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DOCUMENTING MATERNAL AND CHILDCARE INFORMATION OF MOTHERS PRESENTED TO SUBSTANCE USE TREATMENT SERVICES: A QUALITATIVE STUDY OF REPORTS IN A CLINICAL CASE REGISTER

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Abstract

Background: Mothers comprise a significant proportion of women in substance use treatment services. These women have needs that, if not addressed, can negatively impact their capacity to parent. This study explores the feasibility of using free-text notes from electronic health records (EHRs) to identify factors which impair mothers' ability to care for their children.

Method: Qualitative analysis of EHRs of 50 women attending substance use services in Southeast London who were parents of dependent children (defined as mothers of children aged <18 years independent of living together). A sampling stratification process was developed to ensure an adequate volume of data were available and analysed per case. Search terms were identified and tested. Data from clinical notes and letters of communication with other services/agencies (free-text notes) were extracted using the identified search terms and deductive thematic analysis was conducted.

Results: The mean number of documents per case was 92.17(SD = 18.51). Five themes with subthemes were identified: childcare arrangements, family context, safeguarding issues, factors that might impact the treatment plan and care of the child, and communication between the healthcare and child welfare systems.

Conclusion: The study demonstrates a novel approach for exploring parenting-related characteristics of mothers in substance use treatment. Despite a range of maternal and childcare related information available on EHRs, the type of treatment and support being offered to patients in response to the reported information is less well documented. Findings highlight the need for further investments in implementing effective family-centred strategies within substance use services.

Key words: mothers, substance use treatment, child welfare, electronic health records, free-text, qualitative analysis

1. Introduction

Substance misuse by parents is considered a significant risk to children's health, education, and social and biological development (Alati et al., 2013; Mirick & Steenrod 2016; Velleman & Templeton, 2018). It is also linked to general child maltreatment and neglect, often compounded by additional parental factors such as cycles of intoxication and withdrawal, socioeconomic difficulties, lack of appropriate parenting skills, and psychiatric comorbidities (Canfield et al., 2017; Kepple, 2018; Torrens et al., 2011). In the UK, approximately 162,000 children aged under 18 years live with a parent who is dependent on opiates and 200,000 live with a parent who is alcohol dependent (McGovern et al., 2018). While not all parents who use substances cause harm to their children, parental substance use is a common feature in care proceedings. Estimates in England and the USA show that parental substance misuse is present in about 50% of child protection cases (Public Health England, 2018; US Department of Health and Human Services, 2019). Mothers, as the primary caregivers, are more likely to be involved in child protective services (Children's Bureau, 2017) and to manage the effects of their substance use on their children (Syed et al., 2018).

Earlier studies demonstrate the importance of delivery of substance use treatment services in improving outcomes for families: including associations between substance use treatment engagement and children spending fewer days in foster care and increased likelihood of parental reunification (Green, Furrer, et al., 2007; Green, Rockhill, et al., 2007; Ryan et al., 2006). However, there are several factors that might create barriers to treatment delivery and engagement for mothers with substance use problems. Women in substance use treatment with children are more likely than women without children to present a history of domestic violence victimisation, psychiatric difficulties, and economic concerns (Canfield et al., 2021), all of which can negatively impact treatment engagement and outcomes. Other reported barriers include lack of childcare, fears of judgement from care providers and fear of loss of childcare and prosecution (Olsen, 2013; Radcliffe, 2011). As such, the need for integrated, multi-sectoral intervention services to support recovery and improve parenting capacity in mothers with substance use problems has been called for (Neo et al., 2021). However, the inconsistent collaboration and information

exchange across substance use and child welfare services means that services are repeatedly failing to recognise the needs of the mothers. This is evidenced by issues in social services detecting and assessing substance use problems (Galvani, Hutchinson & Dance, 2014; Traube et al., 2015) and substance use services' lack of understanding of the needs of mothers during different points of transition within the treatment continuum (e.g., from referral to treatment; He, 2017). There is an urgent need for solutions to such gaps in practice. These efforts can be facilitated by determining whether factors related to parenting are captured by substance use services. Understanding this could aid in the identification of potential barriers to and facilitators of family unification. This includes, for example, understanding if the mother's needs are being met and the extent to which substance use services and child welfare systems are developing interagency strategies to increase the chances of maternal substance use recovery and better child welfare.

1.1 Present study

To explore what information substance use services are recording about what impacts mothers' abilities to care for their children, we undertook a detailed investigation of unstructured clinical data ('free-text') from electronic health records (EHRs). Typically, studies analysing EHRs have relied on structured data ('coded data', e.g., test results and categorical information); however, clinical information is often missing from structured fields. Reasons for this include motivations around clinical uncertainty, stigma, loss of information between services, time pressures or poor clinician training in the coding structure (Ford et al., 2020). In our previous study exploring the characteristics of mothers receiving treatment for substance use in coded data from EHRs, approximately half of mothers of dependent children did not disclose childcare arrangements (e.g., children under the care of the mother/in alternative care) when an assessment of a range of childcare related factors was administered (Child and Needs Risk Form) (citation blinded for peer review). There is anecdotal evidence that women with dependent children might be more comfortable disclosing childcare related information to substance use service professionals during routine consultations rather than during a risk assessment.

Free-text notes from EHRs have the unique benefit of allowing researchers to explore case note communication between different healthcare practitioners and services (e.g., communication between substance use services, psychiatric services, and child protection services; Ford et al., 2019; Ståhl et al., 2013). However, given the rigid data governance applied to the use of such data for research purposes, analysing free-text notes from EHRs can be time consuming and difficult to navigate (Häyrinen et al., 2008; Jensen et al., 2012; Rajkomar et al., 2018). To our knowledge, this is the first study to conduct an in-depth investigation of free-text notes from EHRs of mothers attending substance using treatment services.

The objectives of this study were therefore to i) assess the feasibility of using free-text notes from EHRs to conduct a qualitative analysis of clinical records of mothers receiving substance use treatment and ii) identify what maternal related information and factors that might impair mothers' ability to care for their children was being documented by practitioners in clinical records.

2. METHOD

2.1 Setting

This study uses data from the South London and Maudsley NHS Foundation Trust (SLaM) Case Register. SLaM is one of the largest secondary mental health care providers in Europe covering a geographic catchment of 1.3 million residents in four South London boroughs. SLaM provides specialist addiction services within its catchment area. The Clinical Record Interactive Search (CRIS) integrates information across SLaM records, including clinical notes from the community-based drug assessment and structured treatment and residential treatment units. There is complete coverage from 2007, when all records became electronic (Perera et al., 2016). CRIS was approved as a dataset for secondary analysis by Oxfordshire Research Ethics Committee C (reference 08/H0606/71 + 5) and the CRIS oversight committee approved the current study (reference 19078). All quotes from patient records cited in this paper were reviewed by the CRIS Oversight Committee to ensure no identifiable information was included.

2.2 Sampling

Data from a sub-sample of 50 women from a larger cohort of 1292 women who were mothers of at least one dependent child (defined as mothers of children aged <18 years independent of living together) at the time of admission to substance use treatment were analysed (for further information about the large cohort see [citation blinded for peer review]). There is no information in the literature of a suitable sample size for the analysis of free-text notes in EHRs. However, previous research demonstrated that sample sizes of 20 to 40 interviews are adequate to reach data saturation in less homogeneous samples (Chilman et al., 2021; Hagaman & Wutich, 2017; O'Connor at al., 2020). In this regard, a sample size of 50 cases in this study would allow the exploration of detailed patterns and themes in the notes while considering possible heterogenic characteristics of the sample (e.g., type of substance use treatment being received, relationship status, family support). A sampling stratification process was developed based on a random selection and number of records per case to ensure an adequate volume of data were analysed per case. Specifically, the purpose of this sampling stratification approach was to 1) provide some diversity in terms of overall case notes, while still having enough data with which to draw conclusions and 2) make data handling more representative by not only selecting those cases with the most notes. Detailed information about the sampling stratification is described in Figure 1.

Insert Figure 1

2.3 Data Extraction and Analysis

Data extraction for each case began at their first attendance to substance use treatment recorded on the CRIS system and ended on 30 June 2021. Patient notes were accessed and read through the CRIS user interface. This included analysis of free-text notes, which recorded details of patients' contact with practitioners and letters and other documents (e.g., referrals to the multi-agency risk assessment conference, multi-agency public protection arrangements, or new referrals and plans for children's social care). Extracted sections of text relevant to the aims of the study were manually extracted and transferred into an Excel spreadsheet for analysis; all data remained within the SLaM secure IT environment. Data were extracted and analysed in two stages:

2.3.1 First Stage: Pilot Study

To understand the type of information available in free-text notes and the feasibility of being able to qualitatively analyse them, a pilot study with a subsample of 12 of the randomly selected 50 cases was conducted by authors AB and AN.

