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The complex information needs of disadvantaged young first-time mothers: insights into multiplicity of needs.

Abstract

Purpose: to holistically explore the information needs of socioeconomically disadvantaged young first-time mothers, and associated issues of complexity.

Design/methodology: survey and semi-structured field interviews with 39 young mothers (aged 15-23) from UK areas of multiple deprivations.

Findings: participants reported multiple and complex needs spanning interrelated topics of parenting, poverty, and personal development. In the majority of instances, participants were either unsure of their ability to meet their needs, or needed help with needs; and several described situations of considerable anxiety and stress. Multiplicity is identified and conceptualised as an important factor contributing to complexity, including three component elements: simultaneous occurrence of needs (concurrency), relationships between needs (interconnectivity), and evolving needs (fluidity). In various combinations, these elements influenced a mothers' actions and/or ability to selectively attend to needs, with multiple needs often competing for attention, and compounding issues of cognitive load and affect.

Research limitations/implications: draws attention to multiplicity of needs as an understudied topic within human information behaviour, and calls for further research into how people recognise and attend to complex needs, and influencing factors.

Practical implications: raises important questions regarding how we approach complexity of information needs in our design and delivery of information systems and services.

Originality/value: evidences disadvantaged young mothers to have more extensive and complex information needs than previously understood; and identifies and conceptualises multiplicity as an important factor contributing to complexity of information needs during major life transitions such as motherhood.

Keywords: information behavior; information need; health communication; health education; complexity; mothers.

Paper type: research paper

1. Introduction

This study explores extent and complexity of information needs amongst young first-time mothers from areas of multiple deprivations (e.g. education, employment, income, health, crime, housing). An understudied and at-risk group (health and wellbeing), recent work by Buchanan et al. (2019) with healthcare professionals providing support to disadvantaged young mothers suggests that such mothers may have more extensive and complex needs than previously understood. Described as "multiple, interrelated, and at times competing" (Buchanan et al., 2019, p.127); their needs are reported to extend beyond parenting to issues of socioeconomic disadvantage and age. Issues of recognition of needs are also reported, as are issues of cognitive load and affect. This paper now explores their information needs from the important and underrepresented perspectives of the young mothers themselves, and beyond identification of needs, provides empirical and conceptual insight into multiplicity as an important factor to consider when seeking to understand complexity of information needs, and when seeking to support young women during an important tranformative period of their lives.

2. Background

Key concepts

The concept of information need has been much debated within human information behavior (HIB), and variously described as, "complex" (Cole, 2012, p.3), "awkward" (Case and Given, 2016, p.94), and "perennial and perplexing" (Savolainen, 2017, p18). Much ongoing debate concerns conceptual

vagueness and multiple interpretations of a problematic compound term, but it is nonetheless considered a useful construct for understanding why people seek information (e.g. Cole, 2012; Savolainen, 2017); and is commonly regarded by HIB scholars as a context sensitive secondary need triggered by primary physiological and/or psychological needs and associated feelings of uncertainty (Case and Given, 2016). However, Savolainen reports that whilst widely discussed within HIB, "there is a need to examine further the nature of information need as a central concept of HIB research" (2017, p.3). As context sensitive phenomena, further understanding benefits from in-depth examination in specific situations and amongst specific demographic groups such as here.

Complexity is a similarly challenging concept to explore. Definitions and boundaries differ by discipline including distinctions between complicated, complex, and chaotic (for example, see reviews of complexity theory by Manson, 2001, and Turner and Baker, 2019); but complexity can be broadly understood as applying to (typically) non-linear systems with multiple heterogenous and autonomous elements that interact dynamically with various degrees of order (or not). Bawden and Robinson (2015), discussing from an information science perspective, describe complexity and information as "inextricably intertwined" concepts (2015, p.2177) but note that, "We still do not understand complexity, nor how best to measure and compare it in any particular system or context" (2015, p.2184), and call for further research attention. Recent calls for attention have also been made within the social sciences to encourage holistic examination of social systems. Turner and Baker (2019, p.4), critical of reductionist approaches to real-world complex environments, argue that examining complexity, "expands on the reductionistic framework by not only understanding the parts that contribute to the whole but by understanding how each part interacts with all the other parts and emerges into a new entity, thus having a more comprehensive and complete understanding of the whole". In the context of our study, this relates to how fully we understand the information needs of disadvantaged young women as they transition to motherhood.

Young mothers as a study group

The transition to motherhood is recognised as a period of "profound social change" (Prinds *et al.*, 2014, p.734) and psychosocial adjustment for women (e.g. Grimes *et al.*, 2014; Da Costa *et al.*, 2015; Kamali *et al.*, 2018). Mercer notes that it, "involves moving from a known, current reality to an unknown, new reality" (2004, p226), further described by Prind *et al.* as an, "existentially [life] changing event" (2014, p.733). It can transform how a women thinks of herself, and the world around her, and generates new needs for understanding both specific and general. For example, Montesi and Bornstein (2017, p.201) comment that, "…becoming a mother implies a new perception of oneself as more in need of information". Such profound transformation can also be problematic, and involve considerable anxiety and stress (e.g. Da Costa *et al.,* 2015; Loudon *et al.*, 2016). Many women find themselves at home with a child within hours of giving birth and report feeling unprepared for motherhood. For example, Carolan (2007, p1168) reports that, "Following birth and the immediate postpartum euphoria, the new mother was confronted with the myriad concerns of her new role… Many described feeling really lost and helpless. Most felt ill-prepared and ill-equipped for their new role". Information helps preparedness, but unmet needs are reported, and correlated with negative health outcomes (e.g. Gazmararian *et al.*, 2014; Rotich and Wolvaardt, 2017).

