Developing health information literacy in disengaged at-risk populations: insights to inform interventions

Abstract

Purpose: to advance our understanding of the challenges of health information literacy education in disengaged at-risk populations; and from the perspective of professionals out with information professions occupying everyday support roles.

Design/methodology: qualitative in-depth case study. Our participants were a team of UK Family Nurses providing outreach support to young expectant mothers from areas of multiple deprivations, and the mothers themselves. Our data collection methods were observation, survey, interviews, and focus groups.

Findings: information needs of mothers are multiple, and not always recognised as information problems, or revealed. Several felt overwhelmed, and actively avoided health information. There is low awareness and/or use of state sources of online health information.   Family nurses provide an important information intermediary role, but are unfamiliar with information literacy (IL) concepts and models; consequently, there is limited evidence of client transitions to independent information seeking, or underpinning pedagogical practices to achieve such goals.

Research limitations/implications: further research is required into appropriate pedagogical approaches to IL education adaptable to semi-structured everyday situations. Recognition of information need requires particular attention, including methods of elicitation and specification in the problematic context.

Practical implications: in an era of digital transitions and public service reforms, we raise important questions regarding the true reach of Public Health policy.

Originality/value: holistically examining nurse-client information behaviours; extends discussion of low IL in nurses beyond issues of evidence based practice, to issues of developing healthcare self-efficacy in at-risk clients.

Keywords: information literacy, health information literacy, information behaviour, information intermediary, mothers.

Article classification: research paper

1 Introduction

This paper advances our understanding of the theoretical and practical challenges of developing health information literacy (understood as information literacy (IL) in the health context) amongst disadvantaged (socioeconomic) and dependent (support) populations; and from the perspective of professionals out with information professions occupying everyday support roles (e.g. health and social care).   Such a perspective is important as two recent information behaviour studies (Buchanan and Tuckerman, 2016; Buchanan et al, 2018a) conducted with at-risk (health and wellbeing) groups in areas of multiple deprivations (e.g. employment, education, health, crime), which evidence significant IL issues, also evidence general disengagement with information professionals (e.g. librarians, educators) and associated learning programmes, and a localised dependence upon support workers when seeking everyday information. Cognisant to correlations between low IL and poor health outcomes (e.g. Berkman, 2011), this study raises important questions regarding approaches to IL education in at-risk populations, and the role of primary healthcare professionals in everyday support roles.

2 Background

Our understanding of information literacy (IL) in the everyday context, i.e. out with formal education programmes and the workplace, is limited. Martzoukou and Sayyad (2017), in a recent review of research examining IL in the everyday context, report that, "Despite the clear value of information literacy within the everyday life context, most empirical research has been conducted within educational and workplace settings" (2017, p.2).   In relation, they report that, "...the implications of lacking IL skills within the everyday life environment have not been sufficienctly researched ...   It is further unclear how people can be supported and empowered to develop effective information literacy practices within the different realms of everyday life" (2017, p.29).

A broader perspective is also called for within health fields. McCormack et al (2017), reporting calls for a broader perspective of health literacy that shifts the focus of current research from, "...examining patient-level skills and deficits to more in-depth and cross-cutting studies that include individuals and populations as well as health professionals and health systems" (2017, p.8), concludes that, "Despite these calls for a broader perspective, there have been no systematic attempts to expand conceptualization of health literacy and increase patient engagement" (2017, p.9). McCormack et al (2017) argues that to effectively address issues of low literacy requires a broader social ecological perspective that takes into account multiple and complex levels of influence and interaction (i.e. individual, interpersonal, organizational, community, and macro-policy). Similar to Martzoukou and Sayyad (2017), understanding of context is identified as important to effective IL interventions. Similar issues are raised with regard to the digital health aspects of health literacy. For example, in a systematic review of factors influencing digital health interventions, O'Conner et al (2016) conclude that, "Further research is needed on novel ways to engage and educate the public about digital health" (2016, p.11), including better understanding of how demographic variables such as low socioecomic status influence engagement with health information.

Two recent information behaviour studies amongst at-risk populations (Buchanan and Tuckerman, 2016; Buchanan et al, 2018a) have contributed to our understanding of IL in the everyday context, and provided direction for this current work.

