ADDICTION
SSA SOCIETY FOR THE STUDY OF ADDICTION
METHODS AND TECHNIQUES
doi:10.1111/add.13314

Iterative categorization (IC): a systematic technique for analysing qualitative data

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ABSTRACT

The processes of analysing qualitative data, particularly the stage between coding and publication, are often vague and/or poorly explained within addiction science and research more broadly. A simple but rigorous and transparent technique for analysing qualitative textual data, developed within the field of addiction, is described. The technique, iterative categorization (IC), is suitable for use with inductive and deductive codes and can support a range of common analytical approaches, e.g. thematic analysis, Framework, constant comparison, analytical induction, content analysis, conversational analysis, discourse analysis, interpretative phenomenological analysis and narrative analysis. Once the data have been coded, the only software required is a standard word processing package. Worked examples are provided.

Keywords Coding, inductive analysis, iterative categorization, qualitative data analysis, qualitative research, research methods.

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Submitted 11 September 2015; initial review completed 19 November 2015; final version accepted 20 January 2016

INTRODUCTION

The field of addiction has consistently provided qualitative researchers with a lucrative arena in which to apply and develop their methods [1]. Despite this, addiction science is dominated by biomedical and psychological approaches [2], with qualitative research accounting for a minority of addiction journal output (7% of papers published in top-ranked journals in 2009) [3]. In addition, the proportion of qualitative research published in any given addiction journal seems to be inversely proportional to that journal's Impact Factor (i.e. fewer papers in higher-ranked journals) [3]. Such findings suggest a problem with qualitative addiction publishing that has been linked to both the epistemology of qualitative methods (specifically, the lack of credibility afforded to interpretative approaches to knowledge) and addiction journal practices (inflexible policies on article structure and length and the use of reviewers without appropriate qualitative expertise) [3,4].

This paper describes a simple but rigorous and transparent technique for analysing qualitative textual data in order to achieve three aims: (i) to offer practical assistance to addiction researchers struggling to analyse their own qualitative data; (ii) to provide insights into qualitative data analysis that may increase its legitimacy within addiction science; and (iii) to assist those tasked with reviewing or making editorial decisions on qualitative journal submissions. While the paper is written primarily for those who are new to qualitative addiction research or who are mystified, sceptical or confused by the processes of qualitative data analysis, there is likely to be interest from qualitative researchers more generally. The technique, Iterative Categorization (IC), has not been published previously *sui generis*. None the less, it has been used to train new addiction researchers and to write many qualitative addiction papers, including two published in *Addiction* [5,6].

IC is not a stand-alone method of analysing qualitative data; it is rather a systematic technique for managing analysis that is compatible with, and can support, existing common analytical approaches, e.g. thematic analysis, Framework, constant comparison, analytical induction, content analysis, conversational analysis, discourse analysis, interpretative phenomenological analysis and narrative analysis. It achieves this by enabling researchers to code and analyse their data by topic, event, story, verbal interaction, signifier, feeling, idea, category, theme, concept or theory, etc. IC can be used with textual data that

have been coded deductively (based on the researcher's pre-existing hunches or theories about issues likely to be important within the data) and inductively (based on issues emerging as important from the data themselves). The value of IC is that it offers researchers a set of standardized procedures to guide them through analysis to publication, leaving a clear audit trail. The audit trail demonstrates how they have arrived at their findings, and provides a route back to the raw data for further clarifications, elaborations and confirming/disconfirming evidence.

WHY IS QUALITATIVE DATA ANALYSIS OFTEN POORLY EXPLAINED?

Textbooks and methodological papers describing qualitative methods report that qualitative data analysis is a 'highly personal activity', involving 'creativity' and 'inspiration' [7–9]. The analytical approach used within any study will relate to the research aim(s), nature and amount of data collected, time and resources available, and analytical skills, epistemological position and interests of the researcher [4,8,10]. There are no firm rules about the volume of data needed for meaningful interpretation [9]. Furthermore, there is no rigid separation between data collection and analysis, as early hunches and preliminary interpretations can be used to inform, adapt or revise later data-gathering [11]. In short, qualitative data analysis is less standardized than statistical analysis [9].

Recently, published qualitative studies have begun to include longer Methods sections. Despite this, the additional explanation provided focuses commonly upon how the data were coded and 'managed', not on the intellectual processes involved in 'generating findings' [8]. In fact, published accounts of qualitative data analysis are often limited to explaining that categories, themes and concepts were generated through iterative coding, with team members discussing and/or independently verifying the findings. Sometimes, relatively esoteric approaches to the analysis of a particular data set are described more fully, although these are not necessarily replicable in other studies. Increased transparency is to be welcomed and has probably been prompted by the emergence of checklists and guidelines for writing up qualitative research [e.g. Critical Appraisal Skills Programme (CASP) [12], Consolidated Criteria for Reporting Qualitative Research (COREQ) [13], Relevance, Appropriateness and Transparency (RATS) [14]]. None the less, the information provided in most published reports is still insufficient to guide novice qualitative researchers in undertaking their own analyses or to allay the fears of sceptical reviewers and readers who believe that qualitative findings are overly reliant upon intuition [9].

WHAT IS ALREADY KNOWN ABOUT QUALITATIVE DATA ANALYSIS

While qualitative data analysis is characterized by creativity and inspiration, it still needs to be systematic and rigorous [15]. Qualitative data (in the form of interview or focus group transcriptions, documentary materials, and fieldnotes) tend to be unstructured, so the researcher must begin by imposing some order on them [16]. To this end, any audio recordings should be transcribed, ideally verbatim and to a level of detail required by the particular project and method. For example, 'naturalized transcription' might be used to capture every utterance (including time gaps, drawn out syllables or emphasis) in discourse or conversation analysis while 'denaturalized transcription' (which focuses on informational content) might be preferable for thematic analysis, content analysis or Framework [17].

All transcriptions and other textual material should next be read and re-read to ensure familiarization with their content. An accepted analytical method (thematic analysis, Framework, constant comparison, analytical induction, content analysis, conversational analysis, discourse analysis, interpretative phenomenological analysis and narrative analysis, etc.) can then be deployed. Although there are differences between, and often within, these methods in terms of their purpose and even their philosophical, ontological and epistemological orientations, they tend to be underpinned by several common processes. These include: coding; identifying important phrases, patterns, and themes; isolating emergent patterns, commonalities and differences; explaining consistencies; and relating any consistencies to a formalized body of knowledge [18].

As indicated above, coding (also known as indexing) is the most clearly (and easily) explained of these core processes and is undertaken increasingly using software such as NVivo [19], MAXqda [20] or Atlas.ti. [21]. There are also basic coding programs that can be downloaded freely from the internet, such as QDA Miner Lite [22], CAT [23] or Aquad [24]. Coding involves reviewing all data line-by-line, identifying key issues or themes (codes) and then attaching segments of text (either original text or summarized notes) to those codes. New codes are added as additional themes or issues emerge in the data, often creating a hierarchical 'tree' of codes. Some authors recommend coding initially into multiple exploratory 'open' codes, then collapsing these into fewer more focused codes, and then merging the more focused codes into a small number of broader conceptual codes [25,26]. Others suggest beginning with broader descriptive codes and then breaking these down into smaller coding units to make comparisons across the data [27].

While coding involves a degree of conceptual thinking, the main analytical work occurs after coding and is executed less transparently using software. Indeed, it is at this

more analytical stage that the novice may become confused or the sceptic impatient. How, exactly, does one identify patterns, commonalities and differences in the coded data systematically and then begin to explain these? According to Miles & Huberman, analysis is underpinned by three concurrent activities: (i) data reduction (simplifying, abstracting and transforming raw data); (ii) data display (organizing the information by assembling it into matrices, graphs, networks or charts); and (iii) conclusion drawing/verification (interpreting the data and testing provisional conclusions for their plausibility) [18]. Ritchie & Lewis not dissimilarly refer to (i) 'charting' (creating charts by, for example, using code labels as column headings and case/participant identifiers as row headings so that participants' responses to every code can be summarized in matrix form) and (ii) 'mapping and interpreting the data' (looking for patterns, associations, concepts and explanations within the matrix) [8].

