Reasons for the use of mild analgesics among English students

Abstract

Objective

Mild analgesics such as paracetamol and ibuprofen are amongst the most commonly used over-the-counter (OTC) drugs. However, little is known about what beliefs people hold about them. The present paper examines: (a) the patterns of mild analgesic usage in a sample of university students, (b) their beliefs about the associated risks and the necessity of taking mild analgesics, and (c) the association between beliefs about analgesics and self-reports of their use.

Setting

A convenience sample of 333 students studying at a large English University were approached on the University campus. Of these, 291 agreed to participate, yielding an 87% response rate.

Method

This study employed a cross-sectional design, with all participants completing the same questionnaire concerning their use of mild painkillers, such as paracetamol and ibuprofen, and beliefs about their use.

Main outcome measure

Four questions asked about their patterns of mild analgesic use in the past month, specifically (a) have they taken analgesics, (b) how often did they take analgesics when they had symptoms, (c) did they take more than a single dose of 1-2 tablets at one time, and (d) did they exceed the maximum dose.

Results

Almost all of the 291 participants reported symptoms in the past month, with over two thirds treating with mild analgesics, and one sixth exceeding the maximum dose. Only 17% indicated that there were short-term risks of using mild analgesics, although half indicated that there were long-term risks. The risks that were identified generally did not conform with current medical thinking. Perceptions of risks were not generally associated with self-reports of analgesic usage. Rather, respondents who thought analgesics were more necessary were more likely to report taking analgesics, report taking more analgesics, and report exceeding the maximum dose.

Conclusion

These results indicate the need for caution in current moves to encourage self-medication. If people are unaware of the risks of drugs such as paracetamol or ibuprofen, then they may only contact health professionals after they experience adverse effects.

Keywords: analgesic, over the counter, risk perception, health beliefs, NSAIDs, paracetamol

Impact of the findings on practice

1. Health professionals should encourage young people to consider not only whether mild analgesics such as paracetamol, aspirin and ibuprofen. medication are really necessary, but also alternative methods of pain relief .

Introduction

Most pain experienced by the general public is treated without consulting a health professional[1]. In line with this, mild analgesics such as paracetamol and ibuprofen are amongst the most commonly used over-the-counter (OTC) drugs in the Western world. It has been estimated that they constituted approximately 23% of OTC sales in the United Kingdom in 2004[2]. Although these drugs are readily available, there are a number of risks associated with their use. Paracetamol is one of the leading causes of drug-related poisoning[3-5], high doses being particularly harmful to the liver. In addition, Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) such as ibuprofen or aspirin can lead to potentially serious side effects, particularly gastrointestinal inflammation and ulceration[6]. Moreover, the prolonged use of mild analgesics to treat daily headaches can lead to dependence and consequent rebound headaches on withdrawal[7].

Given the prevalence of pain and mild analgesic use, and the associated risks even when used appropriately, it is important to understand how people view their risks and benefits. There is good information on the demographic correlates of mild analgesic use[8]. However, little is known about what beliefs people possess regarding mild analgesics, and whether these beliefs are associated with the use of mild analgesics. What little data is available suggests that people view OTC medication as "weak" and hence less risky than other forms of medication[9,10]. The aim of the present study is to fill the current gap in knowledge by examining which beliefs are associated with the use and over-use of mild analgesics.

Perceptions of risks have been found to predict a number of health-related behaviours in a variety of contexts[11,12]. In the context of beliefs about medicines for chronic medical conditions, there is increasing evidence that not only are patients' concerns about the risks of taking medicines important in determining their use, but also beliefs about their necessity[13]. The present study therefore examines whether concerns about the risks of mild analgesics, as well as beliefs about the extent to which mild analgesics are necessary, predict mild analgesic use.

The present study employs a sample of university students. Such a sample has two advantages. First, they are less likely to be on prescribed medication due to their youth. Second, their analgesic use is unlikely to be habitual and hence more likely to be informed by their beliefs about analgesics.