Buchanan and Tuckerman (2016) in a study of adolescent information behaviours in disadvantaged and disengaged circumstances, worked with UK young people aged 16-19 not in education, employment or training (NEET), and their support workers. NEET youth are an at-risk group as delinquency rates are higher than peers, as is the prevelance of substance abuse and mental health issues (O'Dea et al, 2014; Princes Trust, 2014). Buchanan and Tuckerman evidence low levels of IL amongst NEET youth; with NEET youth demonstrating a wide range of unmet everyday needs, a dependence upon support workers when seeking and processing information, and passive non-motivated information seeking behaviours often abandoned. Such issues are compounded by an impoverished and insular existence, and general disengagement with state services. Buchanan and Tuckerman report that due to such issues, support workers would not leave NEET youth to find information independently, but would instead provide or guide them to information. An important everyday support role is identified, but, in relation, Buchanan and Tuckerman found, "no evidence of proactive transitions to independent information seeking from either party, nor of basic literacy issues being explicitly addressed" (Buchanan and Tuckerman, 2016, p.543). The authors recommend remedial IL education as an, "immediate priority for public and third sector agencies, addressing both immediate and long-term needs" (Buchanan and Tuckerman, 2016, p.533). Cognisant of issues of insular existence and disengagement, they recommend that interventions be based on tailored outreach, and that, "Such interventions face a number of significant challenges, not least managing adolescent perceptions of independence in dependent and vulnerable situations, and issues of trust" (Buchanan and Tuckerman, 2017, p.544).

Buchanan et al (2018a) further explored the everyday role of support workers, and the factors influencing information interactions, via fieldwork with UK state and voluntary sector professionals (i.e. health and social care) who provide support to young vulnerable mothers from areas of multiple deprivations. Such mothers are an at-risk group as they are more likely to be single parents, to have experienced family conflict/trauma, not to be in employment or education, and at risk of short and long term mental health issues (Trivedi et al, 2007). Buchanan et al report low levels of IL amongst young mothers, and similar to NEET youth, report this issue compounded by general disengagement with state services and structured learning programmes. Young mothers are reported to have multiple, interrelated, and at times competing information needs, many unmet without support worker intervention and assistance. Buchanan et al (2018) evidence and define an important information intermediary role amongst support workers with three key contributions to information behaviours in disadvantaged and dependent circumstances. Intermediaries: facilitate information needs recognition and considered purposeful action within problematic situations; are a key source of information in themselves, and a key integrative connection to other external sources not otherwise accessed; and tailor and personalise information for relevance, and communicate via incremental and recursive cycles that take into account learning needs. However, whilst identifying an important intermediary role, Buchanan et al [2018, n.p.] also note that, "Evidence of dependent relationships also raises important research questions regarding the development of self-efficacy in disadvantaged populations, and the role of non-information professionals engaged in everyday support roles".

In summary, the above studies identify low levels of IL in at-risk populations, and a high dependence upon localised support workers as information intermediaries. This raised two key research questions; in disadvantaged and dependent populations:

1. What is the IL education role of non-information professionals occupying everyday support roles?

2. How is, and should, IL education be approached in everyday problematic situations?

3 Methodology

Our case study participants were a team of UK National Health Service (NHS) Family Nurse Partnership (FNP) nurses providing outreach support to vulnerable young first-time mothers from areas of multiple deprivations, and

the mothers themselves.   Nurse visits are from pregnancy to child age two: weekly at start, then fortnightly scaling down to monthly towards end. The study zone (team area) was confirmed via the Scottish Index of Multiple Deprivations as within the 5% most deprived decile in Scotland (Scottish Government, 2016).

As previously noted, young mothers from areas of multiple deprivations are an at-risk group. Infant mortality rates are higher than older mothers (Torvie et al, 2015), and babies at greater risk of poor nutrition and care (Harron et al, 2016).   Stress and anxiety are heightened, as are rates of depression (Raskin et al, 2016).   Low literacy is also reported (Bennet et al, 2013).   Notwithstanding such issues, motherhood can be a positive and transformative experience for young people (Brand, 2014); however young mothers can be subject to significant negative attention and stigmatisation that encourages marginalisation and "a climate of sex-based shame" (Shoveller and Johnson, 2006, p.47).   Such factors contribute to issues of disengagement with state services (Buchanan et al, 2018a).

Our theoretical framework was provided via models and concepts of information behaviour and IL.   Wilson's (1999) model provided an overarching framework for understanding information behaviours at the macro-level.   IL was defined as per the American Library Association (1989) definition, "Information literacy is a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information."; and placed in the health context via Scottish Government NHS definition [Scottish Government, 2014, p.3], "Health Literacy is about people having enough knowledge, understanding, skills and confidence to use health information, to be active partners in their care, and to navigate health and social care systems".   For nurses unfamiliar with IL, the Big6 model was utilised as a generic model to illustrate and initially explain IL in relation to information seeking processes, and to relate nurse practices to theoretical concepts. Utilised solely as a illustrative high-level model, further broader discussion of approaches to IL was encouraged via open questions (i.e. discussion not specific to one model or approach).

Our data collection methods were observation, survey, semi-structured interviews and focus groups, conducted over six months, and designed to explore nurse-mother information interactions both physical and digital.   For the period of the study, each nurse was provided with a tablet PC and mobile Internet access.   Tablets included a bookmark to YoYo, a digital portal providing direct access to state sources of information for mothers (for a YoYo overview, see Buchanan et al, 2018b).   It was made clear to nurses that they were free to use tablets as deemed appropriate and were under no obligation to use YoYo (or any other digital resources) during their interactions with mothers.   Previous to provision of equipment, nurses had no means of digital access during home visits beyond their own personal mobile phones.