Young mothers are reported to be at increased risk of negative health outcomes. The World Health Organisation (2018) reports that the leading cause of death amongst young women aged 15-19 globally is complications from pregnancy and childbirth. Infant mortality rates are also higher than older mothers (Torvie *et al.*, 2015), and infants at greater risk of poor nutrition and care (Harron *et al.*, 2016). Stress and anxiety are also heightened, as are rates of depression (Raskin *et al.*, 2016). Low literacy is also reported (Bennet *et al.*, 2013), as are issues of preparedness for motherhood (e.g. Cronin, 2003). Notwithstanding such significant issues, it is important to note that motherhood is also reported as a positive transformative experience for young women (Duncan, 2007; Brand *et al.*, 2014); however young mothers can also be subject to significant negative attention and societal stigmatisation. Shoveller and Johnson argue that public discourse on parenthood predominantly portrays young mothers as a problem, and encourages marginalisation and "a climate of sex-based shame" (2006, p.47). They argue that public health interventions have been preoccupied with risk and "what is wrong with the individual", as opposed to the environment, and that greater attention needs to be given to how to "transform youths' social contexts and structures" (2006, p.56). Brand *et al.* discuss how this deficit view can lead to mothers concealing their needs from professionals due to

"fear of stigmatisation and lack of confidence" (2014, p.175). They report "strong evidence of the interrelationship between a young mother's support systems and experiencing a positive transition to motherhood" (2014, p.177), but that "service models that offer the right type of support for young mothers are limited" (2014, p.177). They highlight the need for a "bottom-up" approach to primary health care that, "focuses on building and sustaining relationships that respond to young mothers' unique needs" (2014, p.178). This study sought to better understand their needs.

Previous studies examining the information needs of young mothers

For the purposes of this study, we sought to identify previous empirical studies involving young women aged <25 expecting or with their first child, and of disadvantaged socioeconomic status.

It is notable that the majority of relevant studies within library and information studies (LIS) have involved mothers aged >20 and variously report an average age of approximately 30 (Nicholas and Marden, 1998; Lee, 2015; Loudon *et al.*, 2016; Obasola and Mabawonku, 2017; Kamali *et al.*, 2018). Findings are also generalised with the exception of Kamali *et al.* (2018), who notably report decreasing age and education, and first-time pregnant status, as contributing to needs.

With respect to information needs identified, LIS studies commonly report needs relating to pregnancy and birth, and child and parent health. Nicholas and Marden (1998) are notable for also identifying needs relating to child development and behaviour, finances, housing, and careers; and Loudon *et al.* (2016) for also identifying needs relating to activities. Notably, Ruthven *et al.* (2018) specifically examined the needs of young mothers (aged 14-21), and adds relationship and legal needs to previously identified needs. Some studies, whilst largely healthcare oriented, also nonetheless report extensive needs, and issues of uncertainty and anxiety (Loudon *et al.*, 2016; Kamali *et al.*, 2018).

Whilst previous LIS studies provide some insight into the information needs of mothers, it is important to note that not all needs identified are evidenced, particularly non-health related; and in several instances, evidence is limited to selective quotes and/or simple topic listings (Kamali *et al.*, 2018; Lee, 2015; Loudon *et al.*, 2016; Nicholas and Marden, 1998; Obasola and Mabawonku, 2017). Some also lack important contextual data, specifically: socio-economic status (Ruthven *et al.*, 2018), and existing or new mother status (Lee, 2015); and some are focused on specific topics such as health (Lee, 2015; Obasola and Mabawonku, 2017) or pregnancy and birth (Kamali *et al.*, 2018).

Further LIS studies involving mothers, such as McKenzie (2002, 2003, 2004), examine information practices, and whilst discussing the construction of need during interpersonal interactions, do not explicitly examine needs. Recent studies by O'Brien (2018), Greyson (2017), and Montesi and Bornstein (2017) have a similar focus.

A number of studies within health disciplines also provide insight into the information needs of mothers (Carolan, 2007; Porter and Ispa, 2013; Grimes *et al.,* 2014; Leurer and Misskey, 2015; Guerra-Reyes *et al.*, 2016; Laferriere and Crighton, 2017). However once again, the majority of participants are aged approximately 30, and findings generalised. They commonly identify needs relating to pregnancy and childbirth, and child and parent health, with Porter and Ispa (2013) also identifying child development and stress needs.

A small number of health studies have focused on young mothers (Cronin, 2003; Owusu-Addo *et al.*, 2016) or majority involved young mothers (Gazmararian *et al.*, 2014; Rotich and Wolvaardt, 2017). Beyond commonly identified healthcare needs, these studies also report needs relating to relationships (Gazmararian *et al.*, 2014; Owusu-Addo *et al.*, 2016), stress (Shieh *et al.*, 2009; Gazmararian *et al.*, 2014) and domestic abuse (Shieh *et al.*, 2009).

Similar to LIS studies, some health studies also identify issues relating to extent of needs, particularly amongst young and/or first-time mothers. Gazmararian *et al.* (2014, p.839) report that, "new mothers face a significant informational deficit", and Owusu-Addo *et al.* (2016, p115) that, "An important take-away message from this study was the breadth and depth of information needed by pregnant teenagers". In relation, some report new mothers as ill prepared and overwhelmed by needs (Cronin, 2003; Carolan, 2007; Porter and Ispa, 2013).

However, similar to LIS studies, in several instances evidence is limited to selective quotes and/or simple topic listings (Carolan, 2007; Grimes *et al.*, 2014; Shieh *et al.*, 2009). Several also lack important contextual data regarding socio-economic status (Cronin, 2003; Porter and Ispa, 2013;

Gazmararian, 2014; Rotich and Wolvaardt, 2017); or are focused on specific health topics such as pregnancy (Shieh *et al.,* 2009; Owusu-Addo *et al.*, 2016), breastfeeding (Leurer and Misskey, 2015), or environmental health risks (Laferriere and Crighton, 2017).