In practice, it can be helpful to simplify qualitative data analysis into just two core stages: (i) description and (ii) interpretation. Qualitative data first need to be described (the quasi-equivalent of running frequencies on quantitative data). This is because the researcher requires a basic understanding of the nature and range of topics and themes within the data before they can begin to interpret them—that is, look for patterns, categories or explanations and relate them to a broader body of knowledge (the quasi-equivalent of inferential statistics). Simplifying (or 'reducing') the raw data and then displaying them in matrices or charts (not dissimilar to a spread sheet) facilitates both description and interpretation by allowing the researcher to be systematic and comprehensive in comparing the data both across and within codes. This effectively permits them to explore similarities and differences between topics and themes and between cases/participants. Findings can then be related to published literature, theory, policies and practices.

ITERATIVE CATEGORIZATION

IC has its origins in a study of non-fatal overdose conducted by the current author in 1997–99 [28–31]. This involved 200 qualitative interviews transcribed verbatim ('denaturalized transcription') by professional transcribers plus observational data. Findings needed to be disseminated in a range of formats to different audiences, including policymakers, addiction service providers, police and opiate users. Data were being analysed using the Framework method and, to this end, the author was trialling a then relatively new qualitative software program (WinmaxPro, now MAXQDA). This program became an invaluable tool for organizing and sorting the data by both deductive and inductive codes, but offered little assistance with the main analytical work. After reflection, the author determined that the best strategy was to export the data for each code into its own Microsoft Word document and then review this line-by-line, summarizing and organizing the findings iteratively under emergent headings and subheadings.

Because each file of coded data was lengthy (including verbatim data extracts from up to 200 participants), the screen was split within Word so that the headings and subheadings at the top of the page and the raw coded data at the bottom of the page could be managed. As participants comprised distinct subgroups (those who had/had not overdosed, males/females, methadone patients/non-methadone patients, etc.), the summarized data were labelled under the new headings and subheadings so that it was easy to see who had made which comments. Because the author had conducted the interviews personally, listened to the interviews, coded the data and now summarized the findings, she felt confident in her ability to link the 'decontextualized' short summaries under each heading back to the original interviews and observations.

Over the years, the author has modified and adapted this technique in response to the demands of different addiction-related qualitative studies, with different aims and objectives, using different study designs and analytical approaches, and working alongside researchers from different disciplines and with different levels of qualitative research experience. In consequence, IC has its roots in pragmatism and other researchers are duly encouraged to select, adapt or develop aspects of the process according to what works best to improve understanding within any given study [32,33]. IC, however, assumes that: (i) the study for which the data are being analysed has clear aims and objectives (or an appropriate research question) and (ii) any interview or observation guides used for data generation were informed by both those aims/objectives and the relevant literature.

Recommended approach to coding

To facilitate clear progression from the study aims/objectives to the study conclusions, it is best if coding begins with deductive codes derived from any structured or semi-structured instruments used for data generation. This is because analysis and write-up of these deductive codes should feed back into the original study aim or question. Specifically, if one has taken the time to ask about a particular issue since it seemed important to the study aim, it is illogical to disregard that issue when coding the data prior to analysis. Deductive codes can then be supplemented by more inductive ('*in vivo*') codes derived more creatively from emergent topics in the data. Analysis of the inductive codes can be particularly valuable in complementing, expanding, qualifying or even contradicting the initial hypotheses or assumptions of the researcher.

In terms of whether it is preferable to move from focused codes to broad codes or from broad codes to more focused codes, IC favours a relatively uncomplicated coding process based on fairly substantive codes grouped under general headings. As above, these codes should resemble closely the topics and prompts used in any data collection instrument (and it can even be helpful to number the codes so that they are consistent with the data collection instrument) (Fig. 1 shows a very simple coding frame used in a study exploring the barriers injectors face when accessing treatment [34,35]). While this may seem prescriptive or basic, there are dangers in having an elaborate, unstructured coding tree, particularly if this involves a large number of very small codes. Most obviously, researchers can become confused and start to code inconsistently, so potentially undermining the integrity of their later analyses.

The researcher using IC is encouraged to think of coding primarily as a means of systematically ordering and sorting their data. As part of this process, each document to be coded needs a meaningful identifier. For example, a study involving interviews with people from three geographical locations: C, L and K might have files labelled C1; C2; C3; L1; L2: L3; K1; K2; K3, etc. where '1', '2', '3', etc. denote the participant number. If gender seems likely to be of analytical relevance, the file identifiers might also include 'f' denoting 'female' and 'm' denoting 'male'. If each participant was interviewed twice, identifiers might be extended further to include 'a' for first interview and 'b' for the second interview (e.g. C1fa, C1fb). Essentially, a creative but clear labelling system should be developed for each study. The researcher should next code the data comprehensively (i.e. so that no original data remain uncoded),

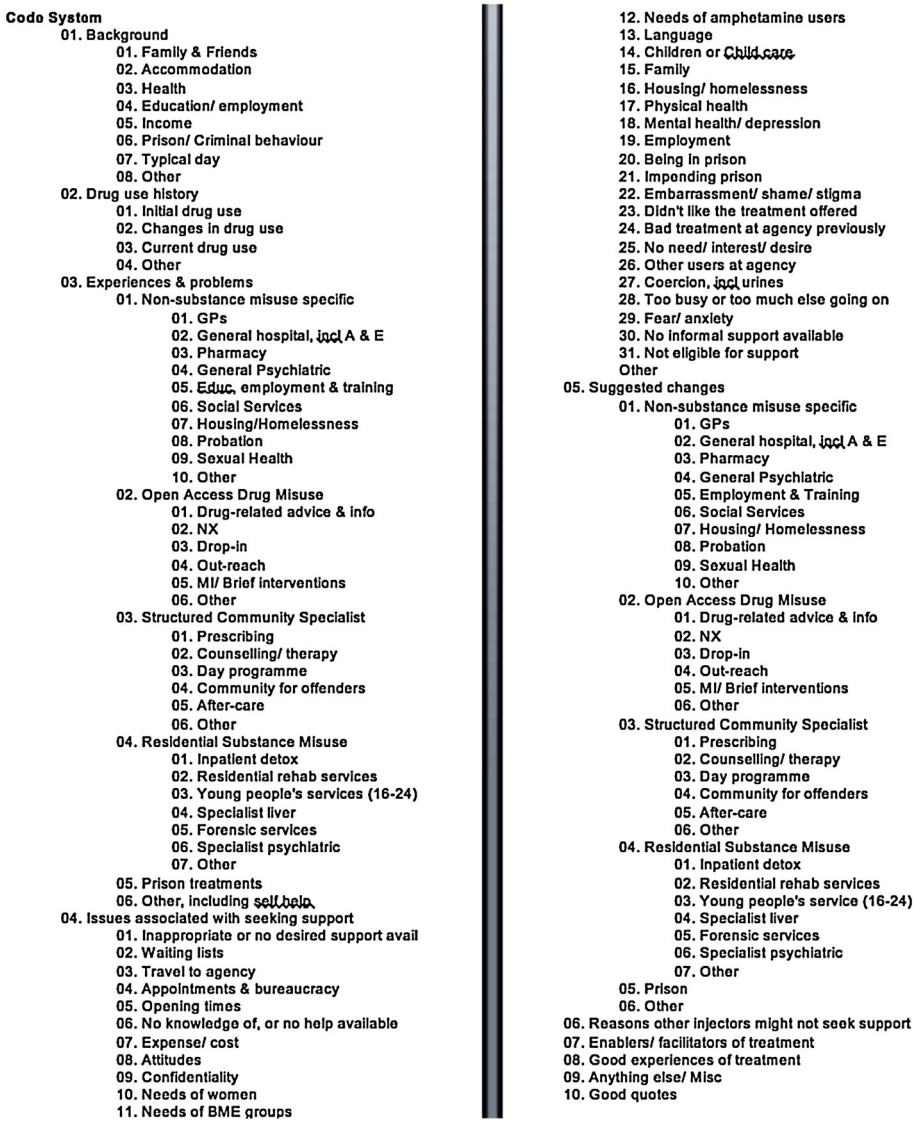


Figure 1 Basic coding frame

coding segments of text to multiple codes as appropriate (i.e. if a single statement contains information relevant to more than one code, then it should be coded to all relevant codes). Unless there are only limited data, this is accomplished most easily using specialist qualitative software.

