

DO PHARMACISTS' PERCEPTIONS OF OTC ANALGESIA REFLECT EXISTING EVIDENCE?

An exploratory survey of UK community pharmacists' views and opinions of the use of over-the-counter (OTC) analgesics.

FIN MCCAUL¹, CORNELIA HERSCH², SUNIL KOCHHAR³, TERENCE MAGUIRE⁴,
ANDY TISMAN⁵, ALYSON BROWN⁶

¹Prestwich Pharmacy, Manchester, UK. ²Reckitt Benckiser, UK. ³Regent Pharmacies, Gravesend, UK.

⁴School of Pharmacy, Queen's University Belfast, UK. ⁵IQVIA, London, UK.

⁶School of Pharmacy and Life Sciences, Robert Gordon University, Aberdeen, UK.

Key words: Safety, OTC ibuprofen, Paracetamol, Self-care, Pharmacy.

ABSTRACT

BACKGROUND: Community pharmacist recommendation plays a key role in self-care for pain management. Pharmacists' perceptions of analgesia are important in understanding how this influences patient recommendations.

OBJECTIVES: To explore community pharmacists' over-the-counter analgesic recommendations and perceptions of analgesic efficacy and safety.

METHODS: An exploratory online survey of 305 self-selected UK community pharmacists (242 completed).

RESULTS: Generic paracetamol was the first choice recommendation for all types of pain among 89% of pharmacists, with 8% recommending generic ibuprofen. While 32% strongly agreed/agreed paracetamol was an appropriate analgesic, 41% strongly disagreed/disagreed it was more effective than branded ibuprofen. Pharmacists perceive paracetamol is safer than ibuprofen (65% strongly agreed/agreed), with the risks associated with prescription-strength ibuprofen transferred to OTC doses (58% strongly agreed/agreed). Most pharmacists believed ibuprofen was not as gentle on the stomach as paracetamol and it should always be taken with/after food. Ibuprofen was never/infrequently recommended for use in patients with 'sensitive stomach' (90%), minor gastrointestinal problems (86%), minor renal problems (81%), asthma (77%), other respiratory problems (68%) or minor liver problems (68%).

CONCLUSIONS: Pharmacists' beliefs around ibuprofen are extrapolated from prescription use, rather than the OTC evidence base, which demonstrates comparable safety for ibuprofen and paracetamol at OTC doses. Pharmacists' advice on taking OTC ibuprofen with food and not recommending for patients with minor GI issues and asthma also contradicts the evidence and Summary of Product Characteristics. Improved pharmacy education on the safety and efficacy of analgesics in the OTC environment is required to ensure patients receive advice that optimises clinical outcomes and reduces the risk of dissatisfaction with pharmacists' recommendations.

INTRODUCTION

Community pharmacists are recognised as being the most accessible healthcare professionals in the UK, with 79% of the population of Great Britain having a pharmacy within one kilometre of their home¹. More recent data shows that 90% of the English population live within a 20-minute walk of a community pharmacy and 86% of Scots within 20 minutes travelling time^{2,3}. This wide geographical distribution enables 1.6 million members of the general public to seek pharmacists' advice each day and highlights the vital role community pharmacy plays in improving the health and wellbeing of the nation⁴.

Pharmacy and self-care

The services available from community pharmacy have expanded over recent decades, resulting in the profession playing a more integrated role in promoting self-care, which is a key building block for a patient-centred health service across all nations in the UK⁵⁻⁸. Although 92% of the public believe it is important to take care of their own health to alleviate the pressure on the NHS, 47% do not regard pharmacy as their first-line source of advice or medication for minor ailments, while a similar percentage feel a general practice (GP) consultation, visit to Accident & Emergency or a 999 call is warranted if their minor ailment symptoms indicate a more serious complaint^{9,10}.

An estimated 57 million general practitioner consultations in the UK involve a minor ailment discussion, accounting for 20% of a GP's workload and an estimated £2 billion cost to the NHS¹¹. Further research has estimated that 5% of emergency department attendances and 13% of GP consultations relate to minor ailments that could be managed effectively in community pharmacy¹².

A move towards greater pharmacy intervention has been seen in Scotland via the implementation of a Minor Ailments Service since 2006, where patients register with a community pharmacy of their choice to receive direct pharmaceutical care for the management and treatment of common self-limiting conditions^{13,14}.

Pharmacy and trust

While the potential for pharmacy to be a primary enabler in supporting self-care is acknowledged, the degree to which the population 'trusts' advice from pharmacists remains lower than that for other healthcare professionals¹⁵. This may be due to a lack of awareness of pharmacists' skills, with some people regarding pharmacists as less qualified than doctors or hospital staff⁹.

However, a more recent survey found around half of people said they would be more likely to see a pharmacist over a GP for a minor ailment, if they knew how much time and money it would save¹⁶.

