

BMJ Open From pain treatment to opioid dependence: a qualitative study of the environmental influence on codeine use in UK adults

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ABSTRACT

Objectives To investigate the views and experiences of people who use codeine in order to describe the 'risk environment' capable of producing and reducing harm.

Design This was a qualitative interview study. Psychological dependence on codeine was measured using the Severity of Dependence Scale. A cut-off score of 5 or higher indicates probable codeine dependence.

Setting Participants were recruited from an online survey and one residential rehabilitation service.

Participants 16 adults (13 women and 3 men) from the UK who had used codeine in the last 12 months other than as directed or as indicated. All participants began using codeine to treat physical pain. Mean age was 32.7 years (SD=10.1) and mean period of codeine use was 9.1 years (SD=7.6).

Results Participants' experiences indicated that they became dependent on codeine as a result of various environmental factors present in a risk environment. Supporting environments to reduce risk included: medicine review of repeat prescribing of codeine, well-managed dose tapering to reduce codeine consumption, support from social structures in form of friends and online and access to addiction treatment. Environments capable of producing harm included: unsupervised and long-term codeine prescribing, poor access to non-pharmacological pain treatments, barriers to provision of risk education of codeine related harm and breakdown in structures to reduce the use of over the counter codeine other than as indicated.

Conclusion The study identified microenvironments and macroenvironments capable of producing dependence on codeine, including repeat prescribing and unsupervised use over a longer time period. The economic environment was important in its influence on the available resources for holistic pain therapy in primary care in order to offer alternative treatments to codeine. Overall, the goal is to create an environment that reduces risk of harm by promoting safe use of codeine for treatment of pain, while providing effective care for those developing withdrawal and dependence.

INTRODUCTION

The risk of codeine dependence and physical harm associated with long-term use of codeine

Strengths and limitations of this study

- Adds to a relatively small body of qualitative research investigating codeine dependence.
- Presents an investigation of environmental factors producing and reducing harm related to codeine containing medicines through the adoption of the 'risk environment' approach.
- A limitation is the small sample size, and findings cannot be generalised to all regions of the UK.
- The study recruited a higher proportion of women compared with men potentially ignoring certain experiences of pain, codeine use and dependence specific to men.
- The risk environment approach focuses on a particular aspect of the social world and may overlook individual circumstances.

containing medicines are well known.^{1 2} In the UK, data from the National Drug Treatment Monitoring System show that codeine was the primary or secondary drug for 2.2% of clients (n=4248) in structured drug treatment (2013/2014).³ Escalating use to a daily dose of 1250 mg codeine, which is five times the maximum daily dose,⁴ has successfully been treated with opioid agonist therapy (buprenorphine/naloxone) and tapered dosing over a 4-month period.² However, many individuals who are dependent on codeine (experiencing withdrawal symptoms when codeine is removed) may not seek help due to a reluctance to explore other types of pain treatments.^{5 6} Furthermore, regional variability in addiction treatment may act as a barrier against receiving effective care. To improve pain treatment and physical and mental health, concerted efforts are needed at the level of codeine prescribing, dispensing and use to reduce the number of patients who become dependent after starting on codeine.

Codeine is widely accessible in the UK: it is one of the most commonly prescribed opioids and can be purchased over the counter (OTC) in licenced pharmacies without a medical prescription. Codeine is available in pure formulations with a medical prescription and as compound products available OTC or with a medical prescription depending on the codeine dose. In 2016, the UK was the second biggest consumer of codeine in the world at 44.2 tons.⁷ According to Prescription Cost Analysis data, more than 15 million items of co-codamol (codeine/paracetamol) were dispensed in the community in 2017 (England only)—an increase of approximately 15% since 2007.