We also note limited conceptual considerations of information need in previous studies. Several LIS studies do not extend to theoretical discussion (Nicholas and Marden, 1998; Lee, 2015; Obasola Mabawonku, 2017; Kamali et al., 2018), and another focuses on information seeking aspects (Loudon et al., 2016). One study (Ruthven et al., 2018), discusses mothers' online posts with reference to Taylor's (1968) levels of information need (outlined below), reporting posts to be longer and less specific when needs are not understood, and contributing to our understanding of how uncertainty can manifest in communication. There are similar conceptual limitations to health studies with the majority not including theoretical considerations (Cronin, 2003; Carolan, 2007; Porter and Ispa, 2013; Gazmararian et al., 2014; Grimes et al., 2014; Leurer and Misskey, 2015; Guerra-Reyes et al., 2016; Laferriere and Crighton, 2017; Rotich and Wolvaardt, 2017). Two studies (Shieh et al., 2009; Owusu-Addo et al., 2016) reference Wilson's (1997) model of information behavior (outlined below), but limited to general discussion. Such limited conceptual considerations appears reflective of studies of information need more broadly. For example, Savolainen reports that, "…researchers have seldom scrutinized the conceptual nature of information need despite the fact that this concept is heavily used" (2017, p.6).

In summary, previous studies exploring the information needs of mothers have majority involved mothers aged approximetly 30, and focused on perinatal needs. Some suggest more extensive needs, and that age and new mother status are important contributing variables; however, this is limited to a small number of studies with limited empirical evidence provided, and the most relevant limited to pregnancy topics (Shieh et al., 2009; Owusu-Addo et al., 2016), or lacking demographic data important to context (Cronin, 2003; Rotich and Wolvaardt, 2017; Ruthven et al., 2018). Our understanding of socioeconomic variables is thus also limited. There are also limited conceptual considerations within previous studies, and for our purposes, exploration of complexity. This raised two key research questions:

RQ1. What are the everyday information needs of disadvantaged young first-time mothers?

RQ2. In relation, how might we conceptualise complexity of information needs?

3. Methodology

This study was part of a three year investigation into the information behaviours of young disadvantaged first-time mothers from UK areas of multiple deprivations. In its entirity, the study sought to better understand their information needs, their information behaviours, and the factors influencing their behaviours. We report on insights into needs here, and focus on the relevant methodological aspects below.

Theoretical framework

Of initial relevance to our understanding of information needs were Wilson (1997), Taylor (1968), and Chatman (1996).

Wilson (1997) provided a macro framework for understanding contextual factors influencing information needs and behaviours. Wilson proposes three factors which form context: personal (physiological and psychological); role (social and work); and environment (socio-economic); and that such factors act as intervening variables between determination of need and action, including stress/coping and risk/reward mechanisms.

Taylor (1968) provided a model for understanding the formation of information needs as a cognitive process, including early stages of understanding and expression. Taylor (1968) proposes four levels of cognition and communication of need: visceral (vague and inexpressible); conscious (rudimetary and ambigous); formalized (understood and defined); and compromised (structured and expressed).

Chatman (1996) provided a model for understanding issues of need disclosure. Chatman proposes that in impoverished and/or sensitive circumstances people can withhold problems in the belief that negative consequences outweigh benefits; and variously employ self-protective behaviours of: secrecy (concealment), deception (distortion), risk-taking (aversion), and situational relevance (utility).

It is important to note that whilst guided by the above, our overall approach (see data analysis) incorporated an inductive element, particularly in relation to complexity. This was considered appropriate given limited current understanding of appropriate methods for examining complexity in particular systems or contexts (Bawden and Robinson, 2015).

Data collection

Our data collection methods were questionaire followed by semi-structured interviews; conducted over eighteen months within young mother support groups and mothers' homes (invites distributed via support group staff and nurse home visits). Both questionaire and interviews comprised component parts to cover the study in its entirity (i.e. information needs, information seeking behaviours, and influencing factors). We report here on findings pertaining to needs and reserve other findings for future papers. Relevant design aspects are discussed below.

The questionnaire explored what types of information needs young mothers have, and their ability to meet with or without support. A typology of information needs provided an indicative list of needs (that could be added to), and was derived from Buchanan *et al.'s* (2018) typology. Buchanan et al.'s typology was developed through synthesis of findings from previous studies involving older mothers (Loudon *et al.*, 2016), and work with healthcare professionals providing support to young disadvantaged mothers (later reported as Buchanan *et al.*, 2019). This study now explored these needs from the perspectives of the young mothers themselves, with two minor refinements to the typology: 'things to do' was added to make outside (home) activities explicit; and toddler care subsumed under baby care for participant relevance (majority expectant or with infants). The adapted typology (see Table 1) also facilitated our comparative analysis of needs reported in previous studies.

Table 1. A typology of information needs of mothers (derived from Buchanan et al., 2018)

In the questionnaire, participants were first asked if they needed information on topics and if yes, if they felt that they could meet the need themselves, were unsure if they could meet the need themselves, or needed help to meet the need. Design also incorporated provision for participants to add further needs not felt to fit categories.

Post questionnaire, individual and small group semi-structured interviews (1hr. duration) were conducted with mothers to explore needs in more depth. Interviews began with a short discussion of what was meant by 'information need' including example topics (e.g. questions you might have relating to pregnancy, baby care, state welfare), and reiterating explanations provided in preceding information sheets. Cognisant to the potential for the term 'information need' to be considered too abstract by some mothers; the interviewer asked open-ended questions in natural language such as, "Are there things you want to find out?" and "What questions do you/have you had?". Whilst the interviewer initially prompted mothers with example topics to encourage discussion, mothers self-identified their needs and had the freedom to discuss as many or as few needs as they saw fit, current or recalled. Participants were not required to provide narratives that might provide additional context, but it was recognised that narrative accounts can naturally occur. One team member conducted interviews with all interviews recorded (subject to permission) and transcribed in full.

Data analysis

Qualitative data analysis (utilising NVivo) incorporated both deductive and inductive elements. Thematic analysis followed Braun and Clarke's (2006) approach: data transcription and familiarisation; initial code generation; collating codes into themes; reviewing themes; refining themes; and producing themes. Data was disaggregated into meaningful categories via identification of patterns and regularities through iterative cycles of pattern coding and thematic analysis, involving multiple readings of verbatim transcripts. Initial start-list codes were based on, but not limited to, categories of information need as per our typology (see Table 1), and concepts of information behaviour as per our theoretical framework (e.g. Taylor's (1968) levels of need, Wilson's (1997) stress/coping mechanisms). Further codes were emergent from data, in particular those relating to complexity and emergent concepts of multiplicity.