Pharmacy and evidence

A potential area of concern, however, is that pharmacists may not always make recommendations that utilise the full extent of the available evidence base when it comes to making OTC product recommendations¹⁷⁻¹⁹, instead often relying on personal judgement informed by patient feedback^{17,18}. Additionally, pharmacists, by nature, tend towards displaying risk-averse behaviours. One study found 92% of community pharmacists agreed safety was the primary consideration when dealing with OTC medicines²⁰. While, in isolation, these may not be problematic issues, together they pose a dilemma for the profession and for patients.

For patients, improving their understanding and management of minor ailment symptoms is the service they would most value from pharmacy²¹. In addition, patient satisfaction with a pharmacy consultation is significantly associated with symptom resolution¹². Therefore, balancing both efficacy and safety considerations to optimise patient treatment outcomes is important in improving patient satisfaction and may help address a lack of patient confidence in pharmacists' abilities.

Pharmacy and pain management

Painful conditions are among the most commonly presenting minor ailments in general practice¹¹; in the Scottish Minor Ailments Scheme, paracetamol was the number one dispensed item, followed by ibuprofen¹⁴.

The scope for pharmacy input into self-care for painful minor ailments is evident, and it is imperative that pharmacists and pharmacy support staff have relevant and evidence-based knowledge to inform their practice. The lack of 'new' news in this sector may result in an over-familiarity with existing analgesics and long-held beliefs around efficacy and safety, particularly around the gastrointestinal (GI) safety of non-steroidal anti-inflammatory drugs (NSAIDs) and their use in specific patient populations, such as people with asthma.

Failure to use the available evidence base has the potential to leave patients without the relief they need or using treatments inappropriately.

MATERIALS AND METHODS

The aim of the survey was to undertake market research exploring community pharmacists' OTC analgesic recommendations (branded and unbranded) for specific pain states; to understand their perception of analgesic efficacy and safety, in general and in patients with concomitant conditions, and to determine if these acted as barriers to recommendation. Although a significant proportion of OTC analgesic recommendations will be made by pharmacy assistants/counter staff, this is often under pharmacist supervision, therefore understanding pharmacists' beliefs is critical.

The survey was conducted by insight firm IQVIA (formerly IMS Health) on behalf of Reckitt Benckiser (RB). A preliminary pharmacy segmentation and targeting analysis was conducted to identify and target retail pharmacies with potential high pain relief product sales using the ONEKEY database (highest potential in terms of overall sales of OTC adult systemic analgesics). Invitations to participate were issued to 5,120 community pharmacists in the UK located in these high potential retail pharmacies; other pharmacies were excluded. Participating pharmacists were contacted initially via email on November 12th, 2015, with a follow-up via post at their work address. Participants replied online by 20th November, 2015, and were recompensed with a voucher worth £30 for the time taken to participate in the survey. As this was a market research survey, ethical approval was not required under company guidelines.

Initially, 305 pharmacists participated in a 10-minute online survey representing an even geographical spread. Participants were screened in terms of attitudes towards recommending branded ibuprofen on a scale of 1-5 (1= first-line recommendation choice, 5 = never recommend). Pharmacists who recommended branded ibuprofen as first-line OTC analgesic (1% of the total) and those who never recommended branded ibuprofen (20% of the total) were screened and excluded from the next stage of the survey to minimise either potential positive or negative bias towards branded ibuprofen and focus on the majority of pharmacists in the middle of the recommendation spectrum.

A total of 242 pharmacists progressed to complete the online survey, answering questions exploring the frequency and proportion of analgesic recommendations in pain types and by age; the factors considered important in making analgesic recommendations; and opinions on analgesic efficacy, safety and recommendation. As this was an exploratory survey, questions were not tested prior to use. The questions were developed through IQVIA in-house expertise and experience garnered from similar surveys with pharmacists and other healthcare professionals and utilising previously identified safety perceptions of OTC analgesics generated through RB's market research among pharmacists and pharmacy assistants.

RESULTS

A total of 242 pharmacists from across the UK completed the online survey (5% response rate).

Results show the important role community pharmacists play in providing advice to patients on OTC pain management, with each pharmacist advising an estimated average of 40.1 patients per week on analgesic use.

Pharmacists' pain management recommendations

When asked to consider how frequently they recommended a treatment for all pain types (e.g. headache, migraine, toothache, body pain, period pain, etc.), of those pharmacists who had a first-line analgesic recommendation, unless contraindicated (n=251), 89% said generic paracetamol was their first-line recommendation, 8% recommended generic ibuprofen and one person recommended generic aspirin. The remainder recommended a branded variant of these analgesics:

0.8% recommended Nurofen first-line; 1.6% recommended Panadol/Panadol Extra; no pharmacist recommended Anadin/Anadin Extra.

Both generic and branded analgesics were most often recommended for:

- Body pains: (generic ibuprofen 48%, branded ibuprofen 50%; generic paracetamol 34%, branded paracetamol 26%; generic aspirin 28%, branded aspirin 34%). Body pains included: musculoskeletal pains, backache, joint pain, sprains and strains and pain of mild osteoarthritis
- Headache/migraine: (generic ibuprofen 18%, branded ibuprofen 17%; generic paracetamol 24%, branded paracetamol 41%; generic aspirin 32%, branded aspirin 36%).