Therapeutic indications for codeine use are treatment of mild to moderate pain not relieved by non-opioid analgesics such as paracetamol and ibuprofen.⁴ Although considered a ‘mild opioid’,⁸ long-term codeine use can lead to tolerance and dependence.^{9–11} Use of compound products containing paracetamol or ibuprofen in higher than recommended doses may result in harm from high doses of accompanying non-opioid analgesics, such as renal and gastrointestinal complications attributed to ibuprofen and liver damage attributed to paracetamol.¹² Indications of possible codeine dependence include long-term use for non-cancer pain,⁵ use for anxiety and depression,¹⁰ and obtaining codeine from multiple sources, including prescribed, OTC and from the illicit market.^{2,13}

With the high level of codeine use in the UK, it is important to consider which factors impact on the production and reduction of codeine related harm. In this article, we adopt the ‘risk environment’ framework as an approach to investigate social situations and environments that are specific to codeine use. The risk environment can be seen as a space where multiple factors affect individual risk by considering how different types of environments (physical, social, economic and policy) interact at different levels (micro and macro).¹⁴ This framework has previously been applied to explore the risk environments of illicit drug harms, including in relation to HIV transmissions¹⁵ and overdose,¹⁶ but not the development of codeine dependence in a pain treatment context.

In the risk environment, microenvironments involve physical risks from substance use and social and financial circumstances, whereas macroenvironments relate to wider structural influences such as laws, health service revenue and spend, and national policies.¹⁴ Codeine-specific examples illustrate the logic applied in this framework: at the micro level, starting patients on prescribed codeine without a clear plan for stopping again may increase the risk of long-term use and subsequently dependence.⁶ Conversely, careful and patient-involved dose tapering protect against long-term use. At a macro-level environment, regulation restricts access to high doses of codeine in the form of pure formulations to prescription-only with prescribers deciding if they are appropriate to use. While compound codeine formulations (combined with paracetamol or ibuprofen) are available OTC, regulations state that only one packet can

be sold at a time and the packet labelling must state: ‘Can cause addiction. For three days use only’.

However, studies indicate that transitions still occur from short-term codeine use to treat pain into long-term use and dependence.^{10,13,17} Reasons why individuals experience dependence on codeine include: physical and psychological withdrawal resulting in prolonged use,^{1,10,18} poor understanding of the risks of taking codeine¹⁹ and disengagement from general practitioners (GPs) due to concerns of codeine dependence being recorded in medical notes.^{13,20} In a pain treatment setting where opioids are prescribed more often and for longer periods, despite the lack of evidence of long-term efficacy for chronic pain,^{10,21–23} investigating the risk environment can offer a better understanding of the social and political institutions that play a role in reducing codeine harm.

As such, our aim of the article is to explore the risk environment that influences codeine harm from the perspective of people who use or have used codeine recently for pain treatment.

METHODS

Design

This was a qualitative study that used data from semi-structured interviews with participants living in the UK who reported use of codeine in the last 12 months. Inclusion criteria were: any individual aged 18 years or over who used codeine other than as directed or as indicated, whether wilful or unintentional, and whether it resulted in harm or not.²⁴

Recruitment

Participants were recruited among respondents to an online survey (n=14) and through a residential rehabilitation service (n=2) in order to capture individual experiences across the spectrum from initial misuse to dependence that required structured addiction treatment.¹⁰ A question in an online survey¹⁰ invited respondents to take part in an interview by emailing the researcher or providing contact details. The researcher (AK) contacted and interviewed all eligible participants who did so, resulting in 18 interviews. A leaflet was provided to clients in the residential rehabilitation programme informing about the study. All eligible clients in the service at that time were invited to take part, resulting in an additional 10 interviews conducted by AK.

Sample

Of the 28 participants, one was excluded as codeine was used according to accepted medical practice or guidelines. Another 11 participants were excluded from the analysis as codeine was predominantly sourced as substitution for illicit opioids (heroin). This resulted in a sample of 16 participants who first took codeine for pain treatment, which allows for an investigation of influential factors that have an effect on codeine harm.

Data collection

Participants were given a Participant Information Sheet informing them of the reasons for doing the study and the involved researchers and institutions (online supplementary file 1). They were then asked to sign a consent form to ensure their informed consent to the research (online supplementary file 1). Interviews took place either in the residential rehabilitation service, at a location chosen by the participant or over the phone. The first interview was conducted in May 2015 and the last in April 2016. Interviews lasted from 35 min to 1 hour and 35 min. Participants were compensated for their time with a £20 gift voucher. Interviews were conducted using a topic guide, covering: demographic information, initial use of codeine, patterns of codeine use, difficulties managing codeine use, sourcing of codeine, use of other drugs or medicines and views on codeine availability and regulation. New topics brought up by the participants were pursued during the interviews with follow-up questions. Codeine dependence was measured using the five-item Severity of Dependence Scale (SDS) during the most recent period of codeine use.^{25 26} A score of 5 or above, out of a maximum score of 15, was used to indicate probable psychological dependence on codeine.⁹