One team member coded with periodic code checking (multiple sample coding) conducted by the second team member independent to the first, with no notable disagreement in coding to report. Regular team discussion facilitated minor refinements to code structures, and identification of primary codes for data initially assigned multiple codes (for example, when distinguishing between perinatal and general health topics). Emergent themes were identified and refined iteratively (both team members), and as per Braun and Clarke's (2006) recommendations, our analysis included two levels of review (within and across themes) to check for coherence, consistence, and distinctiveness of themes. Analysis included identification of exemplar direct quotes (from coded data extracts) for inclusion in this paper to evidence themes.

We conducted an inter-rater reliability test of our coding of information needs by asking a colleague not involved in this study with extensive qualitative coding expertise to code 15% of data (random sample). This resulted in a Kappa coefficient of .89, indicative of high agreement.

Ethical approval

Ethical approval was obtained via Institutional Ethics Committee, with the study run in strict accordance with the University Code of Practice on Investigations of Human Beings. Informed written consent was obtained from all participants, who all participated voluntarily.

4. Findings

Participant demographics are provided below, followed by questionnaire and interview findings. The main study zone was the Greater Glasgow urban area extending to semirural areas within the Central Belt of Scotland.

Participants

In total, 39 mothers participated in this study. 25 completed the questionnaire, and 39 were interviewed (25 completing both). Variance in participation reflected variance in week-by-week support group attendance where much of the engagement with mothers occurred, and the practical availability of participants in the late stages of pregnancy or with infants. Some questionnaires were also returned incomplete and/or spoiled.

38 of the 39 participants provided demographic data. The youngest was aged 15, the oldest 23 (mean age 19). 5 mothers (13%) where expecting their first child, 30 (77%) had one child, and 4 (10%) had two children. Expectant mothers where variously 21-38 weeks pregnant (mean 32 wks). The youngest child was 2 months, the oldest 4 years (mean age 12 months). 35 of 39 mothers disclosed educational qualifications: 5 (14%) had left school without completion; 24 (69%) had or were working towards one or more national school qualifications; and 6 (17%) had or were working towards college certificate qualifications. None indicated college diploma or university degree enrolment or qualifications. All participants who disclosed residence (38 of 39) were confirmed via the Scottish Index of Multiple Deprivations (Scottish Government, 2016) to reside within the 10% most deprived zones in Scotland.

Questionnaire

Questionnaire responses provided an indication of the types of information needs participants had, and their ability to meet with or without support (see Figure 1). With respect to needs per topic, needs associated with parenting (playtime, things to do, early learning and childcare) appear common alongside needs associated with topics of poverty (money and benefits, housing) and personal development (work, education & training). With respect to needs per individual, participants on average identified seven types of need. Figure 1 also illustrates that in the majority of instances of need (117 of 163 total responses, or 72%), our participants were either unsure of their ability to meet the need (34%), or needed help with their needs (38%). In particular, our participants appear to need help with money and benefits, early learning and childcare, stress, housing, and things to do. Health topics are lower-ranked in comparison, and could be explained by all our participants being members of support groups and/or having a state assigned family nurse (all of which support health topics), and the majority also having on average 12 months experience of caring for their babies. Participants could add further needs, but none did so. Interviews provided further depth of insight into needs, including important context.

Figure 1: The information needs of young mothers (questionnaire) and their confidence in their own ability to meet.

Interviews

Via interviews we identified and coded 494 instances of need. Table 2 illustrates rate of occurrence by number of mothers and times discussed. Some variance in occurrence is notable when compared to questionnaire findings, most notably baby care and general health needs now appearing more prominent, and things to do and playtime appearing less so; however, we would caution against over analysis as this could simply reflect what mothers chose to discuss. We believe what is more important is that our mothers are once again demonstrating multiple needs across topics of parenting, poverty, and personal development.

Table 2: The information needs of young mothers by occurrence and times discussed (interviews).

With regard to baby care needs, participants discussed multiple new needs, and issues of affect. For example, one commented:

> I needed information about everything; I hadn't been around a lot of babies so I needed to know how to feed them and change them and how to hold their head. I also needed to know about what the best things to give them are, and what products I should buy. When I found out I was pregnant it was a total surprise, I didn't plan it and I was in a bit of a panic – I wouldn't change it now but at the time I was panicking.

And another:

> I got in such a muddle with sleeping and feeding, I just didn't know what to do, I couldn't seem to get the balance right, and she was up and down, and then I couldn't sleep either, it was really knackering [exhausting].

Mothers also discussed how baby care needs changed over time as their child developed. For example, one commented:

> Because obviously she's growing, so you go through like getting the bottles down and getting the times down… and all that, and it's like, "Oh, wait, now we need to change that". It just all changes. Then like the teething and stuff, and how it changes her routine. It's all like drastically changing all the time… I think I know what I'm doing then I'm back to just winging it a lot of the time!

And another:

> When I was pregnant… a lot about what to expect about sleeping and stuff like that, and how long babies would sleep for, and how long they should be bathed and stuff like that… but now it's more if she's got like a mark on her - like sometimes she'll have a heat rash… and stuff like that… general health stuff.

With regard to general health needs, mothers discussed needs that could arise from illness, accident, or childbirth. Questions related to labour were a recurrent theme amongst expectant mothers, and often multiple in nature. For example, one commented:

> More how am I going to survive the labour at that stage [laughs]... I am having all these dreams, all these nightmares [laughs]. Honestly, I need to know what to put in my bag, how long I'm going to stay there for, if there's any complications will I get a C-section or something, and how will this happen?

And another:

> Probably the pain, that's probably the big thing… obviously what's the complications that can happen during labour. You just kind of… hear so many bad stories that you automatically think what if that happens to me… and you start to kind of freak yourself out a bit.