Recommendations also varied by patient age. When generic paracetamol was recommended, it was most often for adolescents and older patients over 65 years, with branded paracetamol most frequently recommended for adults aged 18-49 years. When generic or branded ibuprofen were recommended this was most often for adults aged 18-49 years and generic or branded aspirin for those aged 35-49 years.

Pharmacists' perceptions of analgesic efficacy

Where branded ibuprofen was not a first-line recommendation, 32% strongly agreed/agreed that paracetamol was 'good enough' (in terms of efficacy) versus 24% who strongly disagreed/disagreed.

In addition, 13% strongly agreed/agreed that paracetamol was more effective than branded ibuprofen versus 41% who strongly disagreed/disagreed.

Pharmacists' perceptions of analgesic safety

Pharmacists have a strong perception of the safety of OTC analgesics, with paracetamol believed to be safer and better tolerated than OTC ibuprofen (see Table 1). A significant proportion of pharmacists also perceive OTC ibuprofen to be associated with GI bleeding (see Table 1).

While 77% of pharmacists strongly agreed/agreed ibuprofen's GI adverse events were dose and duration-dependent, there was some discrepancy in beliefs. Almost 60% strongly agreed/agreed that the risks seen with prescription dose ibuprofen transferred to the OTC dose, with around half believing there was little difference in the tolerability between these doses and a strong perception that OTC dose ibuprofen increased the risk of GI adverse events.

Pharmacists' perceptions of ibuprofen safety

When asked specifically about the use of branded ibuprofen in certain patient populations, few pharmacists regularly recommend its use in patients with a 'sensitive stomach', minor GI problems (such as indigestion, heartburn or dyspepsia), minor renal or hepatic problems, asthma or other respiratory problems (see Figure 1).

Table 1: Pharmacists' perceptions of analgesic safety: a comparison between paracetamol and ibuprofen at acute and prescription dose.

	Strongly agreed/ agreed	Neutral	Strongly disagreed/ disagreed	Don't know
Paracetamol vs ibuprofen safety				
Paracetamol is safer (n=242)*	65%	23%	12%	N/A
Paracetamol provides a better risk/benefit ratio (n=242)*	52%	31%	17%	N/A
OTC/branded ibuprofen is not as well tolerated as paracetamol (n=235) [§]	50%	26%	21%	3%
As an NSAID, [branded ibuprofen] is associated with more adverse events [than paracetamol] (n=242)*	42%	33%	25%	N/A
Ibuprofen GI safety				
OTC/branded ibuprofen causes GI bleeding (n=242)*	43%	33%	24%	N/A
OTC/branded ibuprofen is as gentle as paracetamol on the stomach (n=214) [§]	5%	9%	86%	0%
Ibuprofen OTC vs. Rx dose/use				
Ibuprofen's GI adverse events (AEs) are dose and duration dependent (n=236) [†]	77%	13%	8%	2%
The risk associated with prescription strength ibuprofen can be transferred to OTC dosage and usage (n=236) [†]	58%	24%	16%	2%
There is little difference between the tolerability of prescription strength ibuprofen and OTC strength ibuprofen (n=230) [†]	49%	23%	23%	5%
Compared to prescription strength ibuprofen, OTC strength ibuprofen is well tolerated (n=237) [†]	29%	36%	32%	2%
OTC strength ibuprofen is associated with minimal GI AEs unlike prescription usage (n=235) [†]	23%	26%	48%	3%
Ibuprofen in acute OTC use				
In acute use, OTC strength ibuprofen does not increase the risk of GI adverse events, compared to placebo (n=221) [†]	28%	24%	40%	9%
In acute use, OTC strength ibuprofen has a higher risk of GI AEs than placebo (n=219) [†]	53%	20%	18%	10%
Ibuprofen and food intake				
OTC/branded ibuprofen should always be taken during or after food (n=221) [§]	76%	11%	4%	9%
OTC/branded ibuprofen can be taken on an empty stomach (n=241) [§]	8%	12%	79%	0%