Initially, the two authors read and coded all free text notes for six of the twelve cases. This was done by taking an inductive approach. Codes were independently generated by the two authors with the goal of identifying types of information being recorded in EHRs, with a particular focus on reporting child and mother outcomes. After discussion, a preliminary coding framework emerged with 12 codes (see supplementary TS1) and common terms used to refer to information about children and childcare were identified (e.g., “daughter”, “neonatal”, “twins”, “adoption”; see supplementary material TS2 for the full list of terms identified). We chose to identify search terms due to many notes attached to each case being irrelevant to the aims of this study (e.g., practitioners’ reports of being unable to reach the patient via phone calls, missed appointments, etc.). In addition, we experienced technical issues accessing a large number of free-text notes within the CRIS interface and, thus, we wanted to explore an approach that could reduce time allocated to read and code each case without comprising the quality of the data. However, as the CRIS interface is often sensitive to search specifications, we iteratively worked to determine how many search terms could be entered before errors occurred. This led to seven search terms being applied to all remaining cases; terms were selected based on relevance and frequency of use (see supplementary material TS2). After term application, the average number of records per case read and coded decreased from 341.83 (*SD* = 71.33) to 92.17 (*SD* = 18.51). The time taken to code the data decreased from an average of 5.33 hours (*SD* = 1.40) to 2.08 hours (*SD* = 0.38) per case.

To ensure these search terms allowed for appropriate data saturation, we re-coded the six cases using the records available after limiting by the identified search terms. This allowed us to complete a sensitivity analysis to ascertain whether the volume of data and data from notes related to maternal care/issues remained similar after applying search terms.

Lastly, notes were extracted using the search terms for the remaining six cases and analysed through an open-coding process. This process allowed for exploring the richness of the data by assessing if there were sufficient data to be coded within each case using the preliminary coding framework. The process of coding here also allowed for organising data (e.g., reports of mother's non-adherence to treatment) into meaningful groups before further refinement.

2.3.2 Second Stage: Thematic Analysis

With the remaining 38 cases, we conducted a full deductive thematic analysis (Braun & Clarke, 2012). The pilot study provided the initial step of data familiarization. All notes were extracted using the search terms identified in phase two of the pilot study. First, as the initial coding framework identified was broad and not directed by any specific aims, we modified the preliminary codes to be guided by our primary research question: How are substance use services recording issues that might impact the mothers' ability to care for their children? These codes were agreed upon before analysis. This resulted in the generation of a codebook, which provided a standardised procedure and baseline for organising and analysing data. Next, we organised data into themes, which were iteratively checked and refined with the codes identified. In determining themes, we aimed to find a balance between theoretical concepts (e.g., known risk factors) and the details of what was being reported in the EHRs. This involved exploring connections between concepts across cases with the goal of documenting key themes and their related actions, origins, and consequences. Finally, we selected rich data extracts to illustrate each of the themes identified.

2.3.3 Quantitative Analysis

Throughout the pilot study and thematic analysis, we kept track of variables that would help us determine feasibility and usability of CRIS and EHRs: number of records, time to search CRIS for individual cases, and time to code each case. We also reported information on the sociodemographic, clinical, and childcare characteristics of the participants. This information was extracted from the larger cohort that this subsample was stratified from (for detailed information see citation blinded for peer review).

3. RESULTS

Sample characteristics from structured data in the EHRs are reported in Table 1. Overall, the sample was diverse and representative of key characteristics of substance use treatment services in SLaM including age ((M = 38.21, SD = 6.73), ethnicity (62.8%, White British) and type of substance used (28% opioids, 24% crack-cocaine, 40% alcohol dependence).

Insert Table 1

3.1 Pilot Study

The sensitivity analysis showed that of the 823 text extracts coded from the initial search, 170 (20.7%) were missing after application of search terms (median of 49 extracts missing per case). As our primary research question is about how EHRs are recording issues related to childcare and parenting (reflected in our search terms), we then assessed the amount of missing text extracts that had a direct reference to children (using related terms, e.g., son, daughter). Only 6.3% (56 of the 823 text extracts) of these extracts were missing (median of 8 missing per case). Thus, we concluded that our search terms exhibited sensitivity and could be applied to remaining cases.

From the analysis of the additional six cases, we identified that all cases had information in at least in nine of the 12 codes from the preliminary coding framework. This demonstrated that there were sufficient data in the notes to conduct an in-depth investigation of our primary research question. In addition, this process allowed for codebook refinement.

3.2 Deductive Thematic Analysis

Analysis of the remaining 38 cases yielded five themes with subthemes. These themes were 1) childcare arrangement, 2) family context, 3) safeguarding issues, 4) factors that might impact the treatment plan and care of the child, and 5) communication between the healthcare and child welfare systems. Every mother had information in all five themes. The content within each theme and how it was distributed across type of notes (e.g., case notes, review documents, letters of

communication) is presented below. Further description of the themes and subthemes with examples of quotes are presented in Table 2.

3.2.1 Theme 1: Childcare arrangements

Records from case notes demonstrated that mothers openly report to practitioners who looks after their children on a daily basis. A range of formal and informal arrangements were identified. For example, in cases where the mothers had the primary caregiver responsibilities, there were descriptions of whether she was a single mother or if she had a close relative (often the child's grandmothers or aunts helping with childcare). It was, however, less frequently reported who was looking after the child during the time mothers were attending substance use services. In cases where the child was removed from the care of the mother, there was information on the nature of removal (e.g., temporary or permanent removal) and the level of contact the mother had with the child. This information was updated from time to time indicating that practitioners were made aware of changes in childcare arrangements.

3.2.2 Theme 2: Family context

- *Relationship with parents*

The type of relationship mothers had with their own parents, especially with their mothers, was well documented. In some cases, the practitioners documented this relationship as a positive factor for the mother (e.g., grandmother is supportive and helps with childcare). This is less consistently documented as positive by the practitioners in cases of difficult family relationships. Here, the health professional tends only to document what the mothers says rather than describe their own interpretation of this relationship as a potential risk factor for the mothers' recovery, parenting style, and child outcomes.

- *Family background*

There was also a clear description in case notes of the mother's family background in terms of family history of substance use, poverty, and mental health difficulties.

- *Relationship with child's biological or non-biological father*

Patients explicitly reported the type of relationship they had with the biological/non-biological father of the child (i.e., both the biological father and the adoptive/acting father). The quality of this relationship varied significantly across patients – in some cases it was described as a positive factor and in other cases as a stressor or barrier.

- *Challenges around dependent children behaviour/development*

Mothers often reported the challenges they experienced around their children's emotional and behavioural development to practitioners. Specifically, they reported stressful factors such as the child's aggressive responses to the mother, arguments between siblings, and educational attainment.

- *Relationship with adult children*

Several mothers of dependent children also had older children aged 18 years or older. EHRs contained information about the type and quality of these relationships. When this was reported, it was often a description of this older child helping the mother in some chaotic situation, and a description of this child developing emotional and behaviour problems. Although mothers reported the challenges of dealing with adult children, practitioners did not consistently document this as a risk factor for the mother's recovery and/or safety of her other dependent children (younger than 18 years old).

3.2.3 Theme 3: Safeguarding issues

- *Neglect*

A range of safeguarding issues were reported in the case notes and letters of communication with social services. This included reports of when the children's needs were not being met, although the consistency and quality with which these issues were reported were low (e.g., healthcare professionals would add short speculatory notes that the child may be neglected but with little description of the area or severity of neglect).

- *Child's psychological functioning*

EHRs also contained information regarding the children's psychological functioning. Practitioners reported mothers trying to meet the daily caring needs of the children (e.g., taking the child to school, having a clean house, being present) but that mothers often did not fully understand the impact that their parenting style and drug use behaviour had on their children's mental health.

- *Impact of mother's psychological functioning*

Drug use comorbidity with other mental health disorders, in particular mood disorders (i.e., major depression, bipolar and anxiety) and psychotic symptoms were well documented. In some cases, the practitioners reported the impact of the mothers' mental health comorbidities on their ability to care for the child. Several mothers reported to practitioners that they developed depression after giving birth and that this likely contributed to continued substance use. This and other mental health concerns are evidenced by letters of communication between substance use treatment services and mental health services about referrals for psychological intervention. Records documented communication within mental health services about barriers and progressions in the mothers' treatment.