Several mothers also discussed needs relating to their mental health including issues of post-natal depression. For example, one participant commented:

> I had health problems after having my daughter and I don't think anyone was helpful with that… I didn't feel that anyone was giving me the emotional support because I was quite depressed about it, I didn't think anyone was understanding the pain I was in… especially doctors.

And another:

> I didn't even care… I don't think I washed my hair or anything. I didn't even want to get out of my bed and then I had a baby and I was like get him away from me, take him away… all I wanted to do was lie in my bed and waste away - not eat, not even drink water or anything. They [health visitors] had to force me to get washed, and eat and take a drink.

With regard to money and benefit needs, several mothers described states of confusion: not knowing what to ask or where to begin due to limited understanding of state welfare systems. For example, one commented that she, "wouldn't even know where to start", another that, "[I] don't even know what to look for in the first place", and another that, "I just didn't know where to go, where to start, I was just like a headless chicken". Another recalled telephoning the UK Jobcentre upon the birth of her child, but commented that she "didn't even know what she was phoning for". In relation, several discussed difficulties using online systems increasingly prevalent as part of UK state welfare reforms. For example, one commented:

> Once you know what it is you need to look for, everything, it's all there, it's all online, but you need to know what to type into that search engine before you can find it. So that's the biggest problem, I think.

Some mothers also appeared not to understand how changes in circumstances such as leaving home, ending a relationship, or changes in partner income could impact entitlements, with significant financial impact. For example, one mother commented:

> I actually missed out on – is it your Sure Start [UK State maternity grant] thing where you get £500? Whichever one it is, I couldn't claim it because I had originally been on a joint claim with his dad. So then when we split up… because I wasn't registered, I couldn't claim for that £500 and I ended up losing it... And I really needed that money because my benefits weren't coming through yet, so I basically had no money.

With regard to housing needs, these were often interwoven with financial and relationship issues and needs, with mothers variously describing experiences involving multiple moves, periods in temporary and/or unfurnished accommodation, and homelessness; with some occurring late in pregnancy or with a newborn. For example, one mother commented:

> That [housing allocation request] was… really stressful. You were panicking because you'd end up homeless. I didn't particularly get on with my partner's mum at one point, so I didn't have a really good situation with my mum, either. So I used to stay at my mum's, then my nana's [grandmother], then my mum's, then my nana's, then [partner's] mum's, and then I had an argument with his mum, and then she chucked me out the week before we were getting my flat.

And another:

> It was [Housing Association] found [housing] for me, a month before I had her. There was not a lot of time whatsoever. It was all chaos. We didn't even have a cooker, a fridge freezer or a tumble - a washing machine or anything like that, till the day I got out of hospital from having her, that was the day that that came. I didn't have carpets for weeks after she was born or anything.

In the above example the mothers support worker had been instrumental in identifying her needs and obtaining a Community Care Grant for the mother to purchase furnishings, attested to in the mothers concluding comment, "**I**t was [support worker] that done it for me, or I wouldn't have known what to do".

With regard to early learning and childcare needs, discussions focused on nursery provision aspects, with several mothers describing this as challenging to resolve due to difficulties finding and applying for affordable, and limited, local childcare places. Many indicated that their needs where not met without assistance from support workers. For example, one commented:

> I got [support worker] to phone up and get me an appointment because I didn't know you could just like walk in and ask these people… to like try and get him into nursery, because I didn't know what to do.

With regard to legal needs, mothers discussed needs relating to family matters such as registering their child's birth or changing their name, and issues of violation of human rights not always recognised as such. For example, one mother discussed feeling pressured into contraception:

> After I had [child], I got the implant put in, the day after, and I wanted it out, because… I just didn't like it. They [nurse] were telling me "No you can't, because we can't"… She said to me, "Oh no, we can't have too many teen pregnancies in [area] in the statistics now", being so rude, and I was like, "That shouldn't matter, I don't want this in my arm. If you don't take it out, I'm going to rip it out my own arm", so they eventually took it out and… I didn't want anything, I just wanted to get my hormones and that back to normal and get my period back, but…. [nurse] basically like insisted that I got the Depo jab [injection]... She would not let me leave that surgery without getting something.

With regard to work, education and training needs, several mothers discussed not only the need to find information on these topics, but also information on childcare that facilitated access to work, education and training. For example, one mother commented:

> A lot of it is more than just finding out like about the course – I can do that – but you need to find out like all the times and dates you would need to be in, and then if that works with his nursery, and how are you going to pay for it.

With regard to family relationship needs, several mothers discussed needs for information on how to manage and cope with tensions in relationships variously encompassing their parents, partners, ex-partners and in-laws. For example, one commented:

> I think things are more difficult for young couples, and that is why a lot of young couples don't last. Like thinking about my friends from my baby group, most of us are on our own now… because there is a lot of pressure on them – especially if they didn't plan it. If you haven't talked about it before you fall pregnant it can be like what does this mean, should we get married, move in together, are we staying together forever?

Some mothers discussed being unable to address other needs whilst concerned about relationships, and described an important support worker role. For example, one commented:

> I think it's good to have that support there, because I was 26 weeks when everything came out, and I was struggling enough telling my mum, my dad, my grans and stuff like that, I couldn't think about like money and what are you going to do next and all that, so [support worker] was there to sort that out for me, and it was also good for my mum and that to get their head around it, instead of having to sort me out, if you know what I mean.

With regard to needs associated with things to do and the associated topic of playtime, several mothers discussed how such activities needed to be affordable (free or subsidised) and accessible (local), and that such activities could be difficult to find without support worker assistance. For example, one mother commented:

> I think that's why some young mums get, like anxiety and, like they get in postnatal depression mode because they're not told about all these things, the things that are on. If you've not got a family nurse or a health visitor that comes to see you a lot you'll never really know.

With regard to stress, some mothers described needs arising from the onset of parenting responsibilities and financial issues, and the impact upon their mental health. For example, one mother commented:

> I think that's how my anxiety sort of started getting bad, because it's just like, for a while I had my

> daughter and trying to do all that stuff, but I think it's mainly because I just went from being a teenager and not here to being hit by all these responsibilities, I mean, it's obvious that it's me that caused it myself, I know that, but it's like so much at the one time.