Aim of the study

The present paper therefore examines: (a) the patterns of mild analgesic usage in a sample of university students, (b) their beliefs about the risks and the necessity of taking mild analgesics , and (c) the association of mild analgesic use with beliefs about risks, and beliefs about the necessity of taking analgesics.

Methods

Participants

A convenience sample of 291 students at a large English University were recruited, who were studying for over 80 different degree courses. A further 42 students were

approached but declined to participate, resulting in a response rate of 87%. Of the final sample, 183 were women (63%).

Design and procedure

This study employed a cross-sectional design. Participants were approached at a variety of locations around the campus of the University, asked if they would be willing to complete a brief questionnaire concerning the use of mild painkillers, such as paracetamol and aspirin, and were given a questionnaire to complete at their own rate. The University of Birmingham Safety and Ethics Committee approved this study (reference 05/18).

Measures

The questionnaire began by asking whether the respondents had suffered from any of the following in the last month: headache, hangover, sports injury, period pain, migraine, none of these. If they had, they were asked which of the specific symptoms listed in Table 1 they had experienced. If they reported experiencing symptoms, they were then asked if they had taken analgesics/ painkillers in the past month to relieve these symptoms. If they reported taking analgesics, they were then asked four further questions about their patterns of use in the past month, specifically:

- which analgesics/ painkillers have you taken? (response options: “neurofen”, “ibuprofen”, “paracetamol”, “aspirin”, “resolve”, “alka seltzer”, “other (please specify)”.

- what dosage do you normally take? (response options: “1-2 tablets once”, “1-2 tablets every 4 hours”, “more than 1-2 tablets every 4 hours”, “other (please specify)”.
- when you have these symptoms, how often do you do you use painkillers/ analgesics? (response options: “never”, “sometimes”, “usually”, “always”).
- when you use analgesics/ painkillers, how often do you exceed the maximum dose? (response options: “never”, “sometimes”, “usually”, “always”).

If participants indicated they had not experienced any symptoms in the past month, or they had not taken any analgesics/ painkillers in the past month, the questionnaire directed them to the final section of the questionnaire, to be completed by all respondents. This final section began with two questions asking participants about whether they believed there were short-term or long-term risks of taking analgesics, and what, if any, they thought these risks were.

The final part of the questionnaire consisted of the Beliefs about Medicines Questionnaire (BMQ)[14], a validated questionnaire with four distinct scales. Two scales are concerned with beliefs about medicines in general: medicines are intrinsically harmful and medicines are overused. Two scales are concerned with beliefs about specific medicines (in this case, mild analgesics): perceived necessity of mild analgesics and concerns about mild analgesics.

Analysis

To be able to examine the association between beliefs about analgesics and self-reports of analgesic usage, four dichotomous measures of analgesic usage were derived:

- Reports of using analgesics in the past month (compared with not taking analgesics).
- Reports of normally taking a single dose of 1-2 tablets (compared with normally taking more).
- Reports of "sometimes" taking analgesics when they have the symptoms they reported experiencing (compared with "usually" or "always" taking them).
- Reports of "never" exceeding the maximum dose when taking analgesics (compared with "sometimes", "usually" or "always" exceeding the maximum dose).

Chi-squared tests were used to examine the associations between these dichotomous measures of analgesic usage and the dichotomous measures of perceptions of risk. To examine whether the BMQ measures were associated with self-reports of analgesic usage, scores on the BMQ scales were compared between groups defined by the dichotomous measures of usage reported above, using independent samples t-tests.

Results

Frequencies of symptoms reported and of use of analgesics in the past month

Of the 291 respondents, only 20 reported not experiencing at least one of the following in the last month: headache (n=227), hangover (n=190), period pain (n=114), sports injuries

(n=80), migraine (n=24). The sample as a whole reported a mean number of 3.25 (SD = 1.86) different types of symptoms in the last month (see Table 1).

(Table 1 about here)

Of the 271 respondents who reported at least one symptom in the last month, 199 (73%) reported taking analgesics to relieve these symptoms. Of these, 108 reported taking more than one type of preparation (40% of those reporting symptoms and 54% of those reporting taking analgesics). The types and frequencies of analgesics taken are reported in Table 2.