- *Substance use*

Practitioners' concerns about substance use exposure to the children were generally reported in two ways: 1) reporting situations of when the mother was intoxicated in the presence of the children; and 2) by consistently asking mothers to report how the substances (including opioid agonists medications) were stored in their house. Also recorded in case notes were the strategies undertaken by the mothers to use substances away from their children.

- *Intimate partner violence (IPV)*

Description of IPV victimisation experienced by the mothers was recorded across most cases. This involved reports of all types of violence (physical, emotional, sexual, and coercive control) either in past or current relationships. IPV victimisation from current partners appeared to be a key factor for removing the child from the care of the mother or to increase the children's length of stay in foster care. In cases where mothers terminated the relationship with the perpetrator, the child's safety had

generally improved. There were some reports of mothers being physically violent towards their partners.

- *Child being abused by others*

EHRs also contained reports of the children's experience of abuse by other adults, in particular daughters being sexually abused. These experiences were more often reported in appointment notes where mothers had disclosed to healthcare practitioners in conversation, rather than in correspondences between services. Such disclosures occurred more frequently with mothers who had children in alternative care. For example, there were some cases where the mother reported that the child was being cared for by her mother (the child's grandmother) and that the child was being sexually abused by a male family member or family friend.

3.2.4 Theme 4: Factors that impact the treatment plan and care of the child

- *Socioeconomic*

Records documented that many mothers were living in situations of social and economic instability, particularly with regard to housing, and that this posed an additional barrier to treatment and childcare. When this was disclosed, practitioners documented that they signposted patients to the welfare system. They also recorded helping mothers to complete assessments for universal credit (payment to help with living costs) support and provide letters to support applications for housing allowance.

- *Trauma*

Past/recent/on-going traumatic experiences such as mothers experiencing sexual and physical abuse by non/ex-partners, assaults, and threatened by drug dealers were well documented in cases notes. These traumatic experiences were often associated with a mental health crisis and substance use relapse. In cases of on-going traumatic experiences, practitioners often noted that they have advised the mother to contact the police. Also documented in case notes, were the mother's disclosures of the negative impact of having the child removed from their care. In these cases, the loss of a child was only documented as the mothers' own

justification for using drugs with no recorded documentation of how the practitioner dealt with this information.

- *Informal support*

EHRs also provided information on the types of informal support (or lack thereof) from friends, family, or others that might affect the ability to mothers to care for their chid(ren). In the case notes, this was often documented by mothers' reports about difficulties to attend appointments due to childcare responsibilities or the need to plan for childcare arrangements so they could attend inpatient rehabilitation programmes. However, such social support details were rarely reported in EHRs for mothers who had their children removed from their care. Across letters of communication between practitioners and social services, social support was noted only when this was a positive factor for the mother (e.g., when social services wanted to place children with family members).

- *Formal support*

EHRs showed that practitioners and social services communicated openly about the needs of mothers. Discussions about child safety was frequently reported by practitioners to social services; this was often recorded in the EHRs via emails and letters between services and notes regarding team meetings. There were some records documenting that practitioners had discussed and/or referred mothers to additional support services that could assist them in addressing issues that might impact the care of their children and treatment outcomes including, for example, supports related to temporary care assistance for a child with developmental delays/behaviour problems, supports related to surviving IPV and sexual and reproductive health. It was less documented however, whether the mothers had indeed attended and received support from these suggested services. There were also inconsistencies in reports about how practitioners addressed queries related to pregnancy. There were some cases where mothers explicitly reported their willingness to have another child and sought information from practitioners about being pregnant during treatment, especially those receiving opioid agonist therapy. Records documented that practitioners had advised the patients who they should speak with, including specialist midwifes, when pregnancy was confirmed. However,

it was not possible to conclude if practitioners communicated with these professionals and details of how the substance use treatment was planned according to pregnancy status were rarely reported. Generally, the EHRs showed documentation of when practitioners been made aware of the outcome of the pregnancy as well as details of neonatal abstinence syndrome and if the infant was removed from the care of the mother.

- *Experience and views of social services involvement*

Practitioners were made aware of mothers' experiences in working with and/or the mothers' views of social services. Information highlighted the negative perceptions mothers have of social services including hostile opinions, feelings of fear, and views that social services are not there to help them. Practitioners challenging the mothers' negative views of and issues with social services were not often reported, nor was the emphasis of the importance of collaboration between services (e.g., explaining to mothers why they would need to share information with social services and how this could be beneficial to them and their children).

3.2.5 Theme 5: Communication between healthcare and child protection systems

Records demonstrated that practitioners were informed when a Child Protection Plan was opened and under which category (physical harm, emotional harm, sexual abuse or neglect). The child protection system frequently contacted practitioners to request updates about the mother's treatment progression. These updates were informed either by emails and/or practitioners attending Child Conference's meetings.

- *Lack of adherence to treatment plan*

Example of information exchanged across systems involved description of mothers attending or missing appointments as well as relapse (reuse of a substance after an attempt to stop or period of abstinence). In cases of relapse, the practitioners reported the reason given by the mother about the situation that led her to relapse and often the quantity of the substance used. There was also often discussion surrounding alternative care arrangements and the mother's preferences for this

(e.g., preference for her children to live with her sister rather than an unknown foster parent).

- *Progression*

Cross-service communication records contained descriptions of treatment plans/outcomes, mental health improvement/deterioration, and general functioning and wellbeing. It was evident from letters of communication that in cases where mothers were progressing well towards recovery, but had isolated relapse(s), practitioners asked the child protection social workers to consider the overall progress that the mothers achieved so far, advocating on the mother's behalf.

- *Childcare concern*

In cases where the practitioners were made aware of situations that might impact child safety, they had openly informed the child protection system about it. Alongside this communication, the mothers' reactions were also reported (e.g., some mothers asked for substance use services not to tell social services about non-adherence and child safeguarding issues, in few cases threatening to run off with the child).

- *Care plans for children*

Lastly, practitioners were always informed by the childcare system about the outcome of the care proceeding. However, the time between the decision regarding childcare being made and when other services were informed of this outcome was sometimes unclear.

4. Discussion

To the best of our knowledge, this is the first study to use EHRs to investigate what maternal information and factors that might impact mothers' ability to care for their children are being documented in clinical records by practitioners. The study demonstrates the methodological approach to, and the feasibility of, identifying this information using free-text notes from a large-scale clinical register (CRIS) of mothers attending treatment for substance use problems in South London, England. This was confirmed by the adequate quantity and quality of data available through the process, which was illustrated by: i) a diverse and representative sample of

mothers in substance use services generated by the sampling process; ii) the low number of missing codes identified after search terms were applied; and iii) the fact that there was sufficient data that could be deductively coded in each case.

Regarding our second objective, documented information in patients' notes demonstrates that practitioners in substance use treatment services are presented with a range of information relating to how difficulties build up or change over time in these women's lives. Less documented however, is what kind of treatment and support is being offered to patients in response to the information that is presented to them. Putting together these findings and the evidence of challenges in the practice of engaging with mothers with substance use problems at different stages of need (Barnett et al., 2021; Cook et al., 2017; Radiclife et al., 2019) a key message is that it remains unclear how family-centered strategies are translated into practice across substance use services.

4.1 Study implications

The five themes identified builds on existing research that shows that substance use is not an isolated problem in these women's lives (Canfield et al., 2017) and echo the range of challenges expressed in qualitative interviews by mothers with substance use problems about the barriers for substance use treatment engagement and views of the child welfare system (Howard & Colvin, 2021; Ostrach & Leiner, 2018; Virokannas et al., 2011). These include the difficulty for these women to deal with repeated incidences of trauma (e.g., experiencing intimate partner violence, experiencing sexual abuse and physical violence) experienced over the course of their own childhood and adulthood, and the challenges they experience to break the intergenerational transmission of violence to their offspring. Improving maternal and childcare outcomes for women in substance use services involves understanding the historic adversity and external stressors of this population.