Data management and analysis

Interviews were audio-recorded and then transcribed verbatim by a professional service, with any participant identifying information removed from the transcripts. Data analyses were completed by three researchers on the project (AK, EK and SJ) and coded using the qualitative software NVivo (V.11). A coding framework was developed deductively from the topic guide and from codes that emerged inductively from the data.²⁷ For this paper, all coded data were analysed using Framework.²⁸ In the first stage, the coded data were reviewed to describe aspects of each factor that influenced codeine use in the risk environment. Since similar factors were identified as being important to the production and reduction of harm among the participants, the analyses were merged and then grouped into more inductive categories. We organised these under four headings: (i) patient education on the risk of codeine, (2) the role of prescribing practices related to codeine and non-pharmacological pain treatment, (3) the accessibility and use of OTC codeine and the differences between relationships with GPs and pharmacists and (4) access to interventions and treatment for codeine dependence. These categories are used to structure the results below. Emergent factors that appeared to have an impact on the harms of using codeine use that may have transferability to other settings²⁹ were categorised into microenvironment and macroenvironment (physical, social, economic and policy) and used for mapping the various domains of the risk environment.¹⁴ A risk environment for codeine is presented in [table 1](#). Analyses are presented with supporting quotes (anonymised using participant numbers) and SDS scores.

Patient and public involvement

Patients were not involved in the design and conduct of the study.

RESULTS

Participant characteristics

The sample consisted of three men and 13 women, with a mean age of 32.7 years (SD=10.1) and a mean period of codeine use of 9.1 years (SD=7.6) ([table 2](#)). In the sample, three participants (18.8%) were unemployed, three (18.8%) were students and 10 (62.5%) were employed. Comorbid anxiety or depression was self-reported by four participants (25%) and four (25%) reported concurrent use of codeine and other prescription opioids. Using the SDS, 10 participants (62.5%) scored five or more, indicating probable codeine dependence. At the time of interview, four participants (25%) sourced codeine from a medical prescription, three used OTC codeine (18.8%), whereas nine used both (56.3%). Only one participant reported additionally sourcing codeine from the internet, while three also used codeine obtained from family or friends. In total, four participants (25%) had received intervention and treatment for their codeine use, including addiction treatment, GP-led intervention, counselling or from a psychiatrist.

Education of patients on prescribed codeine

Many participants explained that they had not fully understood the potential risks when they first started taking codeine, including its addictive potential. Reflecting on their initial codeine use, many expressed frustrations with their GP and suggested that they wished they had been given more information:

If I had had a doctor who possibly just had a little bit more time to say here's what I'm giving you, here's what it is, here's what it does, here's the risks to it. If I had just been a little bit more educated, perhaps it wouldn't have happened [use in excessive doses]. (Participant 11, male, dependence score 0)

Participants identified several potential barriers facing health professionals in effectively communicating risks. Specifically, participants felt that the typical 10 min GP appointment was not enough to fully discuss available options for pain therapy. Of note was that participants who had greater awareness of the risks of codeine, typically from searching for information on the internet, were often more motivated to avoid these risks. However, when participants voiced concerns to their GP, they felt ignored and detached from decisions about their health and care:

I kind of had to battle to get my GP to do or say anything about my lower back pain, because they're just like, it's lower back pain, what can you do? They just kind of send you away, say carry on, take the painkillers... It didn't seem like anyone was taking any care

Table 1 The codeine risk environment in the context of pain treatment: examples of environments producing and reducing harm