And another discussed an attempted suicide:

> I was like really worried about money, like how am I going to afford all this? And then I just got really ill thinking about it, and that's what made, I think, me have postnatal depression… But it was worrying about money and how I would pay all these bills, because at the time, my partner wasn't, he wasn't working, and he wasn't able to get any benefit or whatever, so it was like me, and I was paying for everything, and I was like, "I don't have enough money for this". I couldn't sleep, and I was just constantly worrying about it… I had like panic attacks and made myself sick thinking about it, and then it just got to a point where I was like, I wanted to like jump off the Erskine Bridge [a suicide black spot], because it was too much.

With regard to health terms, some mothers discussed needs relating to understanding unfamiliar terminology. For example, one mother commented, "They [health professionals] need to remember that we are young mums - we're not like qualified and 30-year-old, knowing what we're actually doing". And another, "Well, they [social workers] used pure fancy words like pure words I had no idea what they mean, and I had to get my mum to translate for me, to understand what was actually happening".

With regard to domestic abuse, some mothers discussed needs arising from abusive relationships, although not always recognised as instances of domestic abuse. For example, one mother commented:

> The only reason I got bail conditions [for partner] was because [partner] got like done for… domestic abuse or something like that, but he didn't even touch me… Oh what do you call… if [police] get called to a house… were arguing in, what would you call that? A domestic, something like that… But he never like - he never hit me, he like nudged me, and I don't even think he was drunk, so it probably wasn't on purpose, but what he was saying was that would probably be classed as domestic abuse or violence – not violence, well… I don't know.

Another talked about receiving useful information on relationships, but did not expand on why the information was useful, commenting:

> The first thing they [support workers] gave me talks through power and control and healthy relationships and unhealthy relationships, I kept that, I've got it somewhere… it was helpful.

With regard to helplines, one mother discussed a need to access a UK National Health Service helpline. In relation, several mothers discussed feeling oversupplied with helpline numbers, commenting, "… you're constantly bombarded with leaflets, constantly".

Finally, several mothers, in general discussion, discussed feeling overwhelmed by many of the above needs at once. For example, one mother commented:

> When you first find out [pregnant] I think the whole thing is probably labour, is probably one of the first things that comes to your mind. Aspects of money, that's probably another thing that comes to your mind. How do I tell everyone… that's probably a biggie. How are people going to react, that kind of thing. I was… really nervous, I was scared and I kind of made it overwhelming for myself. I kind of was thinking about it too much and, oh, it was nerve-wracking. I was shaking even just thinking about telling anyone.

And another:

> [I had] quite a lot [of questions]… about the breastfeeding for example. Obviously all the stuff that's happening to me like Braxton Hicks contractions. I don't know, just like personally. My relationship with the father of the baby or with the family overall. Obviously the finances…. because I was really struggling at one point and I got [family nurse] and other welfare officers to… help me.

The above mother, when asked how she had felt, replied, "Overwhelmed… because that was a bit too much and especially as this was my first baby and I want everything to be perfect".

5. Discussion

In discussing our findings, we return to our research questions.

RQ1. What are the everyday information needs of disadvantaged young first-time mothers?

We evidence more extensive needs than previous studies, which is perhaps understandable given that several have focused (albeit somewhat narrowly we would argue) on perinatal topics, and few have involved young mothers from disadvantaged backgrounds. If we limit direct comparison to studies with a similar (broad) scope as ours (Nicholas and Marsden, 1998; Cronin, 2003; Porter and Ispa, 2013; Gazmararian *et al.*, 2014; Loudon *et al.*, 2016; Ruthven *et al.*, 2018); beyond commonly identified needs, we identify several needs not previously reported (play, health terms, helplines), and several needs previously only evidenced to very limited degrees (family relationships, domestic abuse, legal advice, things to do). Beyond important breadth of insight, we also provide important depth of insight into needs.

We evidence interrelationships between information needs, for example housing needs interwoven with financial and relationships needs, and work and education needs interwoven with childcare and welfare needs. In relation, we provide insight into issues of cognitive load and affect, evidenced by participants describing themselves as "overwhelmed", and comments such as, "I had like panic attacks and made myself sick thinking about it". There is evidence of the interplay of Wilson's (1997) stress and coping mechanisms known to influence initial action (or not) on needs, and in relation, an important support role provided by health professionals, evidenced in participant comments such as, "I was really struggling at one point and I got [family nurse] and other welfare officers to… help me.". Buchanan et al. (2019) have previously identified such professionals as providing an important intermediary role, assisting young mothers with recognising and addressing needs. This study now evidences this important role from the mothers' perspectives.

We also provide insight into occurrence of information needs. We evidence that our participants have frequent and simultaneous needs relating to parenting (baby care, early learning etc.) and poverty (money & benefits, housing etc.) and personal development (work and education etc.). In relation, it is notable that needs related to domestic abuse appear less common, possibly due to a reluctance amongst our participants to disclose on a sensitive issue. We note this as young mothers are reported to be at higher risk of abuse than older mothers (e.g. Bekaert and SmithBattle, 2016), and a recent study of young mothers' posts to online forums found a significant number (41%) to be relationship related (Ruthven *et al.*, 2018). Thus our findings on this topic might indicate secrecy or deception amongst some of our participants, indicative of self-protective information behaviours (Chatman, 1996).

We also provide insight into which needs mothers feel that they need help with, and evidence that in the majority of instances, our mothers are either unsure of their ability to meet their needs, or need help (see Fig. 1). Several discussed feeling overwhelmed by needs and not knowing were to begin, evidenced in comments such as, "[I] wouldn't even know where to start", and "[I] don't even know what to look for in the first place". There is evidence of incognizance (St Jean, 2012), and early visceral and conscious stages of information need formation (Taylor, 1968), and associated issues of uncertainty (Kulthau, 2004).

In summary, we evidence extensive interrelated information needs amongst our mothers, and identify issues of multiplicity contributing to issues of cognitive load and affect. We believe our findings regarding multiplicity have significant theoretical and practical implications discussed further below.

