Heliyon 9 (2023) e16215

Contents lists available at ScienceDirect

Heliyon

journal homepage: www.cell.com/heliyon

Research article

"At the time I only wanted to relieve stress": Exploring motivation for behaviour change in long-term hypnotic users

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ARTICLE INFO

Keywords:
Biopsychosocial model
Insomnia
Hypnotics and sedatives
Motivation
Primary care
Deprescriptions

ABSTRACT

Background: Motivating patients to discontinue long-term benzodiazepine receptor agonist (BZRA) use for insomnia remains an important challenge in primary care because of the medication's unfavourable risk-benefit profile. Previous studies have shown that understanding the complexity of patients' motivation is crucial to the primary care physician for providing effective interventions efficiently. Theoretical frameworks about behaviour change show that motivation is a multi-layered concept that interacts with other concepts, which aligns with a holistic perspective or implementation of the biopsychosocial model.
Aim: Exploring primary care patients' views and ideas on what factors helped or hindered them in discontinuing long-term BZRA use, in relation to motivation as conceptualised in the Behaviour Change Wheel, and associated domains of the Theoretical Domains Framework.
Design and setting: A qualitative study with semi-structured interviews in primary care in Belgium between September 2020 and March 2021.
Method: Eighteen interviews with long-term hypnotic users were audio recorded, transcribed and thematically analyzed, using the Framework Method.
Results: The success of discontinuation interventions does not solely rely on patients' spontaneous sense of striving for improvement. Reinforcement and identity were found to be important domains for motivation. Beliefs about personal capabilities, and about consequences of both BZRA intake and discontinuation, differed between previous and current users.
Conclusion: Motivation is a multi-layered concept which is not fixed in time. Patient empowerment and goal setting could help long-term BZRA users to lower their intake. As well as public health interventions that might change social attitudes towards the use of hypnotic medication.

1. Introduction

Hypnotic medication is prescribed to treat sleep problems, such as insomnia. This medication includes the class of benzodiazepine receptor agonists (BZRA), which are not recommended for long-term use because of their unfavourable risk-benefit profile. The increased risk of falls and hip fractures, prolonged reaction times, psychiatric reactions, cognitive impairment and depression are

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https://doi.org/10.1016/j.heliyon.2023.e16215
Received 3 March 2023; Received in revised form 7 April 2023; Accepted 10 May 2023
Available online 12 May 2023

reasons why BZRA are considered a potentially inappropriate medication for the elderly in Europe [1]. If necessary, their use should be limited to the lowest possible dose and the shortest possible duration. However, as opposed to what guidelines recommend, continuous use of a low steady dose of BZRA remains common [2], especially for insomnia, and is estimated to have a 5% prevalence rate [3–5]. They are mainly used by elderly women [5].

In the past five years, the de-medicalisation of insomnia and deprescribing of hypnotic use has gained attention in research. From studying the efficacy of cognitive behavioural therapy for insomnia [6] to the impact of mass media coverage on public views [7], scientists have covered three key domains for delivering complex health interventions: biological, psychological, and social [8]. The biopsychosocial model incorporates the biomedical model (which explains behavioural aberrations based on disordered somatic processes) and provides a more complete account of healthcare and illness behaviour by also paying attention to personal and social contexts [8]. This model helps to provide person-centred care [9–11] and improve patient outcomes [12]. Furthermore, the model underpins goal-oriented care [13], which is used in rehabilitation and disability contexts [14], such as living with chronic pain, a psychiatric disorder, and possibly functional disorders [8].

Although the current treatment guidelines for insomnia are written from a holistic, biopsychosocial perspective - with a stepped-care approach and hypnotics being reserved for patients who show severe suffering due to a prominent acute episode of insomnia - [15] in practice, a biomedical approach seems dominant considering the high consumption of prescribed hypnotics [16]. The plurality of these prescriptions is provided by a primary care physician [17].

1.1. Operationalising motivation

The biopsychosocial model considers the interrelationships between different constructs and their contribution to the patient's illness [8]. In order to increase our understanding of patients' motivation to continue hypnotic use, a holistic perspective to operationalise motivation is preferable. Recent evidence-based research in the field of deprescribing – i.e. lowering the use of medication – has adopted the Behaviour Change Wheel and the Theoretical Domains Framework (TDF) [18–20]. Both frameworks offer a theory-based approach to designing and implementing behaviour change interventions and consider elements at a personal and social level to support clinical practice [21].