(Table 2 about here)

Of these 199 respondents who reported taking analgesics in the past month, 115 reported that they "sometimes", 69 "usually" and 15 "always" took analgesics when they had the symptoms they reported. The usual dosage reported was a single dose of 1 to 2 tablets for 119 respondents, and more than this for 80 respondents. Of the 199 respondents who reported taking analgesics in the past month, 149 reported exceeding the maximum dose "never", 39 "sometimes", 6 "usually" and 4 "always".

Perceptions of risks of analgesics, and association with usage

Of the whole sample, only 51 (18%) indicated that they thought there were any short-term risks of taking analgesics, with 186 (64%) indicating no risks, and 53 (18%) did not know. Equally, 147 (51%) indicated that they thought there were long-term risks of

taking analgesics, with 82 (28%) indicating no risks, and 60 (21%) did not know. The specific risks mentioned by respondents in the free text comments were reliably coded ($\kappa = 0.93$), and are shown in Table 3.

(Table 3 about here)

For the respondents who reported symptoms in the past month, there was no association between whether they perceived analgesics to possess short term risks, and whether they took analgesics or not, how often they used analgesics, the dose they took, or how often they reported exceeding the maximum dose. There was also no association between whether they perceived analgesics to have long term risks, and whether respondents took analgesics or not, how often they used analgesics, or the dose they took. There was however a significant association between whether analgesics were perceived as possessing long term risks and how often respondents reported exceeding the maximum dose. Those respondents who thought that there were long term risks were more likely to report exceeding the maximum dose, compared with those who either thought that there were no long term risks, or did not know ($\chi^2 = 5.02$, df = 1, N = 198, p = 0.031).

Perceptions of necessity and concerns about analgesics, and association with usage

The BMQ mean scores for the present sample are reported in Table 4, along with mean scores that have previously been reported for a range of chronic illness groups, regarding their prescribed medication[14]. The mean scores for two of the scales (General – Harm and General – Overuse) are comparable with those of the chronic illness groups: the beliefs of the present sample about medicines in general are similar to those of the

chronic illness groups that have been previously reported. However, the mean scores for the two scales (Specific - Necessity and Specific - Concerns) that assess beliefs about analgesics are dissimilar to those reported for chronic condition groups. The respondents in the present study report much lower concerns about analgesics, compared to the concerns of the chronic illness groups with their own medicines. An even larger difference is present for the beliefs the respondents in the present study have about the necessity of analgesics compared with the beliefs of the chronic illness groups about the necessity of their own medicines: the mean for the present analgesic sample was 7.59, compared with mean scores of between 17.72 and 21.26.

(Table 4 about here)

The association between self-reported analgesic usage, and the two BMQ scales assessing specific beliefs about analgesics (Necessity and Concerns) are reported in Table 5. The mean BMQ Concerns scores were not significantly different between groups defined by whether or not they took analgesics, how often they used analgesics, the dose they took, or how often they exceeding the maximum dose. By contrast, mean BMQ Necessity scores were significantly different for groups defined by all four self-report measures of analgesic use. Those respondents who took analgesics had higher necessity scores than those respondents who did not. Those who "usually" or "always" used analgesics when they had symptoms had higher necessity scores than those who "sometimes" used them. Those respondents who took larger doses of analgesics had higher necessity scores. Finally, those who "sometimes", "usually" or "always" exceeded the maximum dose had high necessity scores than those who "never" did so.

(Table 5 about here)

Discussion

A number of clear findings emerged from the present study. Almost all of our student sample reported some symptoms in the past month, which over two thirds treated with mild analgesics. One quarter of those who reported using analgesics also reported exceeding the maximum dose in the past month. Only 18% of respondents indicated that they thought there were short-term risks of using mild analgesics, although half indicated that they thought there were long-term risks. The risks identified do not conform with current medical thinking. Perceptions of risks were not generally associated with self-reports of analgesic usage. However, beliefs about the necessity of analgesics were associated with self-reports of analgesic use and over-use.