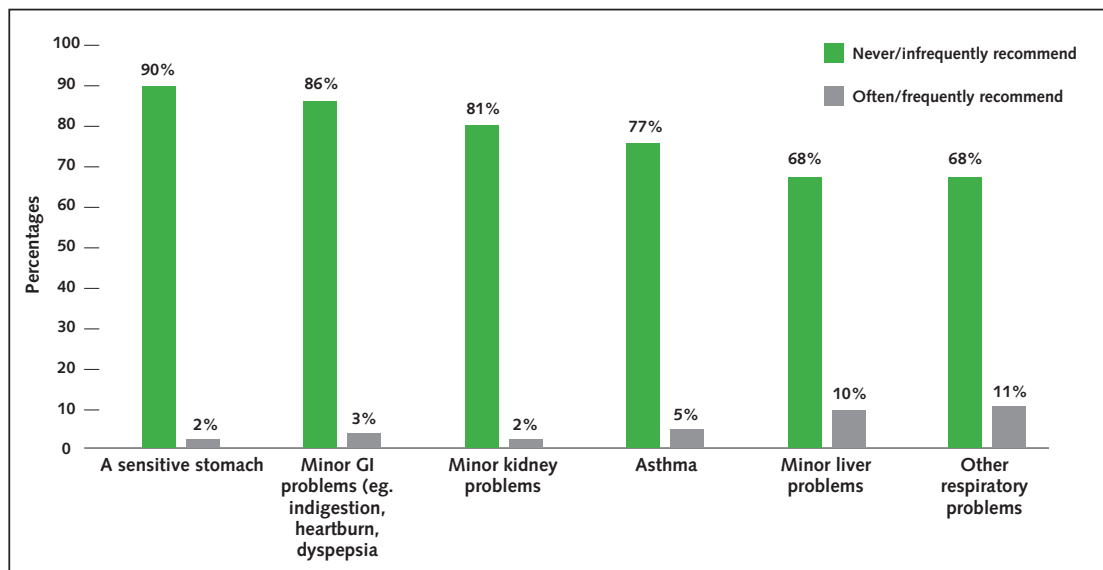
*Q6: You have mentioned that branded ibuprofen is not your 1st line recommendation of OTC pain reliever; please rate **how strongly you agree or disagree with the following statements** (where 1=strongly disagree, 5=strongly agree) (See statements above).

§Q7: Thinking about branded ibuprofen/OTC ibuprofen, please rate **how strongly you agree or disagree with the following statements** (where 1=strongly disagree, 5=strongly agree) (See statements above).

†Q9: Please rate **how strongly you agree or disagree with the following statements** (where 1=strongly disagree, 5=strongly agree) (See statements above).

Note: due to rounding, some rows do not add up to 100%.

Figure 1: Percentage of pharmacists who would never or infrequently recommend or often/frequently recommend a branded ibuprofen for use in certain patient populations (n=242).



Q5: Please indicate how likely you would be to recommend a branded ibuprofen to your customers who had the following conditions. Please use a scale of 1 to 5 where 1 = I would never recommend, 5 = I would often recommend.

Pharmacists' perceptions of ibuprofen use with food

The majority of pharmacists (76%) strongly agreed/agreed that ibuprofen products should be taken with or after food, while 8% strongly agreed/agreed that it could be taken on an empty stomach (see Table 1).

DISCUSSION

Pain management remains one of the commonly consulted therapy areas within community pharmacy, yet there is a disconnect at the heart of each interaction: the primary driver for the pharmacist is a safety-based recommendation, while patient satisfaction is focused on symptom resolution^{12,20}. This survey suggests pharmacists' perceptions of analgesic safety do not reflect the existing evidence base for OTC use, which may negatively impact on patient outcomes and satisfaction with pharmacy advice.

Efficacy

While paracetamol was most pharmacists' first-line analgesic recommendation for all pain types, just 13% stated they believed paracetamol was more effective than branded ibuprofen, reflecting the evidence base on analgesics' comparative efficacy²².

In terms of single active ingredients in the context of OTC management of post-operative pain, a Cochrane review from Moore *et al*, 2015, concluded that fast-acting ibuprofen salts have the lowest Number-Needed-to-Treat (NNT; see Box 1) of all analgesics (200mg and 400mg fast-acting ibuprofen, NNT = 2.1; standard ibuprofen 200 mg and 400 mg, NNT = 2.5 and 2.9, respectively;

paracetamol 500 mg and 975/1000 mg, NNT = 3.5 and 3.6, respectively; aspirin 1000 mg, NNT = 4.2)²². Only ibuprofen + paracetamol combinations were found to have superior efficacy to fast-acting ibuprofen (ibuprofen 400 mg + paracetamol 1000 mg, NNT = 1.5)²². The meta-analysis found more patients achieved pain relief with ibuprofen than those taking either paracetamol or aspirin²².

Number-needed-to treat

The number-needed to treat (NNT) is a measure of the effectiveness of an intervention and the number of people who must be treated in order for 1 patient to benefit. The closer the NNT is to one, the more effective the treatment.

Where paracetamol/branded paracetamol was recommended, this was most often for body pains or headache/migraine, but this does not necessarily reflect current guidance. For example, approximately 8% of all paracetamol and 7% of all branded paracetamol recommendations were for backache, yet NICE guidance recommends paracetamol should not be used solus but only in conjunction with opioids; oral NSAIDs are the first-line option²³.

Further, a significant proportion of paracetamol/branded paracetamol recommendations were for headache/migraine. While paracetamol is one of the first-line options for tension-type headache and migraine in NICE advice, as are ibuprofen or other NSAIDs, guidance from the British Association of Headache, the European Headache Federation and the European Federation for Neurological Societies suggest paracetamol has limited evidence of efficacy in migraine and is less effective than NSAIDs in tension-type headache²⁴⁻²⁷. The EFNS recommends ibuprofen 400 mg as the NSAID of choice for tension-type headaches on the basis of safety and efficacy²⁷.

In the paediatric age group, more recommendations were made for paracetamol than for ibuprofen, yet data show ibuprofen provides faster, more effective and longer-lasting fever relief in this population^{28,29}.