At the centre of the Behaviour Change Wheel is the COM-B model, representing capabilities, opportunities, motivation, and behaviour (Fig. 1). This model has been linked to the TDF by a group of behaviour change experts [22], providing more constructs to operationalise the COM-B concepts (Table 1). The combination of COM-B with TDF provides a relevant framework to increase our understanding of patients' motivation for the discontinuation of long-term BZRA use.

Two recent interview studies explored the views of current and previous BZRA users, with one focusing on the prescriber's influence and the other on the TDF. They both emphasized the importance of patient-centred interventions, which is consistent with adopting a holistic perspective, but the papers lacked an in-depth discussion of patients' motivation [18,23]. Previous studies have shown that understanding the complexity of patients' motivation is crucial to the primary care physician for providing effective interventions in a time-efficient manner [24–26]. Therefore, this study explores primary care patients' views on what factors helped or hindered them in discontinuing long-term hypnotic use, in relation to motivation as conceptualised in the COM-B model and associated domains of the TDF.

2. Method

2.1. Study design and setting

A qualitative study, using semi-structured in-depth interviews [28], was conducted with Belgian primary care patients who were current or previous long-term users of hypnotics, more specifically BZRA. Long-term BZRA use was defined as continuous use (more than 80% of days) for minimally six months [29]. The qualitative method was chosen because of its merits regarding the exploration of human behaviour and the complex relation to its context with a real-world population [30]. Furthermore, the technique of in-depth interviewing was preferred because it allows deviation from the topic guide to explore patients' narratives [28]. The study was

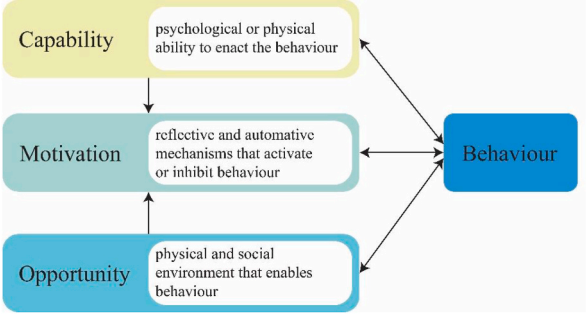

Fig. 1. The COM-B model, adapted from Michie et al., 2011 [27].

Table 1
Motivation as conceptualised in the COM-B model and associated TDF domains with definition and constructs, adapted from Michie et al., 2011 [27], and Atkins et al., 2017 [22].

COM-B	TDF domain	Definition	Constructs
Automatic motivation	Reinforcement	Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus	Rewards (proximal/distal, valued/not valued, probable/improbable), Incentives, Punishment, Consequents, Reinforcement, Contingencies, Sanctions
	Emotion	A complex reaction pattern, involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event	Fear, Anxiety, Affect, Stress, Depression, Positive/negative affect, Burn-out
Reflective motivation	Social/professional role and identity	A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting	Professional identity, Professional role, Social identity, Identity, Professional boundaries, Professional confidence, Group identity, Leadership, Organisational commitment
	Beliefs about capabilities	Acceptance of the truth, reality or validity about an ability, talent or facility that a person can put to constructive use	Self-confidence, Perceived competence, Self-efficacy, Perceived behavioural control, Beliefs, Self-esteem, Empowerment, Professional confidence
	Optimism	The confidence that things will happen for the best or that desired goals will be attained	Optimism, Pessimism, Unrealistic optimism, Identity
	Intentions	A conscious decision to perform a behaviour or a resolve to act in a certain way	Stability of intentions, Stages of change model, Transtheoretical model and stages of change
	Goals	Mental representations of outcomes or end states that an individual wants to achieve	Goals (distal/proximal), Goal priority, Goal/target setting, Goals (autonomous/controlled), Action planning, Implementation intention
	Beliefs about consequences	Acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation	Beliefs, Outcome expectancies, Characteristics of outcome expectancies, Anticipated regret, Consequents

reported following the Standards for Reporting Qualitative Research [31] and Consolidated Criteria for Reporting Qualitative research [32].

2.2. Ethical approval

Project approved by the Ethics Committee for Research of UZ/KU Leuven on June 15, 2020 (ref. S63790). Written informed consent was obtained from all participants before data collection.

