

BMJ Open National initiative to promote public involvement in medicine safety: the use of a cross-sectional population survey to identify candidate behaviours for intervention development in Scotland

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ABSTRACT

Objectives The aim of this study was to explore the public's current awareness of the safe use of medicines in general, and over-the-counter (OTC) analgesics (painkillers) in particular, as well as their information-seeking and advice-seeking, medicine use and disposal.

Setting General population, Scotland.

Participants Adults (aged >16 years) living in Scotland.

Interventions A cross-sectional survey was undertaken in collaboration with Ipsos MORI (a market research company). The content was informed by a multi-stakeholder prioritisation event and supplemented with information from earlier studies.

Results The survey was completed in March 2020 by 1000 respondents, most of whom had used a pharmacy in the previous 12 months to obtain a medicine. Of the 1000 respondents, 39% (n=389) were 55 years and over; 52% (n=517) were women; and 58% were degree-educated.

On receipt of a new prescription, up to 29.8% (95% CI 27.0% to 32.7%) of respondents proactively sought specific information or advice from the pharmacist. Few (5.2% (95% CI 4.0% to 6.8%)) respondents 'always' discussed their new prescription medicine with pharmacy staff and 28.9% (95% CI 26.2% to 31.8%) reported 'never' engaging in this behaviour. Respondents aged >35 years were less likely to engage in this behaviour.

Just over half (53% (95% CI 50.5% to 56.7%)) the respondents reported oral OTC analgesic use at least once in the previous month.

In terms of medicine disposal, 29.3% (95% CI 26.6% to 32.2%) of respondents considered waste bin disposal to be of low or no harm.

Conclusions This study identified low levels of information-seeking and advice-seeking from pharmacy personnel especially on receipt of new prescription medicines. Potentially unsafe behaviours were identified in the use and disposal of medicines. These results will inform the development of interventions to promote advice-seeking and increase awareness regarding safe medicine use.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The survey included 1000 adults and was administered by an experienced market research company.
- ⇒ Data were derived from a nationally representative sample in terms of age, gender and area of residence in Scotland.
- ⇒ Respondent perceptions (positive or negative) of community pharmacies and/or pharmacy personnel could have been influenced by the increased use and/or awareness of community pharmacy services due to the COVID-19 pandemic.

INTRODUCTION

Medicines are the most commonly used healthcare intervention.¹ Every medicine has benefits and harms. One of the five objectives of the WHO Global Patient Safety campaign, Medication Without Harm, is to 'empower patients, families and their carers to become actively involved and engaged in treatment or care decisions, ask questions, spot errors and effectively manage their medications'.²

Our study was conducted in Scotland, where the national health policy³ embraces the WHO's concept of patients taking active roles in their healthcare, by encouraging citizens to ask five questions during their consultations:

1. Is this test, treatment or procedure really needed?
2. What are the benefits and what are the downsides?
3. What are the possible side effects?
4. Are there simpler or safer options?
5. What would happen if I did nothing?

Similarly, the national pharmaceutical care strategy for Scotland⁴ highlights the need for the safer use of medicines and to increase the use of community pharmacies as suppliers

of prescription and over-the-counter (OTC) medicines. Community pharmacies are the most commonly visited healthcare facilities.⁵ Low levels of advice-seeking from community pharmacy personnel regarding medicines has been reported previously,^{6–8} particularly with pharmacy users from minority ethnic groups or who were not native speakers within the country.^{7,8} This might reflect low public or patient awareness of pharmacy services in general.⁶ The disposal of medicines is also an important feature in terms of public safety and environmental harm. Surveys of the disposal of medicines have reported poor compliance with national guidelines.^{9,10}

There is a need to develop and evaluate interventions to raise public awareness regarding the safe and effective use and disposal of medicines. In 2019, Healthcare Improvement Scotland¹¹ in collaboration with researchers from the University of Strathclyde, initiated the Public Involvement in Medicine Safety (PIMS) study to develop and test new initiatives to promote public awareness and engagement with the safe use of medicines. While the study involved the safety of all medicines, it included a specific focus on newly prescribed medicines, as well as OTC analgesics due to their prolific use¹² and their potential for harm, addiction and dependence.^{13,14}

The aim of the first empirical component of the PIMS study was to explore the public's current awareness of the safe use of medicines and their behaviour in terms of information-seeking and advice-seeking, medicine use and disposal.

METHOD

Topic identification and prioritisation

Medicine safety is a broad topic. As such, the first stage of the PIMS study was to prioritise the specific areas of medicine safety to target. On 14 November 2019, a face-to-face meeting was held in Edinburgh, Scotland, the participants of which included members of the Quality Improvement in Pharmacy Practice collaborative (pharmacists and other health professionals), patient and public representatives, as well as individuals with specific expertise in relevant topics. The purpose of the meeting was to discuss and reach agreement on medicine safety priorities which would be addressed in subsequent stages of the study. All invitees were asked to respond to the following question in advance of the meeting:

In your opinion, in Scotland, what are the priorities for increasing the safe use of:

- ▶ All medicines?
- ▶ Painkillers? (NB: lay terminology was used to facilitate comprehension by patient and public participants.)

The general 'medicine safety' theme was discussed first, and additional themes were added thereafter. Each participant was asked to select the three themes that mattered most to them. The same process was used during the discussion of the safety of painkillers (analgesics).