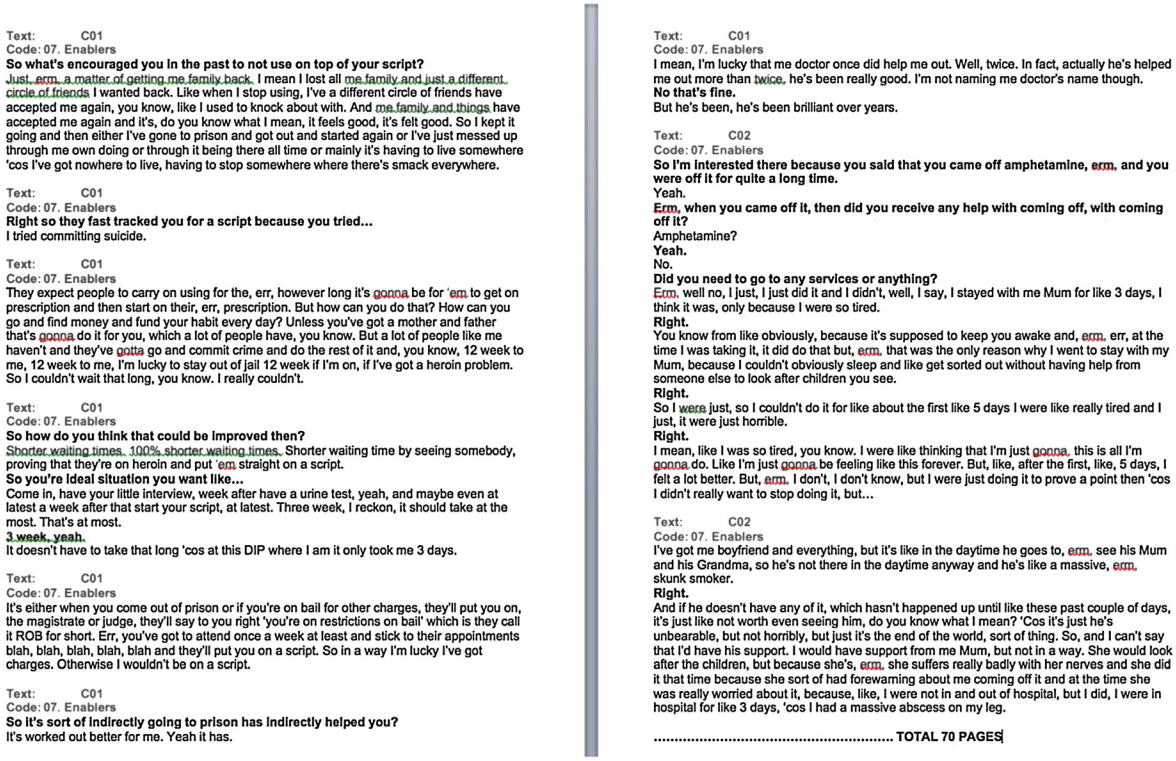
Preparing for analysis

A number of qualitative computer packages now have in-built features for creating matrices (or grids/charts) that facilitate both data reduction and data display. These matrices permit data to be summarized and then reviewed both across and within cases. It is also possible to create document 'attributes' so that data relating to participants with particular characteristics can be isolated and examined separately. Although helpful, the researcher still needs to scroll up and down or across the matrix (or export or print off the matrix or aspects of the matrix) in order to appreciate and then interpret what is going on within the whole dataset. Furthermore, the process of moving from the matrix to writing up the findings cannot be executed or explained by using the available specialist software alone. IC bridges this gap, demystifying the 'black box' of analysis without requiring the matrix function.

In IC, raw (unsummarized) data from the coding stage are exported from the qualitative software into a standard word processing package, such as Microsoft Word. Data from each exported code should be labelled as a 'coding' file (e.g. data from a code focusing on factors that facilitate or enable treatment entry might be labelled 'enablers coding') (Fig. 2). Because the raw data will have been coded into fairly broad codes, many of which will resemble topics or questions raised by the researcher at the data generation stage, these coding files will probably be long—potentially 100–200 pages. This is not, however, a problem; the length of the coding files simply reflects the fact that the data still retain valuable contextual material. In an ideal world, an electronic coding file would be created for every study code and then analysed sequentially. In the real world, the researcher may have a good sense of codes that contain data of limited interest and codes that contain very fertile data. In which case, prioritizing the coding files to be exported and analysed may be justified.

Descriptive analyses

Exported coding files should be duplicated with the duplicate file renamed as an analysis file, e.g. 'enablers analysis'. Each coding file should be stored electronically with its partner analysis file, but from this point the coding file will be a reference document only and the analyses will be undertaken using the analysis file. Each analysis file should next be skim-read, with the researcher spontaneously noting down topics and themes, perhaps also generating mind maps to show how issues seem to interconnect. This



Text: C01
Code: 07. Enablers
So what's encouraged you in the past to not use on top of your script?
Just, erm, a matter of getting me family back. I mean I lost all me family and just a different circle of friends I wanted back. Like when I stop using, I've a different circle of friends have accepted me again, you know, like I used to knock about with. And me family and things have accepted me again and it's, do you know what I mean, it feels good, it's felt good. So I kept it going and then either I've gone to prison and got out and started again or I've just messed up through me own doing or through it being there all time or mainly it's having to live somewhere 'cos I've got nowhere to live, having to stop somewhere where there's smack everywhere.

Text: C01
Code: 07. Enablers
Right so they fast tracked you for a script because you tried…
I tried committing suicide.

Text: C01
Code: 07. Enablers
They expect people to carry on using for the, err, however long it's gonna be for 'em to get on prescription and then start on their, err, prescription. But how can you do that? How can you go and find money and fund your habit every day? Unless you've got a mother and father that's gonna do it for you, which a lot of people have, you know. But a lot of people like me haven't and they've gotta go and commit crime and do the rest of it and, you know, 12 week to me, 12 week to me, I'm lucky to stay out of jail 12 week if I'm on, if I've got a heroin problem. So I couldn't wait that long, you know. I really couldn't.

Text: C01
Code: 07. Enablers
So how do you think that could be improved then?
Shorter waiting times. 100% shorter waiting times. Shorter waiting time by seeing somebody, proving that they're on heroin and put 'em straight on a script.
So you're ideal situation you want like…
Come in, have your little interview, week after have a urine test, yeah, and maybe even at latest a week after that start your script, at latest. Three week, I reckon, it should take at the most. That's at most.
3 week, yeah.
It doesn't have to take that long 'cos at this DIP where I am it only took me 3 days.

Text: C01
Code: 07. Enablers
It's either when you come out of prison or if you're on bail for other charges, they'll put you on, the magistrate or judge, they'll say to you right 'you're on restrictions on bail' which is they call it ROB for short. Err, you've got to attend once a week at least and stick to their appointments blah, blah, blah, blah, blah and they'll put you on a script. So in a way I'm lucky I've got charges. Otherwise I wouldn't be on a script.