RQ2. How might we conceptualise complexity of information needs?

Whilst we generally recognise that people have multiple needs and motivations (e.g. Maslow, 1943); we have arguably given limited attention to multiplicity of needs within HIB. To better argue this point, we first unpack multiplicity as a concept, drawing upon our findings to identify and propose three component elements variably contributing to complexity: concurrency, interconnectivity, and fluidity. In doing so we seek to avoid premature simplification (i.e. treating multiple needs as a natural occurrence dealt with via simple deferral and/or selective attention).

Concurrency: simultaneous occurrence of needs is evident in our findings. Illustrative examples include mothers, upon discovering that they are pregnant, having both pregnancy and relationship

needs to resolve, and in several cases, housing needs. Several discussed difficulties in understanding and coming to terms with their pregnancy and communicating to others, particularly family members. Another recounted only securing housing accommodation late in pregnancy and having to deal with basic furnishing needs, including essential white goods important to infant care, in parallel to hospital admission and childbirth. Mothers described such situations as “overwhelming” and “chaos”.

Interconnectivity: relationships between needs are evident in our findings. Illustrative examples include housing needs interwoven with state welfare and relationship needs; and work, education and training needs interwoven with childcare needs. One mother discussed missing out on a state grant due to a change in partner relationship impacting eligibility; and another recounted difficulty aligning her college education needs with nursery and state welfare needs. Many aspects of infant care, for example sleeping and feeding, are also interwoven, with mothers discussing a need to understand how one influences another. Mothers described such needs as “a nightmare” and “a muddle”.

Fluidity: evolving and changing needs are evident in our findings. Illustrative examples include needs relating to infant development; and housing and financial needs impacted by a lack of stability in personal circumstances (e.g. employment, residence, relationships). Several mothers discussed ongoing changes in infant feeding needs and routines brought on by natural infant development, and their need to constantly learn and adapt. Another discussed volatile living arrangements including four changes of short-term accommodation, and ending in homelessness. Mothers described such situations as “drastically changing all the time” and “really stressfull”.

The above phenomena are variously found in definitions and descriptions of complex systems (for a recent review of common characteristics in the context of social systems, see Turner and Baker, 2019), and for our purposes, help us to better understand multiplicity as a factor contributing to complexity of information needs. Returning to our point regarding limited attention to multiplicity within HIB, we now consider with reference to commonly cited models.

Taylors (1968) highly cited levels of information need, and associated pre-negotiation model, refers to “need” rather than “needs”. Accompanying discussion is similarly focused on singular instances of need formation and expression. Wilson (1981, 1997) variously refers to “need” and “needs” when discussing his model of information behaviour, but similar to Taylor (1968), the model begins with “need”. Supporting discussion (Wilson, 1981) acknowledges interrelationships between underlying primary (basic human) “needs”, but in general terms. Kulthau (2004), with reference to Taylor (1968), also refers to “need” in her task-based model of the information seeking process. Need is associated with a topic and task, and whilst there is some discussion of multiple topics and tasks, need is treated in the singular. Further models provided by Krikelas (1983) and Robson and Robinson (2013) diagrammatically depict “needs”, and Krikelas notably distinguishes between immediate and deferred needs, but neither model provides further distinction or discussion. A similar orientation is found in reviews of HIB such as Case and Given (2016), who variously refer to “need” and “needs”, but again without significant distinction.

This is not intended as a criticism of such seminal models and authoritative reviews, but does suggest a gap in our understanding, for whilst we appear to tacitly acknowledge the existence of multiple information needs, we also appear to limit our conceptualisation and discussion to single instances (and/or treatment of need as an abstract noun). We would argue that this is an over simplification and significant omission, giving limited explicit consideration to the reality of complex everyday situations, and cognitive and affective factors of selective and divided attention. As we have evidenced, complex situations create complex needs competing for attention, and compounding issues of cognitive load and affect. How people identify, understand and attend to complex needs appears to be largely unexplored in HIB research.

6. Practical Implications

Our findings raise important practical questions regarding how we approach complexity of information needs in our design of information systems and services, particularly digital. Complexity is commonly addressed through meaningful schemas and element interconnectivity, but arguably within narrow topic boundaries. For example, if we examine the two main State provided sources of online

information on parenthood, the National Health Service Scotland's 'ReadySteadyBaby' [1], and the Scottish Governments 'Parents Club' [2], the former only addresses seven of our fourteen categories of identified needs, and the latter only five. Neither provide holistic support in relation to our findings. At best, they assume that mothers can self-identify their needs, and locate and navigate multiple systems to meet; however, our findings suggest this is often not the case without intermediary support with significant implications for digital healthcare strategies and associated goals of self-management.

7. Limitations and Areas for Further Research

Our findings should not be considered representative of mothers as a whole as mothers are not a homogenous group. In relation, our findings should not be considered representative of young mothers as a whole as not all are disadvantaged. We thus provide insight into the information needs of a particular group within a particular socioeconomic environment, and encourage further studies with further population groups. However, whilst population generalisation is not possible, theoretical generalisation is through quality of theoretical reasoning. We thus propose that our concept of multiplicity has broader applicability for identifying and understanding complexity of information needs in profound and problematic situations beyond motherhood (i.e. during other major life transitions). In relation, we would call for further research into how people identify, understand, and attend to multiple information needs, and the socioeconomic and psychological influencing factors (and benefiting from an interdisciplinary perspective that draws upon relevant existing work including the study of motivation and attention within psychology). How we holistically support peoples' complex needs in our design of information systems and services, and communicate via health promotion/education campaigns, also warrants further research.

8. Conclusions

The transition to motherhood is a period of profound change and psychosocial adjustment for women that creates multiple new needs for information. We have evidenced young first-time mothers from areas of multiple deprivations to have more wide ranging and complex needs than previously understood, spanning topics of parenting, poverty, and personal development. We also evidence that in the majority of instances, our mothers are either unsure of their ability to meet their needs, or feel that they need help with their needs. Several also felt overwhelmed by the extent of their needs, and described situations of anxiety and stress. Intermediary support appears important in such circumstances, assisting mothers with understanding and addressing their needs. In relation, we raise important questions regarding limited holistic support within existing systems and services, particularly digital.