In total, 128 and 113 responses were generated from the pre-meeting questionnaire relating to medicine safety

in general and the safety of analgesics, respectively. Nineteen individuals attended the meeting, of whom 18 participated in the ranking exercise (MCW, as the convenor, abstained). The responses were grouped according to common themes and discussed during the meeting. The following six themes were selected for inclusion in a bespoke Ipsos MORI questionnaire, the final version of which comprised 18 items:

- ▶ Use of community pharmacies to obtain medicines.
- ▶ Perception and expectations of pharmacists and medicine advice provision.
- ▶ Advice-seeking behaviour for medicines in general and for oral OTC analgesics.
- ▶ Use of oral OTC analgesics and management of pain.
- ▶ Perceptions of risk and medicine use.
- ▶ Disposal of unwanted or expired medicines.

Survey development

Measuring current behaviours, beliefs and attitudes

A national population survey was undertaken to explore the topics identified from the prioritisation exercise. The questionnaire for use in the survey (online supplementary material appendix 1) comprised mostly closed questions with multiple response options and several with open responses. The range of topics was informed by the prioritisation exercise as well as results from an earlier Citizen's Panel.¹⁵ The population survey was developed in collaboration with Ipsos MORI (a market research company) who then interviewed a sample of 1000 adults aged >16 years in Scotland between 19 and 27 March 2020 using its online panel. The Ipsos MORI panel recruitment process is open to all members of the public and panellists are randomly selected for participation in each study based on their demographics. The sample size (n=1000) reflected the standard size used by Ipsos MORI and the available budget. The sampling method was quota sampling by gender, age and working status.

Data acquisition

The demographic data collected included age, gender, education, child <18 in household, employment, urban/rural area, social grade and participant's general health. The total figure and % for each response differed for each question and was not always 100% of the total population (n=1000) because of the differences in participants' responses (<1000 participants responded to some questions and/or more than one response per respondent is recorded for each question).

Data management and analysis

Survey data were weighted using random iterative method (RIM) weighting¹⁶ to the known offline population proportions for age, gender, region and working status. Quotas were sourced from PAMCo data¹⁷ from 2019 to 2020, which is a large offline dataset with in-depth weighting based on Office for National Statistics mid-year estimates.

Descriptive statistics are presented. Several responses have been combined from different questions to present the data in the most meaningful manner. The results are presented as % (n) where the denominator was 1000. The % (n/N) is presented for items with less than 1000 respondents. The 95% CIs were calculated using the binconf function in the Hmisc library in R V.4.2.1.

Univariate tests were used to investigate the relationship between demographic characteristics and information-seeking/advice-seeking. The association between selected demographics and behaviour was explored using χ^2 tests.

Patient and public involvement statement

While patients and public were involved in the prioritisation exercise, they were not involved in the design or analysis of the survey. The survey was completed by members of the public.

RESULTS

The characteristics of the 1000 survey respondents are presented in [table 1](#). Most respondents (78% (95% CI 75.0 to 80.2%), n=777) had used a pharmacy in the previous

		Overall (n=1000) % (n)	Male (n=483) % (n)	Female (n=517) % (n)
Age category (years)	16–24	13.1 (131)	22.9 (30)	77.1 (101)
	25–34	16.5 (165)	26.7 (44)	73.3 (121)
	35–44	14.7 (147)	49 (72)	51 (75)
	45–54	16.8 (168)	57.7 (97)	42.3 (71)
	55+	38.9 (389)	61.7 (240)	38.3 (149)
Education	No formal education	6.2 (62)	59.7 (37)	40.3 (25)
	GCSE/O level/NVQ12	17.7 (177)	46.9 (83)	53.1 (94)
	A level or equivalent	17.8 (178)	46.6 (83)	53.4 (95)
	Degree/Masters/PhD	58.3 (583)	48 (280)	52 (303)
Child <18 in household†	No child below 18	75 (759)	49.4 (375)	50.6 (384)
	At least one child <18	23.9 (239)	45.2 (108)	54.8 (131)
Employment¶ (χ^2 : p<0.05)	Employed (full/part time)	48.3 (483)	49.5 (239)	50.5 (244)
	Self employed	6.2 (62)	64.5 (40)	35.5 (22)
	Unemployed	10.5 (105)	41.9 (44)	58.1 (61)
	Full time parent, homemaker, retired	25.7 (257)	53.7 (138)	46.3 (119)
	Student/pupil	9.4 (94)	23.4 (22)	76.6 (72)
Urban/rural‡, **	Urban	74.1 (741)	50.7 (376)	49.3 (365)
	Rural	14.5 (145)	52.4 (76)	47.6 (69)
Social grade**	Upper middle class	2.8 (28)	57.1 (16)	42.9 (12)
	Middle class	33.9 (339)	54.6 (218)	45.4 (181)
	Lower middle class	31.1 (311)	43.4 (135)	56.6 (176)
	Skilled working class	9.3 (93)	55.9 (52)	44.1 (41)
	Working class	11.5 (115)	47 (54)	53 (61)
	Lower level of subsistence	5.5 (55)	16.4 (9)	83.6 (46)
Participant's general health§	Excellent	7.2 (72)	45.8 (33)	54.2 (39)
	Very good	32.8 (328)	43 (141)	57 (187)
	Good	33.1 (331)	56.2 (186)	43.8 (145)
	Fair	18.8 (188)	54.2 (102)	45.7 (86)
	Poor	8 (80)	47.5 (38)	52.5 (42)

*Weighted by gender, age, working status and ITV region.
 †Missing data 0.2 (n=2).
 ‡Refused to answer 11.4 (n=114).
 §Prefer not to say 0.1 (n=1).
 ¶ χ^2 , p<0.05.
 ** χ^2 , p<0.001.
 GCSE, General Certificate of Secondary Education; NVQ, National Vocational Qualifications.