It is imperative, however, that practitioners go beyond simply identifying problems - mothers must have their difficulties recognised and their need for help endorsed by substance use services. Given the interplay between the complex range of individual and family difficulties mothers contend with, and the myriad of social, health, educational and welfare systems they have to navigate to gain the support they

need, services must collaborate and develop interagency strategies to ensure that these mothers receive the services as intended. Achieving this goal requires efforts that exceed the practice of information sharing that can be facilitated by encouraging shared funding resources between agencies (He, 2017; Horwath & Morrison, 2007) and by developing joint committees that would ensure that mothers' different needs are met within different points of the substance use treatment pathway (from referral to treatment entry and to treatment completion; Belenko et al., 2017; Children and Family Futures, 2022; He, 2017). The implementation of evaluative frameworks could assist these joint committees in determining, for example, when substance use services should address mental health problems, prioritise socioeconomic support, refer to parenting workshops and provide childcare support. Additionally, given that parents who enter substance use services during care proceedings require more monitoring than those typically provided to care proceeding's parents without substance use problems, plans for frequent contact and oversight the mothers must be prioritised (Children and Family Futures, 2022). This would ensure that possible barriers for mothers to engage in treatment are acknowledged by all services involved and, if their treatment plan needs to be adjusted, appropriate changes would be made quickly enough to sustain their motivation to receive treatment (Children and Family Futures, 2022).

Our findings illustrate the value of using free-text notes from EHRs to explore maternal characteristics. Typically, studies in this area have relied on qualitative interviews. However, this approach can often be problematic given the ethical and methodological challenges of conducting research with vulnerable and 'hard to reach' populations (Nordentoft & Kappel, 2011). This may be due to a variety of reasons including, for example, stigma associated with substance use, fear of losing care of their child, and mistrust of the research process and of researchers (Mirick, 2016; Radcliffe et al., 2020). Free-text notes from EHRs provides a complementary approach to understanding the needs and experiences of the women in different stages of their lives including before and during treatment for substance use as well as after involvement in care proceedings. However, more information about the process of accessing, analysing, and reporting this type of data needs to be available for researchers. Presently, the STROBE (von Elm et al., 2007) and RECORD (Benchimol et al., 2015) reporting guidelines for observational studies

using EHRs does not provide guidance on in-depth qualitative analysis of free-text notes from EHRs. A framework to guide this type of work is needed to improve the transparency, reproducibility and interpretation of studies.

Findings also highlight that key data about maternal and childcare characteristics of women attending substance use services are largely narrative in nature. This type of data is of great value for both research and treatment planning as it captures much variability between patients. However, clinical text records present several nuances, especially case notes. These notes are not written with the intention that other people will read them in detail and thus, they can be hastily written using informal language and with practitioners' own words to describe a problem (Carrol et al., 2012; Ford et al., 2016). It might be that if practitioners were aware that their notes were going to be read and treatment plans developed on the basis of their notes, they may be inclined to provide more detailed and in-depth accounts of mothers' reports. A fruitful line of further research would be to explore practitioners' views of writing up notes. Obtaining information on their expectations and intentions in this process would enrich understanding of how to interpret the notes.

Lastly, this study provides a foundational corpus of terms and concepts from which Natural Language Processing (NLP) applications could help address the exigencies of quantifying key information about maternal and childcare characteristics within EHR. NLP applications may help structure and organise the free-text entities/ concepts within the EHRs, to not only better characterise the complex array of difficulties captured in narrative form, but also to potentially support methods that anticipate a range of future positive or adverse events (Kraljevic et al., 2021).

4.2 Strengths and limitations

This study identified a range of information about maternal and childcare data in free-text notes. We developed a structured criteria for selecting the sample to decrease the risk of bias in our findings. However, in the first stage of data stratification, case selection was biased towards individuals with a higher volume of clinical records, which might have resulted in the selection of more complex cases with longer duration in substance use services. Thus, the findings here are unlikely to reflect the experiences of mothers with straightforward cases and short term service use. Presently, there is no consensus in the literature of what is "good

enough" for case selection in EHRs (Ford et al., 2016), nor is there consensus on the best approach to extract free-text data from these cases. Prior to our study, little understanding of how much information, and what type, was contained about mothers within unstructured sections of clinical records in substance use services was known. We developed and tested an approach to manage and analyse the high volume of data available, which involved a range of clinical notes and letters of communication with other services/agencies. This approached allowed for a deeper dive investigation into issues mothers faced before and during the time of their substance use treatment.

We were able to estimate through sensitivity analysis that the use of search terms had a small impact on the volume of relevant maternal and childcare information included in free-text notes. This reassured us that search terms applied were an adequate and pragmatic approach to extracting information. However, we are aware that the use of search terms might have impacted full data saturation. We also had to reduce the number of search terms identified due to technological limitations with CRIS's online platform for accessing data (i.e., discovering the limit of seven search terms before errors occurred).

There are some other limitations with the CRIS interface as a platform for qualitative research including the lack of tools for analysis of text and multiples errors in processing long queries. This impacted the time needed to undertake this work and the number of cases selected for the feasibility study. A larger sample size in the pilot phase would have given a greater comparison for the sensitivity analysis. Work is needed to improve text analytic technologies in CRIS.

It is also important to acknowledge that most of the information documented are reflections of the practitioners' interpretation of mothers' reports. Mothers might limit the information they share with professionals because of concerns about child safeguarding. It is also not possible to conclude that absence of information in the notes indicates that certain conversations between practitioners and mothers are not happening. Another potential limitation refers to the generalisability of the findings. The study drew the sample from a population attending substance use services in South London. Reports and responses to mothers' needs may be different in other

locations in England, especially in those areas covered by the Family Drug and Alcohol Court (FDAC) – a model that has provided evidence on supporting family reunification and improving maternal outcomes for mothers with substance use problems through addressing their multiple needs (Harwin et al., 2018).

4.3 Conclusion

Our study demonstrates a novel approach for exploring factors that might impact the ability of mothers attending substance use treatment to care for their children. Findings highlight that although there is a range of information being documented by practitioners in patients' clinical records, it remains unclear what kind of treatment and care is being offered to mothers in response to the information presented. This evidence supports the need for further investments in implementing effective family-centered strategies within substance use services.

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7. References

Aitken, M., de St Jorre, J., Pagliari, C., Jepson, R., & Cunningham-Burley, S. (2016). Public responses to the sharing and linkage of health data for research purposes: a systematic review and thematic synthesis of qualitative studies. *BMC Medical Ethics*, *17*(1), 73.

Alati, R., Davey Smith, G., Lewis, S. J., Sayal, K., Draper, E. S., Golding, J., Fraser, R., & Gray, R. (2013). Effect of Prenatal Alcohol Exposure on Childhood Academic Outcomes: Contrasting Maternal and Paternal Associations in the ALSPAC Study. *PLOS ONE*, *8*(10), e74844.

Belenko, S., Knight, D., Wasserman, G. A., Dennis, M. L., Wiley, T., Taxman, F. S., ... Sales, J. (2017). The Juvenile Justice Behavioral Health Services Cascade: A new framework for measuring unmet substance use treatment services needs among adolescent of- fenders. *Journal of Substance Abuse Treatment*, *74,* 80–91.

Benchimol, E.L., Smeeth, L., Guttmann, A., et al (2015). The REporting of studies Conducted using Observational Routinely-collected health Data (RECORD) Statement. PloS Medicine, 12, e1001885.

Brandon, M., Sidebotham, P., Bailey, S., Belderson, P., Hawley, C., Ellis, C., & Megson, M. (2012). New learning from serious case reviews: a two year report for 2009-2011. *Department for Education*, *63*.

Braun, V., & Clarke, V. (2012). Thematic analysis. In *APA handbook of research methods in psychology, Vol 2: Research designs: Quantitative, qualitative, neuropsychological, and biological.* (pp. 57-71). American Psychological Association.

Canfield, M., Radcliffe, P., Marlow, S., Boreham, M., & Gilchrist, G. (2017). Maternal substance use and child protection: a rapid evidence assessment of factors associated with loss of child care. *Child Abuse & Neglect*, *70*, 11-27.

Canfield, M., Norton, S., Downs, J., & Gilchrist, G. (2021). Parental status and characteristics of women in substance use treatment services: analysis of electronic patient's records. Journal of Substance Abuse and Treatment, https://doi.org/10.1016/j.jsat.2021.108365.

Carroll, J., Koeling, R., & Puri S. (2012) Lexical acquisition for clinical text mining using distributional similarity. In Alexander Gelbukh (ed.) *Computational Linguistics and Intelligent Text Processing, Springer Lecture Notes in Computer Science, Volume 7182*, 232-246.