Exploration of digital interactions is important given that digital is a key aspect of ongoing public service reforms. To place in context, the Scottish Government (2017) digital strategy seeks to, 'put digital at the heart of everything we do' (p.2), with digital considered, 'key to the transformation of health and social care' (p.15).   The associated digital health and care strategy (Scottish Government, 2018, p.2) states that, "Over the next decade digital services will become not only the first point of contact with health and care services for many people, but also how they will choose to engage with health and care services on an on-going basis."

Observation was conducted prior to interviews to provide the researcher with a degree of immersion and appreciation of the research environment.   One researcher attended three team meetings, and accompanied nurses on six home visits to observe nurse-mother information interactions. Observations were not recorded to maintain a sense of normality (notes written post-observation).

A survey (mothers) was distributed to explore what information mothers look for online, and how and where.   A pre-coded list of information topics was provided via the typology developed as part of YoYo design (Buchanan et al, 2018b).   These categories were: general health; health terms; baby health; baby play; baby learning and development; stress; housing; money/benefits; family relationships; work, education, training; domestic abuse; legal advice; and helplines.   Mothers were asked if they do/would look online for information on these topics, and if so, where they looked (i.e. Google search or specific sources). Participants who indicated use of a specific source were asked to identify the source.   Participants could also add further information needs/topics.   The survey also asked mothers to self-rate (likert scales) their abilities to use computers, and locate and read information, without difficulty.

Individual semi-structured interviews with mothers were conducted to explore nurse-mother information interactions from the mothers' perspectives.   Questions explored the types of needs that formed the basis of interactions, the sources of information used, and the nurse role.   Two rounds of individual semi-structured interviews with nurses firstly explored nurse-mother information interactions from the nurse perspective, and then nurse understanding of IL concepts, and approaches to IL education in clients. One team member conducted interviews, which were recorded and transcribed in full.

Finally, a focus group with the nurse team was conducted over two semi-structured sessions.   In the first session nurses were provided with summarised findings from observation, survey, and interviews, and invited to discuss validity.   In the second session, nurses were asked to discuss their IL role, approaches to IL education, and influencing factors.   One research team member moderated the sessions with minimal intervention beyond instruction, presentation of data, and prompts.   The second team member observed and took notes.   Sessions were recorded and transcribed in full.

Data analysis incorporated both deductive and inductive elements, with data disaggregated into meaningful categories via identification of patterns and regularities through iterative pattern coding and thematic analysis.

Initial start-list codes were based on, but not limited to, concepts of information behaviour and IL. Further codes were emergent from data, in particular those relating to factors influencing interactions. Multiple data collection methods facilitated triangulation. Periodic code checking (multiple sample coding), was conducted by one team member independent to the first, with no notable variations found. Emergent themes were developed and refined iteratively including crosschecking for coherence, consistence, and distinctiveness (Braun and Clarke, 2006).

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 voluntary participants.

4   Findings

Participants

Our six family nurse participants, who formed the area team and participated in interviews and focus groups, were aged 36-51 (avg. age 43). All were university-qualified, and collectively posssessed 105 years professional experience in healthcare with the majority of time in family support roles (avg. experience 17.5 years). The combined caseload of participants at time of study was 89 young mothers.

Completed surveys were returned from 31 mothers, however two returns where largely incomplete and removed, leaving a total of 29 participants (33% return rate). Our survey participants were aged 17-20 yrs (avg. age 18.5 yrs). All were expecting their first child, and all were from areas of multiple deprivations. The majority (86%) had completed one or more school qualifications (National 4/5) and/or college (HNC/HND) qualifications. 14% had not completed school. None had completed a university degree.

The six interviewed mothers were aged 17-19 yrs (avg. age 19 yrs), and all from areas of multiple deprivations. Five were expecting their first child, and one had given birth (child four months old). All had completed one or more school qualifications (National 4/5) and/or college (HNC/HND) qualifications.

Observation (nurse-mother)

Observation was primarily intended to sensitise the researcher to the research environment and establish acceptance amongst participants; however some observations are notable. Nurses were observed taking time to discuss individual needs of mothers (often poverty related), and flexibly accomodating such needs alongside delivery of FNP programme specified learning outcomes (e.g. mother health, homebuilding, personal development, pregnancy and child care, relationships, access to services). Nurses were also observed bringing various resources with them to deliver and support individual learning needs, ranging from the provided tablet PCs to leaflets and visual and demonstrative props such as foetal dolls. Information interactions could thus be considered semi-structured and interactive, nurses being flexibly responsive to arising everyday needs alongside pre-prescribed FNP programme aspects.

Survey (mothers)

All 29 survey participants confirmed that they look online for information. They were then asked, for each information topic (see methodology), if they do/would look online for information on the topic, and whether they would conduct a Google search, or go to a specific source.