Safety

Safety is the over-riding issue for pharmacists when considering OTC recommendations²⁰. There was a firm belief that paracetamol was safer, better tolerated and had fewer adverse events than ibuprofen/branded ibuprofen.

At OTC dose and in OTC use, data show that, when used in accordance with the Summary of Product Characteristics (SPC), the adverse event rate seen with OTC ibuprofen is comparable to placebo and to paracetamol in adults. Moore *et al*, 1999, found, when used at OTC dose for up to seven days, there was no statistical difference between ibuprofen and paracetamol in total adverse event rates (13.7% and 14.3%, respectively)³⁰. A meta-analysis of the available paediatric data

similarly found no significant difference between ibuprofen and paracetamol in adverse events incidence, with a more recent review also concurring^{31,32}.

Potentially, this misperception in adults may be due to concerns over adverse events seen at high-dose (>1200 mg) ibuprofen used for prolonged periods in the prescription setting being extrapolated to low dose (\leq 1200 mg) ibuprofen used for a maximum of 10 days in the OTC environment. While there was strong agreement in most pharmacists that the safety of ibuprofen was dose and duration dependent, around half did not believe there was any difference in tolerability between prescription and OTC doses, yet 58% strongly agreed/agreed that the risks seen in the prescription environment could be transferred to the OTC situation. This does not reflect the available evidence or guidance, which generally advises that OTC doses of ibuprofen cause fewer adverse events than prescription doses³³⁻³⁵.

It is also clear pharmacists have embedded beliefs around which patients are suitable for ibuprofen use.

Patients with GI issues

The survey reveals that pharmacists perceive GI bleeding is a significant risk with ibuprofen at OTC doses. Yet, Lewis *et al*, 2002, found OTC dose ibuprofen (\leq 1,200 mg) had a similar odds ratio (1.1) to paracetamol (2,000-3,999 mg; OR 1.2) for GI bleeds, with a dose-response relationship resulting in increased risk at higher, non-OTC doses³⁵.

Further research from Le Parc *et al*, 2002, revealed, when ibuprofen was used at OTC dose for up to seven days, there were no cases of GI bleeding (n=4,291; non-inclusion criteria mainly limited to contraindications from the respective SPCs or to methodological or legal requirements)³⁶. Doyle *et al*, 1999, concluded there was no statistically significant difference in GI bleeding rates versus placebo with maximum dose ibuprofen used for 10 days (n=1,246; study excluded those with serious medical conditions or had used prescription medication that was contraindicated for use with NSAIDs, had a known sensitivity to ibuprofen or NSAIDs, were pregnant or nursing or had taken an investigational drug within the previous 30 days³⁷).

Misconceptions around GI adverse events at OTC dose may mean that pharmacists are erroneously screening out patients who may benefit from ibuprofen treatment: most pharmacists never or infrequently recommend ibuprofen for patients who experience a 'sensitive stomach' or have minor GI problems or heartburn. These are patients in whom OTC ibuprofen use is not contraindicated. The risk of OTC ibuprofen causing such GI adverse effects is comparable to placebo and paracetamol^{30,37}.

The survey indicates that 10% of generic ibuprofen/branded ibuprofen recommendations were for those aged 65 years plus. Use in older patients is a caution under the SPC as the elderly have an increased frequency of adverse NSAID reactions, especially GI bleeding and perforation. This further illustrates a lack of pharmacy familiarity with ibuprofen's SPC.

Where pharmacists do recommend ibuprofen, they may be trying to minimise the perceived risk of GI adverse events by recommending patients take with or after food in the belief that food provides a gastroprotective effect³⁸. Data from a number of double-blind, randomised, controlled trials, in a total of 1,619 fed and fasted patients, demonstrated similar rates of GI adverse events for ibuprofen vs. placebo³⁹⁻⁴⁴.

The evidence shows that taking analgesics with food markedly reduces absorption and levels of drug in the bloodstream, making them less effective and potentially increasing the likelihood of additional doses, or alternative analgesics, being taken⁴⁵. For pharmacists, it may be that their desire to provide 'good' advice is causing reduced efficacy in patients, leading to reduced satisfaction with a pharmacy intervention.

It is also worth noting that paracetamol may not be devoid of GI risk. A retrospective, longitudinal, cohort study of analgesic use in the UK prescription setting (ranging from first prescription to continuous use in the preceding six months) found that paracetamol had an overall relative risk of upper GI events of 1.36; ibuprofen had an overall relative risk of 1.18⁴⁶.

Patients with respiratory issues

The results also indicate there is confusion surrounding the use of ibuprofen in patients with respiratory issues, with most pharmacists not recommending ibuprofen for use in patients with asthma, and many also avoiding use in those with other respiratory problems.

Branded ibuprofen's SPC states that it is contraindicated in patients who have previously shown hypersensitivity reactions, such as asthma, rhinitis, angioedema or urticaria in response to aspirin or other NSAIDs. The Global Initiative on Asthma has determined this is an issue in just 7% of people with asthma, with prevalence higher in those with severe asthma (15%)⁴⁷. This is known as aspirin-exacerbated respiratory disease and is distinct from other allergic inflammatory conditions in that it develops in the third or fourth decade⁴⁸.

