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Use of analgesics in Denmark: A national survey

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Abstract

People suffering from pain constitute a sizeable and heterogeneous patient group. Conventional oral analgesics are considered a cheap and safe first-line treatment. These drugs are used on both a regular and 'as needed' basis and are often obtained over-the-counter (OTC). We explored patient-reported patterns of use and adverse effects of analgesics in a community pharmacy questionnaire. Eight pharmacies invited persons aged ≥18 years requesting analgesics via prescription or OTC to complete an electronic questionnaire. A total of 2410 participants completed the questionnaire (68% female; 50% ≥ 60 years). Most participants filled a prescription for paracetamol (61%; $n = 842$) and non-steroidal analgesics ($n = 363$; 26%). Among OTC users, most obtained paracetamol (61%). Among prescription users, 73% ($n = 1114$) had their analgesic prescribed for daily use; however, of these only 61% ($n = 630$) reported using it daily, while 35% ($n = 363$) reported 'as needed' use. Of all prescriptions, 80% ($n = 898$) were labelled with the standardized indication 'against pain'. Self-reported indications showed that back pain and muscle/joint pain were the most common indications. Among non-new users of OTC analgesics ($n = 841$), 17% ($n = 141$) used their medication daily. Finally, 90% ($n = 1658$) of all participants reported not experiencing adverse effects. Our findings suggest a need for continuous assessment of analgesic patterns of use after treatment initiation to inform counselling in community pharmacies and elsewhere.

KEYWORDS
adverse effects, analgesics, community pharmacy, patterns of drug use, questionnaire

1 | INTRODUCTION

Pain is a leading cause of disability[1] and a common reason for which people seek medical help.[2] Conventional oral analgesics constitute the first-line treatment for pain, as they present a relatively safe and cheap solution.[3] Chronic pain affects 10%–30% of the European adult population,[4,5] and patients using analgesics comprise a large and heterogeneous group. Thus, analgesics are used for a wide range of pain indications, such as headache, joint pain, and neuropathic pain. Prescriptions for analgesics, however, often contain standardized phrases for indication and dosage on the drug label, for example, 'against pain' and 'dosage according to written instructions'. Further, patients will often use analgesics 'as needed', at times in addition to regular pain

management, and use will often vary widely both between persons and over time for the individual person. This can create considerable challenges for pharmacy staff and other healthcare professionals in providing individualized counselling on the rational, safe, and effective use of these medications.

Only few studies have examined utilization patterns for analgesics from a patient perspective.[6,7] Knowledge on the actual use of analgesics, indications, and patients' experience with adverse effects is thus scarce. The community pharmacy setting provides an excellent opportunity to address these questions by directly asking people redeeming prescriptions for analgesics and those buying over-the-counter (OTC) analgesics.

The present study, conducted in the Danish community pharmacy setting, aimed to explore patients' self-reported pattern of use, indications, and adverse effects when using analgesics.

2 | METHODS

We conducted a questionnaire-based study to explore the use of analgesics among adults obtaining prescription and/or OTC analgesics at eight community pharmacies across Denmark during April and May 2021.

2.1 | Setting and participants

Community pharmacies were recruited via the Danish Network for Research and Development in Pharmacy Practice,[8] currently comprising 102 pharmacies across Denmark. Pharmacies were continuously recruited from March to May 2021. Pharmacies expressing interest in participating in the study to collect data received additional information regarding the project and the data collection process by e-mail. Participating pharmacies were offered an individual online video meeting with one author (MR, BB, or JRH) before initiation of data collection. The pharmacies were asked to each appoint a staff member as a contact person and a backup in case of illness. Pharmacy staff collecting data for the study included both pharmacists and pharmacy technicians. One author (MR, BB or JRH) visited the pharmacies within the first 2 days of data collection to help set up the online data collection tool and to ensure full agreement and understanding about the data collection process. Further, the pharmacies were in continuous contact with one author (MR, BB, or JRH) during the data collection period. Finally, all pharmacies were offered an individual video- or phone-based meeting with one of the authors halfway through their data collection period.