12 months to obtain a prescription medicine and slightly fewer (61%, (95% CI 57.9% to 64.0%) (n=610)) had used a pharmacy to obtain an OTC medicine during the same period.

Information-seeking/advice-seeking behaviour

Medicines

Most respondents ($\geq 85\%$) agreed (strongly agree/tend to agree) with each of the statements that, in relation to medicines, pharmacists are allowed to give advice, that it is their job to give advice, that they would trust the pharmacist's advice, and that it is within the customer or patient's rights to ask pharmacists for advice. In terms of barriers to obtaining advice, 11% (n=111) of respondents agreed that they would feel awkward asking for advice and 15% (n=154) perceived pharmacists to be too busy to give them advice. The extent of agreement with these statements did not differ consistently across the respondent characteristics.

New prescription medicines

Only 5.2% (95% CI 4.0% to 6.8%) (n=52) of respondents stated that they 'always' discussed their new prescription medicine with pharmacy staff and 29% (n=289) stated they 'never' engaged in this type of discussion. Respondents who reported never engaging with this behaviour were older (≥ 55 years vs 16–24 years, 33% (128/389) vs 19% (25/131)) (OR 2.08 (95% CI 1.28 to 3.38)). Degree-educated respondents were more likely to report never engaging in the behaviour compared with respondents who had National Vocational Qualifications or General Certificate of Secondary Education qualifications (30%

(176/583) vs 22% (39/177)) (OR 1.53 (95% CI 1.03 to 2.28)).

The majority of respondents (64.6% (95% CI 61.6% to 67.5%), n=646) *expected* the pharmacist to tell them how to use the new prescription medicines correctly and this did not vary by any of the demographic characteristics measured. The respondents' expectations regarding the other elements of information that could be provided, for example, side effects, allergies, were considerably lower, with less than 50% expecting the pharmacist to inform them about any of these aspects of their new prescription medicine. Similarly, whilst 65% (95% CI 62.0% to 68.0%) (n=650) of respondents wanted the pharmacist to tell them how to use their new prescription medicine correctly, up to 54% of respondents wanted the pharmacist to provide information about their side effects, allergies, any other health problems and the best treatment for their problem. This finding did not vary by demographic characteristic (figure 1).

Up to one-third (29.8% (95% CI 27.0% to 32.7%) n=298) of participants reported proactively seeking information/advice from a pharmacist on receipt of a new prescription medicine. When specific items of information *were* sought, younger respondents tended to report this behaviour more frequently compared with older respondents.

Management of pain

OTC pain medication

Just over half (53.6% (95% CI 50.5% to 56.7%), n=536) of the respondents reported using an oral OTC analgesic