Text: C01
Code: 07. Enablers
So it's sort of indirectly going to prison has indirectly helped you?
It's worked out better for me. Yeah it has.

Text: C01
Code: 07. Enablers
I mean, I'm lucky that me doctor once did help me out. Well, twice. In fact, actually he's helped me out more than twice, he's been really good. I'm not naming me doctor's name though.
No that's fine.
But he's been, he's been brilliant over years.

Text: C02
Code: 07. Enablers
So I'm interested there because you said that you came off amphetamine, erm, and you were off it for quite a long time.
Yeah.
Erm, when you came off it, then did you receive any help with coming off, with coming off it?
Amphetamine?
Yeah.
No.
Did you need to go to any services or anything?
Erm, well no, I just, I just did it and I didn't, well, I say, I stayed with me Mum for like 3 days, I think it was, only because I were so tired.
Right.
You know from like obviously, because it's supposed to keep you awake and, erm, err, at the time I was taking it, it did do that but, erm, that was the only reason why I went to stay with my Mum, because I couldn't obviously sleep and like get sorted out without having help from someone else to look after children you see.
Right.
So I were just, so I couldn't do it for like about the first like 5 days I were like really tired and I just, it were just horrible.
Right.
I mean, like I was so tired, you know. I were like thinking that I'm just gonna, this is all I'm gonna do. Like I'm just gonna be feeling like this forever. But, like, after the first, like, 5 days, I felt a lot better. But, erm, I don't, I don't know, but I were just doing it to prove a point then 'cos I didn't really want to stop doing it, but…

Text: C02
Code: 07. Enablers
I've got me boyfriend and everything, but it's like in the daytime he goes to, erm, see his Mum and his Grandma, so he's not there in the daytime anyway and he's like a massive, erm, skunk smoker.
Right.
And if he doesn't have any of it, which hasn't happened up until like these past couple of days, it's just like not worth even seeing him, do you know what I mean? 'Cos it's just he's unbearable, but not horribly, but just it's the end of the world, sort of thing. So, and I can't say that I'd have his support. I would have support from me Mum, but not in a way. She would look after the children, but because she's, erm, she suffers really badly with her nerves and she did it that time because she sort of had forewarning about me coming off it and at the time she was really worried about it, because, like, I were not in and out of hospital, but I did, I were in hospital for like 3 days, 'cos I had a massive abscess on my leg.

…… TOTAL 70 PAGES

Figure 2 Extract of coded data

relatively creative process should assist the researcher in further prioritizing codes for analysis, identifying duplication, complementarity and contradiction between codes, and assessing the probable nature and range of findings. Notes and diagrams should then be set aside so that more systematic inductive line-by-line analyses can begin.

At this point, the first analysis file should be opened and the font and formatting edited so that as much text as possible can be read on a single computer screen: in this regard, it is best to convert the file to small fount with single line-spacing. The file should also be given a clear heading. The cursor can next be placed near the top of the page on the line after the heading and the return key pressed repeatedly so that there is approximately half a page of blank space between the heading and the coding extracts. The 'split screen' function should then be used just below the file heading, so that the top half of the screen is blank and the bottom half shows the file heading and coding extracts (Fig. 3).

The researcher can now read the first coding extract in the bottom of the screen and summarize the key points made in the top half. This might be one simple point or several points. Each point should be written on a new line with the identifier of the data source included in brackets at the end of each point (Fig. 4). The coded data extract that has been summarized at the top of the screen can now be deleted from the bottom of the screen and the researcher can move to the next coded extract repeating the process. When a point already noted in the top half of the screen recurs in another coding extract in the bottom half of the screen, the identifier of the second source can be added to the brackets, separated from the first source by a semi-colon. If there is a slight difference or subtle nuance that distinguishes the point made in the second

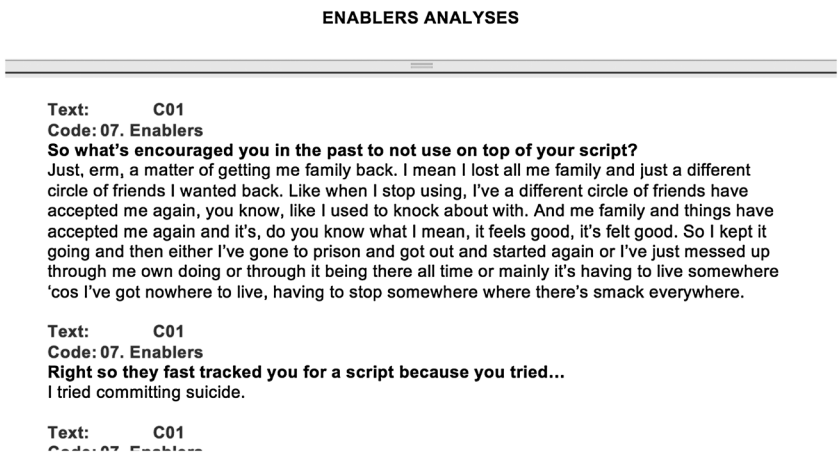


Figure 3 Split screen ready for analyses

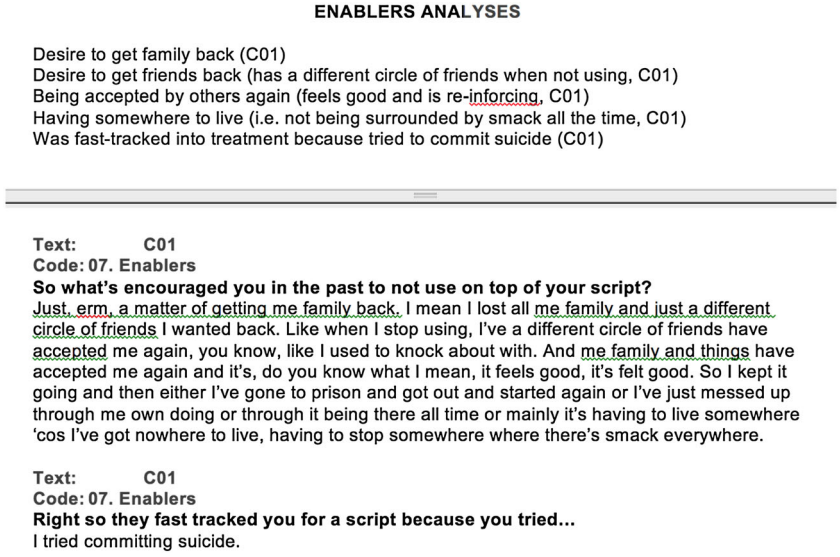


Figure 4 Initial line-by-line analyses

source from the first source, this can be included within the brackets after the semi-colon.

The researcher works their way down the coding extracts in the bottom half of the screen and deletes each extract once it has been summarized in the top half of the screen. After every 10–15 coding extracts have been summarized, the researcher should review and rationalize the list of points in the top half of the screen, grouping any similar points together. Before long, it will become evident that some points have been made by many participants and the qualifiers within the brackets will start to display complex commonalities and differences (Fig. 5). If, in undertaking this process, the researcher identifies any particularly apt quotations, these should be summarized like other coded data, but left in the bottom half of the screen rather than deleted. Once the researcher reaches the end of the coding extracts, all the data will have been systematically reduced with the qualifiers and identifiers within the brackets, providing a strong connection back to the original source (and context), and the quotations offering useful illustrative material.