Microenvironment		Macroenvironment	
Risk	Intervention	Risk	Intervention
<i>Physical</i>	Prolonged codeine use. Excessive codeine use. Codeine dependence.	Diversion of codeine containing medicines (obtaining codeine from friends and family).	Review of regulation on prescription and monitoring.
<i>Social</i>	Ineffective risk communication between GPs and patients to inform of codeine risks. Disengagement from healthcare providers. Limited engagement between patient and pharmacist. Over-reliance on potentially inaccurate internet and peer information.	Codeine's dominant role in contemporary pain treatment. Stigmatisation of codeine dependence. Anonymised information sourcing on the internet from unreliable sources.	Improved access to alternative non-pharmacological pain management therapies. Increased awareness and opportunity for early intervention for codeine dependence across community, employment and health services.
<i>Economic</i>		Lack of resources available for non-pharmacological pain treatment in primary care (eg, physical therapy).	Funding and reform for NHS primary care and local drug addiction treatment services.
<i>Policy</i>	Low utilisation of medicine review of repeat prescription of codeine. Ineffective implementation of pharmacy OTC restrictions. Ease of circumventing pharmacy restrictions.	Nature of GP appointments (long waiting times, short duration). Ineffective laws and regulation governing OTC sales of codeine containing medicines.	More time to spend with codeine-dependent patients in GP surgeries. Increased availability and convenience in securing appointment and access to screening and brief intervention. Review of legal and regulatory governance surrounding OTC codeine.

Factors may overlap physical, social, economic and policy environments and change place between environments over time. GPs, general practitioners; NHS, National Health Service; OTC, over the counter.

Table 2 Participant characteristics and codeine use

Participant	Gender (F/M)	Initial type of pain	Subsequent reasons for codeine use	Time between first and last use	Source of obtaining codeine	Severity of Dependence Scale score	Intervention and treatment
1	M	Headache.	To reduce stress.	7 years.	Prescription, OTC, obtained from family.	15*	Residential rehabilitation programme.
2	F	Dysentery.	Recreational purposes and to reduce stress.	1 year.	Prescription and OTC.	4	None.
3	F	Pain after an operation.	To sleep, to reduce stress and for depression.	1 month.	Prescription.	7*	GP support and counselling.
4	F	Period pain.		15 years.	Prescription.	12*	GP support.
5	F	Injury.	To sleep and recreational purposes.	15 years.	Prescription and OTC.	8*	None.
6	F	Deep vein thrombosis from heroin use.	Used when heroin unavailable.	8 years.	Prescription and OTC.	11*	Previously in residential rehabilitation. At time of interview none.
7	F	Pain after an operation.	For anxiety.	10 years.	Prescription and OTC.	14*	None.
8	F	Back pain.		20 years.	Prescription.	7*	None.
9	F	Head injury.	To reduce stress and to sleep.	2 years.	Prescription and OTC.	10*	None.
10	F	Migraines.	To reduce stress and to sleep.	25 years.	Prescription.	2	None.
11	M	Migraines and back pain.	For anxiety and for depression.	14 years.	Prescription, OTC and internet.	0	Private psychiatry and private pain specialist.
12	F	Arthritis.		2 years.	Prescription and OTC.	5*	None.
13	M	Headache and later osteoarthritis.	For anxiety, recreational purposes.	15 years.	Prescription, OTC and obtained from family.	1	None.
14	F	Arthritis.		3 years.	OTC.	6*	None.
15	F	Migraines, back pain and irritable bowel syndrome.	To sleep.	8 years.	OTC and obtained from a friend.	2	None.
16	F	Ulcers.	To sleep.	4 months.	OTC.	0	None.

*Scores of 5 and above indicate probable psychological dependence on codeine. F, female; M, male; OTC, over the counter.

in the fact that I could get addicted to this; I didn't bother to go back. (Participant 15, female, dependence score 2)

Such encounters with health professionals enhanced the feeling of not being listened to and contributed towards disengagement from health services, distrust in medical opinions and isolation. In this environment, fewer factors acted to protect against unsupervised, long-term codeine use. Consequently, the lack of effective communication between prescribers and patients, and a resulting poor education of patients on codeine risk, appeared to facilitate the development of codeine dependence for some participants.