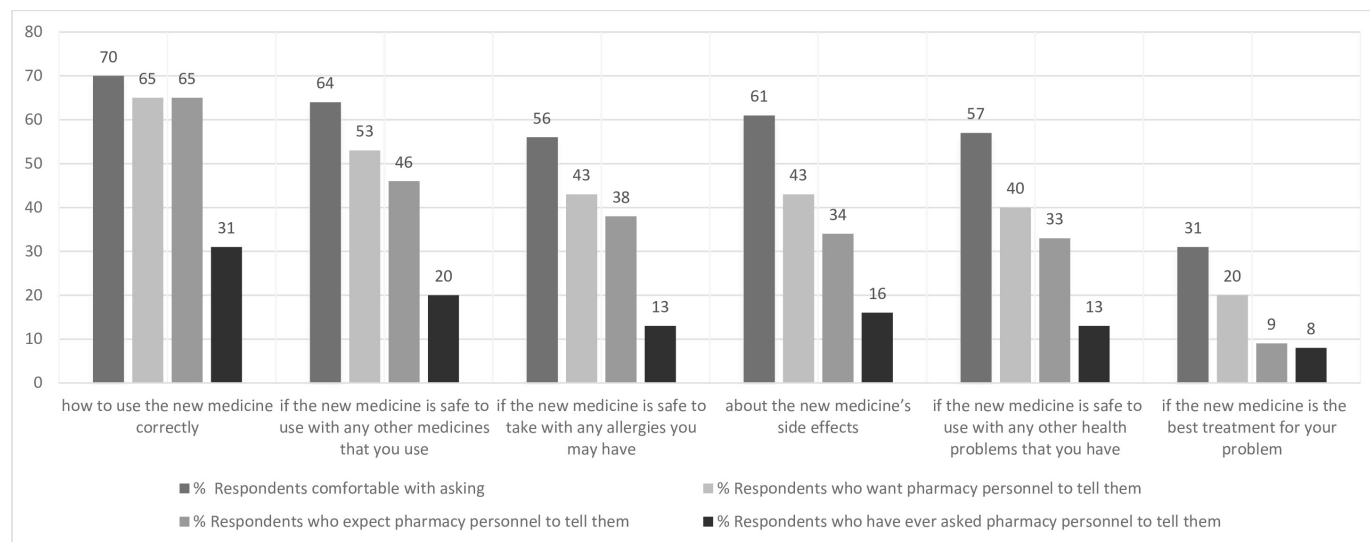


Figure 1 New prescription medicines-respondents' preferences for information seeking and provision on receipt of a new prescription medicine. *The total figure and % differ for each category and $>100\%$ because of the variation in responses (more than one response is recorded for each category by each participant). (1) How to use new medicine correctly (70% (680/975); 65% (650/1000); 65% (646/1000); 31% (298/975)). (2) If the new medicine is safe to use with any other medicines that you use (64% (624/975); 53% (530/1000); 46% (456/1000); 20% (199/975)). (3) If the new medicine is safe to take with any allergies you may have (56% (546/975); 43% (429/1000); 38% (385/1000); 13% (131/975)). (4) About the new medicine's side effects (61% (594/975); 43% (433/1000); 34% (343/1000); 16% (158/975)). (5) If the new medicine is safe to use with any other health problems that you have (57% (558/975); 40% (400/1000); 33% (333/1000); 13% (131/975)). (6) If the new medicine is the best treatment for your problem (31% (304/975); 20% (203/1000); 9% (95/1000); 8% (76/975)).

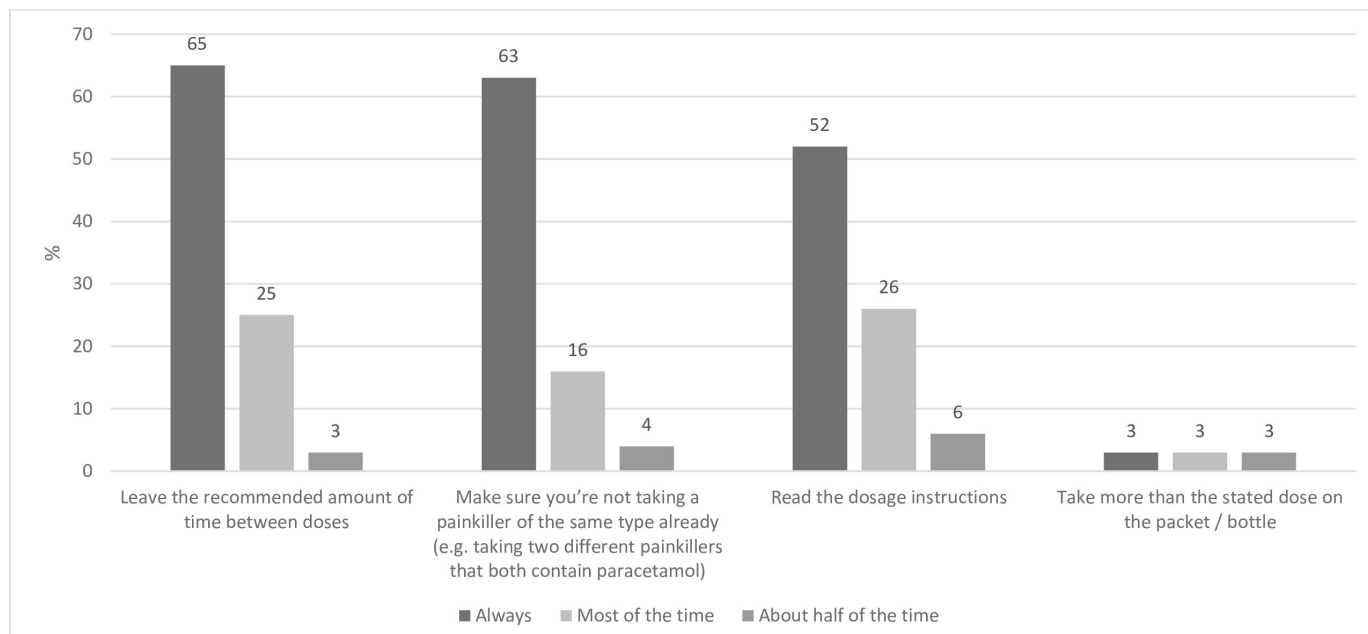


Figure 2 Management of pain—thinking of all the times you take oral over-the-counter painkillers, how often, if at all, do you do each of the following? (1) Leave the recommended amount of time between doses (65% (623/959); 25% (241/959); 3% (27/959)). (2) Make sure you are not taking a painkiller of the same type already (eg, taking two different painkillers that both contain paracetamol) (65% (608/959); 16% (159/959); 4% (36/959)). (3) Read the dosage instructions (52% (496/959); 26% (254/959); 6% (62/959)). (4) Taking more paracetamol than the stated dose on the packet/bottle (3% (29/959); 3% (28/959); 3% (26/959)).

in the previous month, ranging from daily use to once a month. The use of analgesics did not vary substantially across demographic characteristics. Paracetamol was used most frequently, with 86% (n=858) of respondents reporting its use at least once in the previous month. There was some variation in the type of analgesic used and the age of respondent: younger respondents (16–24 years) were more likely to report the use of ibuprofen compared with respondents aged 55 years and over (69% (91/131) vs 52% (203/389)) (OR 2.08 (95% CI 1.37 to 3.18)). The use of paracetamol-containing and codeine-containing medicines increased with age and then declined in respondents aged 55 years and over. Respondents aged 35–44 years and 45–54 years were significantly more likely to report using these compound analgesics compared with the youngest respondents (16–24 years) and any other age group (42% (62/147) vs 27% (36/131) (OR 1.92 (95% CI 1.16 to 3.19)) and 43% (73/168) vs 27% (36/131) (OR 2.03 (95% CI 1.24 to 3.31))), respectively.