Children and Family Future (2022). Comprehensive framework to improve outcomes for families affected by substance use disorders and child welfare involvement. Retrieved from https://www.cffutures.org/files/CFFComprehensiveFramework.pdf

Chilman N, Song X, Roberts A*, et al*. (2021). Text mining occupations from the mental health electronic health record: a natural language processing approach using records from the Clinical Record Interactive Search (CRIS) platform in south London, UK. *BMJ Open* 2021;**11:**e042274.

Choi, S., & Ryan, J. P. (2007). Co-occurring problems for substance abusing mothers in child welfare: Matching services to improve family reunification. *Children and Youth Services Review*, *29*(11), 1395-1410.

Cook, J. L., Green, C. R., de la Ronde, S., Dell, C. A., Graves, L., Ordean, A., ... Wong, S. (2017). Epidemiology and effects of substance use in pregnancy. *Journal of Obstetrics and Gynaecology Canada, 39*(10), 906–915.

Cowie, M. R., Blomster, J. I., Curtis, L. H., Duclaux, S., Ford, I., Fritz, F., Goldman, S., Janmohamed, S., Kreuzer, J., Leenay, M., Michel, A., Ong, S., Pell, J. P., Southworth, M. R., Stough, W. G., Thoenes, M., Zannad, F., & Zalewski, A. (2017). Electronic health records to facilitate clinical research. *Clinical Research in Cardiology*, *106*(1), 1-9.

Dawe S., & McMahon TJ. (2018). Innovations in the assessment and treatment of families with parental substance misuse: Implications for child protection. Child Abuse Review 27(4): 261–265.

Ford, E., Carroll, J.A., Smith, H.E., Scott, D., Cassell, J.A. (2016). Extracting information from the text of electronic medical records to improve case detection: a systematic review, *Journal of the American Medical Informatics Association*, 23,(5), 1007–1015

Ford, E., Oswald, M., Hassan, L., Bozentko, K., Nenadic, G., & Cassell, J. (2020). Should free-text data in electronic medical records be shared for research? A citizens' jury study in the UK. *Journal of medical ethics*, *46*(6), 367-377.

Forrester, D. (2000). Parental substance misuse and child protection in a British sample. A survey of children on the child protection register in an inner London district office. *Child Abuse Review*, *9*(4), 235-246.

Forrester, D., & Harwin, J. (2007). Parental Substance Misuse and Child Welfare: Outcomes for Children Two Years after Referral. *The British Journal of Social Work*, *38*(8), 1518-1535.

Galvani, S., Hutchinson, A., & Dance C. (2014) Identifying and assessing substance use: Findings from a national servey of social work and social care professionals. British Journal of Social Work, 44;. 1895-1913

Green, B. L., Furrer, C., Worcel, S., Burrus, S., & Finigan, M. W. (2007). How effective are family treatment drug courts? Outcomes from a four-site national study [Article]. *Child Maltreatment*, *12*(1), 43-59.

Green, B. L., Rockhill, A., & Furrer, C. (2007). Does substance abuse treatment make a difference for child welfare case outcomes? A statewide longitudinal analysis. *Children and Youth Services Review*, *29*(4), 460-473.

Grella, C. E., Hser, Y. I., & Huang, Y. C. (2006). Mothers in substance abuse treatment: Differences in characteristics based on involvement with child welfare services. *Child Abuse and Neglect*, *30*(1), 55-73.

Hagaman, A.K. & Wutich A. (2017). How many interviews are enough to identify metathemes in multisited and cross-cultural research? Another perspective on guest, bunce, and Johnson’s (2006) landmark study. *Field Methods, 29*, 23–41.

Harwin, J., Alrouh, B., Broadhurst, K., McQuarrie, T., Golding, L., & Ryan, M. (2018). Child and parent outcomes in the London family drug and alcohol court five years on: building on inter- national evidence. *International Journal of Law, Policy and The Family, 32*, 140–169.

Häyrinen, K., Saranto, K., & Nykänen, P. (2008). Definition, structure, content, use and impacts of electronic health records: A review of the research literature. *International Journal of Medical Informatics*, *77*(5), 291-304.

He, A. S. (2017). Interagency collaboration and receipt of substance abuse treatment services for child welfare-involved caregivers. *Journal of Substance Abuse Treatment*, *79*, 20-28.

Home Office. (2017). *2017 Drug Strategy*. Retrieved from https://www.gov.uk/government/publications/drug-strategy-2017

Horwath, J., & Morrison, T. (2007). Collaboration, integration and change in children's ser- vices: Critical issues and key ingredients. *Child Abuse & Neglect, 31*, 55–69.

Howard H., & Colvin, M.L. (2021). Women in the Waves: Learning from Mothers in Recovery through Photovoice. Child Welfare. 99 (1), 25-68.

Jensen, P. B., Jensen, L. J., & Brunak, S. (2012). Mining electronic health records: towards better research applications and clinical care. *Nature Reviews Genetics*, *13*(6), 395-405.

Kepple, N. J. (2018). Does parental substance use always engender risk for children? Comparing incidence rate ratios of abusive and neglectful behaviors across substance use behavior patterns. *Child Abuse & Neglect*, *76*, 44-55.

Kraljevic, A., Shek, A., Bean, D., Bendayan, R., Teo, J.TH., Dobson R., J., B. (2021). MedGPT: Medical Concept Prediction from Clinical Narratives. ArXiv. https://doi.org/10.48550/arXiv.2107.03134

McGlade, A., Ware, R., & Crawford, M. (2009). Child protection outcomes for infants of substance-using mothers: A matched-cohort study. *Pediatrics*, *124*(1), 285-293.

McGovern, R., Gilvarry, E., Addison, M., Alderson, M., Carr, L., Geijer-Simpson, E., Hrisos, N., Lingam, R., Minos, D., Smart, D., & Kaner, E. (2018). *Addressing the impact of non-dependent parental substance misuse upon children. A rapid review of the evidence of prevalence, impact and effective interventions.* Retrieved from https://www.drugsandalcohol.ie/29045/

Mirick RG. (2016). Challenges in recruiting parents to participate in child welfare research: implications for study design and research practice. *Children and Family Social Work, 21*(4):484–91.

Nagle, A., & Watson, G. (2008). Parental substance misuse: An Islington perspective. *Child Abuse Review,* 17 (6), 444-453.

Nordentoft, H. M., & Kappel, N. (2011). Vulnerable participants in health research: Methodological and ethical challenges. *Journal of Social Work Practice*, 25 (3), 365- 376.

Olsen, A. (2013). Punishing parents: Child removal in the context of drug use. *Drug and Alcohol Review,* 34(1), 27-30.

Ofstead. (2013). *What about the children?* Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/419128/What_about_the_children.pdf

Ostrach, B., & Leiner, C. (2019). “I didn't want to be on Suboxone at first…” - Ambivalence in perinatal substance use treatment. *Journal of Addiction Medicine, 13* (4), 264-271.

Perera, G., Broadbent, M., Callard, F., Chang, C. K., Downs, J., Dutta, R., … Stewart, R. (2016). Cohort profile of the South London and Maudsley NHS Foundation Trust Biomedical Research Centre (SLaM BRC) Case Register: Current status and recent enhancement of an Electronic Mental Health Record-derived data resource. *BMJ Open*, *6*(3), e008721.

Public Health England. (2018, December). Safeguarding children affected by parental alcohol and drug use. GOV.UK. Retrieved from https://www.gov.uk/government/publications/safeguarding-children-affected-by-parental-alcohol-and-drug-use.