2.3. Recruitment and selection

Interviewees were participants in the process evaluation of a cluster randomised controlled trial about the effectiveness of blended care (Figure A1 in Appendix A) to discontinue long-term hypnotic use [29]. Eligibility criteria for the trial included a continuous use of BZRA as hypnotics by adult patients with chronic insomnia disorder (Figure A2 in Appendix A). For the process evaluation, the patient population was limited to the intervention group (N = 456). Participants were purposively selected to obtain variation in age, sex, discontinuation status, and how intensely they had used the online intervention that was made available to them in the trial. In their initial consent form, patients were informed that a selective number would be invited to discuss their personal views and experiences. If selected, they were invited by their general practitioner (GP), for the interview. Patients who agreed, could contact the researchers or have the GP provide their contact details to the researchers. To minimise the recruitment workload for the GPs, refusal of participation was not documented.

2.4. Data collection

Interviews were conducted after the patients had passed the 26 weeks' interval in the study, meaning that the intervention was no longer available [29], to prevent intervention bias. A narrative review of health behaviour and behaviour change theories [33–38] inspired the topic guide (Table 2). To obtain a Dutch and French version, back-translation [39] was used. Semi-structured telephone and online interviews were conducted by two native speakers, researcher Kristien Coteur (KC) and research assistant Magali Le Clef. In person interviews were contra-indicated due to COVID-19. Both women had previously interviewed patients in a clinical context, and KC also in a research context. To optimise the topic guide each conducted a pilot interview, which allowed verification of the comprehensibility and missing topics. Since there were no major modifications needed, both interviews were included for analysis. During the study, the iterative process of collecting and analysing data led to continuous updates of the topic guide. All interviews started with a personal introduction and verification of informed consent. All interviews were audio recorded.

2.5. Data analysis

Interviews were anonymised during verbatim transcription. For analysis, the Framework Method was used [40]. All interviews were coded by two independent researchers (KC and research assistant Shani De Coster) in Nvivo12 [41]. Transcripts were read line by line and data were coded into an a priori framework of ten categories, based on the topic guide and agreed upon by the core research team (deductive component). Simultaneously, data within each category was coded inductively. To maintain a faithful representation of patients' views, their language was often used to name the codes. These codes were then grouped to form themes and sub-themes, with a particular focus on patients' views and experiences concerning discontinuation and the interventions by the GP. Disagreements were solved through discussion. Additionally, the team (KC, MVN, KVdB, SA) discussed text interpretations after analysis of three, eight, eleven, seventeen, and eighteen interviews. After 15 interviews, no new themes were found, nor were there elements that assigned new meaning to the data. This remained after three extra interviews, so data collection was stopped [42]. Next, an analytical framework based on the concept of motivation in the COM-B model and the associated domains and constructs from the TDF (Table 1), was used to link the patients' narratives to the concepts of automatic and reflective motivation. Automatic motivation includes impulses and inhibitions, which correspond to the TDF domains of *reinforcement* and *emotion*. Reflective motivation includes more

Table 2
Summary of the interview topic guide.

Topic	Components
Background narrative	Insomnia
	Medication use
Blended care	Interaction with the GP: present, past, possible improvements
	Differences with usual care (prior to trial)
	E-tool: satisfaction, advantages and disadvantages
	Personal motivation
	Outcome
Needs	To maintain a stop or reduce intake
Impact of COVID-19 crisis	On insomnia
	On medication use
	Other impact

cognitive processes, such as comparing ourselves to others (identity) or evaluating events, which can impact our beliefs about capabilities, about consequences, goals, and more. The final matrix contains themes, codes, and a reference count. (Supplemental file 1) Because specific codes were selected to constitute a link to motivation, a detailed overview is available so that data interpretation can be verified and alternative criteria selected as needed.

4. Results

4.1. Study population

All interviews were scheduled between September 2020 and March 2021, and lasted between 26 and 77 min. The sample consisted of 18 patients, with ages ranging from 33 to 79 years old (median 56), and 88% being female. The duration of BZRA intake varied between 2 and 30 years (median 9.5). Seven out of 18 patients had discontinued their BZRA use by the time of the interview. Two more patients reduced their intake, two increased, while the others' intake remained steady. Sample characteristics are listed in Table 3.