As illustrated in Figure 1, our mothers have multiple information needs across multiple topics, and do/would predominently look online for information on these topics via Google searches. Of a total of 223 information needs indicated by 29 participants, 180 (81%) are or would be Google searches.

The majority of our participants do/would look online for information on health topics (General Health, Baby Health, Health Terms, Baby Development). For General Health information, the highest ranked topic, 36% of participants indicated use of a specific source; however 8 of 10 of the applicable respondents cited the parent organisation "NHS" rather than a specific source. Similar patterns are evident in the responses to other health topics, with references to specific sources for Health Terms (8%), Baby Health (15%), and Baby Development (18%), and again the majority general references to the NHS. Across health topics, one specific reference was made to "NHS Inform", the NHS online information service; and none to ReadySteadyBaby, the NHS online guide for pregnancy and childbirth.

The majority of our participants do/would look online for information on Education/Training and Money/Benefits topics, with reference to specific sources, 36% and 48% respectively. However, once again, specific sources are not identified. For example, for Money/Benefits, 6 of 10 participants cited "government website" or variant.

Approximately half of our participants do/would seek information online for Housing and Helpline topics. For Housing information, 27% of participants indicated that they would use a specific source, but again provided general references (local council). For Helpline topics, no specific sources were indicated.
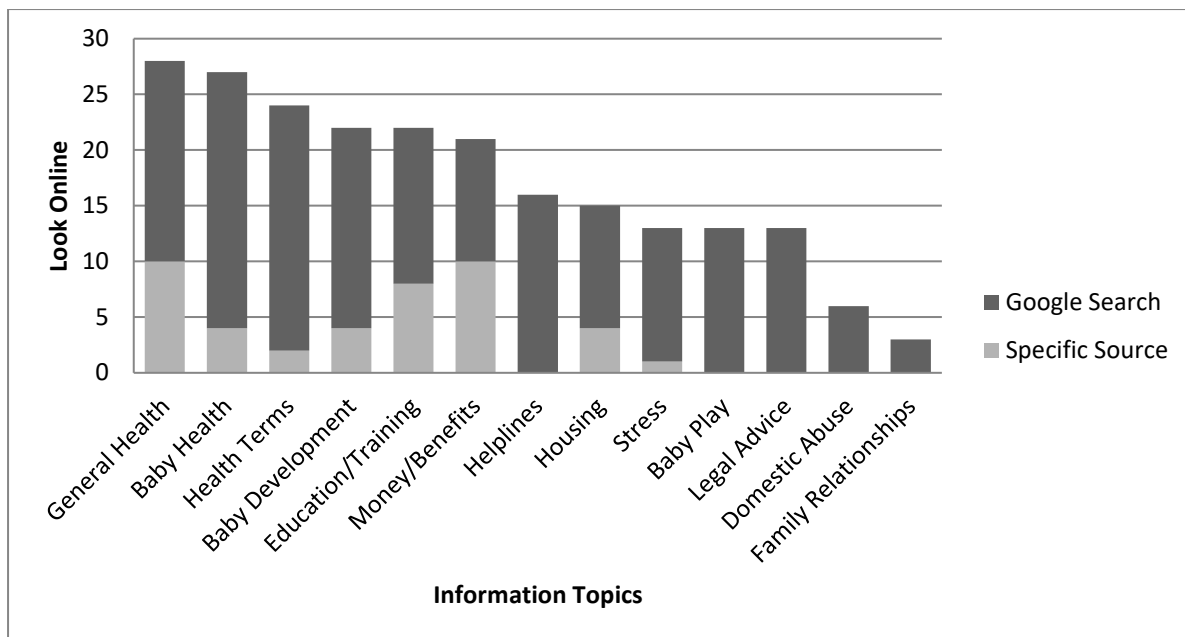
Figure 1. Type of online information seeking conducted by young mothers (n29) by information topic.

Just under half (45%) of participants do/would seek information on Stress, Baby Play, and Legal Advice. For Stress, one participant indicated use of a specific source with a general reference to, "u tube". No specific sources were indicated for Baby Play and Legal Advice.

Some mothers indicated that they do/would look for information on Domestic Abuse and Family Relationship topics online, 21% and 10% of participants respectively. All indicated that they would seek information on these topics via Google searches.

Mothers were also provided with opportunity to add any information needs/topics that they felt they had but were not covered by the survey. None were provided.

Finally, mothers were asked to self-rate their ability to use computers, find information, and read information. With respect to their ability to use computers without difficulty, the median response was 5, equating to 'strongly agree'. With respect to their ability to find information without difficulty, the median response was 4, equating to 'agree'. With respect to their ability to read information without difficulty, the median response was 4, equating to 'agree'. In total, across all responses, two participants (7%) indicated experiencing difficulties, one with respect to finding information, and one with reading information. Eight (28%) neither agreed nor disagreed. Full distribution is illustrated in Figure 2.