We identify and conceptualise multiplicity as an important factor contributing to complexity of information needs, including three component elements: simultaneous occurrence of needs (concurrency), relationships between needs (interconnectivity), and evolving needs (fluidity). We evidence that in various combinations these elements influence a mothers' ability to action and/or selectively attend to needs due to shared immediacy and interactivity, with multiple needs often competing for simultaneous attention, and compounding issues of cognitive load and affect.

We posit that to this point multiplicity of information needs has received limited attention within human information behaviour, and that this is an over simplification of the reality of complex everyday life situations such as motherhood. We call for further studies into how people attend to multiple needs, and influencing factors, to progress practical and conceptual understanding of complex real-world situations. Such studies will advance our understanding of interactive aspects of information needs, and why some needs are acted upon, and some are not.

Notes

1 https://www.nhsinform.scot/ready-steady-baby

2 https://www.parentclub.scot/

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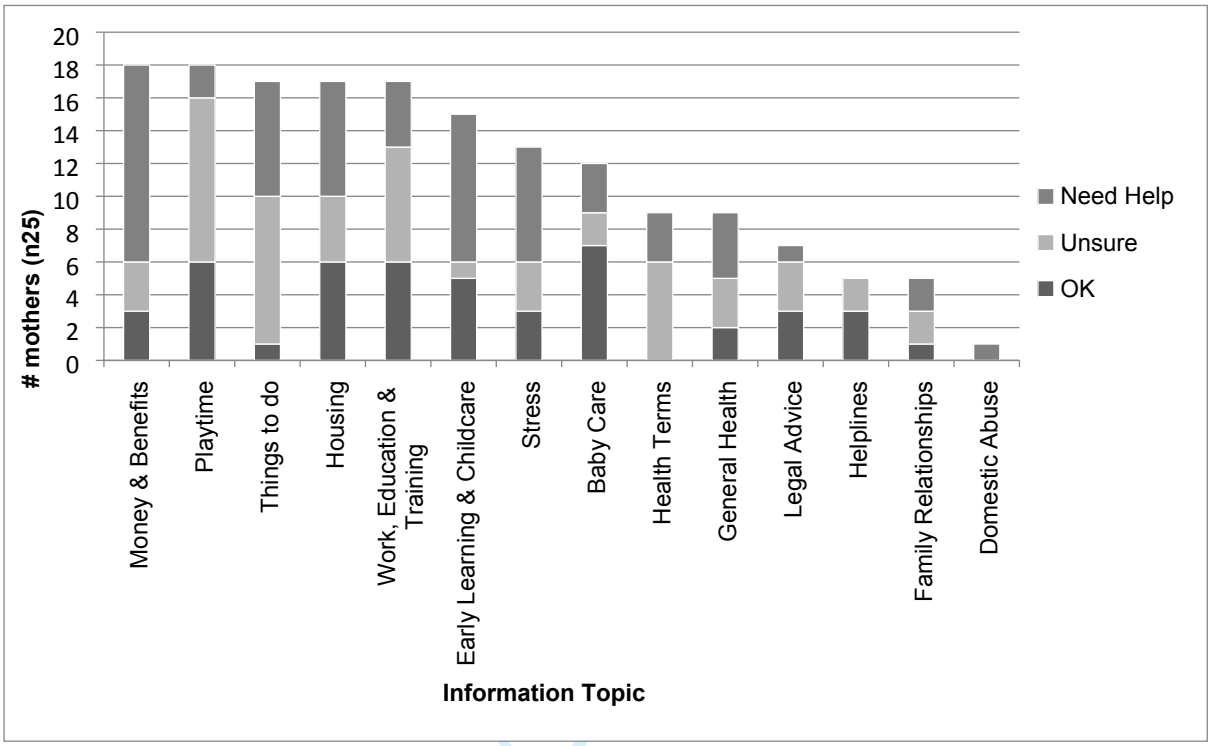

Figure 1: The information needs of young mothers (questionnaire) and their confidence in their own ability to meet.

Table 1. A typology of information needs of mothers (derived from Buchanan et al., 2018)

Categories	**Examples**
Baby Care	Pregnancy, birth, sleeping, bathing, feeding, immunization etc.
General Health	Postnatal depression, family planning, diet, illnesses & infections etc.
Health Terms	Basic medical terminology, acronyms, definitions etc.
Early Learning & Childcare	Social & emotional development, language & literacy, nursery etc.
Playtime	Early communication, reading, singing, games, toys etc.
Things to do	Mothers groups, playgroups, places to visit etc.
Stress	Anxiety, relaxation exercises, sleeping problems etc.
Money and Benefits	State welfare, maternity grants, food and vitamin vouchers etc.
Housing	State housing, private renting, furnishing, repairs, eviction etc.
Work, Education &Training	Careers, jobs, courses, childcare support etc.
Family Relationships	Communication, sexual relationships, separation etc.
Domestic Abuse	Emotional abuse, physical abuse, sexual abuse and coercion etc.
Legal Advice	Tenancy agreements, debt, employment rights, child custody etc.
Helplines	Emotional support, counselling, support services etc.

Table 2: The information needs of young mothers by occurrence and times discussed (interviews).

Information Topic	# mums discussed (n39)	%	# times discussed (n494)	%
Baby Care	25	64.1	124	25.1
General Health	24	61.5	97	17.8
Money & Benefits	22	56.4	76	15.4
Housing	20	51.3	32	6.5
Early learning & Childcare	20	51.3	27	5.5
Legal Advice	17	43.6	41	8.3
Work, Education, Training	14	35.9	21	4.2
Family Relationships	13	33.3	37	7.5
Things to do	12	30.8	19	3.9
Stress	9	23.1	9	1.8
Health Terms	8	20.5	9	1.8
Domestic abuse	6	15.4	6	1.2
Playtime	4	10.3	4	.8
Helplines	1	2.3	1	.2