4.2. Main findings

All TDF domains associated with motivation were represented in the patients' narratives. (Supplemental file 1) The domains of *goals* and *optimism* were associated with three and five themes, whereas other domains captured ten themes or more. All domains are described below, starting with the findings about automatic motivation.

4.3. Automatic motivation to discontinue hypnotics

Several factors reinforced patients to reduce or stop BZRA intake. First, personal experience, such as noticing side effects when increasing their dose, or physical dependence. Second, the general belief that less medication is better, because of their side effects, and the financial burden. Third, practical or emotional support by family members, such as taking care of the household, or listening when needed. Nonetheless, family members were not always aware of patients' hypnotic use or attempts to discontinue. Sometimes, hypnotic use was not discussed because family members would not care, or the patient was not confident about successfully discontinuing.

Fourth, specific triggers influenced automatic motivation, like falling asleep in the car after work, which convinced the patient that BZRA were no longer needed, or receiving a message about discontinuation from multiple angles. The effect of repetition was also described in relation to the trial, where regular reminders and questionnaires were perceived as positively confrontational.

> "It [reminders] does provide motivation, you get them and you are confronted with it [hypnotic use] again. If I didn't have that, the GP talks about it once, but you don't work on it, then you're not going to start doing it [reducing] either I think." (PT17)

Finally, GPs reinforced motivation to discontinue, by following up on the patient's progress, helping them set the pace, showing sincere interest, being available to talk, and being motivated themselves.

Concerning the TDF domain 'emotion', stress played an important role in starting discontinuation. Patients mainly referred to work-related stress, with a decrease being motivational. Also, patients mentioned that an increase in stress could lead to relapse.

Table 3
Interviewee characteristics at the time of the interview.

Patient ID	Age	Sex	Duration of BZRA use	Discontinued	Intense use of intervention[a]	Exercises completed	Date interview
PT1	33	f	9 years	yes	no	0	14/09/2020
PT2	51	m	2010: 3 years, stopped, restarted since 1 year and 2 months	no, stable	yes	9	25/09/2020
PT3	54	f	4 years	yes	yes	10	28/09/2020
PT4	64	f	30 years	yes	no	2	30/09/2020
PT5	60	f	2 years	no, increased	yes	8	19/10/2020
PT6	50	f	10 years	no, reduced	yes	9	19/10/2020
PT7	55	f	16 years	no, reduced	no	1	20/10/2020
PT8	65	m	10 years	no, increased	yes	9	26/10/2020
PT9	56	f	19 years	no, stable	no	0	30/10/2020
PT10	48	f	14 years	yes	yes	10	02/12/2020
PT11	79	f	6 years	no, stable	no	3	21/12/2020
PT12	65	f	9 years	no, stable	yes	6	21/12/2020
PT13	36	f	2 years	no, stable	yes	9	03/02/2021
PT14	52	f	6 years	no, stable	yes	9	04/02/2021
PT15	45	f	13 years	yes	no	1	04/02/2021
PT16	68	m	2 years	no, stable	no	2	08/02/2021
PT17	66	f	18 years	yes	yes	9	08/02/2021
PT18	65	f	12 years	yes	yes	9	12/03/2021

[a] Intensity of use of the intervention was based on the number of exercises completed by the patient. There were 8 interactive elements available which could be completed multiple times. Cut-off was set at 5.

Successful discontinuation and reduction of BZRA were associated with positive emotions like happiness, feeling calm and confident, and being proud of oneself.

4.4. Automatic motivation to use hypnotics

The most mentioned reinforcing factors to use BZRA were associated with their clinical effects, namely shorter sleep onset latency, fewer awakenings during the night, feeling well rested in the morning, and muscle relaxation. The presumed absence of side effects reinforced continuation. Although the withdrawal syndrome – when forgetting their BZRA or running out of medication – is a side effect of physical dependence, many patients viewed withdrawal symptoms as a confirmation that their medication is needed and still working.

Furthermore, GPs reinforced motivation to use hypnotics by approving the current dose, wavering the patient's interest in discontinuation, not listening to the patient's problems, and continuing prescriptions.

> "It's like antibiotics … you get a box and you have to take it until empty, you know that it is not really healthy for your body either, because you only get it for this [condition]. But if it is suddenly prescribed for a year, then you do not assume that it will affect your lifestyle or your body." (PT1)

Emotionally, mainly fear and stress motivated BZRA use. Patients feared not sleeping. For some, this fear was stronger than the fear of potential side effects. One patient also feared discontinuation because of false expectations, based on her previous experience with withdrawal symptoms. Stress could also be sleep-related, such as less worrying because the patient was confident about being able to sleep at night, or anxiety-related, with BZRA used to stop overthinking.