2.2 | Questionnaire development

The questionnaire was developed to cover information not available in existing registry-based data sources, more specifically the Danish National Prescription Registry which has recorded information on prescriptions redeemed in Danish community pharmacies since 1995.[9] Initially, a draft questionnaire was developed, including questions detailing participant habits and experiences when using analgesics. The draft questionnaire was subject to two pilot tests. First, the questionnaire was pilot tested in a 4-day period in one pharmacy (one data collector in one pharmacy and with 57 respondents). Based on this, the questionnaire was adjusted to further investigate the standardized indication 'against pain' as well as self-reported use of analgesics and adverse effects when using analgesics. The adjusted questionnaire was then pilot-tested in a 3-day period (in two pharmacies and with 101 respondents). Based on this second pilot test, the questionnaire was adjusted into a final version. The final questionnaire comprised questions about the type of analgesics the participant requested, prescription and OTC, on-label and self-reported indications, on-label dosage, self-reported use (i.e., regular and 'as needed' use), and adverse effects when using analgesics. Additionally, the questionnaire included demographics on all participants. The questionnaire was administered in Danish, however, a translated version of the questionnaire is available in Appendix S1.

Analgesic medication was defined according to the Anatomical Therapeutic Chemical (ATC) classification system[10] as the following groups: N04 (analgesics), N03A (anti-epileptics), N06A (antidepressants), M02AA (anti-inflammatory preparations, non-steroids for topical use), M01 (anti-inflammatory and anti-rheumatic products, non-steroids), N07BC02 (methadone), R05DA04 (codeine), and natural medicine. Several of these groups contain drugs not specifically or exclusively used as analgesics. Therefore, the pharmacy staff was instructed to exclude people for whom the indication on the label did not specifically state 'against pain' or similar indications, such as 'against neuropathic pain'.

2.3 | Data collection and analysis

Pharmacy staff invited all adults (≥18 years) who bought analgesic medications for analgesic purposes, either for themselves or for relatives/next of kin, to participate in the study. The pharmacy staff administered the questionnaire by asking the participants the individual questions and adding in the responses to the online data collection tool REDCap.[11]

Each pharmacy collected data over a 9- or 10-day period during April and May 2021. A preliminary investigation from the two pilot test pharmacies showed that a mid-sized pharmacy, serving approximately 300–600 daily people, could provide approximately 300 completed questionnaires in a 10-day data collection period.

Data were analysed using descriptive statistics using Microsoft Excel.

2.4 | Ethics

This study was registered with the repository of the Region of Southern Denmark (approval 21/19881). The Regional Committees on Health Research Ethics waived registration due to the study design (case number 20212000-29). All participants were given verbal information on their juridical rights according to the European General Data Protection Regulation and were offered a written document detailing these rights.

3 | RESULTS

The questionnaire generated 3521 registrations of which 507 were invalid (427 registrations of pharmacy staff having forgotten to invite the person and 83 were inclusion was prohibited due to, e.g., language barriers). Of the 3011 persons who were invited to participate in the study, 80% ($n = 2410$) accepted, of which 1374 (57%) filled a prescription while 1036 (43%) obtained OTC analgesics (Table 1). Of all eligible registrations, 1983 participants (82%) picked up analgesics for themselves and 427 participants (18%) picked up analgesics for their relative or next of kin. More than half of participants were aged 51–80 years (64%; $n = 1532$) and two thirds were female (68%; $n = 1628$). Of the 1983 participants who collected analgesics for themselves, 95% ($n = 1881$) had previous experience with the medication(s), while 5% ($n = 102$) were new users.

Among participants redeeming prescription analgesics ($n = 1374$), the most commonly filled analgesic was paracetamol (61%), followed by nonsteroidal anti-inflammatory drugs (NSAIDs; 26%) and opioids (21%) (Table 2). Among those filling prescriptions, 65% ($n = 889$) collected a single type of analgesic, while 24% ($n = 330$) filled two analgesic classes, and 11% ($n = 155$) collected three or more analgesic classes. The most common OTC analgesics were paracetamol (61%; $n = 635$), NSAIDs (29%; $n = 297$), and aspirin (19%; $n = 200$).

A total of 73% ($n = 1114$) of prescriptions had a dosage instruction of daily use, while 22% ($n = 330$) were prescribed 'as needed' (Table 3). Conversely, among all non-new users of prescription analgesics ($n = 1040$), 61% ($n = 630$) reported daily use and 35% ($n = 363$) stated using their analgesics as needed (Table 3). Participants

TABLE 1 Characteristics of survey participants recruited from eight Danish community pharmacies.