While the majority of respondents reported the appropriate administration of OTC analgesics in terms of dose, dosing frequency, reading the dosage instructions and avoiding the use of multiple analgesics with the same active ingredient (figure 2), a maximum of 65% (95% CI 62.0% to 68.0%) (n=650) of respondents reported ‘always’ engaging with these behaviours.

At least 10% of respondents had inaccurate perceptions of OTC analgesic safety (figure 3). Of note, 18% (n=180) considered the use of codeine-containing analgesics for more than 3 days to be safe/fairly safe; a further 17.9%

(95% CI 15.6% to 20.4%) (n=179) did not know whether this practise was safe or not.

The respondents were asked about their use of pharmacies and pharmacy personnel for advice and treatment of pain and 72% (n=724) and 41% (n=406) strongly agreed/agreed that pharmacists and medicine counter assistants (MCAs), respectively, were trained to provide advice on pain management. (MCAs are non-degree trained members of pharmacy personnel who manage many OTC consultations independently or with the involvement of a pharmacist.) While the majority 64% (n=639) of respondents strongly agreed/agreed that they felt they could seek advice from a pharmacy for their pain, only 32% (n=322) indicated that they did this and 39% (n=388) stated that they would not. More than half (57%, n=547) of the respondents said they were comfortable asking the pharmacist if the OTC was safe to use with their other medicines (figure 4). When asked about previous use of pharmacies to obtain OTC analgesics, few respondents reported any of the specific information-seeking behaviours regarding the safe and/or appropriate administration of the medicine (figure 5).

Medicine disposal

Respondents were asked how they disposed of expired medicines and the perceived harm associated with different disposal methods, and the majority reported using unsafe disposal methods. When asked what they would typically do with expired medicines, 39% (n=391) would return them to a pharmacy, 34% (n=339) would

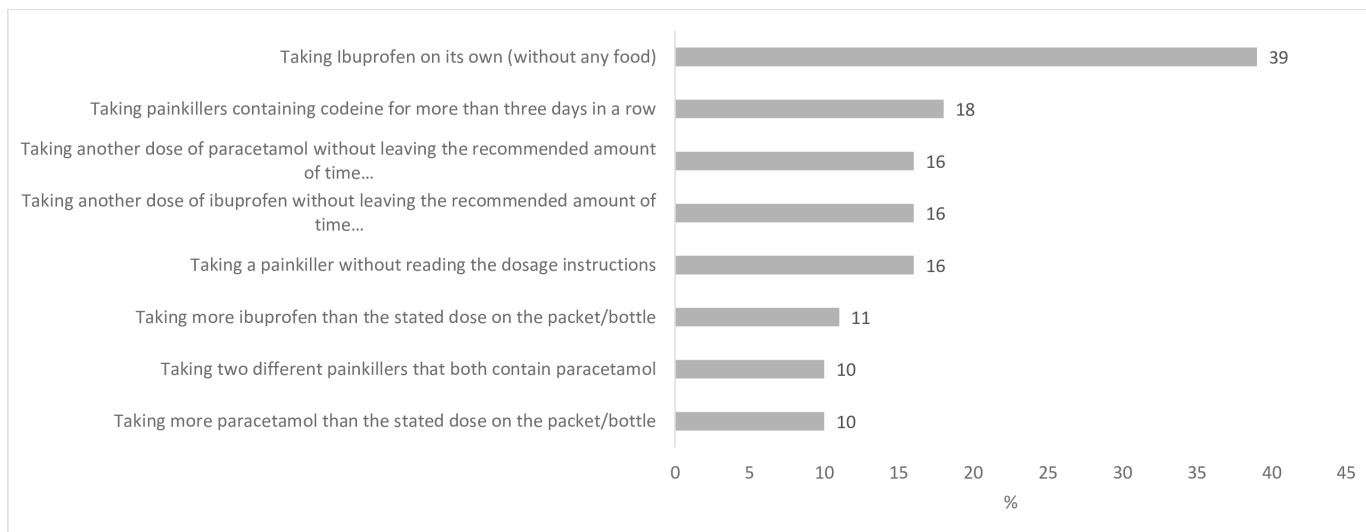


Figure 3 Management of pain—respondents' perceptions of fairly/very safe over-the-counter analgesic use.

dispose of them in a domestic waste bin. Between 7% and 13% of respondents did not know which disposal methods were harmful. Similar percentages of respondents that is, 18% (n=185) and 19% (n=186), considered disposal via the toilet or sink to be associated with low or no harm, respectively. Nearly one-third (29.3% (95% CI 26.6 to 32.2%), n=293) of respondents considered waste bin disposal to be of low or no harm (online appendix figure 1). Male and younger respondents were less likely to consider waste bin disposal to be harmful compared with female and older respondents.

DISCUSSION

This national survey identified several behaviours where interventions are required to promote greater engagement by the public to improve the safe and effective use and disposal of medicines.

While the majority of respondents used pharmacies and were comfortable with the concept of seeking information or advice from pharmacists during consultations, they had low expectations of engagement with pharmacists and pharmacy personnel and even lower levels of information-seeking and advice-seeking in relation to medicine needs.

A Citizens' Panel survey undertaken in Scotland in 2016¹⁵ showed low levels of public awareness of pharmacists in terms of their ability to provide support for chronic conditions and the management of minor ailments. A systematic review of patient and public perspectives of community pharmacies in the UK⁶ concluded that the environment within pharmacies may prevent individuals from communicating effectively with pharmacy personnel despite the availability of consultation rooms.