Radcliffe, P. (2011). Substance-misusing women: Stigma in the maternity setting. *British Journal of Midwifery, 19*, 497–504.
Radcliffe, P., Canfield, M., Boreham, M., Marlow, S., & Gilchirst, G. (2020). How to capture the experience of mothers with alcohol problems involved in English family court proceedings – Lessons from the field. *Advances in Dual Diagnosis.* https://doi. org/10.1108/ADD-11-2019-0015.
Radcliffe, P., Chandler, A., Martin, F., Whittaker, A. (2019). Parents and substance use. *International Journal of Drug Policy, 68*, 97-100.
Rajkomar, A., Oren, E., Chen, K., Dai, A. M., Hajaj, N., Hardt, M., Liu, P. J., Liu, X., Marcus, J., Sun, M., Sundberg, P., Yee, H., Zhang, K., Zhang, Y., Flores, G., Duggan, G. E., Irvine, J., Le, Q., Litsch, K., Mossin, A., Tansuwan, J., Wang, D., Wexler, J., Wilson, J., Ludwig, D., Volchenboum, S. L., Chou, K., Pearson, M., Madabushi, S., Shah, N. H., Butte, A. J., Howell, M. D., Cui, C., Corrado, G. S., & Dean, J. (2018). Scalable and accurate deep learning with electronic health records. *npj Digital Medicine*, *1*(1), 18.
Ryan, J. P., Marsh, J. C., Testa, M. F., & Louderman, R. (2006). Integrating substance abuse treatment and child welfare services: Findings from the Illinois alcohol and other drug abuse waiver demonstration [Article]. *Social Work Research*, *30*(2), 95-107.
Sarkola, T., Gissler, M., Kahila, H., Autti-Rämö, I., & Halmesmäki, E. (2011). Early healthcare utilization and welfare interventions among children of mothers with alcohol and substance abuse: A retrospective cohort study [Article]. *Acta Paediatrica, International Journal of Paediatrics*, *100*(10), 1379-1385.
Sidebotham, P., Brandon, M., Bailey, S., Belderson, P., Dodsworth, J., Garstang, J., Harrison, E., Retzer, A., & Sorensen, P. (2016). *Pathways to harm, pathways to protection: a triennial analysis of serious case reviews 2011 to 2014: Final report.* Retrieved from ttps://www.gov.uk/government/uploads/system/uploads/attachment_data/file/533826/Triennial_Analysis_of_SCRs_2011-2014_-__Pathways_to_harm_and_protection.pdf
Solis, J. M., Shadur, J. M., Burns, A. R., & Hussong, A. M. (2012). Understanding the diverse needs of children whose parents abuse substances. *Current drug abuse reviews*, *5*(2), 135-147.
Ståhl, Y., Granlund, M., Simeonsson, R., Andersson Gäre, B., & Enskär, K. (2013). Psychosocial health information in free text notes of Swedish children's health records. *Scandinavian Journal of Caring Sciences*, *27*(3), 616-623.
Stockdale, J., Cassell, J., & Ford, E. (2018). "Giving something back": A systematic review and ethical enquiry into public views on the use of patient data for research in the United Kingdom and the Republic of Ireland. *Wellcome Open Res*, *3*, 6.
Substance Abuse and Mental Health Services Administration. Treatment Episode Data Set (TEDS): 2009 discharges from substance abuse treatment services (DASIS Series S-46, DHHS Publication No. SMA 09-4378) Author, Rockville, MD (2009)
Syed, S., Gilbert, R., & Wolpert, M. (2018). Parental Alcohol Misuse and the impact on children: A rapid evidence review of service presentations and interventions. Retrieved from https://www.ucl.ac.uk/children-policy-research/sites/children-polic y-research/files/parental-alcohol-misuse-and-impact-on-children.pdf.

Torrens, M., Gilchrist, G., & Domingo-Salvany, A. (2011). Psychiatric comorbidity in illicit drug users: Substance-induced versus independent disorders [Article]. *Drug and Alcohol Dependence*, *113*(2-3), 147-156.

Traube, D.E., He, A.S., Zhu, L., Scalise, C., & Richardson, T. (2015). Predictors of substance abuse assessment and treatment completion for parents involved with child welfare: One state's experience in matching across systems. Child Welfare, 94, 45-66

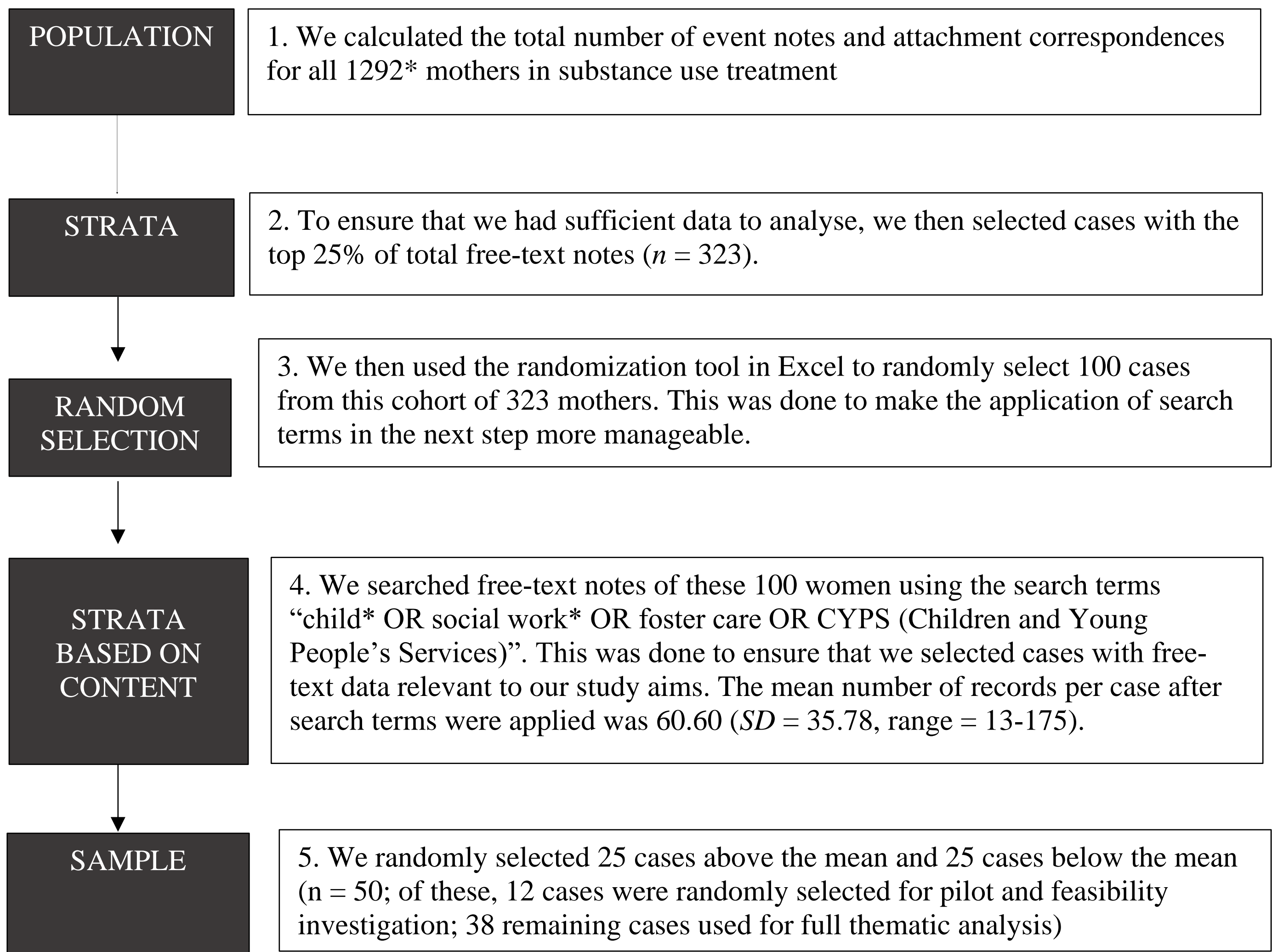
U.S. Department of Health & Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. *Child maltreatment 2017.* Washington, DC: U.S. Department of Health & Human Services;2019

Velleman, R., & Templeton, L. (2018). Understanding and modifying the impact of parents' substance misuse on children. *Advances in Psychiatric Treatment*, *13*(2), 79-89. https://doi.org/10.1192/apt.bp.106.002386

Virokannas E. (2011). Identity Categorization of Motherhood in the Context of Drug Abuse and Child Welfare Services. *Qualitative Social Work*, 10(3): 329-345.

von Elm, E., Altman, D.G., Egger, Met., et al. (2007) The strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. *Lancet*, 370, 1453-1457

Wells, R., & Chuang, E. (2012). Does formal integration between child welfare and behavioral health agencies result in improved placement stability for adolescents engaged with both systems? *Child Welfare, 91,* 79–100.



Note: * The original cohort comprised of 1343 women, however, 51 cases were recently excluded due to new governance that allowed patients to opt out of their EHRs being used for research purposes.