Interviews (young mothers)

When asked about what types of information needs they have, several mothers discussed multiple needs and issues of affect. For example, one 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.

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...

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".

Information needs related to labour were a recurrent theme, and often multiple in nature. For example, one mother 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?
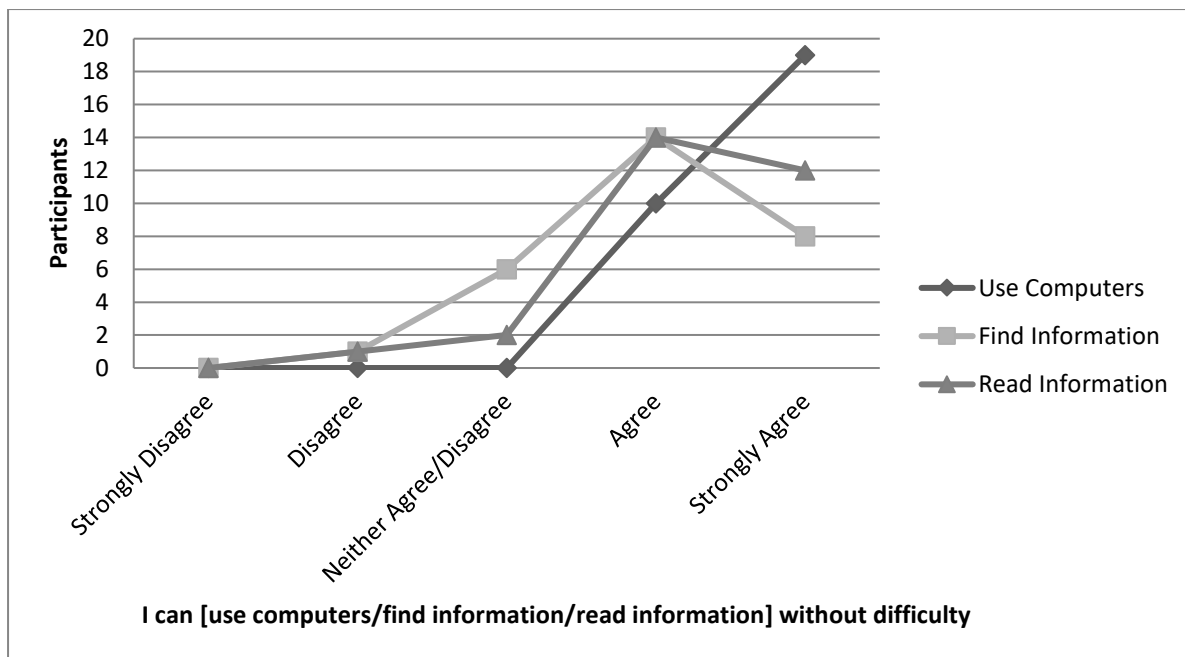
Figure 2. Young mother (n29) assessments of their abilities to use computers, and find and read information.

Some mothers provided vague responses to questions regarding information needs. For example, one replied, "Probably labour", but beyond that, that she, "Can't think of anything". Some mothers felt that they had no specific questions. For example, one replied, "Not really… because I've got a lot of cousins and that so I already know a lot about weans [babies]", and in relation to birth that, "I'm not thinking about it [laughs], I'm just waiting".

Some mothers discussed issues of awareness of needs. For example, one commented, "Probably there will be a lot that I won't know about but it's just not came through yet because I've not experienced it." And another, "I thought I knew quite a lot until she [family nurse] came out and gave me everything".

With regard to how such needs are met, all mothers identified their family nurse as an important and trusted source of information and support. For example, one commented, "Whatever I need to ask her she'll help me". And another:

She [family nurse] is just so helpful. Cos I can text her whenever if I am worried about something. She is so understanding and easy to talk to, and I feel like I really could speak to her about anything. Just most recently with the housing - just applying for my own flat and stuff like that, and she gave me so much information... because before I really had no idea.

And another:

She [family nurse] helps a lot cos I'm not… I don't tend to ask… I don't go to the midwives and ask 101 questions, I just wait until she is out and then I have 101 questions to ask her do you know what I mean. She's a massive help.

Whilst discussing nurse role, several mothers also indicated preferences for interpersonal communication. For example, one commented:

Every time I Google something there's all these forums like women talking and I don't really like to listen to that, but then [family nurse] said about this YoYo application, and that's all the websites that are I guess like monitored, and the real information is in them, but I'd still rather just ask [family nurse] or my midwife about something.

And another:

I think the nurse really has helped with everything just cos I think if I did have just the Internet... it would have just been completely different, just the whole experience of you know having a baby and things like that… I can look up stuff and get like printed information and know the facts but it's also good to be able to like speak. I think it's maybe something to do with how I am as a person… it's a lot easier to speak to her and explain things properly rather than, "how I am going to type out this question… into Google", whereas you know I can write a text or speak to her in person and get like an instant response and one that I understand.