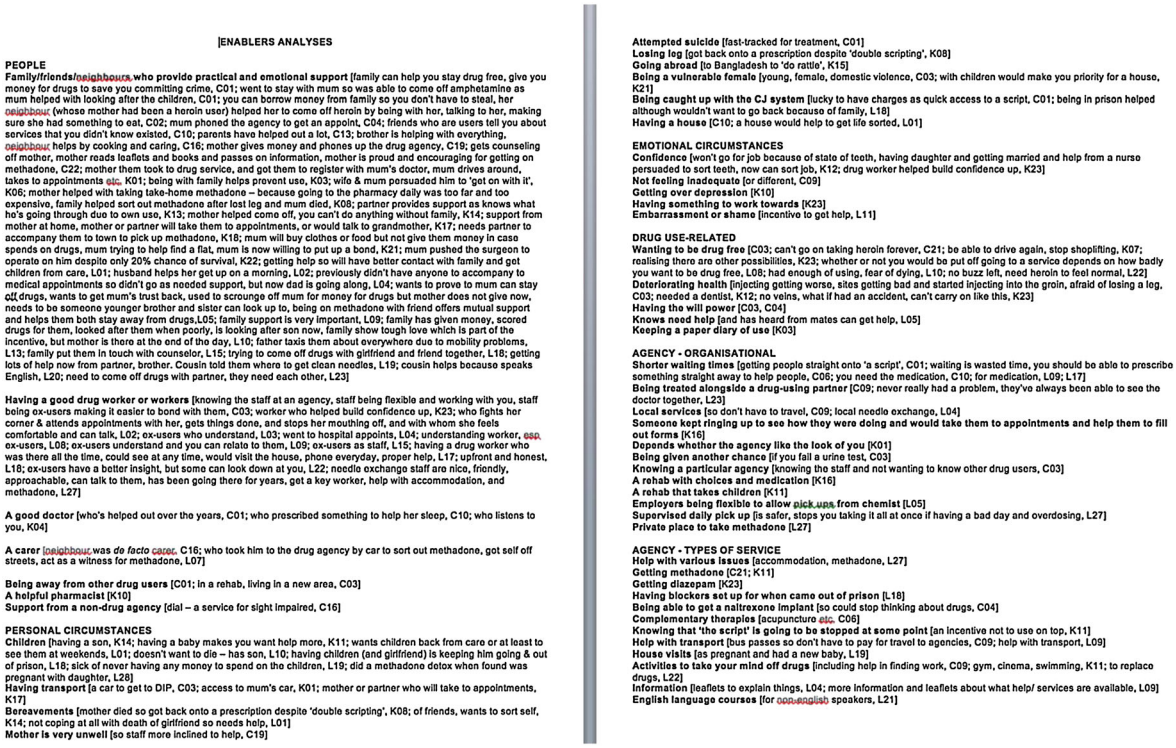
Next, the researcher should review, rationalize and re-group all the points one further time to ensure some logical order or emerging narrative—usually with the most often-discussed points at the top of the list and the least frequent or more unusual points at the bottom (Fig. 6; Supporting information, File S1, provides for a longer worked example). This can be a creative process, as the researcher may want to construct new headings or subheadings, potentially of a more abstract or conceptual nature. To complete the analysis file, the researcher should then summarize quickly and spontaneously initial thoughts on the findings in a few paragraphs of text at the top of the file or intersperse these between sections of the analysis (see Supporting information, File S2). As the process of writing while contemplating the meaning of a display of data can inspire further analyses [8,36], the researcher will now be suitably primed for more interpretive work.

ENABLERS ANALYSES

PEOPLE

Family/friends/neighbours who provide practical and emotional support
[family can help you stay drug free, give you money for drugs to save you committing crime, C01; went to stay with mum so was able to come off amphetamine as mum helped with looking after the children, C01; you can borrow money from family so you don't have to steal, her neighbour (whose mother had been a heroin user) helped her to come off heroin by being with her, talking to her, making sure she had something to eat, C02; mum phoned the agency to get an appoint, C04; friends who are users tell you about services that you didn't know existed, C10; parents have helped out a lot, C13; brother is helping with everything, neighbour helps by cooking and caring, C16; mother gives money and phones up the drug agency, C19; gets counseling off mother, mother reads leaflets and books and passes on information, mother is proud and encouraging for getting on methadone, C22; mother them took to drug service, and got them to register with mum's doctor, mum drives around, takes to appointments etc, K01; being with family helps prevent use, K03; wife & mum persuaded him to 'get on with it', K06; mother helped with taking take-home methadone – because going to the pharmacy daily was too far and too expensive, family helped sort out methadone after lost leg and mum died, K08; partner provides support as knows what he's going through due to own use, K13; mother helped come off, you can't do anything without family, K14; support from mother at home, mother or partner will take them to appointments, or would talk to grandmother, K17; needs partner to accompany them to town to pick up methadone, K18; mum will buy clothes or food but not give them money in case spends on drugs, mum trying to help find a flat, mum is now willing to put up a bond, K21; mum pushed the surgeon to operate on him despite only 20% chance of survival, K22; getting help so will have better contact with family and get children from care, L01; husband helps her get up on a morning, L02; previously didn't have anyone to accompany to medical appointments so didn't go as needed support, but now dad is going along, L04; wants to prove to mum can stay off drugs, wants to get mum's trust back, used to scrounge off mum for money for drugs but mother does not give now, needs to be someone younger brother and sister can look up to, being on methadone with friend offers mutual support and helps them both stay away from drugs,L05; family support is very important, L09; family has given money, scored drugs for them, looked after them when poorly, is looking after son now, family show tough love which is part of the incentive, but mother is there at the end of the day, L10; father taxis them about everywhere due to mobility problems, L13; family put them in touch with counselor, L15; trying to come off drugs with girlfriend and friend together, L18; getting lots of help now from partner, brother. Cousin told them where to get clean needles, L19; cousin helps because speaks English, L20; need to come off drugs with partner, they need each other, L23]

Figure 5 Example of analytical complexity



|ENABLERS ANALYSES

PEOPLE

Family/friends/neighbours who provide practical and emotional support [family can help you stay drug free, give you money for drugs to save you committing crime, C01; went to stay with mum so was able to come off amphetamine as mum helped with looking after the children, C01; you can borrow money from family so you don't have to steal, her neighbour (whose mother had been a heroin user) helped her to come off heroin by being with her, talking to her, making sure she had something to eat, C02; mum phoned the agency to get an appoint, C04; friends who are users tell you about services that you didn't know existed, C10; parents have helped out a lot, C13; brother is helping with everything, neighbour helps by cooking and caring, C16; mother gives money and phones up the drug agency, C19; gets counseling off mother, mother reads leaflets and books and passes on information, mother is proud and encouraging for getting on methadone, C22; mother them took to drug service, and got them to register with mum's doctor, mum drives around, takes to appointments etc, K01; being with family helps prevent use, K03; wife & mum persuaded him to 'get on with it', K06; mother helped with taking take-home methadone – because going to the pharmacy daily was too far and too expensive, family helped sort out methadone after lost leg and mum died, K08; partner provides support as knows what he's going through due to own use, K13; mother helped come off, you can't do anything without family, K14; support from mother at home, mother or partner will take them to appointments, or would talk to grandmother, K17; needs partner to accompany them to town to pick up methadone, K18; mum will buy clothes or food but not give them money in case spends on drugs, mum trying to help find a flat, mum is now willing to put up a bond, K21; mum pushed the surgeon to operate on him despite only 20% chance of survival, K22; getting help so will have better contact with family and get children from care, L01; husband helps her get up on a morning, L02; previously didn't have anyone to accompany to medical appointments so didn't go as needed support, but now dad is going along, L04; wants to prove to mum can stay off drugs, wants to get mum's trust back, used to scrounge off mum for money for drugs but mother does not give now, needs to be someone younger brother and sister can look up to, being on methadone with friend offers mutual support and helps them both stay away from drugs,L05; family support is very important, L09; family has given money, scored drugs for them, looked after them when poorly, is looking after son now, family show tough love which is part of the incentive, but mother is there at the end of the day, L10; father taxis them about everywhere due to mobility problems, L13; family put them in touch with counselor, L15; trying to come off drugs with girlfriend and friend together, L18; getting lots of help now from partner, brother. Cousin told them where to get clean needles, L19; cousin helps because speaks English, L20; need to come off drugs with partner, they need each other, L23]