The high frequency of symptoms reported is consistent with previous research carried out with a variety of populations[15]. Equally, the high proportion (over two thirds) of our sample that reported taking analgesics in the past month fits with evidence on the high volume of sales of OTC analgesics[2] and self-reports of analgesic use in population studies[8]. The present study builds on this previous work by highlighting the lack of awareness of the risks associated with commonly taken analgesics in a highly educated sample, of whom 17% reported exceeding the maximum dose in the past month.

The sample as a whole appeared to possess very little awareness of the harmful effects that mild analgesics can cause. Several studies in Western countries have found that

paracetamol is the most common drug implicated in self-poisoning[4]. This has resulted in prevention strategies such as changes in legislation to restrict the number of tablets that can be sold at general outlets in the United Kingdom[3] and the addition of methionine to paracetamol tablets in the United States, to reduce its hepatotoxic effects[5]. Despite these measures, only three of our respondents (1%) indicated that liver damage was a short-term risk of mild analgesic use, although 34 (12%) cited it as a long-term risk.

The other group of analgesics that our sample reported using in the past month were NSAIDs, notably ibuprofen and aspirin. Although OTC doses of ibuprofen may be as safe as paracetamol when used for short periods, it cannot be assumed that consumers will adhere to the recommended doses. Very few of our respondents were aware of these risks: only 8 (3%) cited it as a short-term risk, with 13 (4%) citing it as a long-term risk.

The most common risk cited by our sample concerned dependency or tolerance, with 78 (27%) mentioning it as a long-term risk. This may reflect awareness of the phenomenon of rebound headaches, where the prolonged use of both opioid and non-opioid analgesics can itself result in iatrogenic headaches[1]. Alternatively, this may reflect a general suspicion of medicines, part of a wider concern about the health consequences of modern life[16]. Consistent with this, the mean responses on the two BMQ scales about medicines in general being Overused and Harmful were similar to those of older, clinical samples who were on prescribed medication[14].

Not only is there an almost total lack of awareness of the more common problems that can be caused by mild analgesics in the present sample, but also the perceptions of risks

are generally not related to reports of the use of these analgesics. By contrast, the BMQ Necessity scale was found to be very highly significantly associated with all four self-report measures of analgesic usage. The prediction of analgesic use and overuse by necessity beliefs but not concerns may be because, OTC drugs, in contrast to the prescribed medication in previous reports[13,17], are seen as "weak" and not as risky as other forms of medication[9,10]. The present study has provided some quantitative support for this argument (in Table 4): the BMQ Concerns scores are considerably lower than for prescribed drugs in clinical samples.

A limitation of the present research is that it was conducted with a student sample, and employed self-report measures of mild analgesic usage. Future work needs to establish whether the lack of awareness of risks arising from mild analgesic usage is more widespread in the general population. Future research should also examine what factors lead to people viewing analgesics as being highly necessary, given that these beliefs are associated with analgesic use, and over-use. Variation in the perceived necessity of analgesics could be due to greater frequency or intensity of symptoms experienced, or to perceptions of the efficacy of analgesics themselves.

Conclusions

In the United Kingdom, Government policy is encouraging self-care of minor, self-limiting illnesses[18]. In line with this, the status of many previously prescription only medications (POMs) is being changed to make them available to OTC, to encourage self-medication. We have shown that not only do people have fewer concerns about

analgesics, compared with prescription medication, but our highly educated sample are unaware of the risks associated with analgesic use. This lack of awareness of risks, in conjunction with UK Government policy, has the potential to cause problems. If people see OTC drugs as weak, and are unaware of the risks of drugs such as ibuprofen or paracetamol, then they may only come into contact with health professionals after they experience adverse effects. Further, they may not associate symptoms such as stomach problems with the use of NSAIDS, due to their lack of awareness that this is a likely side-effect. The present study already suggests that these problems may be occurring, given that one sixth of the total sample (one quarter of those who took analgesics in the past month) are aware that they exceeded the maximum dose. This deliberate overuse of analgesics is likely to be only part of the overall picture of misuse, with people being unaware of exceeding the recommended dose of paracetamol for instance, due to taking it in multiple preparations.