As such, ibuprofen and other NSAIDs can be taken by the vast majority of people with asthma. However, the SPC also advises that bronchospasm may be precipitated in patients suffering from, or with a previous history of bronchial asthma or allergic disease, which may explain why pharmacists are cautious in recommending ibuprofen use in this patient population.

It is unclear however, how this has been extrapolated by pharmacists as also meaning ibuprofen cannot be recommended for those with other respiratory problems. More work is required to understand why pharmacists have made this extrapolation and to determine which patients with other respiratory problems are not being recommended ibuprofen as a result, e.g. those with chronic obstructive pulmonary disease, upper respiratory infections, etc.

Patients with renal or hepatic issues

The majority of pharmacists also did not recommend ibuprofen use in patients with minor renal or hepatic problems; again, ibuprofen use is not contraindicated in these patients. This reluctance

to recommend may be a reflection of the pharmacist's inability to assess the degree of severity of renal or hepatic issues.

Study limitations

The research was undertaken as a survey to explore pharmacists' approaches and attitudes towards various analgesic treatments. The low response rate of 5%, the exclusion of pharmacies with low analgesic sales and those highly favourable or extremely unfavourable to the use of branded ibuprofen (21% of the initial sample), limits the generalisability of the results. The low response rate may partly be due to the short eight-day time period for response; such surveys would usually run for up to four to six weeks.

Given these limitations, further work is necessary to repeat the survey in a wider, more representative population in order to fully understand the perceptions of community pharmacists towards the advice and supply of OTC analgesics.

Emerging data

The results indicate the need for pharmacists to remain abreast of current data. As an example, since this survey was undertaken, additional data on ibuprofen use in those with cardiovascular (CV) issues has been published^{49,50}. A potential increased CV risk with OTC ibuprofen has been mooted, however, much of the data available on CV risk associated with NSAIDs is predominantly based on studies that recorded CV events, but were not specifically designed to evaluate the CV risk at OTC dose and in OTC use^{49,50}. Older data have concluded that there appears to be no increased risk at low, OTC doses of NSAIDs^{51,52}, but further research is needed to determine the true CV impact of OTC dose and use. In the interim, pharmacists should follow NICE and European Medicines Agency guidance, which currently advises that, while CV risk is increased with high-dose ibuprofen, where an NSAID is needed, OTC dose is recommended^{33,53}.

CONCLUSIONS

The pharmacist's role in managing pain within the OTC environment is critical; however this study suggests that pharmacists may have ingrained beliefs around the efficacy and safety of OTC analgesics that are inconsistent with the current evidence base and ibuprofen SPC.

This highlights the need for improved pharmacy education on the efficacy and safety of analgesics used at OTC dose and duration when advising on the treatment of mild-to-moderate pain. Awareness of the difference between OTC and prescription pain management should be an integral element of pharmacy education, beginning at undergraduate and pre-registration training and regularly updated to reflect the current data as part of continuing professional development.

The implication for practice is that pharmacists should prioritise efficacy as well as safety when making a treatment recommendation. Re-evaluating their current advice to accurately reflect the OTC evidence base can help ensure patients seeking effective analgesia advice obtain better clinical outcomes. This could possibly improve patients' perception of pharmacists in providing

tailored treatment that is specific to their pain needs, with a further potential benefit in enhancing self-care and reducing consultations in the GP practice for OTC pain conditions.

Correspondence to: Fin McCaul, Prestwich Pharmacy, 40 Longfield Centre, Prestwich, Manchester, M25 1AY, UK. Email: fin@mccaul.eu. Tel: 0161 798 9932.

Authors' contributions: CH contributed to the development of the questionnaire and AT supervised the data collation and analysis on behalf of IQVIA. AB, SK, TM, FM were involved in the initial drafting of the publication and critically reviewing subsequent drafts. All authors read and approved the final version of the manuscript prior to submission.

Authors' declaration of personal interests: Alyson Brown has received funding from RB to attend advisory boards and provide consultation; she has no financial holdings in RB. Sunil Kochhar, Dr Terence Maguire and Fin McCaul have received funding from RB to attend advisory boards, provide consultation and have served as speakers; they have no financial holdings in RB. Cornelia Hersch is an employee of RB and holds shares in the sponsoring organisation. Andy Tisman is an employee of IVQIA, which has been contracted to provide services to RB.

The authors have no other relevant affiliations or financial involvement with any organisation or entity with a financial interest or financial conflict with the subject matter or materials discussed in the manuscript, aside from those disclosed.

Declaration of funding interests: This work was supported by Reckitt Benckiser. Marianne Mac Donald of Health Ink Ltd provided editorial support in the preparation of this manuscript, under the direction of the authors, funded by RB.