Having a good drug worker or workers [knowing the staff at an agency, staff being flexible and working with you, staff being ex-users making it easier to bond with them, C03; worker who helped build confidence up, K23; who fights her corner & attends appointments with her, gets things done, and stops her mouthing off, and with whom she feels comfortable and can talk, L02; ex-users who understand, L03; went to hospital appoints, L04; understanding worker, esp. ex-users, L08; ex-users understand and you can relate to them, L09; ex-users as staff, L15; having a drug worker who was there all the time, could see at any time, would visit the house, phone everyday, proper help, L17; upfront and honest, L18; ex-users have a better insight, but some can look down at you, L22; needle exchange staff are nice, friendly, approachable, can talk to them, has been going there for years, get a key worker, help with accommodation, and methadone, L27]

A good doctor [who's helped out over the years, C01; who prescribed something to help her sleep, C10; who listens to you, K04]

A carer [neighbour was *de facto* carer, C16; who took him to the drug agency by car to sort out methadone, got self off streets, act as a witness for methadone, L07]

Being away from other drug users [C01; in a rehab, living in a new area, C03]
A helpful pharmacist [K10]
Support from a non-drug agency [dial – a service for sight impaired, C16]

PERSONAL CIRCUMSTANCES

Children [having a son, K14; having a baby makes you want help more, K11; wants children back from care or at least to see them at weekends, L01; doesn't want to die – has son, L10; having children (and girlfriend) is keeping him going & out of prison, L18; sick of never having any money to spend on the children, L19; did a methadone detox when found was pregnant with daughter, L28]
Having transport [a car to get to DIP, C03; access to mum's car, K01; mother or partner who will take to appointments, K17]
Bereavements [mother died so got back onto a prescription despite 'double scripting', K08; of friends, wants to sort self, K14; not coping at all with death of girlfriend so needs help, L01]
Mother is very unwell [so staff more inclined to help, C19]

Attempted suicide [fast-tracked for treatment, C01]
Losing leg [got back onto a prescription despite 'double scripting', K08]
Going abroad [to Bangladesh to 'do rattle', K15]
Being a vulnerable female [young, female, domestic violence, C03; with children would make you priority for a house, K21]
Being caught up with the CJ system [lucky to have charges as quick access to a script, C01; being in prison helped although wouldn't want to go back because of family, L18]
Having a house [C10; a house would help to get life sorted, L01]

EMOTIONAL CIRCUMSTANCES

Confidence [won't go for job because of state of teeth, having daughter and getting married and help from a nurse persuaded to sort teeth, now can sort job, K12; drug worker helped build confidence up, K23]
Not feeling inadequate [or different, C09]
Getting over depression [K10]
Having something to work towards [K23]
Embarrassment or shame [incentive to get help, L11]

DRUG USE-RELATED

Wanting to be drug free [C03; can't go on taking heroin forever, C21; be able to drive again, stop shoplifting, K07; realising there are other possibilities, K23; whether or not you would be put off going to a service depends on how badly you want to be drug free, L08; had enough of using, fear of dying, L10; no buzz left, need heroin to feel normal, L22]
Deteriorating health [injecting getting worse, sites getting bad and started injecting into the groin, afraid of losing a leg, C03; needed a dentist, K12; no veins, what if had an accident, can't carry on like this, K23]
Having the will power [C03, C04]
Knows need help [and has heard from mates can get help, L05]
Keeping a paper diary of use [K03]

AGENCY - ORGANISATIONAL

Shorter waiting times [getting people straight onto 'a script', C01; waiting is wasted time, you should be able to prescribe something straight away to help people, C06; you need the medication, C10; for medication, L09; L17]
Being treated alongside a drug-using partner [C09; never really had a problem, they've always been able to see the doctor together, L23]
Local services [so don't have to travel, C09; local needle exchange, L04]
Someone kept ringing up to see how they were doing and would take them to appointments and help them to fill out forms [K16]
Depends whether the agency like the look of you [K01]
Being given another chance [if you fail a urine test, C03]
Knowing a particular agency [knowing the staff and not wanting to know other drug users, C03]
A rehab with choices and medication [K16]
A rehab that takes children [K11]
Employers being flexible to allow pick ups from chemist [L05]
Supervised daily pick up [is safer, stops you taking it all at once if having a bad day and overdosing, L27]
Private place to take methadone [L27]

AGENCY - TYPES OF SERVICE

Help with various issues [accommodation, methadone, L27]
Getting methadone [C21; K11]
Getting diazepam [K23]
Having blockers set up for when came out of prison [L18]
Being able to get a naltrexone implant [so could stop thinking about drugs, C04]
Complementary therapies [acupuncture etc, C06]
Knowing that 'the script' is going to be stopped at some point [an incentive not to use on top, K11]
Help with transport [bus passes so don't have to pay for travel to agencies, C09; help with transport, L09]
House visits [as pregnant and had a new baby, L19]
Activities to take your mind off drugs [including help in finding work, C09; gym, cinema, swimming, K11; to replace drugs, L22]
Information [leaflets to explain things, L04; more information and leaflets about what help/ services are available, L09]
English language courses [for non-english speakers, L21]

Figure 6 Grouped and re-ordered analyses

Interpretive analyses

In the second stage of the analysis, the aim is to identify patterns, associations, concepts and explanations within the data and to ascertain how the findings complement or contradict previously published literature, theories, policies or practices. It is not always necessary, or indeed possible, to accomplish all these goals with every analysis file or in every study. For example, someone analysing data from a study that seeks to evaluate an intervention and has practitioners and commissioners as the intended audience may not need to engage with complex macro theories. Equally, a researcher working within one discipline may legitimately explore their findings in relation to other work within their own or a cognate discipline rather than unrelated disciplines. Thus, a sociologist may prefer to explore how their findings relate to some aspect of 'social' rather than 'psychological' theory. The key point is that the analyst must find a way of moving beyond a simple description of their own data so that their findings are transferable (i.e. have meaning) to other contexts [37].

To begin, each completed analysis file should be read and re-read. Specifically, the researcher needs to consider: (a) which points or issues or themes recur within (and potentially across) the analyses files; (b) whether and, if so, how these points or issues or themes can be categorized into higher order concepts, constructs or typologies beyond those already identified in the earlier descriptive stage; and (c) the extent to which points or issues or themes apply to pre-identified subsets of the data/study participants. Assuming the coded source documents had clear identifiers and the number of cases/participants is not too large, it should be easy to see (from the analysis file) whether one particular group of individuals (e.g. men or women) made the same point or points repeatedly or if particular points were relevant to just first or second interviews, etc. Care must, however, be taken not to over-quantify this process, as the aim is to look for clear patterns in the data, not statistical differences.

Similarly, the researcher can next test other more speculative hunches or theories they have about the data, including those based on their knowledge of the existing literature or policy or practice. They may also return to their notes and mind maps produced at the start of the descriptive stage for inspiration. For example, previous research might have suggested that a particular experience is common among injectors with resident children. If so, they can check which participants made the point in question and then back-check the characteristics of those participants using the original source documents or any participant attributes created in the qualitative software program at the coding stage. A researcher working within a particular theoretical tradition or branch of a discipline can also explore how their data are consistent with, add to, or contradict common assumptions in that field. Similarly, findings from a study of a particular intervention or service can be related to other similar interventions or services and thence to broader policymaking and service

commissioning processes to support, oppose or suggest changes to current practice.