> "Just knowing that I fall asleep if I take it, that I won't wake up and start thinking. That actually." (PT9)

The relief of stress motivated one patient to increase their dose and was found more important than being dependent on hypnotics.

> "Well listen, at the time I only wanted to relieve stress. So I didn't really think about it and I took that [BZRA] and it became a habit, that's all." (PT18)

Furthermore, BZRA were used by patients to fight depressed feelings and exhaustion. The only positive emotion regarding BZRA use was happiness. This happiness came from patients perceiving the medication as a solution to their problem, or as still working.

> "I'm happy that it still works for me … she [mother-in-law, in her 80s] is taking sleeping medication and she wakes up at night. She takes a lot of medication. I'm glad it still works [for me]." (PT14)

To consider discontinuation, patients felt they need a calmer and less anxious life, in a more relaxed environment, with sport opportunities, and to do more of what they like.

4.5. Reflective motivation to discontinue hypnotics

Regarding identity, comparison to other people lowered the threshold for some patients to discontinue. For example, they identified with being in a less severe situation than other long-term users, or with 'normal people' who sometimes have bad nights. Furthermore, identification with addiction and polymedication made patients think about their use patterns. Also, helpful personal characteristics were described, such as curiosity, prioritising rational choices, and their ability to act and proudly recognise their achievements. This ability to act was also reflected in self-regulating behaviours that were newly installed, such as using hypnosis or listening to podcasts, staying physically active, refraining from siestas, limiting late-night use of screens, and using pain medication when in pain instead of hypnotics. Furthermore, patients perceived behavioural control when they successfully discontinued, especially when they did it alone or stopped multiple BZRA. Discontinuation also boosted patients' self-confidence, which was associated with no longer thinking of hypnotics, or having a new life with a sense of a calmer self. Finally, empowerment by professionals increased reflective motivation. Raising the topic was found to be empowering, just as confirming that it is okay to discontinue, providing information and tools, and showing compassion when discontinuation gets difficult.

> "She understood that I had a difficult time for a while. You sometimes need that [understanding] when you are not motivated, via your GP or someone else." (PT17)

Family and friends could also empower the patient. However, their reactions varied strongly.

Motivation to discontinue was also increased by changing beliefs about consequences, such as realising the addictive potential of BZRA and learning about tolerance, which develops to the hypnotic effect but not to the side effects. Hence, BZRA were no longer perceived as harmless medication.

> "I tell myself that the drugs weren't doing me any good but they were still destroying me. If I can say "destroying me", I don't know if I'm using the right word but they were really addictive." (PT18)

Furthermore, the necessity of BZRA use disappeared for multiple reasons. One patient realised that sedation did not solve their worries. Another attested to feeling better with no sleep than with sleep by medication or alcohol. Similarly, another recognised that their sleep did not worsen after stopping BZRA. Finally, no longer using hypnotics was described as liberating.

> "Oh well, we're hanging in there. And we don't fall back on alcohol and we don't fall back on XANAX and pills, and that's it. A newfound freedom!" (PT15)

Although there were few references to goal setting, it positively impacted reflective motivation for two patients. One set a goal to sleep without medication, while the other wanted to achieve better sleep. Other patients described intentions, such as wanting a normal sleep pattern, and not relapsing in the future. Finally, some patients showed great optimism. They did not see any reason why not to try to stop when the GP talked about it or had turned their anxious thoughts into positive ones.

4.6. Reflective motivation to use hypnotics

Identity also played a significant role in continuing hypnotic use, especially professional identity. The importance of doing a good job, and being mentally present on the work floor, were important stressors. Although, a retiree found it equally important to be able to take care of the grandchildren. This possible change in views was described by two other patients who identified as someone who always found an excuse to continue their intake, without necessarily having good reasons. Closely aligned to identity, patients referred to groups that receive BZRA out of compassion, like the elderly, or hospital patients, who need to be comfortable according to the caregiver.