REFERENCES

1. Office of Fair Trading. The Control of Entry Regulations and Retail Pharmacy Services in the UK. A report of an OFT market investigation. January 2003.
2. Todd A, Copeland A, Husband A, et al. The positive pharmacy care law: An area-level analysis of the relationship between community pharmacy distribution, urbanity and social deprivation in England. *BMJ Open*. 2014;4(8):e005764.
3. Pflieger D, Bennie M, Strath A. NHS Pharmaceutical Care Services Planning. Introduction to Data Sources and Use. July 2006.
4. Pharmacy Voice, Royal Pharmaceutical Society, Pharmaceutical Services Negotiating Committee. Community Pharmacy Forward View. August 2016.
5. NHS England. Five Year Forward View. October 2014.
6. The Scottish Government. The Healthcare Quality Strategy for NHSScotland. May 2010.
7. Welsh Government. The Health and Care Standards. April 2015.
8. Northern Ireland Health and Social Care. Transforming your Care. Strategic Implementation Plan. October 2013.
9. Proprietary Association of Great Britain. Self Care Nation. Self care attitudes and behaviours in the UK. 2016.
10. Self Care Forum. Press release: Over 2 million unnecessary A&E visits "wasted". October 2012.
11. Pillay N, Tisman A, Kent T, et al. The economic burden of minor ailments on the National Health Service (NHS) In the UK. *SelfCare*. 2010;1(3):105–16.
12. Pharmacy Research UK. Community Pharmacy Management of Minor Illness. MINA Study. Final Report. January 2014.

13. The Scottish Government. NHSScotland Circular: PCA (P)(2-16) 12. Additional Pharmaceutical Services Minor Ailment Service Directions and Service Specification. July 2016.
14. NHS Scotland. Prescribing & Medicines: Minor Ailments Service (MAS). Financial year 2015/2016. March 2017.
15. The General Pharmaceutical Council and IPSOS. Public perceptions of pharmacies. January 2015.
16. Proprietary Association of Great Britain. Confused about self care? October 2017.
17. McKee P, Hughes C, Hanna LA. Views of pharmacy graduates and pharmacist tutors on evidence-based practice in relation to over-the-counter consultations: A qualitative study. *J Eval Clin Pract.* 2015;21(6):1040–6.
18. Rutter P, Wadesango E. Does evidence drive pharmacist over-the-counter product recommendations? *J Eval Clin Pract.* 2014;20(4):425–8.
19. Burkiewicz JS, Zgarrick DP. Evidence-based practice by pharmacists: utilization and barriers. *Ann Pharmacother.* 2005;39(7–8):1214–9.
20. Hanna LA, Hughes CM. Pharmacists' attitudes towards an evidence-based approach for over-the-counter medication. *Int J Clin Pharm.* 2012;34(1):63–71.
21. Porteous T, Ryan M, Bond C, et al. Managing minor ailments; the public's preferences for attributes of community pharmacies. A discrete choice experiment. *PLoS One.* 2016;11(3):e0152257.
22. Moore, RA, Derry, S, Aldington, D, Wiffen P. Single dose oral analgesics for acute postoperative pain in adults - an overview of Cochrane reviews. *Cochrane Database Syst Rev.* 2015; Issue 9. Art. No.:CD008659. DOI:10. 1002/14651858. CD008659.pub3.
23. National Institute for Health and Care Excellence. Low back pain and sciatica in over 16s: assessment and management. NICE guideline. November 2016. nice.org.uk/guidance/ng59.
24. National Institute for Health and Care Excellence. Headaches in over 12s : diagnosis and management. Clinical guideline CG150. September 2012. nice.org.uk/guidance/ng150.
25. British Association for the Study of Headache. Guidelines for all healthcare professionals in the diagnosis and management of: migraine, tension-type headache, cluster headache and medication-overuse headache. 3rd edition (1st revision). 2010.
26. Steiner TJ, Martelletti P. Aids for management of common headache disorders in primary care. *J Headache Pain.* 2007;8(S1):1–47.
27. Bendtsen L, Evers S, Linde M, Mitsikostas DD, Sandrini G, Schoenen J. EFNS guideline on the treatment of tension-type headache - Report of an EFNS task force. *Eur J Neurol.* 2010;17(11):1318–25.
28. Kelley MT, Walson PD, Edge JH, Cox S, Mortensen ME. Pharmacokinetics and pharmacodynamics of ibuprofen isomers and acetaminophen in febrile children. *Clin Pharmacol Ther.* 1992;52:181–9.
29. Hay AD, Redmond NM, Costelloe C, et al. Paracetamol and ibuprofen for the treatment of fever in children: The PITCH randomised controlled trial. *Health Technol Assess.* 2009;13(27):1–186.
30. Moore N, Van Ganse E, Le Parc J-M, et al. The PAIN Study: Paracetamol, Aspirin and Ibuprofen New tolerability study. A large-scale, randomised clinical trial comparing the tolerability of aspirin, ibuprofen and paracetamol for short-term analgesia. *Clin Drug Invest.* 1999;18:89–98.
31. Kanabar DJ. A clinical and safety review of paracetamol and ibuprofen in children. *Inflammopharmacology.* 2017;25(1):1–9.
32. Pierce CA, Voss B. Efficacy and safety of ibuprofen and acetaminophen in children and adults: A meta-analysis and qualitative review. *Ann Pharmacother.* 2010;44(3):489–506.
33. National Institute for Health and Care Excellence. Non-steroidal anti-inflammatory drugs. Key therapeutic topic. January 2015. nice.org.uk/guidance/ktt13.