Prescribing practices and the use of non-pharmacological pain therapies

The majority of participants who received prescription codeine did so through a repeat prescription. Individuals robustly reported being able to order their repeat prescription with few restrictions on amounts and frequency, which for some resulted in increasing codeine intake:

It wasn't just once a month for my periods, like I went through a period of having really bad back ache, so I took it for that. Then for when I twisted my ankle like four or five times, so I'd take it for that. I started running two years ago, now I've got a knee injury, so I'd take it for that. It was just whatever niggles and

pains there were, I'll just pop some tablets because I had them on a repeat prescription and they were basically on tap. That's when it started to really get a grip, because I was taking them for other things on a more or less daily basis. (Participant 8, female, dependence score 7)

Within the risk environment, prolonged access to codeine with minimal supervision from a health professional can facilitate use of codeine other than as indicated during the initial consultation, influencing transition to subsequent dependence.

It was striking that participants using codeine from a medical prescription reported being prescribed codeine as a first resort for pain, even when participants were otherwise motivated to try other types of pain treatments:

I went and said I need another bout of physio for my back because it's starting to hurt again. And they [GP] said: 'oh, you've got to be in constant pain for six weeks'. And I said: 'I've been in constant pain for six weeks already, and it's a recurring problem, so please just refer me.' And the doctor said: 'no, go and take these pain medicines [codeine] and come back in six weeks'. And I said: 'I think it's really dangerous that you're telling me to go away and take a pain med that I know is really highly addictive constantly for six weeks, for a problem that you already know exists.' And they said: 'well, that's just the way it works, I'm sorry. (Participant 8, female, dependence score 7)

For some primary care patients in the study, these issues were perceived as a general systematic problem reflecting a lack of treatment resources. They felt like they had been prescribed codeine in order to quickly get rid of them, rather than their GP taking the time to deal with the underlying problem or being referred to specialist services. This did lead to frustration and, in some cases, disengagement from GPs, for example, to seek treatment privately:

... [I]f that's the only advice you're going to give me [take codeine], then I will do what works for me. And I went to an osteopath and that really helped. (Participant 15, female, dependence score 2)

In contrast with the negative perceptions of codeine prescribing expressed by some participants, those who were treated with non-opioid pain medicines, physiotherapy and hydrotherapy, indicated that they felt less concerned about continued codeine use:

Through the doctor they referred me to a hydrotherapy thing, because I just hadn't had any physiotherapy before for the pain. So, I had six sessions with them and they gave me exercises to do at home. I've been trying to keep up with that, which has I guess lessened the pain. I no longer think that I'm going to get dependent on codeine because it's been that long that I don't wake up in the morning and think

I have to take a pill. (Participant 12, female, dependence score 5)

Participants' accounts therefore highlighted several structural factors in the risk environment influencing codeine harm: having alternative treatments available beyond codeine resulted in better engagement with health services and greater patient satisfaction while minimising chronic codeine therapy. Conversely, treating pain solely with codeine did result in disengagement from health services.

Differences in relationships with pharmacists and GPs

Implementation of pharmacist intervention to regulate OTC codeine sales is intended to prevent codeine from being used other than as indicated and is one example of a factor that reduces harm. However, participants were able to circumvent restrictions on sale by purchasing from multiple pharmacies over the course of a week or even a day. While one participant had been refused codeine in a pharmacy, most OTC codeine users reported rarely being questioned by pharmacists to find out if codeine was a safe choice, even when they regularly came to the same pharmacy and obtained large amounts of codeine:

It's the same staff all the time and I've bought it from there many times. And nobody has ever questioned me at all. (Participant 7, female, dependence score 14)

Another important outcome of accessing multiple pharmacies in the local area was that participants never established a strong relationship with a single pharmacist, contrasting this to those who described a better relationship with their GP. Even where participants only accessed one pharmacist, they often perceived this relationship as less important to them and therefore less effective in regulating use and providing risk education, support and interventions than their GP. This appeared to also be related to the short amount of time participants spent interacting with pharmacists when buying codeine:

Whenever I go and speak to pharmacists, I've just never felt particularly comfortable speaking to a pharmacist. I find they're a bit... maybe not judgmental, but I find they're a bit short and like they are very kind of medical. I don't find that there's much interaction. I would just prefer to speak to my GP, because I feel I can trust him and I feel I've got a good relationship. (Participant 3, female, dependence score 7)