> "Of course, my doctor's principle is, also with other medication, if you are in pain and you are old you should not suffer unnecessarily. I think she thinks the same way when it comes to sleep. She will of course also look at each case separately." (PT11)

Patients described a similar view among friends and family, who normalised hypnotics as a solution for stress and sleep complaints. Furthermore, the association of discontinuation with an increase in dwelling thoughts, replacing the pills with alcohol, or becoming an insufferable character to their surroundings motivated continued BZRA use.

> "I've tried to quit on my own before. But after a week, I became so unbearable that I started again. The children didn't know how to see me anymore and the husband, I can't tell you!" (PT15)

Concerning beliefs about capabilities, continuous users' narratives showed low levels of self-efficacy. For example, the advice provided by the GP was difficult to implement at home, and being mentally present to take care of a child was important but impossible without medication because of the amount of stress experienced. Moreover, patients doubted if they could sleep in a normal way. They viewed the medication as a necessary solution. Patients also experienced little control over their situation, and long-term problems reduced their confidence to discuss them with their GP.

> "I find it difficult in the sense that it's a long situation, visiting for the same story. … The connection, yes. It's hard for me, and for her too, because it's the same situation every time." (PT6)

However, advice and empowerment to reduce were missed by some of these patients.

> "Someone should say to me, let's get started, it's dangerous what you're doing. But nobody does that, the doctor doesn't do that, or make a plan or whatever." (PT13)

Then again, some patients showed control over their medication intake, by autonomously reducing to the lowest possible dose, or changing their pace of intake. They broke the tablet twice, split it in two to take one in the evening and one at night, or switched to intermittent use.

Finally, beliefs about consequences increased reflective motivation. First, patients believed there were no side effects from using this medication, or they were functioning normally.

> "I know it had effects, I'm not saying it had side effects but I knew very, very well that there was addiction." (PT4)

> "Yes, I have to say I've been taking it for 2 years now and I've just been taking it every day so I don't know the difference. In terms of functioning, gosh, I am awake since 3 o'clock. I think I'm functioning normally." (PT5)

Second, other patients believed that BZRA use is generally not healthy, but necessary.

> "I am not satisfied that I take sleeping medication because I think it is not healthy, but on the other hand, I want to sleep. So I sometimes take sleep medication to sleep." (PT6)

Third, patients believed that stopping would be too difficult at this time. They referred to their unpleasant experience when trying to sleep without BZRA or expressed doubts about their sleep quality afterwards. Finally, some patients believed that one day they will have to stop because they will develop tolerance. Then again, another patient described how they increased their dose and switched between BZRA in response to tolerance.

Concerning intentions, multiple patients described wanting to lower or stop their BZRA use in the future. This desire was always paired with a reason why it could not be done now. One patient acknowledged that new reasons were likely to pop up in the future.

> "When that's over in a month, I'll have peace. But then there will be another new problem … " (PT13)

5. Discussion

This paper captured patients' motivation for the (dis)continuation of hypnotic medication, based on the COM-B model and TDF. Both automatic and reflective motivation were represented in the patients' narratives, as were all associated TDF domains. The domain that was linked to the most themes was *reinforcement*, followed by *identity*. Important constructs from other domains were *beliefs (about consequences), empowerment, perceived behavioural control,* and *stress.* Finally, fewer themes were associated with the domains of *goal setting, optimism,* and *intentions*.

Although patients' narratives were very diverse, it seems that they are more ready to discontinue when intentions arise without excuses to not fulfil them. Also, when beliefs about consequences start changing and patients recognise side effects, there is an opportunity to empower behaviour change. In this stage, the GP's motivation can reinforce motivation in the patient. Furthermore, GPs can support patients by regularly raising the topic, providing information and tools to increase the patient's behavioural control, and showing compassion when discontinuation is difficult. Whereas biomedical aspects may reinforce patients to continue hypnotics, e.g. withdrawal symptoms, mainly personal and social context factors motivate them to lower their use.

5.1. Priorities and stress

Based on the findings, we hypothesize that there is a difference in the priorities of previous and current long-term hypnotic users. Previous users seem to emphasize their health, while current users prioritise a solution to their problem. Many of them were open to other solutions but had not found them, and therefore emphasized the necessity of this medication in their daily life. Among previous users, dependency was the worst side effect. While among current users, dependency was not an issue. These different views and priorities could relate to long-term and short-term thinking, and goal-setting, which can be steered by chronic stress. Chronic stress biases decision-making by affecting the ability to choose an action based on the consequences of this choice, which leads to more habitual behaviour and increases the preference for high-risk/high-reward options [43,44]. Therefore, chronic stress interferes on a biological (neurological) level with both automatic and reflective motivation for discontinuing long-term BZRA use.