Figure 1. Sample stratification flow diagram

Table 1. Sample characteristics (N=50)

Sociodemographic characteristics	
Age (Mean (SD))	38.21 (6.73)
White British	30 (62.50%)
Not in paid employment	46 (92%)
Housing problems	6 (12%)
Substance use and treatment characteristics	
Opioids used in the past 28 days	14 (28%)
Crack used in the past 28 days	12 (24%)
Cocaine used in the past 28 days	3 (6%)
Amphetamines used in the past 28 days	1 (2%)
Cannabis used in the past 28 days	7 (14%)
Alcohol consumed mostly every day of the week in the past 28 days	9 (18%)
Probable alcohol dependence (AUDIT)	12 (40%)
Overdose history	34 (73.1%)
Psychological characteristics	
Lifetime domestic violence victimisation	12 (26.9%)
Social isolation	14 (30.4%)
Self-neglect	8 (17.4%)
Suicide attempt history	15 (32%)
Lifetime hospitalisation due to mental health problems	26 (56.5%)
Children related characteristics	
Number of dependent children (mean (SD))[a]	1.7 (.10)
Children in alternative care[b]	28 (87.5%)
In contact with dependent children	43 (86%)
High risk to children[c]	5 (10%)
Referral to social work made by the substance use service	6 (12.8%)

[a] Defined as having a dependent child under the age of 18 years
[b] Defined as not having the child under the care of the mother. Reported information in 32 cases
[c] Mothers' substance use, mental health or learning disability impacts on their capacity/ability to meet the needs of the child/ren.

Table 2. Description of themes and sub-themes with quotes

Themes	Sub-themes	Definition	Quotes
1. Childcare arrangements	-	Description of who looks after the children on a daily basis	ZZZZZ has a daughter under 5 and is the primary carer, however ex-partner takes an active role with daughter (case notes, ID 10) ZZZZZ has one child under 16 - a daughter who resides with her ex-partner and his parents (case notes, ID2) ZZZZZ has contact but no full-time caring role. (case notes, ID43)
2. Family context	Relationship with any (biological, in-laws, step-parents) of her parents	Reports of relationship dynamics between the mother and her parents	ZZZZZ turned up at the team base this morning without an appointment. She was very tearful. Said she was feeling very bad. Said her mother has been with her for almost a week and has made her life a misery. They keep arguing with each other and this makes ZZZZZ very sad. Said her mother was very controlling. This she does not like. I advised her to speak with her mother and explain how their arguments affect her and the children (case notes, ID2) There are considerable relationship difficulties between Ms ZZZZZ and her mother (whom the children currently reside with) (letter of referral to social services, ID2).
	Relationship with children's biological or non-biological father	Reports of the type of relationship the mother has with the biological/non-biological father of her children	She is presently separated from her partner of many years after giving birth and also the father of her new baby. She told us that, by his actions, he is not acting responsibility; he is an alcoholic and 'plays mind games with her'; he has put her through a lot (mental anguish and verbal abuse-

			shouting; swearing and constantly putting her down); and said that his behaviour towards her is robbing her of her confidence and therefore, her self-esteem is very low. In addition, she said that she is disappointed in their relationship and would have wished to have had her baby in a normal family environment. (initial contact assessment case notes, ID23) She reported that she has been [having a] low mood triggered by a violent relationship. Relationship ended a few years ago following a series of physical violence where she even lost a tooth and also believes that this has had an effect on her young children (case notes, ID2)
	Family/mother's background	Reports of family history of substance misuse, poverty, mental health difficulties, etc.	She reports that her child's father introduced her to drug use and by her late 20s she was injecting heroin and crack cocaine. She reports a difficult childhood in an environment of domestic violence that she witnessed between her parents. She also described domestic violence in her first relationship with her child's father, whom she dated intermittently for nearly 10 years. This relationship was unstable, with both Ms ZZZZZ misusing drugs and her partner spending periods of time in prison. – (case notes, ID20) We discussed her family set up and some historical family events such as her father leaving, her mother having serious physical health problems and her having her son when she was very young (Case notes, ID 12)

	Challenges around dependent children's behaviour/ development	Mother's report of challenges around her children's behaviour and/or development	ZZZZ reports that she is struggling with her two children, as they are mischievous. She says that they swear at her, hit her, break things in the house, broke a car window, [and were] expelled from school for a day for slamming the door and refusing to go to class. Children & Families Services are involved. ZZZZZ has also been informed that one of her children might have ADHD (case notes ID2) Informed me that her drinking as increased to 6 - 8 cans of 9% [alcohol by volume; ABV] daily - due to stress & [domestic abuse] from teenager son - discussed Solace again & encouraged to continue with this, she wants her son to leave, but he [will] not - Son on Youth Offending - arrested again this week for smoking cannabis (case notes, ID2) ZZZZZ attended Court due to her child's absenteeism from school. She said the Judge spoke to her child and made it clear ZZZZ could go to prison if the child did not go to school. ZZZZ has to attend further court hearings. ZZZZ feels she has done all she can to encourage her child to attend school and it is now up to her child to take responsibility. She said the child has been attending school since the hearing. - (case notes ID11)
	Relationship with non-dependent children	Description of the relationship in cases where the mother also has older children (>18 years old)	She said that her older son (in his 20s) who was also staying in the same house threatened to commit suicide because his grandmother (ZZZZZ 's mother) was always yelling at him for

			not finding a job. She said that her son is now sleeping out of the family home and seeking help to find a job. (case notes, ID 17) Her eldest daughter is now mid 20s. They have built up a good relationship; [her daughter] is independent and regularly visits her (case notes, ID 15) ZZZZ's adult daughter called and asked me to provide contact for rehab where ZZZZ could go now. I said that this is possible to arrange through our service and I hope to see her mum next week for the key work session and to discuss it with her. ZZZZ's daughter said that it is too late – "they are taking her kids now and she wants to go somewhere now." I said that I don't have any contacts to give them now. Daughter became angry and hung up (case notes, ID34).
3. Safeguarding issues	Neglect	Reports of children's needs that are not being met	Her teenage son's mental well being appeared to be deteriorating. Mother appeared frustrated with the process and despondent so they were kept on plan under emotional neglect. Recovery issues presented at the conference. Mum's continued drug use and dropping of script during the last month was highlighted. Key worker report and discussed at the conference (letter of communication with social worker, ID 12) When unwell; neglects her children not getting them to school on time or tending to their needs (letter of communication with social worker (ID 29)

	Children's psychological functioning	Reports of mothers not understanding the impact that they are having on their children's mental health	She does not believe that her drinking has anything to do with her child's issues (case notes, ID39). She had a meeting with her son and the Social Worker at the son's request. The boy has some anger issues and asked a lot of personal questions. eg - Why didn't she leave her husband, and when did she start to use drugs and did she use when she was pregnant etc etc. She tried to be honest but obviously this was quite upsetting. However, she seemed to feel that it was a necessary event for her son and helped her to come to terms with the impact of her drug taking (case notes, ID15)
	Impact of mother's psychological functioning	Description of mother's mental health impacting the care of the children	Phone call from ZZZZZ 's friend and reported she is concerned regarding ZZZZZ 's mental health. She reported that ZZZZZ has been drinking and also self harming (cut her arm). Police were called in and she was taken to an A&E. Her daughter was looked after by ZZZZZ's sister for one day. Daughter is back with her now (case notes, ID 28) She denies any thoughts of harm to the children but when Dr QQQQ spoke to her brother he said that she has reported to him hearing voices commanding her to harm her children (letter of communication with social services, ID 29)
	Substance use	Description of substance use exposure to the children	Staff received a call from the children and family social worker stating that he has been to ZZZZZ's house and that she has not been taking

			care of the children and that she has been using drugs in their presence, neglecting them and he will discuss the case with his manager (case notes, ID29) ZZZZZ has an under 10 year old child. She had another child who is now in her 20s and was taken into care under the age of 10. Extensive verbal and written information regarding the risk of death to children associated with medication including methadone and buprenorphine and the safe storage of medication [information was] given to the patient. Metal lockable box provided, she told me she has a medicine cabinet at home as well. There is an open referral to Children and Families. ZZZZZ tells me her husband doesn't use drugs and that he is aware of her drug problems. She was using drugs in the family home bathroom. Child reported to be attending school. - (email to social services, ID33)

	Intimate partner violence (IPV)	Description of mother's or children's experience or exposure to intimate partner violence	Phone call with children's social worker who gave a detailed verbal history of significant events in ZZZZZ 's life. These relate to current domestic violence issues (past psychological/ emotional abuse from ex-partner and more recent sexual abuse from child's father where risk is considered current) (letter of communication with social services, ID8) There was a change in situation as social services no longer sought to remove the children at the moment but were willing to give ZZZZZ another chance to attend for hair strand test. This was because her situation was now different with partner now out of the family home following the incident of violence against ZZZZZ a fortnight ago. She was now expected to attend signpost fortnightly, contact women's aid for support and do other things such as staying as far away from her partner as possible considering that he now lives a few flats away from her (case notes, ID6)
	Children being abused by others	Description of children's experience of being abused by other adults	Her ex-husband's friend was involved in sexually abusing her daughters. This friend is currently in prison for that. ZZZZZ often blames herself for not been able to protect her daughters (medical review case notes, ID34). Client has mentioned that her youngest son was sexual bullied online to do disgusting things. She says the police are involved in the case and they are making investigations. She reports that this child lives with foster parents and she has contact every other month (case notes, ID15)