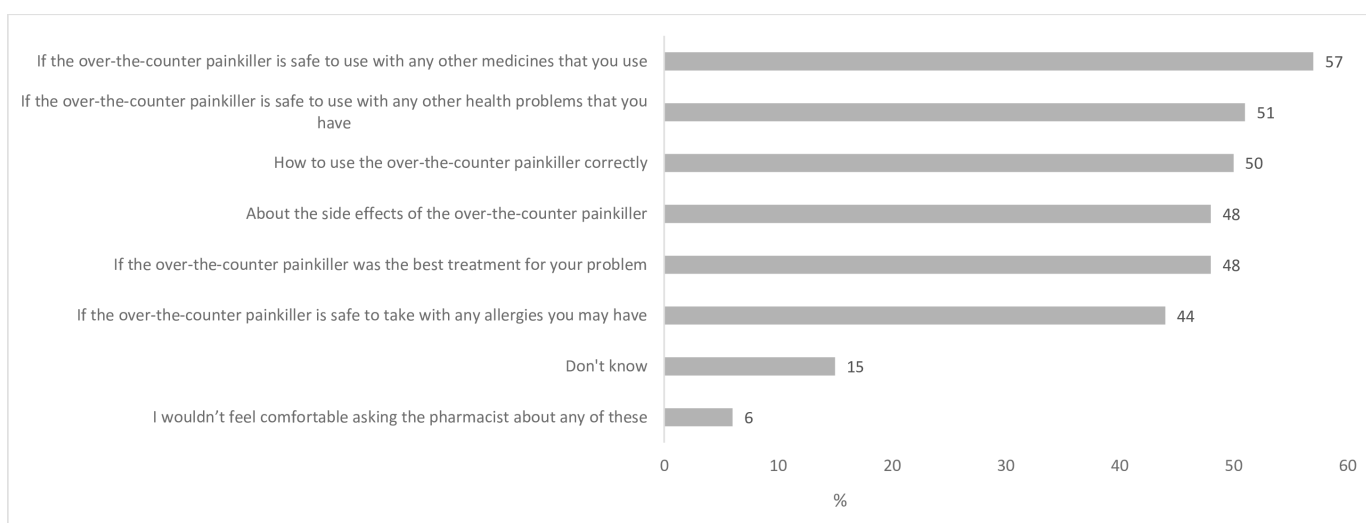


Figure 4 Management of pain—if you needed advice about an over-the-counter painkiller, which, if any of these, would you feel comfortable asking the pharmacist?

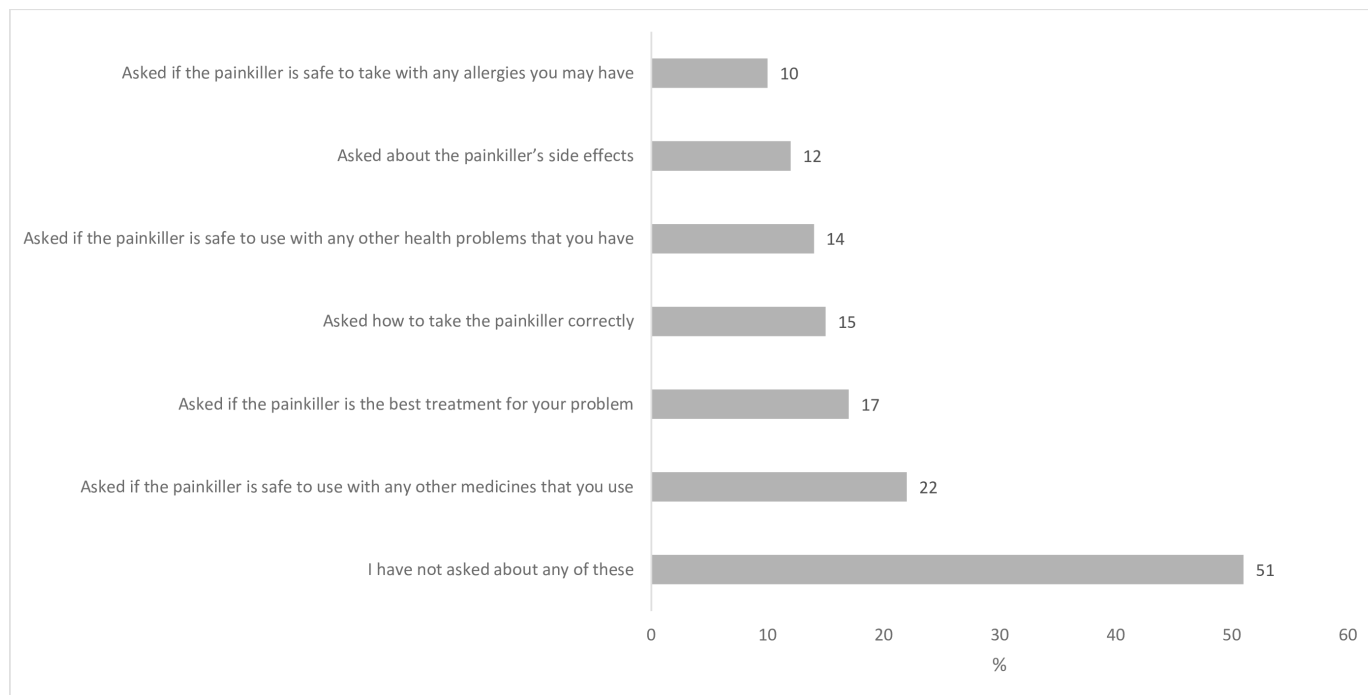


Figure 5 Management of pain—when you used a pharmacy to get an over-the-counter painkiller in the past, which, if any, of the following have you ever done?