5.2. Strengths and limitations

The authors believe this to be the first study exploring the concepts of automatic and reflective motivation among long-term hypnotic users by analysing the narratives of primary care patients. For maximum variability in views, we used purposive sampling. The inter-university collaboration enabled interviews by a native speaker in Dutch and French and an intermittent review process of data analysis. Furthermore, the analysis was strengthened by using theory-based frameworks, i.e. the COM-B model and TDF. By adopting these frameworks in the analytical phase and not during data collection, we obtained rich data [45]. The relative novelty of this approach warrants careful interpretation of the results. Limitations concerning data analysis involve the selective processing of themes about discontinuation. Themes that related more to interventions than motivation, e.g. "contents of the consultation", "sleep routine", and "approach to stopping", were considered out of scope. Furthermore, the representativeness of our findings is limited by the selection process. Although the study sample of the cluster randomised controlled trial (Figure A2) had similar baseline characteristics – being sex, age and depression rates - to Belgian patients that receive three or more prescriptions for BZRA per year [46], participants may have been more motivated to reduce their BZRA intake than non-participating patients. Furthermore, some sampling bias occurred in the pragmatic trial as general practitioners confirmed that not all eligible patients had been invited due to their expectation of refusal [47]. Also, for the current paper, data were collected via telephone or video call due to COVID-19, which could have been a barrier for certain patients to participate.

5.3. Comparison with existing literature

Motivation is undeniably important for behaviour change [24,25,48]. A strong influencer is reinforcement, which follows the principles of operant conditioning, a learning process that can steer both habits and goal-directed behaviour [49]. Although operant learning has been applied successfully to behaviour change [50,51], few cost-effective interventions have described this process [52]. In these interventions, conditioning was possibly implemented inadvertently since it represents basic learning principles. Not knowing about reinforcement schedules could lead to missing a maintainable behaviour change [52]. Though important, operant conditioning for BZRA discontinuation should be used in combination with cognitive interventions, because of the complex interplay between automatic and reflective motivation. This is supported by PRIME theory, which states that goal-directed behaviour is only possible when change can be imagined [48]. To steer behaviour, intentions need to be remembered and generate a need that is stronger than other needs [48]. Correspondingly, our findings imply that intentions and beliefs about consequences are relevant to assessing motivation in clinical practice.

Although analyzed per construct, the beliefs, emotions, and events that impact motivation cannot be disconnected from one another. In 2019, a review of the mechanisms of action of behavioural change techniques found that most of these mechanisms and techniques were grouped in the literature. This finding suggested that mechanisms and techniques are considered as synergistically related [53]. During analysis, we also noted many interactions between components of motivation and multiple constructs being relevant to text excerpts. However challenging to describe, this corresponds to the COM-B model [27], and a holistic perspective, in which all components interact. In the abovementioned review, *beliefs about capabilities* were the most frequently identified mechanism of action. Although not the most referenced in our study, *beliefs about capabilities* was an important domain, including the constructs of

self-efficacy, perceived behavioural control, and empowerment. This domain is intricately linked to the patients' social context because the biopsychosocial model anticipates that different social attitudes might lead to a different illness behaviour in patients [54]. Unfortunately, a recent review showed that this domain remains underrepresented in BZRA discontinuation interventions, just as *optimism* [53,55]. Finally, our findings correspond and complement those of a recent TDF-based study [18], because of our in-depth interviewing and the combination of deductive and inductive coding which enabled us to describe more factors that impacted motivation. For example, *reinforcement* included the experience of withdrawal symptoms by patients (similarity), but also GPs' attitudes (difference); *emotion* included fear and worries (similarity), but also happiness, and more positive emotions among previous users (difference). In all, we concur with the view of BZRA discontinuation as a challenge in primary care because of the variety, and often the complexity, of patient profiles [18].

5.4. Implications for future research and clinical practice

Complementary to the current evidence on discontinuing long-term BZRA, this study could inform the development of future theory-based interventions.