All findings (positive or negative) should be written up more formally and saved as a separate summary file (Fig. 7; Supporting information, File S3). Alternatively, they can be added to the final analysis file and then saved as a separate summary file. The researcher can also include quotations in the summary file and use highlighting or other formatting to distinguish what participants actually reported from their own interpretations of the findings (Supporting information, File S4).

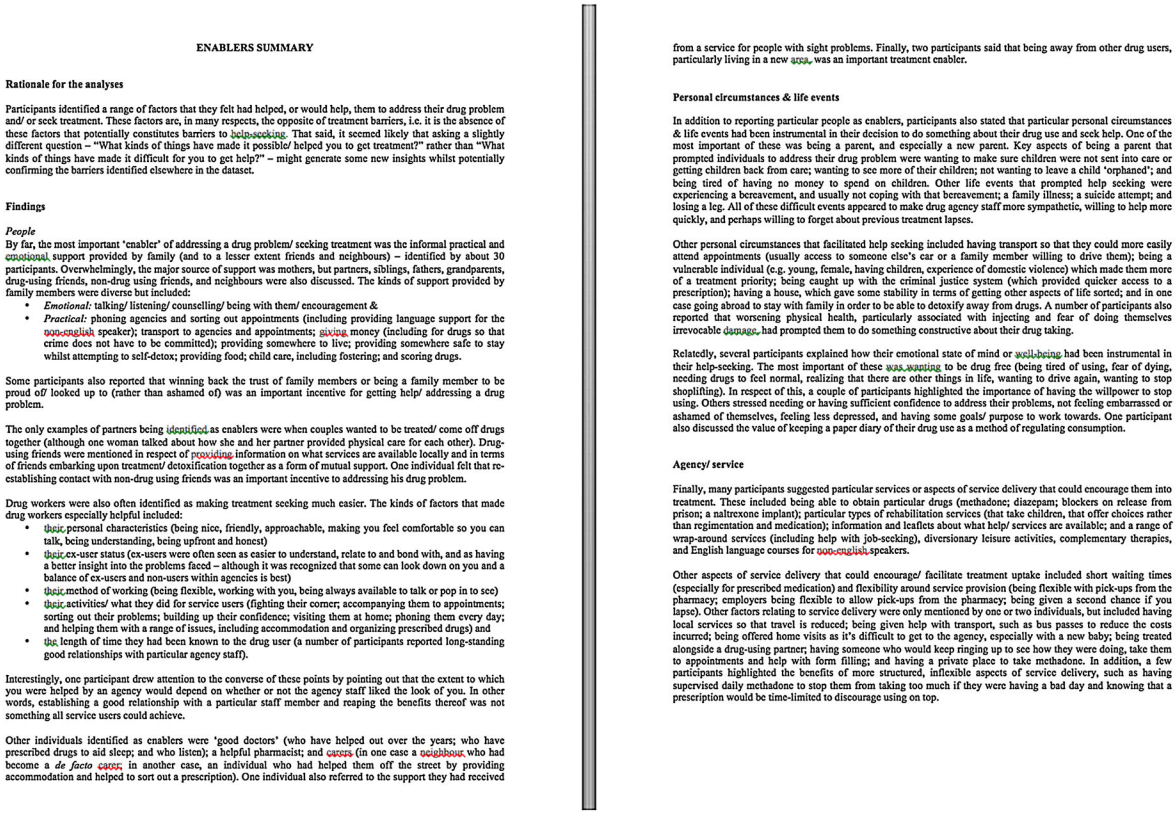
Writing up the findings

Summary documents can often be linked together to form the basis of a study report. This is because the analyses (if executed as suggested) should map back onto the codes, which should map back to any interview guide, which was devised with the original study aims and objectives in mind. Thus, there is a clear forward and backwards trajectory from the study starting point to its conclusion. Further, after completing the IC stages, the researcher will have a very good idea of which aspects of the data will make for interesting research papers and one or more analysis files can then be used to structure a journal article. For example, Figs 6 and 7 form the basis of Neale *et al.*, 2007 [34] and Supporting information, Files S1–S4 form the basis of Neale *et al.*, 2012 [5] and Neale & Strang, 2015 [6]. Using both the summary files and the more detailed analyses files, the researcher can thus write up themes, identify any new concepts or categories and document and endeavour to account for any patterns or associations in the data. Illustrative quotations can be selected from the analysis or summary document or the researcher can return to the earlier coding file for additional original text.

A further note on using computer software

In principle, the entire IC process could be carried out without using any specialist qualitative software. Microsoft Word, Excel and Access can, with time and patience, be used to code and analyse qualitative data [38]. Indeed, it is not so long since all qualitative data were coded and analysed by hand. Alternatively, it could be argued that it is preferable to execute all IC stages using a single specialist software program, as this would facilitate data management, reduce the chances of file corruption or human error when dealing with multiple files, support team working more effectively by providing simultaneous access to the data by multiple users, and retain a stronger link between summarized data and their source (context).

The degree to which a researcher engages with the latest software is, in practice, a matter of personal preference. Coding using specialist software tends to be much



ENABLERS SUMMARY

Rationale for the analyses

Participants identified a range of factors that they felt had helped, or would help, them to address their drug problem and/ or seek treatment. These factors are, in many respects, the opposite of treatment barriers, i.e. it is the absence of these factors that potentially constitutes barriers to help-seeking. That said, it seemed likely that asking a slightly different question – "What kinds of things have made it possible/ helped you to get treatment?" rather than "What kinds of things have made it difficult for you to get help?" – might generate some new insights whilst potentially confirming the barriers identified elsewhere in the dataset.

Findings

People

By far, the most important 'enabler' of addressing a drug problem/ seeking treatment was the informal practical and emotional support provided by family (and to a lesser extent friends and neighbours) – identified by about 30 participants. Overwhelmingly, the major source of support was mothers, but partners, siblings, fathers, grandparents, drug-using friends, non-drug using friends, and neighbours were also discussed. The kinds of support provided by family members were diverse but included:

- *Emotional:* talking/ listening/ counselling/ being with them/ encouragement &
- *Practical:* phoning agencies and sorting out appointments (including providing language support for the non-english speaker); transport to agencies and appointments; giving money (including for drugs so that crime does not have to be committed); providing somewhere to live; providing somewhere safe to stay whilst attempting to self-detox; providing food; child care, including fostering; and scoring drugs.

Some participants also reported that winning back the trust of family members or being a family member to be proud of/ looked up to (rather than ashamed of) was an important incentive for getting help/ addressing a drug problem.

The only examples of partners being identified as enablers were when couples wanted to be treated/ come off drugs together (although one woman talked about how she and her partner provided physical care for each other). Drug-using friends were mentioned in respect of providing information on what services are available locally and in terms of friends embarking upon treatment/ detoxification together as a form of mutual support. One individual felt that re-establishing contact with non-drug using friends was an important incentive to addressing his drug problem.

Drug workers were also often identified as making treatment seeking much easier. The kinds of factors that made drug workers especially helpful included:

- their personal characteristics (being nice, friendly, approachable, making you feel comfortable so you can talk, being understanding, being upfront and honest)
- their ex-user status (ex-users were often seen as easier to understand, relate to and bond with, and as having a better insight into the problems faced – although it was recognized that some can look down on you and a balance of ex-users and non-users within agencies is best)
- their method of working (being flexible, working with you, being always available to talk or pop in to see)
- their activities/ what they did for service users (fighting their corner; accompanying them to appointments; sorting out their problems; building up their confidence; visiting them at home; phoning them every day; and helping them with a range of issues, including accommodation and organizing prescribed drugs) and
- the length of time they had been known to the drug user (a number of participants reported long-standing good relationships with particular agency staff).