34. Henry D, Lim LL-Y, Rodriguez LAG, et al. Variability in risk of gastrointestinal complications with individual non-steroidal anti-inflammatory drugs: results of a collaborative meta-analysis. *BMJ*. 1996;312(7046):1563–6.
35. Lewis SC, Langman MJS, Laporte J, Matthews JNS, Rawlins MD, Wiholm BE. Dose – response relationships between individual nonaspirin nonsteroidal anti-inflammatory drugs (NNSAIDs) and serious upper gastrointestinal bleeding : a meta-analysis based on individual patient data. *Br J Clin Pharmacol*. 2002;54(3):320-6.
36. Le Parc JM, Van Ganse E, Moore N, Wall R, Schneid H, Verriere F. Comparative tolerability of paracetamol, aspirin and ibuprofen for short-term analgesia in patients with musculoskeletal conditions: Results in 4291 patients. *Clin Rheumatol*. 2002;21(1):28-31.
37. Doyle G, Furey S, Berlin R, et al. Gastrointestinal safety and tolerance of ibuprofen at maximum over-the-counter dose. *Aliment Pharmacol Ther*. 1999;13(7):897–906.
38. Rainsford KD, Bjarnason I. NSAIDs: Take with food or after fasting? *J Pharm Pharmacol*. 2012;64(4):465–9.
39. Black P, Max MB, Desjardins P, Norwood T, Ardia A, Pallotta T. A randomized, double-blind, placebo-controlled comparison of the analgesic efficacy, onset of action, and tolerability of ibuprofen arginate and ibuprofen in postoperative dental pain. *Clin Ther*. 2002;24(7):1072–89.
40. Olson NZ, Otero AM, Marrero I, et al. Onset of analgesia for liquigel ibuprofen 400 mg, acetaminophen 1000 mg, ketoprofen 25 mg, and placebo in the treatment of postoperative dental pain. *J Clin Pharmacol*. 2001;41(11):1238–47.
41. Mehlisch DR, Ardia A, Pallotta T. A controlled comparative study of ibuprofen arginate versus conventional ibuprofen in the treatment of postoperative dental pain. *J Clin Pharmacol*. 2002;42(8):904–11.
42. Desjardins P, Black P, Papageorge M, et al. Ibuprofen arginate provides effective relief from postoperative dental pain with a more rapid onset of action than ibuprofen. *Eur J Clin Pharmacol*. 2002;58(6):387–94.
43. Doyle G, Jayawardena S, Ashraf E, Cooper SA. Efficacy and tolerability of nonprescription Ibuprofen versus Celecoxib for dental pain. *J Clin Pharmacol*. 2002;42(8):912–9.
44. Seymour R, Hawkesford J, Weldon M, Brewster D. An evaluation of different ibuprofen preparations in the control of postoperative pain after third molar surgery. *Br J Clin Pharmacol*. 1991;31(1):83–7.
45. Moore RA, Derry S, Wiffen PJ, Straube S. Effects of food on pharmacokinetics of immediate release oral formulations of aspirin, dipyron, paracetamol and NSAIDs - A systematic review. *Br J Clin Pharmacol*. 2015;80(3):381–8.
46. De Vries F, Setakis E, Van Staa TP. Concomitant use of ibuprofen and paracetamol and the risk of major clinical safety outcomes. *Br J Clin Pharmacol*. 2010;70(3):429–38.
47. Global Initiative for Asthma. Global strategy for asthma management and prevention. Updated 2018.
48. Kennedy JL, Stoner AN, Borish L. Aspirin-exacerbated respiratory disease: Prevalence, diagnosis, treatment, and considerations for the future. *Am J Rhinol Allergy*. 2016;30(6):407–13.
49. Sondergaard KB, Weeke P, Wissenberg M, et al. Non-steroidal anti-inflammatory drug use is associated with increased risk of out-of-hospital cardiac arrest: a nationwide case–time–control study. *Eur Hear J - Cardiovasc Pharmacother*. 2017;3(2):100-107.
50. Bally M, Dendukuri N, Rich B, et al. Risk of acute myocardial infarction with NSAIDs in real world use: bayesian meta-analysis of individual patient data. *BMJ*. 2017;1909:j1909.
51. Fosbøl EL, Gislason GH, Jacobsen S, et al. Risk of myocardial infarction and death associated with the use of nonsteroidal anti-inflammatory drugs (NSAIDs) among healthy individuals: A nationwide cohort study. *Clin Pharmacol Ther*. 2009;85(2):190–7.
52. McGettigan P, Henry D. Cardiovascular risk with non-steroidal anti-inflammatory drugs: Systematic review of population-based controlled observational studies. *PLoS Medicine*. 2011 8(9):e1001098.
53. European Medicines Agency. Updated advice on use of high-dose ibuprofen. May 2015.