In clinical practice, implementing a biopsychosocial perspective, not only as a theoretical basis but as a guideline for action during consultations, would increase patient-centredness and facilitate the implementation of goal-oriented care. Moreover, increased attention for the social context might alter patients' *beliefs about capabilities* and *optimism*. These changes would allow all partners to influence the capabilities and opportunities that impact motivation. Finally, interventions that increase stress-management skills could strengthen patients' capabilities, and uncovering the impact of chronic stress on decision-making and habitual behaviour could create a new opportunity to address BZRA use.

6. Conclusion

Motivation is a key component of behaviour change. It is a multi-layered concept that is not fixed in time and is influenced by many domains, in both healthcare and society, which calls for implementation of a holistic, biopsychosocial perspective with more attention to the personal and social context of patients in clinical practice. More specifically, discussing repeat prescriptions and reinforcing events, patient empowerment and goal setting could guide long-term BZRA users towards a more balanced and healthy life.

Author contribution statement

Kristien Coteur : Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed analysis tools or data; Wrote the paper.

Marc Van Nuland, Kris Van den Broeck, Sibyl Anthierens: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed analysis tools or data.

Birgitte Schoenmakers: Analyzed and interpreted the data; Contributed analysis tools or data.

Data availability statement

Data will be made available on request.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

We especially thank Shani De Coster and Magali Le Clef, the research assistants who contributed to data collection and analysis, the GPs for making time to invite their patients in the midst of COVID-19, and of course the patients for sharing their personal stories with us. Moreover, we thank and remember prof. Dr. Catharina Matheï†, who was chief investigator in the Big Bird project, and has supported us through multiple trials and tribulations. Finally, thank you to the Belgian Health Care Knowledge Centre for funding this collaborative project as independent research (KCE-17016). The views expressed in this publication are those of the author(s) and not necessarily those of Belgian Health Care Knowledge Centre.

Appendix B. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.heliyon.2023.e16215.

Appendix A

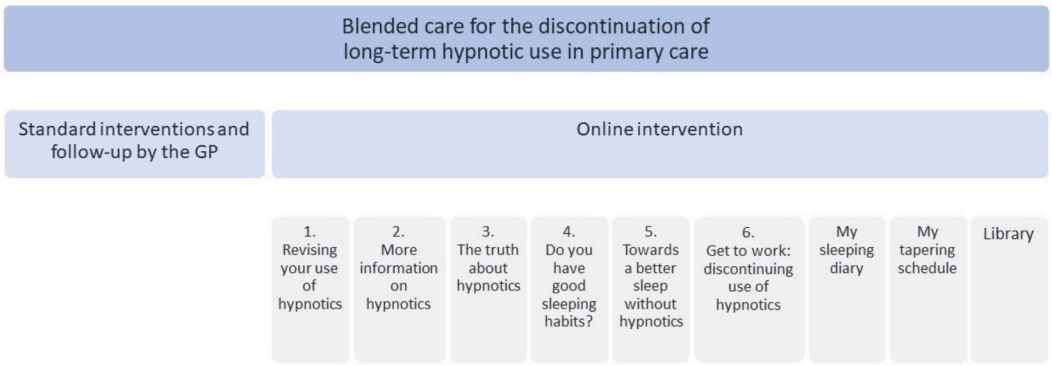

Fig. A1. Schematic overview of the blended care intervention that was available to the intervention group for. The cluster randomised controlled trial was a pragmatic trial, with no guidelines for the physician nor the patient on the use of the online intervention.

Cluster randomised controlled trial on the effectiveness of blended care for the discontinuation of long-term BZRA use for chronic insomnia disorder [46]

Eligibility

Adult patients, minimally 18 years old, who had been prescribed and using BZRA continuously (more than 80% of days) for more than 6 months as hypnotics, without any severe psychiatric or neurological comorbidities, or other contra-indications for discontinuation, were eligible for participation. Patients were also required to have access to the internet, and show a basic level of digital literacy, operationalized as "using e-mail, and using Google to perform a targeted information search". If they acknowledged having these skills, they were deemed fit for the trial. Substance use disorders, terminal illness, and not having their patient record – or Global Medical File – managed by the GP, as is common practice in Belgium, were reasons for exclusion. (p.3) [46]

Process evaluation [47]

Eligibility

The patient population was limited to the intervention group (N=456). Interviewees were purposively selected to obtain variation in age, sex, discontinuation status, and how intensely they had used the online intervention that was made available to them in the trial. (cf. *Recruitment and selection*)

Fig. A2. Overview of eligibility criteria

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