Some mothers actively avoided information. For example, one in the late stages of pregnancy commented, "I'm feeling dead nervous… I try not to look stuff up because there are horror stories and I don't want to scare myself".

Another discussed avoiding online sources when seeking information on labour, commenting, "I didn't go online for that because I knew I would freak myself out with the newspaper articles and all that kind of stuff". Instead she had sought advice from other mothers including her own parents.

One mother discussed using specific online sources of trusted information, commenting, "…the NHS website, that's where I normally go first because I feel that's more secure information". However, the same participant also commented:

> I suppose it [motherhood] could be quite stressful because it's all completely new especially when the baby was like first born… but now it's if I've got a question I know its not going to be terrible and a quick Google can find that answer for me.

Finally, mixed emotions were evident throughout discussions. For example, one mother commented, "I was just asking [family nurse] if I will manage to become a mum at such a young age and how I think mentally I will cope with it. It has just made me really think about the future". And another:

> It's a lot of emotions isn't it? You're scared but you're excited cos you're going to meet a new life, but… I don't know. I am scared. But I know that when I go into hospital they'll do everything possible to make it a good experience.

Interviews (nurses)

When asked how frequently nurses used digital sources of information for their own professional and personal purposes (to ascertain general levels of digital engagement), the median response for both was 5, equating to 'very often'.

When asked how frequently nurses used and/or referred to digital sources during their interactions with mothers, the median response was 2, equating to 'not very often'. One nurse reported no digital interactions. Whilst digital usage was low, all nurses felt digital had an important role. Examples of use included accessing visual resources to aid mothers' learning such as videos of children's games and nursery rhymes, and demonstrative techniques for effective breastfeeding and managing stress.

Low digital interactions were attributed to issues of access and time, and preferences for interpersonal communication. For example, one nurse commented, "Technical issues, just due to where you are [client homes] and maybe not having Internet access". And another, "Well we did try to do it on our phones but we found that it wasn't working that way". In relation, nurses discussed how many mothers had limited Internet access, and whilst public libraries offered a solution, they were not used. For example, one nurse commented, "...the majority they don't go to the library... if they've got phones they've got limited data or they have poor network connections as well". And another, "I've got a couple of clients who don't even have a phone never mind a Kindle or laptop or anything."

With regard to issus of time, priority was given to prescriptive, and paper-based, FNP information topics. For example, one nurse commented:

> Each of our programme visits usually would last about an hour and we've got a certain amount of information that we would try and share with our client... and we know that if you deliver the programme... you are more likely to get the outcomes for the young women and their children.

And another:

> So we do have a lot of paper... that's the programme that we're delivering that takes a lot of time in those visits as well as addressing whatever other issues will be there for clients. Getting time to sit with the pad and spend time, that can be quite challenging.

Nurses also discussed interpersonal communication preferences. For example, one commented, "I just feel that the mums themselves are thinking, 'well I can look that up later'. They are more kind of wanting the time for a kind of one to one verbal kind of chat." And another, "To try and fiddle about with your phone, to try and skip along is not particularly easy... when you are trying to engage with them".

When asked if prior to interviews, nurses had been familiar with the term information literacy, five responded no, and one yes. When asked if they had completed any IL training or qualification, five responded 'no', and one 'yes'. For the 'yes' respondent, this was in relation to a postgraduate healthcare degree. When asked if IL had been explicitly covered they replied, "I suppose probably not specifically". When nurses were asked if they were familiar with any IL models or frameworks, five responded 'no', and one 'yes'; however, the 'yes' respondent could not recall any particular model or framework.

When asked how confident nurses felt in their ability to develop IL in clients, the median responce was 3 equating to 'somewhat'. One nurse commented that whilst unfamilair with IL concepts, they had a degree of confidence in their ability to develop IL skills in clients due to feeling that they understood IL concepts as presented during discussions:

> I think because that's the first that I have seen that [IL] model, so I like to get more information and look at things and make sure that I am doing it right, so it's probably just because that's the first I am seeing that, that when you talk about IL I think yeah OK – when you explain it I know what you're talking about so I should be

able to implement that in practice OK.

All nurses felt that they had a role in developing IL in relation to FNP goals to develop self-efficacy in clients. For example, one commented, "Well we're not going to be with them forever... we're trying to give these girls the skills to find out information in life". And another:

I do feel I have a [IL] role because... part of the FNP programme is about self-efficacy and about people being able to do things independently and get the best possiblle information for the best possiblle outcome for them and their baby.

When asked how they developed IL in clients, the majority discussed this in the context of meeting needs, and conducting searches on behalf of mothers. For example, one commented, "I think its [IL] something we do on a day to day basis... well for a lot of our clients it's really helping them understand their needs before you can even move forward to how we go about meeting those needs". And another, "I suppose... it probably depends what the topic was, if I was able to find that information, but it's then about navigating through that particular system then as well in order to find the right answer for them as well too".