Interestingly, one participant drew attention to the converse of these points by pointing out that the extent to which you were helped by an agency would depend on whether or not the agency staff liked the look of you. In other words, establishing a good relationship with a particular staff member and reaping the benefits thereof was not something all service users could achieve.

Other individuals identified as enablers were 'good doctors' (who have helped out over the years; who have prescribed drugs to aid sleep; and who listen); a helpful pharmacist; and carers (in one case a neighbour who had become a *de facto* carer; in another case, an individual who had helped them off the street by providing accommodation and helped to sort out a prescription). One individual also referred to the support they had received from a service for people with sight problems. Finally, two participants said that being away from other drug users, particularly living in a new area, was an important treatment enabler.

Personal circumstances & life events

In addition to reporting particular people as enablers, participants also stated that particular personal circumstances & life events had been instrumental in their decision to do something about their drug use and seek help. One of the most important of these was being a parent, and especially a new parent. Key aspects of being a parent that prompted individuals to address their drug problem were wanting to make sure children were not sent into care or getting children back from care; wanting to see more of their children; not wanting to leave a child 'orphaned'; and being tired of having no money to spend on children. Other life events that prompted help seeking were experiencing a bereavement, and usually not coping with that bereavement; a family illness; a suicide attempt; and losing a leg. All of these difficult events appeared to make drug agency staff more sympathetic, willing to help more quickly, and perhaps willing to forget about previous treatment lapses.

Other personal circumstances that facilitated help seeking included having transport so that they could more easily attend appointments (usually access to someone else's car or a family member willing to drive them); being a vulnerable individual (e.g. young, female, having children, experience of domestic violence) which made them more of a treatment priority; being caught up with the criminal justice system (which provided quicker access to a prescription); having a house, which gave some stability in terms of getting other aspects of life sorted; and in one case going abroad to stay with family in order to be able to detoxify away from drugs. A number of participants also reported that worsening physical health, particularly associated with injecting and fear of doing themselves irrevocable damage, had prompted them to do something constructive about their drug taking.

Relatedly, several participants explained how their emotional state of mind or well-being had been instrumental in their help-seeking. The most important of these was wanting to be drug free (being tired of using, fear of dying, needing drugs to feel normal, realizing that there are other things in life, wanting to drive again, wanting to stop shoplifting). In respect of this, a couple of participants highlighted the importance of having the willpower to stop using. Others stressed needing or having sufficient confidence to address their problems, not feeling embarrassed or ashamed of themselves, feeling less depressed, and having some goals/ purpose to work towards. One participant also discussed the value of keeping a paper diary of their drug use as a method of regulating consumption.

Agency/ service

Finally, many participants suggested particular services or aspects of service delivery that could encourage them into treatment. These included being able to obtain particular drugs (methadone; diazepam; blockers on release from prison; a naltrexone implant); particular types of rehabilitation services (that take children, that offer choices rather than regimentation and medication); information and leaflets about what help/ services are available; and a range of wrap-around services (including help with job-seeking), diversionary leisure activities, complementary therapies, and English language courses for non-english speakers.

Other aspects of service delivery that could encourage/ facilitate treatment uptake included short waiting times (especially for prescribed medication) and flexibility around service provision (being flexible with pick-ups from the pharmacy; employers being flexible to allow pick-ups from the pharmacy; being given a second chance if you lapse). Other factors relating to service delivery were only mentioned by one or two individuals, but included having local services so that travel is reduced; being given help with transport, such as bus passes to reduce the costs incurred; being offered home visits as it's difficult to get to the agency, especially with a new baby; being treated alongside a drug-using partner; having someone who would keep ringing up to see how they were doing, take them to appointments and help with form filling; and having a private place to take methadone. In addition, a few participants highlighted the benefits of more structured, inflexible aspects of service delivery, such as having supervised daily methadone to stop them from taking too much if they were having a bad day and knowing that a prescription would be time-limited to discourage using on top.

Figure 7 Summarized analyses

quicker than by Word or hand. Meanwhile, Word files containing coded data are more portable and accessible than data coded in specialist software, and this can help to engage team members who may not use any qualitative software or who may prefer a different program. Equally, there are risks when team members analyse the same data file simultaneously in case they override each other; yet it is easy for them to each analyse a different Word file simultaneously. Lastly, specialist software may be able to link summarized data back to their source (context) with a single mouse click. However, the value of this facility actually depends upon the extent to which the analyst has intimate knowledge of the data and when, where, how and why they were generated. No computer program can substitute for this.

Strengths and weaknesses of IC

IC is a rigorous and transparent technique for managing the analysis of qualitative data. It is particularly suitable for novice qualitative researchers who may welcome a set of standardized steps to follow when trying to make sense of their data, but it can also reassure sceptical journal editors, reviewers or readers who question the rigour of qualitative analyses [9,39]. Furthermore, a lone researcher can use IC to demonstrate the validity and potential repeatability of their methods. IC is compatible with, and can support, most common analytical approaches, and is underpinned by concurrent data reduction, data display and conclusion-drawing/verification[18]. The technique generates a clear audit trail with the analyses always linked back to the raw data (so that the original words of the study participants are never lost) and projecting forwards (so that the findings move beyond simple local description demonstrating relevance to the wider world).

More negatively, IC is a time-consuming process, with a single code often taking many hours to analyse. That said, all qualitative analyses take time if executed thoroughly. Similarly, the quality of the analyses undertaken cannot be divorced from the skills and experience of the analyst, including the extent to which they understand the topic and relevant literature and have been involved in the study design and data generation. IC is intended for textual data (rather than images or film) and assumes that the study is guided by clear a clear aim and objectives or research question. As such, it is less suited to studies using a more unstructured approach, e.g. Grounded Theory. Ideally, all the data should have been generated and coded before the main analysis begins, although this is not essential. Experienced analysts may baulk at the degree of structure involved in IC, but they are not the primary intended audience. Furthermore, there is scope for creativity within the structure outlined, particularly at the interpretative stage.

In IC, data are coded typically using qualitative software and then the codings are exported into a word-processing package for line-by-line analysis. While continuing advances in qualitative software design may make the reliance or a word-processing package appear antiquated, this is offset by two factors: (i) understanding the core principles of rigorous analysis is a prerequisite to using any specialist software that merely facilitates the process; and (ii) IC is intended to be a pragmatic analytical technique and others are therefore at liberty to develop and adapt it for use within specialist software if they wish. Ultimately, however, the challenge is for qualitative software designers to develop an accessible program that enables researchers to progress more transparently through the black box that still separates their sophisticated online coding trees, grids and charted summaries from written publications.

Declaration of interests

J.N. is part-funded by the National Institute for Health Research (NIHR) Biomedical Research Centre for Mental Health at South London and Maudsley NHS Foundation Trust and King's College London. The views expressed are those of the author and not necessarily those of the NHS, the NIHR or the Department of Health.

Acknowledgement

Open access for this article was funded by King's College London.

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Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's web-site:

Supplementary File 1 Analyses from: Neale J., Strang J. Naloxone – does over-antagonism matter? Evidence of iatrogenic harm after emergency treatment of heroin/opioid overdose. *Addiction* 2015; 110, 1644-1652.
Supplementary File 2 Analyses from: Neale J., Nettleton S., Pickering L., Fischer J. Eating patterns amongst heroin users: a qualitative study with implications for nutritional interventions. *Addiction* 2012; 107: 635-41.
Supplementary File 3 Summary from: Neale J., Nettleton S., Pickering L., Fischer J. Eating patterns amongst heroin users: a qualitative study with implications for nutritional interventions. *Addiction* 2012; 107: 635-41.
Supplementary File 4 Summary from: Neale J., Strang J. Naloxone – does over-antagonism matter? Evidence of iatrogenic harm after emergency treatment of heroin/opioid overdose. *Addiction* 2015; 110, 1644-1652.