If these results are replicated in a wider community sample, there appear to be grounds for more widespread publicity surrounding the potential hazards of analgesics such as paracetamol and ibuprofen. Further, this may indicate that a model whereby OTC drugs are still sold in pharmacies rather than other retail outlets, but with no prescription required, may be necessary to prevent people in the UK from viewing OTC drugs as essentially harmless. It is still not entirely clear how to ensure consumers will continue to experience the benefits afforded by the availability of analgesics OTC, whilst being less likely to experience the potential risks associated with their use, due to ignorance.

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Table 1.

Frequencies of participants (n=291) reporting different symptoms in the last month (and as percentage of total sample).

Symptoms	Number of participants
Headache	227 (78%)
Pain	173 (59%)
Fatigue	153 (53%)
Sickness	127 (44%)
Dizziness	95 (33%)
Upset stomach	93 (32%)
Strain/ sprain	39 (13%)
Swelling	37 (13%)
(none of these)	20 (7%)

Table 2.

Frequencies of participants (n=291) reporting taking different types of analgesics in the past month (and as percentage of total sample).

Analgesic	Number of participants
Paracetamol	145 (50%)
Ibuprofen	114 (39%)
Neurofen	57 (20%)
Aspirin	27 (9%)
Alka seltzer	12 (4%)
Resolve	6 (2%)
Other	21 (7%)
(Reported taking no analgesics)	72 (25%)
(Reported no symptoms)	20 (7%)

Table 3.

Frequencies of short term and long term risks of analgesic use mentioned by participants (and as percentage of total sample)

	Short term risks	Long term risks
Minor side effects	15 (5%)	4 (1%)
Stomach/ gut	8 (3%)	13 (4%)
Dependency/ tolerance	6 (2%)	78 (27%)
Liver/ kidney	3 (1%)	34 (12%)
Other	12 (4%)	24 (8%)
TOTAL	44 (15%)	153 (51%)

Table 4.

Means (and standard deviations) for Beliefs about Medicines Questionnaire (BMQ) scores in the present study, and data previously reported by Horne et al (1999).[14]

	Present study (N = 288)	Range in six chronic illness groups (N = 524)[a]
Specific		
Concerns (α = 0.64)	9.58 (3.35)	12.91 (3.38) – 15.76 (4.09)
Necessity (α = 0.77)	7.59 (3.17)	17.72 (3.75) – 21.26 (2.98)
General		
Harm (α = 0.61)	9.44 (2.67)	9.29 (2.43) – 10.24 (2.30)
Overuse (α = 0.73)	11.42 (3.17)	11.43 (2.77) – 12.80 (2.90)

[a] Range of mean values for each scale, from validation study (Horne, Weinman & Hankins, 1999), which reported BMQ data on six chronic illness groups (asthma, n = 78; diabetes, n = 99; renal, n = 47; cardiac, n = 116; psychiatric, n = 85; general medical, n = 86).

Table 5.

Mean differences (with standard deviations) between BMQ Necessity and Concerns scale scores for analgesics, according to four self-reported measures of use of analgesics in the last month.

Reported taking analgesics in the past month?			**N**	**Prob**
	Yes	No		
Necessity	8.07 (3.24)	6.38 (2.70)	272	**p < 0.001**
Concerns	9.42 (3.44)	9.94 (3.27)	274	p = 0.261
How often use analgesics when have symptoms?				
	"sometimes"	"usually" or "always"		
Necessity	7.41 (2.79)	8.99 (3.59)	198	**p = 0.001**
Concerns	9.31 (3.40)	9.51 (3.51)	199	p < 0.681
Reported taking more than single dose 1-2 tablets?				
	Yes	No		
Necessity	9.29 (3.72)	7.27 (2.59)	198	**p < 0.001**
Concerns	9.92 (3.58)	9.04 (3.31)	199	p = 0.076
Reported exceeding maximum dose in past month?				
	"never"	"sometimes", "usually" or "always"		
Necessity	7.61 (2.84)	9.54 (3.96)	197	**p < 0.001**
Concerns	9.32 (3.45)	9.55 (3.45)	198	p = 0.692