All nurses discussed how, for interactions to be effective, it was important that information was meaningful to mothers. For example, one commented, "...it's got to be something that they are interested in, it's got to be something that they want to hear". Several discussed using the elicit-provide-elicit motivational technique to understand and meet needs, and being prepared to revisit topics. For example, one commented, "...it's finding out what they know, what they need to know, because again everybody has different information, everyone has different knowledge". In relation, nurses discussed the need for sensitivity. For example, one commented, "...you are trying to maintain a therapeutic relationship and a lot of these young women are quite volatile because of their situation and in order to change, sometimes you have to push a wee bit".

Nurses discussed several challenges to effective information interactions, categorised as: determining individual needs, changing online behaviours, transitioning from dependent relationships, and digital skills.

All nurses discussed dealing with multiple and varied needs on an individual basis. For example, one commented, "all clients are different", and another, "everybody's individual". In relation, nurses discussed how individual needs could be difficult to elicit. For example, one commented, "Some of the clients can be really quiet you know... and they might not feedback much", and another, "I have one client who is very, very quiet... I think she potentially finds it difficult to communicate verbally". Low self-esteem and confidence were considered significant contributory factors. For example, one commented, "...she has lots of isssues with low esteem and low confidence coming from her own adverse childhood experiences", and another, "Sometimes they don't want to know. Sometimes they don't have the confidence. Sometimes you can be faced with barriers as well, and some don't have the literacy skills, they are not able to read and write". Such issues impeded effective information interactions. For example, one nurse commented, "They feel really judged... they dont want to ask questions so that's not helpful, they don't fully talk about the issues which they have because they think somebody is going to judge them".

All nurses discussed difficulties in encouraging mothers to access state sources of online health information, and the importance of demonstration and reinforcement to encourage use. For example, one nurse discussed how when she asked mothers if recommended online resources had been used between visits, she had received a common reply of, "No, I just used Google". The nurse commented, "I think it's a cultural thing. Its just what they're used to doing and I think I probably need to be better at kind of keeping going back to the resource and maybe it will start to kind of mirror them using it I suppose". Another commented, "I think it's just about all the time reinforcing what the helpful sources are". And another:

They would start to do it and then it would get a bit complicated and... then they would give up I suppose and maybe even get sort of waylaid... find it difficult to know where it is pointing them to... maybe the language isn't always particulalry useful for them or they don't maybe understand it.

In realtion, several nurses felt that they themselves would benefit from digital skills training. For example, one commented:

I would love someone to help me to go in and work certain things out... on the phone or computer... to help me be better at doing that kind of thing so that I could then pass that on, or at least be more knowledgable than I am at the moment about... carrying out searches and things, cos you know I'm probably not brilliant at doing that.

Another commented:

I think for... family nurses or practitioners in general it would be great just to get more information ourselves and maybe more training... and perhaps have something that would kind of follow the programme... that would be specific to the FNP programme, that you could always get information from... that the client could also use would be great, and we could all be singing from the same song sheet really, and you would know it was correct up to date info... that would be beneficial.

Transitioning clients from dependent relationships could also be a challenge. For example, one nurse commented:

I find that a lot of them expect maybe their parents... or maybe even older siblings to do a lot for them, so I think they are maybe used to other people carrying out these kind of tasks for them so sometimes they then maybe

expect myself to then go and kind of do it for them too.

Focus groups (nurses)

Nurses agreed with summarised findings except for the young mothers' ratings of their own abilities to use computers, and locate and read information without difficulty (see Figure 2). All nurses thought that mothers had overestimated their abilities across all three criteria. For example, one nurse when presented with the summary data, commented, "I'd be sceptical about that", which prompted multiple "yes" responses from others. A discussion ensued with several nurses believing that when mothers rated their abilities to use computers and information, they did so largely in relation to social media use. For example, one nurse commented, "I think they have no problem accessing social media and I think that's maybe what their understanding of using computers would be", to which another replied, "Instagram. But when it really comes to getting meaningful information I think that would be a different spin on things". In relation, nurses discussed how it could be difficult to obtain a true picture of everyday practices and needs amongst mothers due to practical constraints, and issues of concealment. For example, one nurse commented, "...it's difficult, because I think a lot of time they'll tell you stuff, but you're not observing them doing it, so you don't really know what they are doing, and how they are doing it", to which another replied:

> That's true… many of the questions we ask our clients when we use data forms, they say what they think you want to hear a lot of the time as well, so it's kind of really hard to really know…   I think most of our clients would have maybe some difficulty. It's more unusual I feel to see clients with very good self-efficacy.