New prescription medicines

Low levels of engagement were evident with information-seeking and advice-seeking on receipt of a new prescription medicine. Information-seeking or advice-seeking might be influenced by a number of factors. In this study, older people were less likely to seek advice; perhaps the collection of medicines is a more familiar and frequent behaviour for older people and their non-help seeking behaviour has become routinised. The greater willingness of younger people to seek information about how to use a medicine correctly and whether it was the best treatment, provides opportunities to reinforce this consultation behaviour, such that over time it is more likely to become a habitual pattern of behaviour on presentation of a new prescription at the pharmacy.

Pain management and OTC analgesics

Some respondents lacked awareness of the potential for harm with their OTC analgesic use, for example, exceeding the recommended dose or failing to leave sufficient time between doses.

Four of the ten most commonly reported symptoms in the general public in the UK are types of pain (headache, joint pain, back pain and sore throat)¹² for which treatment is often sought from pharmacies.¹⁸ While OTC analgesics can be effective in the management of a range of painful conditions, they are also associated with abuse, misuse and dependence, and overdose (unintentional and intentional). In a UK survey of 1000 adults, 2% of respondents reported having been dependent on an OTC medicine at some point in their lives, with analgesics (with and without codeine), being one of the most commonly mentioned.¹³ Several initiatives have been

introduced in the UK to reduce the risk of overdose with, and/or addiction to, analgesics containing codeine and dihydrocodeine. Pack sizes were reduced, indications for use were restricted and warnings were added to packaging about the risk of addiction.¹⁹ In 2018, 210 deaths in England and Wales were due to paracetamol²⁰ (which is 10 fewer than the number of deaths due to tramadol (a prescription analgesic)), 35% of the 210 deaths (n=73) were due to paracetamol and codeine preparations.²⁰ In Scotland, 55 deaths were associated with paracetamol or a compound containing paracetamol, for example, co-proxamol, co-codamol.²¹

Medicine disposal

The inappropriate disposal of medicines was reported by at least one-third of respondents, many of whom perceived little or no harm. These findings reflected those of the earlier Citizen's Panel study¹⁵ with no improvements reported in medicine disposal in this current study.

Candidate interventions

The lack of consistent findings associated with specific respondent characteristics for example, age, gender, suggests that candidate interventions do not need to be 'segmented' to target different demographics within the adult population. Various opportunities for intervention are available. The COM-B (Capability, Opportunity, Motivation, Behaviour) model²² will be used to develop candidate interventions. Intervention development will be informed by the survey results in combination with the results of an ongoing study comprising theory-based qualitative interviews with the public to explore the relevant themes in greater depth.



Examples of possible interventions include restructuring the pharmacy environment immediately adjacent to the area where prescriptions are presented to interrupt established patterns of non-help seeking and to reinforce any spontaneous help-seeking. For example, displaying visual 'cues' in the vicinity of the dispensary where prescriptions are presented or collected could help to prompt the desired behaviour. Alternatively, mass media campaigns could be developed to promote information-seeking and advice-seeking about pain management and the appropriate disposal of medicines. The campaign messages could include behaviour change techniques (BCTs)²² that target specific domains relevant to these behaviours. For example, they could emphasise the benefits of seeking information that is, being more informed about how to use their medicine effectively, or the risks of inappropriate medicine use, for example, inappropriate use of OTC analgesics and the risk of dependence. In terms of appropriate medicine disposal, the incorporation of BCTs could promote protection of the environment and avoidance of further harm.

Strengths and limitations

The survey was administered by an experienced market research company and achieved broad representation in terms of age, gender and area of residence in Scotland thus increasing the generalisability of the results. While all surveys are subject to potential sampling error, these data were weighted using a RIM weighting method to the known offline population proportions.¹⁶

Data collection was undertaken during the week when Scotland went into the first major 'lockdown' due to COVID-19.²³ In the several weeks preceding this Government decision, community pharmacies remained open while general medical practices moved to restricted in-person consultations.²⁴ The increased use and/or awareness of community pharmacy services could have influenced respondent opinion (positively or negatively) regarding their perceptions regarding community pharmacies and/or pharmacy personnel. Ethnicity data were not collected.

CONCLUSION

Despite the extensive use of pharmacies, this study identified low levels of advice-seeking from pharmacists especially on receipt of new prescription medicines. Potentially unsafe behaviours were identified in the use and disposal of medicines. These results will inform the development of interventions to promote advice-seeking and increase awareness regarding safe medicine use.