Characteristic	Study population ($n = 2410$)	Prescription ($n = 1374$)	OTC ($n = 1036$)
Female	1628 (68%)	910 (66%)	718 (69%)
Age			
18–24	60 (2.5%)	24 (1.7%)	36 (3.5%)
25–30	78 (3.2%)	28 (2.0%)	50 (4.8%)
31–40	185 (7.7%)	86 (6.3%)	99 (9.6%)
41–50	372 (15%)	186 (13.5%)	186 (18%)
51–60	516 (21%)	286 (21%)	230 (22%)
61–70	559 (23%)	348 (25%)	211 (20%)
71–80	457 (19%)	289 (21%)	168 (16%)
>80	183 (7.6%)	127 (9.2%)	56 (5.4%)
Picking up analgesics			
For themselves	1983 (82%)	1119 (82%)	864 (83%)
For next of kin	427 (18%)	255 (18%)	172 (16.7%)
Previous experience with the analgesic drug[a]	($n = 1983$)	($n = 1119$)	($n = 864$)
Yes	1881 (95%)	1040 (93%)	841 (97%)
None	102 (5.2%)	79 (7.0%)	23 (2.7%)

Abbreviation: OTC, over-the-counter.

[a]Only participants picking up medication for themselves received this question.

TABLE 2 Type of analgesics purchased on prescription and over-the-counter by participants at the community pharmacy.

Analgesic, *n* (%)[a]	Prescription[b] (*n* = 1374)	OTC (*n* = 1036)
Paracetamol	842 (61%)	635 (61%)
NSAIDs	363 (26%)	297 (29%)
Strong analgesics (opioids)[c]	284 (21%)	-
Aspirin	28 (2.0%)	200 (19%)
Analgesics for neuropathic pain[c]	156 (11%)	-

Abbreviations: NSAID, nonsteroidal anti-inflammatory drugs; OTC, over-the-counter.
[a]Several options were available and respondents were allowed to select multiple answers.
[b]Participants were able to report using OTC analgesics, using prescription analgesics or both. If both, individuals were considered prescription users.
[c]Data are only available for prescription users as these medications are not available OTC in Denmark.

TABLE 3 Prescribed dosage and self-reported use of analgesics by participants at the pharmacy on prescription and over-the-counter.

	Prescription[a]	OTC[b]
Prescribed dosage[c]	(*n* = 1374)	
Daily	1114 (73%)	-
Weekly	16 (1.5%)	-
As needed	330 (22%)	-
Daily + as needed	33 (2.1%)	-
Dosage as written	32 (2.0%)	-
Self-reported use[c]	(*n* = 1040)	(*n* = 841)
Daily	630 (61%)	145 (17%)
As needed	363 (35%)	679 (81%)
Daily + as needed	63 (6.1%)	12 (1.4%)
Preceding physical activity	11 (1.1%)	10 (1.2%)
Did not wish to answer	n < 5	n < 5
As needed use[d], ***n* (%)**	(*n* = 436)	(*n* = 697)
Once a week	47 (11%)	75 (11%)
2–3 days a week	152 (35%)	189 (27%)
4–5 days a week	92 (21%)	46 (7.0%)
1–3 times a month	97 (22%)	272 (39%)
Less than one day a month	26 (6.0%)	105 (15%)
Did not wish to answer	26 (6.0%)	15 (2.0%)

[a]Participants were able to report using OTC analgesics, using prescription analgesics or both. If both, individuals were considered prescription users.
[b]No data are listed for OTC under prescribed dosage, since no prescriptions were available nor needed for OTC analgesics.
[c]Participants using multiple medications answered one question for every medication under 'Prescribed dosage'. Under 'Self-reported use', participants using multiple medications answered one single question with the opportunity of multiple answers. These numbers are for non-new users.
[d]Not all participants received this question. Percentages are calculated with the number of participants who answered 'as needed', 'Daily + as needed', and 'preceding physical activity' under self-reported use as the total numerator.
Abbreviation: OTC, over-the-counter.

using prescription analgesics reported that if used 'as needed', it was usually 2–3 days a week (35%), whereas users of OTC analgesic with 'as needed' use most commonly used these one to three times a month (39%). A total of 17% (145 of 841) of participants using OTC analgesics reported using their analgesics daily.

Among persons picking up prescription analgesics for themselves ($n = 1119$), the majority (80%; $n = 898$) of prescription indications were the standardized indication 'against pain' (Table 4). Self-reported indications for prescription analgesics were generally highly diverse, with back pain (31%; $n = 345$), muscle/joint pain ($n = 200$; 18%), and arthritis pain (17%; $n = 192$) being the most common, whereas the most common indications for OTC analgesics were headache (38%; 332 of 864) and muscle/joint pain (20%; $n = 171$). Among participants redeeming a prescription, headache was more common in the youngest age groups with 22% ($n = 10$), while back pain was more common among the elderly (e.g., 39% in the age group 81+ years).

