTEREST STATEMENT

All authors declared no conflict of interest.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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