However, participants also emphasised that pharmacists were far easier and quicker to access than scheduling an appointment with their GP, providing a disincentive to wait and consult with their GP about their codeine use. For participants with a positive and trusting relationship with their GP, a reluctance to be dishonest in their communication with the GP appeared to reduce the risk of dependence occurring; however, this appeared,

in some cases, to be undermined by the convenience of OTC availability:

I lied to the doctor once, but that killed me doing that. I was really ashamed of myself at the time. I wouldn't have kept doing that [to continue using codeine]. It's only because I had been able to buy it OTC that I've kept on with that addiction. And even now, when I have a bad week and I really need codeine, I'll go and buy it OTC. I wouldn't do that if I had to go to my GP and explain. (Participant 7, female, dependence score 14)

Some participants believed that codeine should be restricted to prescription only. In contrast, one participant with a low SDS score suggested that this would not be necessary nor feasible in the context of a wider NHS lack of resources—if everyone self-treating their pain with codeine had to regularly see their GP, primary care would become overwhelmed:

I think that it shouldn't be made much more difficult to get hold of because I think most people can go through some acute pain that lasts a couple of days that you might need something like this for, and our NHS is stretched enough without having to go to the GP every time you spring your ankle. (Participant 15, female, dependence score 2)

This illustrates the dynamic nature of the risk environment, suggesting that for short-term use for acute pain the benefits of OTC codeine outweigh the potential risk of dependence and thus play a significant role in providing access to pain treatment. However, in cases where factors implemented to protect against long-term use fail, such as pharmacist regulation of OTC sales, OTC codeine is associated with a risk of dependence.

Support, intervention and treatment of codeine dependence

Four participants had experience with intervention and treatment for codeine dependence, ranging from GP-initiated medicine review to addiction treatment. Still, most participants with SDS scores indicating probable codeine dependence did not report any medical supervision or support; for some, this spanned several years during which codeine use became an established part of their daily practice.

It is relevant to note the significance of the influence GPs possessed for some dependent participants in influencing their codeine use. While most participants expressed negative GP experiences that led to disengagement and over-reliance on poor information sources, those participants who openly disclosed difficulties in controlling their use of codeine, in the context of a positive and trusting relationship with their GP, were able to receive useful interventions:

I thought I'll just tell him [GP] and I'll just see what he says [about difficulties in managing codeine use]. And I ended up getting signed off work for about

four weeks... I really trust my GP... When I tell him that I don't want to take codeine, he asks me why, and he kind of tries to look at other options for me, which I really appreciate. I think it was kind of a combination of all those different things, the GP and the counselling, the time off work, everything sort of came together. I think if it had only been one of those things, I don't know how well my recovery would have gone. (Participant 3, female, dependence score 7)

Where participants engaged with their GP regarding their codeine use, either due to GP instigated follow-up consultations concerning their use of codeine or to the participant asking for an appointment, their GP was able to help via effective interventions such as tapering codeine and replacing compound products with pure codeine formulations. This suggests that in an environment where GPs have resources to support the patient, they reduce the likelihood of harm occurring:

He wrote me out like a little rota. He said we were going to do it [taper] over a certain period of time. And I had to sign, like he made like a contract for me to sign, and he signed it as well, to say that he was going to help me, and he was going to support me. And he was really understanding and not judgmental at all, it was fabulous. He said he was going to prescribe me a certain amount of just codeine, so not the paracetamol, just codeine on its own. (Participant 8, female, dependence score 7)

When two participants, who had attended addiction treatment, were asked why they had started treatment, they generally described lengthy and complicated pathways that did require significant level of self-motivation. One male participant who was currently a client in a residential rehabilitation programme described the social, economic and physical circumstances that motivated him to eventually seek treatment and detoxification for codeine dependence. These included transitions from single to multiple codeine containing medicine use (OTC and prescribed), breakdown in family relationships, dropping out of university, social isolation, being fired from work and physical adverse effects from high doses of compounded ibuprofen:

I think when I had the stomach ulcer, I started realising then that this will actually kill me. I cut down the Nurofen Plus [codeine/ibuprofen] because it was what kept me going really, but I couldn't put it down...I just couldn't stop. I hadn't got a job, I'd dropped out of uni. Just living at home doing nothing and it kind of dawned on me you know, I've really got a problem. At first, I went to the local drug services, and they said that they don't deal with codeine so there wasn't any help there, and someone gave the number for there [residential rehabilitation service], a family friend or something...It was quite quick, about after two weeks [starting in treatment]. (Participant 1, male, dependence score 15)

For some of the participants, disengagement from medical professionals, and the placing of responsibility on the patient to self-manage their dependence, created situations where participants reported that they instead used the internet to find out more information about codeine, pain treatments and advice on how to manage the use of codeine.