Twitter Margaret C Watson @MagsWatson1

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Contributors JG: analysis and interpretation of data; revising the manuscript for important intellectual content; final approval of manuscript; agreement to be accountable for all aspects of the work. LM: conception and design of study; revising the manuscript for important intellectual content; final approval of manuscript; agreement to be accountable for all aspects of the work. NA: analysis and interpretation of data; revising the manuscript for important intellectual content; final approval of manuscript; agreement to be accountable for all aspects of the work. RB: conception and design of study; revising the manuscript for important intellectual content; final approval of manuscript; agreement to be accountable for all aspects of the work. DD: analysis and interpretation of data; revising the manuscript for important intellectual content; final approval of manuscript; agreement to be accountable for all aspects of the work. MCW: conception and design of study; analysis and interpretation of data; drafting the manuscript and revising it for important intellectual content; final approval of manuscript; agreement to be accountable for all aspects of the work and also is the guarantor for this study.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval The study was submitted to the Strathclyde Institute of Pharmacy and Biomedical Sciences Ethics committee for review which concluded that no ethical approval was required. The research team had no access to any personal details of the respondents; no incentives were offered; and all data provided by Ipsos Mori to the research team were anonymised. Consent to participate was assumed on the basis of each respondent's completion of the survey.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request.

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REFERENCES

- 1 National Institute for Health and Care Excellence. Medicines optimisation: the safe and effective use of medicines to enable the best possible outcomes, NG5. 2015.
- 2 Medication without harm - Global patient safety challenge on medication safety. Geneva: World Health Organization, 2017.
- 3 Calderwood C. Realising realistic medicine: chief medical officer for Scotland annual report 2015-2016. 2017.
- 4 Scottish Government. Achieving excellence in pharmaceutical care: a strategy for Scotland. 2017.
- 5 Eades CE, Ferguson JS, O'Carroll RE. Public health in community pharmacy: a systematic review of pharmacist and consumer views. *BMC Public Health* 2011;11:582:1471-2458..

- 6 Hindi AMK, Schafheutle EI, Jacobs S. Patient and public perspectives of community pharmacies in the United Kingdom: a systematic review. *Health Expect* 2018;21:409–28.
- 7 Rivers PH, Waterfield J, Grootveld M, *et al.* Exploring the prevalence of and factors associated with advice on prescription medicines: a survey of community pharmacies in an English City. *Health Soc Care Community* 2017;25:1774–86.
- 8 Sletvold H, Nguyen T. Experiences and perceptions of foreign-language customers on medication information received in the pharmacy – a focus group study. *International Journal of Pharmacy Practice* 2021;29:330–5.
- 9 Michael I, Ogbonna B, Sunday N, *et al.* Assessment of disposal practices of expired and unused medications among community pharmacies in anambra state Southeast Nigeria: a mixed study design. *J Pharm Policy Pract* 2019;12:12:12:.
- 10 Prabhu VA, Naik V, Doddapaneni S, *et al.* A survey on medicines safety and usage in community pharmacy. *J Basic Clin Pharm* 2013;5:24–5.
- 11 Healthcare improvement Scotland. Available: http://www.healthcareimprovementscotland.org/about_us.aspx [Accessed 21 Oct 2021].
- 12 Statista. Annual sales value of over-the-counter (OTC) medicines in Great Britain from 2000 to 2019. Available: <https://www.statista.com/statistics/425602/sales-value-for-over-the-counter-medication-in-the-united-kingdom/> [Accessed 21 Oct 2021].
- 13 Fingleton NA, Watson MC, Duncan EM, *et al.* Non-Prescription medicine misuse, abuse and dependence: a cross-sectional survey of the UK general population. *J Public Health (Oxf)* 2016;38:722–30.
- 14 Wright J, Bond C, Robertson HD, *et al.* Changes in over-the-counter drug misuse over 20 years: perceptions from Scottish pharmacists. *J Public Health (Oxf)* 2016;38:793–9.
- 15 Healthcare Improvement Scotland. Our voice citizens' panel survey on social care support, pharmacy service and use of medicines and improving oral health [Glasgow]. 2017. Available: <https://www.hisengage.scot/informing-policy/citizens-panel/first-panel-report/> [Accessed 21 Oct 2021].
- 16 Sharot T. Weighting survey results. *Journal of the Market Research Society* 1986;269–84. Available: <http://redresearch.com/wp/wp-content/uploads/2016/01/Weighting-Survey-Results.pdf>
- 17 PAMCo. PAMCo data. Available: <https://pamco.co.uk/> [Accessed 21 Oct 2021].
- 18 McAteer A, Elliott AM, Hannaford PC. Ascertaining the size of the symptom iceberg in a UK-wide community-based survey. *Br J Gen Pract* 2011;61:e1–11.
- 19 Medicines and Healthcare Products Regulatory Agency. Over-the-counter painkillers containing codeine or dihydrocodeine. Available: <https://www.gov.uk/drug-safety-update/over-the-counter-painkillers-containing-codeine-or-dihydrocodeine> [Accessed 21 Oct 2021].
- 20 Office for National Statistics. Deaths related to drug poisoning in England and Wales, 2014 registrations. Newport: Office for National Statistics; 2015. Available: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/deathsrelatedtodrugpoisoninginenglandandwales/2018registrations> [Accessed 21 Oct 2021].
- 21 National Records. Drug-Related deaths in Scotland in 2018. Available: <https://www.nrscotland.gov.uk/files//statistics/drug-related-deaths/2018/drug-related-deaths-18-pub.pdf> [Accessed 21 Oct 2021].
- 22 Michie S, Johnston M. Theories and techniques of behaviour change: developing a cumulative science of behaviour change. *Health Psychology Review* 2012;6:1–6.
- 23 Scottish government. Available: <https://www.gov.scot/news/effective-lockdown-to-be-introduced/> [Accessed 21 Oct 2021].
- 24 Scottish Government. Enhanced role for community pharmacists. Available: <https://www.gov.scot/news/enhanced-role-for-community-pharmacists/> [Accessed 21 Oct 2021].