4. Factors that impact the treatment plan and care of the children	Socioeconomic	Social and economic factors, such as housing, ability to get additional support, benefits/income, and education	ZZZZZ told me she lives in a hostel with 20-30 others and that she only moved in there a couple of months ago. She said she was homeless for nearly two years prior to that and could not remember where else she had lived. She said […] that she finances [the hostel] through prostitution. 'I sleep all day and work all night'. (duty doctor assessment case notes, ID50) She is now homeless. Social services has taken her children and are now with her mother. She has moved in with her mother because she has no where to go. She can not afford to live on her own. At home she is arguing with mother and her eldest son. (case notes, ID15)
	Trauma	Description of the mother's experience of adverse events that might have caused traumas (e.g., abuse by non-partners, assaults, robbery)	ZZZZZ explained that she had been raped by two cousins who were in their 20s and 40s. Said that they had been imprisoned but that her Mum had got them released. Spoke of when the doctor examined her he could get his whole hand up her vagina and said that she had been damaged and doesn't know if she can have children. Said that her Mum didn't believe her and that is why she hates her (nursing case notes at detox, ID50). ZZZZZ presented very tearful and scared. Drug dealers are threatening to harm her and her family, including her Autistic son. Threats of violence and kidnapping them (letter of communication with social services, ID12)

	Informal support	Description of social support (or lack thereof) from friends, family, or others that affect childcare	ZZZZZ said that her sister stopped supporting her when the baby was taken into care. Shared that part of the plan of care of getting her child back rests on support from her family. - (case notes, ID46) Drinking has increased, concerns at the school and a meeting to be held. Issues may now be escalated as child [is] affected and this is showing throughout the day. ZZZZ has expressed interest in detox, although afraid. This may now be a safeguarding matter. Thoughts needed as to if ZZZZ was admitted as inpatient who would take care of her child (case notes, ID24)
	Experience and views of social service involvement	Descriptions of mothers' experiences in working with and/or views of social services	ZZZZZ spoke regularly about her child and how disturbed she is by social services involvement and the guilt associated with this. She kept stating 'I'm going to lose him'. I pointed out that the best way to avoid losing her child is to fully engage in the treatment process; for the child and herself (case notes, ID42) She expressed frustration at social services in regard to her teenage children in foster care- wanting more access, finding it difficult as she doesn't feel social services are including her fully. She wants more access (case notes, ID15)
	Additional formal support	Description of clinician or mother's plans/suggestions for treatment or maintenance of sobriety	Psychology session - ZZZZZ was referred to psychology for help on how to deal with panic without relying on methadone, crack cocaine and alcohol. Presenting problems - Panic Disorder (psychology session case notes, ID16)

			ZZZZ says that she would like to have a baby in the future and has some questions related to pregnancy and methadone and if social services would be involved. I advised her I was unable to answer many of her questions but that I could ask colleagues or arrange for her to see the doctor. ZZZZ also talked about feeling lethargic and tired and she recognises that starting a pregnancy at the moment would not be a good move. I advised her to see her GP regarding this (case notes, ID6).
5. Communication between healthcare and child protection system	Lack of adherence to treatment plan	Description of mother attending/missing appointments and relapse	ZZZZZ has recently spent twenty-eight days in rehab for her alcohol abuse but relapsed within twenty-four hours of leaving. Her mum stated that recently ZZZZZ has been drinking heavily and her mental health had deteriorated. ZZZZZ 's two children arrived at the address, they stated that ZZZZZ threatening to self-harm or commit suicide is becoming a regular occurrence, she is refusing all help and is continuing to drink heavily. (ID37) Client's attendance is very poor and as I am on duty I could not do a full keyworker session. Pharmacy has already confirmed that she missed 2 days and today will be her 3rd day. Due to her poor engagement with the services, and she has been spoken to before about this, I discussed with primary care doctor and I have given her a shorter prescription so that she can attend for a keyworker session next week (ID15)
	Progression	Description of mother meeting the treatment plan/ mental	Again, this cannot be pre-determined, especially if the client is on a low dose of medication. The

		health improvement/general functioning improvement	urine analysis for the last three tests are all negative for amphetamine and all other drugs. I am concerned that Ms ZZZZZ 's efforts are being undervalued and that whilst I understand that the primary concerns are with regard to the children, and that is as it should be, the mother's efforts need to be noted. I would like to draw your attention to how Ms ZZZZZ was two years ago and the progress that she has made since that time. It was agreed at the Case Review meeting by all concerned that Ms ZZZZZ had made progress. However, this is not reflected at all in the letter regarding court (email to safeguarding worker, ID49) Attended ZZZZ's child protection meeting today. ZZZZ has proved herself competent as a mother and her children are both thriving and happy. No concerns, panel all agreed ZZZZ's children no longer need to be under child protection (case notes, ID11)
	Childcare concerns	Concerns raised by healthcare services about the ability of the mother to look after the children	I had received information that ZZZZ was saying at the centre that she has been using cocaine and several men have been staying at her house overnight. She told one of the other mums that one of the men was her supplier. This is very concerning and raises issues about the safety of the children (email to social services, ID41)
			ZZZZZ reported that as a result of our referral, the police went to her sister's house with Social Services and found herself and her under10 year old daughter living in a shed. The police

			removed her daughter and arrested ZZZZZ. Her daughter is subject to a Police Protection Order and is in temporary foster care. ZZZZZ was held in the police station overnight and released this am (email to safeguarding worker,ID48)
	Care plans for children	Changes in childcare decided by career proceedings	ZZZZZ will have supervised access three times a week when her baby is in hospital and twice a week when the baby is in foster care. ZZZZZ will be introduced to a person who will supervise the visits. This supervising person will also take notes of how ZZZZZ interacts with her son. (case notes, ID50) Her daughter has been taken off the Child Protection Register and so she is no longer in need of social services input. (email to social workder, ID28)

Supplementary Materials

TS1. Preliminary Coding Framework from Pilot Study.

Code Name	Description
Relationship with child and background	Information about the mother's relationship with her children and life history/background for mother and child (e.g., mother's history of abuse)
Risk to child	Description of the potential or actual risks to children reported by the mother, clinician, social services, law enforcement, or family (e.g., substance use around child)
Risk to mother	Description of the potential or actual risks to the mother reported by herself, clinicians, law enforcement, or family (e.g., safeguarding concerns about sex working)
Child support network	Description of external formal child support networks, including formal support by Children and Young People Services (CYPS), social services, and foster care
Family support	Description of support the mother or child receives from family or friends (e.g., childcare)
Children as protective factors	Information about the ways in which children act as protective factors for mothers in treatment either reported by the mother or clinicians (e.g., daily structure due to children's needs)
Health deterioration or relapse	Description of the mother's health issues, deterioration, or substance use relapse. This included both substance-related health deterioration (e.g., alcohol induced psychosis) and other health concerns (e.g., COPD)
Clinical judgement	Reports by clinicians' professional opinions/judgements on the mother and children's wellbeing and the mother's engagement (or lack thereof) in treatment services (e.g., noting that the mother continues to put herself in situations that encourage substance use)
Emotional responses and disclosures	Reports of reactions/responses and personal disclosures from the mother during contact with health or legal services (e.g., abusive reactions towards staff, disclosure about sexual assault)
Progress in mother and child health	Description of positive changes to the mother or children's health and wellbeing (e.g., substance use cessation, improvement in children's social functioning)
Treatment plans	Reports of formal treatment plans proposed by clinicians and the mother's reflections on her ability to engage in these plans (e.g., referrals to psychiatric services or detox centres)
Barriers to treatment	Reports of barriers to adherence to treatment plans (e.g., inability to find childcare)

Note. Codes were derived from $n = 6$ cases with free-text data that was not limited by search terms application.

TS2. Search Strategy Using Search Terms.

Search terms	
child*	foster
daughter*	CYPS
son*	school
kid*	parent*
baby	maternal
teenager*	into care
pregnan*	youngest
social work*	eldest
social services	safeguarding

Note: in bold, final search terms used to extract the notes