When I was first diagnosed with depression and anxiety, when I was just being pushed and pulled from different doctors, different psychiatrists, I looked to the internet to do my own research and just understand what these medicines were [codeine]. I didn't know what I was taking, and I didn't know what the risks of abusing it was, so I felt that I should really start understanding what I'm being prescribed. (Participant 11, male, dependence score 0)

Support structures in form of family and friends also played an important role to some participants as a source of information about codeine. For this participant, an encounter with a friend facilitated personal reflection as to her own use of codeine:

One of my best friends was going for a job interview and I said to her: 'do you want to take a codeine like an hour before you leave the house? You'll feel so very relaxed.' And although she took the tablets, she said to me: 'I don't feel comfortable with this and I don't think that I should' A few months later she asked me if I used to take them for reasons other than pain, and I said to her no, but in my heart, I knew that I did. I asked her why. She said: 'because it's a very addictive drug...it's something that can basically change the chemicals in your brain and you'll be addicted forever.' She suggested a few articles for me to read, which I did, and then I was very worried because then I learned that codeine was connected to morphine. (Participant 10, female, dependence score 2)

Such relationships played an important role for participants to gain more confidence in their ability to manage their use of codeine, especially for those using codeine other than as indicated but not experiencing codeine dependence. However, over-reliance on potentially inaccurate online sources and advice from friends and family may also delay or prevent patients from seeking support from health professionals until they experience severe dependence that is much more complicated to treat. As such, the social environment has the capacity to both produce and reduce codeine-related harm.

DISCUSSION

This qualitative study explored codeine use from the perspective of people who use or have used codeine to treat pain in order to unpack the key factors of the risk environment. These findings add to existing literature that suggest that some patients who use codeine for treatment of pain become dependent as a result of environmental

factors.^{10 20} We identified a number of environmental factors that reduced the risk of dependence: medicine review of repeat codeine prescribing, interventions in primary care (such as tapering), social support (friends and online) and access to addiction treatment (table 1). We also identified several microenvironmental and macroenvironmental factors capable of producing harm, especially unsupervised, long-term codeine prescribing and breakdown in structures to stop sales of OTC codeine for use other than as indicated (table 1).

Among micro-level barriers, participants spoke of perceived limitations of pain therapy in primary care resulting in overreliance on codeine. Codeine prescribing often occurred in the context of poor utilisation of non-steroidal anti-inflammatory drugs, graduated exercise and cognitive-behavioural therapy, which may achieve similar levels of improvement in pain^{30 31} without risk of dependence.³² Lack of psychological, social community and pain specialist resources and the services of physiotherapists, occupational therapists and social workers thus appeared to hinder a holistic approach in pain therapy that incorporates prevention, active treatment and rehabilitation. Overcoming these impediments most likely require amending the economic environment that regulates the availability of these resources.

A policy environment dictates procedures for OTC codeine sale in the UK to prevent use other than as indicated.³³ However, lack of trust in the relationship between pharmacists and participants using OTC codeine confirmed concerns previously raised about OTC codeine sale, including inability to effectively monitor OTC codeine consumption and intervene to halt escalating use.³⁴ OTC medicines play an important role given the increasing acceptance of self-care to promote patient empowerment and reduce the pressure on local GP practices. However, drawing on knowledge of engagement between pharmacists and patients at the point of an OTC codeine sale is important to realign OTC sales of codeine with environmental factors to reduce harm.

Comprehensive assessment of codeine dependence, support delivered in primary care and access to addiction treatment is required and should be available for those who need it.⁵ Although some participants viewed the uptake of primary care intervention and addiction treatment positively, they also found them difficult to access. Where engagement and resources permitted, GPs proved to be an effective source of monitoring and reducing harm when concerns had been clearly communicated. Increased awareness of the potential for codeine dependence among GPs is likely to improve treatment of codeine dependence further.¹⁹ Easy-to-access addiction services capable of handling individuals with codeine as the primary drug may also be important here.