Among all non-new participants ($n = 1881$), 30 did not answer the questions on self-reported adverse effects. Among those with responses ($n = 1851$), the majority (90%; $n = 1658$) reported not experiencing adverse effects from analgesics use. Among the 193 (10%) participants who reported experiencing adverse effects, gastrointestinal complaints were most common (58%; $n = 111$), followed by dizziness (13%; $n = 25$) and nausea/vomiting (10%; $n = 19$). Fifteen per cent ($n = 153$) of participants using prescription analgesics reported to experiencing adverse effects, while 5% ($n = 40$) of participants using OTC analgesics reported this. Of 147 reporting their handling of the perceived adverse effects, patients either continued treatment (41%; $n = 60$) or contacted their prescriber (31%; $n = 45$) when experiencing adverse effects, while 22% ($n = 32$) used other medications to ease the adverse effects. When stratifying by analgesic class, the distribution of self-reported adverse events was largely similar across groups (Table S1).

4 | DISCUSSION

Our survey including 2410 participants recruited from community pharmacies across Denmark showed that the most used analgesics were paracetamol and NSAIDs, and

TABLE 4 On-label and self-reported indications for non-new analgesic users divided into age groups.

	OTC[a] ($n = 841$)	Prescription[b] ($n = 1119$)	18–30 years ($n = 45$)	31–50 years ($n = 239$)	51–60 years ($n = 242$)	61–70 years ($n = 299$)	71–80 years ($n = 214$)	81+ years ($n = 80$)
On-label indication, *n* (%)[c]								
Against pain	-	898 (80%)	28 (62%)	178 (75%)	201 (83%)	241 (81%)	181 (85%)	69 (86%)
Against strong pain	-	89 (8.0%)	$n < 5$	19 (8.0%)	17 (7.0%)	30 (10%)	15 (7.0%)	7 (9.0%)
Against neuropathic pain	-	65 (6.0%)	$n < 5$	17 (7.0%)	17 (7.0%)	15 (5.0%)	10 (5.0%)	$n < 5$
Against migraines	-	37 (3.0%)	$n < 5$	15 (6.0%)	8 (3.0%)	6 (2.0%)	$n < 5$	$n < 5$
Other	-	104 (9.0%)	11 (2.0%)	32 (13.0%)	26 (11%)	31 (10%)	16 (7.0%)	$n < 5$
Self-reported indication, *n* (%)[c]								
Against back pain	152 (18%)	345 (31%)	6 (13%)	71 (30%)	72 (30%)	88 (29%)	77 (36%)	31 (39%)
Against headache	332 (40%)	128 (11%)	10 (22%)	41 (17%)	25 (10%)	28 (9.0%)	17 (8.0%)	7 (9.0%)
Against joint/muscle pain	171 (20%)	200 (18%)	$n < 5$	42 (18%)	60 (25%)	55 (18%)	26 (12%)	14 (18%)
Against arthritis pain	46 (5.0%)	192 (17%)	$n < 5$	27 (11%)	34 (14%)	68 (23%)	46 (22%)	14 (18%)
Other	383 (46%)	642 (57%)	28 (62%)	143 (60%)	146 (60%)	163 (55%)	120 (56%)	42(53%)

Note: Only the five most common indications are displayed in the table. All data under the age groups concern participants redeeming prescriptions.
Abbreviation: OTC, over-the-counter.
[a]No data are listed for OTC under indication on drug label, since no prescriptions were available nor needed for OTC analgesics.
[b]Participants were able to report using OTC analgesics, using prescription analgesics or both. If both, individuals were considered prescription users.
[c]Participants using multiple medications answered one single question with the opportunity of multiple answers.

a considerable proportion of participants used prescription analgesics 'as needed', despite the dosage on the drug label stating daily use. The majority of prescriptions included the generic indication 'against pain', while the self-reported indications by participants showed a wide array of indications, most commonly back pain, muscle/joint pain, and pain from arthritis. Approximately one fifth of participants purchasing OTC analgesics used their analgesics daily and the most common indication for OTC analgesic use was headache, back pain and muscle/joint pain. Nine out of 10 participants reported not experiencing adverse effects from their analgesics, with gastro-intestinal complaints being by far the most common self-reported adverse event among those who did, irrespective of analgesic class.