Implications for the risk environment

Considering the negative consequences of prolonged opioid use for chronic pain, which include paralysis of the endogenous opioid system, depression and ineffective

pain control,²³ alternative management of patients with chronic codeine use is warranted.^{22 35} The findings of this study suggest that GPs are well placed to communicate risk, monitor and, if necessary, intervene in codeine use. However, their ability to do so may be limited by a lack of resources and subsequent patient disengagement. Training and funding must be provided, including more time to spend with patients, effective ways to monitor codeine prescriptions, access to other types of treatments and ability to refer to secondary services.

Although pharmacists are empowered by current UK regulations to restrict individual access to OTC codeine by refusing sales and limiting the amounts sold, this study found that having codeine available OTC may produce harm due to limited effectiveness of these interventions. With Australia recently joining countries like the USA, Germany and Japan in restricting codeine to prescription-only,³⁶ it is necessary to review UK OTC regulation to reduce the risk of excessive use of codeine. There is also a need to explore how to improve patient/pharmacist communication.

Using codeine only for its intended indications of mild to moderate pain on a short-term basis and only if it helps would most likely go a long way in preventing dependence. However, this requires effective and acceptable alternatives to manage pain to ensure that pain patients receive the care they need. The goal is to create a system where patients understand their options for pain therapy and the risks of taking codeine. Finally, ending codeine prescriptions in cases of dependence should not be done abruptly and only under close monitoring to prevent relapse or use of other opioids (sourced online or from the illicit market).

Strengths and limitations

A strength of this study is that it helps understand individual experiences in their broader context of the risk environment surrounding codeine use in the UK, an area previously unexplored in the literature. Specifically, this study highlights how different environmental factors intended to facilitate safe use of codeine can potentially act to increase risk without proper utilisation and sufficient funding. This is important in implementing change to ensure that benefits of codeine use in pain therapy outweighs harm. Most obviously, a limitation of the study is the small sample size. Findings cannot be generalised to all regions of the UK. As such, a reduction or production of harm related to codeine-containing medicines will depend on many factors, such as the nature and funding of local primary care. The majority of participants in this study were women, whereas two previous qualitative studies recruited a more evenly distributed sample.^{13 20} The advertisement for the online survey was designed to attract both men and women; however, more women responded (67%),¹⁰ creating a multiplying effect when recruiting for interviews. Although the gender distribution could potentially introduce bias, this is consistent with previous research where opioid utilisation in GP

practices in the UK increased with greater proportion of female registrants.³⁷ As such, the sample in the online survey¹⁰ and in this interview study may reflect the type of individual most likely to receive treatment with opioids. Future qualitative studies should explore the differences between pain, opioid use and dependence in men and women. The inclusion criteria enabled us to study factors contributing to codeine dependence while limiting our ability to identify protective factors in the environment, which may have stopped dependence from occurring. Had we recruited from primary care instead of from an online survey, our findings may have been different in that we had recruited more patients with experience of factors that stopped codeine use other than as indicated. The risk environment approach has a limitation in its ability to understand codeine-related risks. This is because this approach focuses on a particular part of the social world and may not capture individual circumstances that inform codeine dependence, such as comorbidities and specific types of pain. Furthermore, overlaps between different environments (physical, social, economic and policy) are likely when mapping the risk environment. While this is useful for understanding the complicated nature of how drug harms are generated, it can also make it difficult to determine how to implement effective change.

CONCLUSION

This study identifies environments that produce and reduce harm related to codeine-containing medicines among participants with recent use of codeine. The study highlights microenvironments and macroenvironments capable of producing harm, particularly in regard to long-term prescribing, unless realigned with current risks of codeine use and provided with adequate funding. The economic environment is often crucial in reducing drug harm and facilitating effective treatment of dependence. We echo calls for funding to facilitate a more holistic approach to pain therapy to reduce prescribing to patients who may not benefit from opioids.^{22 35} The study found evidence to support regular review of patients prescribed codeine. Alternative non-pharmacological therapies may also go a long way to reduce codeine dependence.

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