The extensive use of the generic indication 'against pain' on the prescription and drug label is most likely due to the process of prescribing in Denmark. Prescribers can choose to manually write the indication or choose an indication from a premade template, which is less time-consuming and thus seemingly often preferred by prescribers. The effect of the unspecified indication on the counselling of patients in community pharmacies remains unknown.

Our study revealed that approximately one fifth of participants using OTC analgesics reported using them daily. This has also been observed in another study that explored self-medication with OTC analgesics among 1889 patients,[12] suggesting that this could be caused by concern about prescription analgesics or failure to acquire a prescription. Further, OTC medication are sometimes less expensive than obtaining them via prescription. In the Danish reimbursement system, this is true for infrequent users that do not use other medications. However, most users are expected to obtain their analgesics via prescription and only about 5% of the total Danish NSAID and aspirin use is currently OTC.[13] Finally, another explanation could be a perception of OTC medication being less harmful compared to prescription medication. A qualitative interview study investigated the consumption of OTC medication for chronic pain in 2015 in the United States of America reported patients experiencing chronic pain chose to use OTC analgesics to achieve some pain relief while trying to reduce the risk of possible downsides to prescription medication.[14] Additionally, for prescriptions analgesics, there was a considerable discrepancy between the prescribed dosage and the participants' self-reported use of analgesics, where participants, generally, seem to use less medication than what appears on the prescription. This could be attributed to several factors such as a different verbal agreement between patient and prescriber than the information stated on the prescription. This finding highlights that treatment needs for patients experiencing chronic pain will change over time and thus stresses the need for continuous assessment of their use of analgesics.

Data suggested that with increasing age, participants were more likely to suffer from different kinds of pain, for example, back pain, pain in joints and muscles, and pain caused by arthritis. Additionally, participants' use of paracetamol and opioid analgesics increased with age. This is likely due to the effect of ageing and thereby an increase in comorbidities, which may cause more complex pain management than is necessary with younger groups.[15] Our data also showed that the use of analgesics against headaches decreased with increasing age, which is in agreement with a previous study.[16]

It is interesting to note that 15% of participants using prescription analgesics reported experiencing adverse effects compared with only 5% of participants using OTC analgesics. This could be due to adverse effects being more prevalent or severe in prescription-only analgesics such as opioid analgesics. Participants' main reaction towards adverse effects were to continue treatment (41%) or to contact the prescriber (31%). Approximately one fifth of participants who experienced adverse effects eased them with other medications, for example, using laxatives to treat constipation resulting from opioid-treatment. However, this pattern might contribute to prescribing cascades. A qualitative study by Farrell et al investigated patient and provider perspectives on prescribing cascades. The study showed that many patients could not recall when their medications were started nor recognized symptoms experienced as potential adverse effects of existing treatments.[17] However, our data sample regarding adverse effects is not sufficient for such considerations, as only 10% of participants reported experiencing adverse effects.

The main strength of the present study is the large number of included participants, recruited from community pharmacies distributed across Denmark. This study has several limitations that need to be considered. Only participants personally visiting the pharmacy were included. This might have led to exclusion of a group of analgesic users who are more vulnerable, for example, persons who recently underwent surgery or persons with impaired mobility who thus receive their analgesics via others. However, this limitation might have been partly mitigated by including participants collecting analgesics on behalf of relatives or next of kin. Further, the study was originally intended to calculate a rough estimate of the response rate by monitoring the total number of eligible persons visiting the pharmacies. This was, however, not possible. Additionally, the patterns of use reported in this study are self-reported and do, thus, not necessarily reflect the actual patterns of use. Finally, during the development of the questionnaire, user-friendliness was prioritized. Owing to the nature of the data collection, being carried out by numerous people in a business environment, it was decided that the questionnaire should be quick and easy to complete as possible. These choices influence the complexity of the data retrieved in this study.

5 | CONCLUSION

This study found that paracetamol and NSAIDs are the most commonly prescribed and sold analgesics in a community pharmacy setting. The vast majority of indications on the drug labels were a standardized phrase, while the self-reported indications by participants showed a variety of different indications for analgesic use. A considerable proportion of people with prescription analgesics used lower analgesic doses than was prescribed to them, while approximately one fifth of participants using OTC analgesics used them daily. These results emphasize the need for continuous assessment of actual patterns of use for analgesic treatment to ensure optimal counselling of patients.

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CONFLICT OF INTEREST STATEMENT

All authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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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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