In relation to overarching goals of developing self-efficacy in mothers, all nurses believed that they had a role in developing IL in their clients. In the discussion that ensued, a number of influencing factors were identified: alignment with primary care priorities and constraints; relevance and application of IL models; the importance of role modelling; and training needs.

Nurses discussed the challenges of attempting to develop IL skills alongside primary care responsibilities and FNP programme learning outcomes.   For example, one nurse commented:

> We usually have at each visit a lot of written material... we do a lot of agenda matching as well but we still have a lot of information [to cover] at each visit... we may also have a developmental review to do... we're also maybe going into visits where the situation is chaotic or our clients have their own agendas that we have to address first... sometimes even trying to get any learning into a visit for some or our clients is a challenging thing to do... if I was to say what probably the most difficult thing is, it would be the time factor.

Another commented, "I think at times it [IL] can be our role but at other times then we can't get too embroiled in things like that cos we need to still look at what we're in to look at".   And another, "I suppose we've got to prioritise each visit and what that's about and obviously the child is at the centre of that as well, but aye [have a IL role]".

Nurses discussed whether or not an IL model such as the example Big6 model would be useful for framing and imparting IL skills, and whilst initially dismissed, was, upon further discussion and reflection, considered relevant. For example one initially commented, "I don't think so."   However a second commented:

> That [IL model] might be quite helpful as a facilitator [prompt] in terms of discussing it with them [mothers] as well about the information – how do they start to go about searching for information that's relevant for them as well, cos some of them do need it broken down.

The nurse who had initially dismissed the model replied, "Aye [yes], actually I done all those stages" and later commented, "I think it would be good reflection if they've done something then say 'Look, you've done this'[refers to IL model]".   However several nurses also voiced concerns regarding how such a model might be received and understood by mothers. For example one commented, "I don't know how well our clients would be able to understand a model like that", which prompted another to reply, "Just a few of them I suppose", and the first to reply, "Probably the ones that would understand it would be the ones that wouldn't have the same amount of difficulties in the first place".

Nurses felt that the best way to impart good IL practices was through role modelling. For example, one commented, "Role modelling..., doing it yourself, doing the steps and showing them how to do it themselves – so if you did it enough times then perhaps they would go through the stages".   And another:

> If you had it [IL model] laminated in your diary and you maybe said 'right we've got a problem, why don't we try and break it down like this', and then... use role modelling... and using it as a framework [to] tick boxes – right I've done that stage, I've done that stage.

Nurses also discussed transitional approaches to independence in clients. For example one, discussing mothers with no income and little understanding of state welfare entitlements and processes, commented:

> There's a bit of a need for fixing initially...   we sometimes get involved in supporting them... you are doing things initially and gradually over time you try to kind of withdraw. I suppose you can think about sharing information in a similar way, inititally you are pointing them to where things are and then you are gradually withdrawing.

In relation, nurses discussed how it could be difficult to correct bad practices.   For example, one commented:

A lot of our clients look for a kind of quick fix... that reflects the society we're in... we've got the time to be talking about [information topics] over a long period of time so... that they've got a better understanding... but that can be challenging if you are trying to work through a process... and they go on a blog or social media and somebody has given them, 'this is how you cure this, this is how you do this', which probably isn't the case".

Nurses also reiterated interview comments regarding their own IL training needs to be able to, in turn, develop IL in clients. For example, one commented, "I think I would appreciate any [IL] training really – if I was going to be able to help my clients then obviously it would be good for me to feel very confident in what I was saying...". And another, "It [IL] is a critical part of our job when you think about it... although we do a bit around MI [motivational interviewing] in the training, there's nothing really about IL". And another, "I think it's [IL] probably something we would do, it's just we didn't know that it was called that". And another, "We are using it [IL] a lot, but, you know I think I didn't really understand there even was a [IL] framework".

5   Discussion

In discussing our findings we return to our research questions.

What is the IL education role of non-information professionals occupying everyday support roles?

Our young majority expectant mothers have multiple information and learning needs across multiple topics spanning issues of parenting, poverty and personal development. Whilst some could articulate needs, particularly in relation to labour, others could not, and some acknowledged a lack of awareness of needs. Several described feeling overwhelmed, and some discussed actively avoiding information to reduce or avoid stress. There is evidence of unconscious needs (Taylor, 1968), problematic need recognition (Buchanan et al, 2018a), information overload (Bawden and Robinson, 2009), and information avoidance (Wilson, 1999).

All mothers identified their family nurses as important and trusted sources of information and support. Our nurses also described an important nurse role in recognising, understanding, and progressing the information needs of young mothers. It is also notable that alongside delivery of the prescribed FNP programme, information interactions are flexibly reponsive to the everyday needs of mothers. An important information intermediary role appears evident (Buchanan et al, 2018a). In relation, there is also evidence of passive information seeking (Wilson, 1999), and seeking by proxy (McKenzie, 2003).

When looking online for information, our mothers predominently do so via Google searches, with Health topics the most searched for, followed by Education and Welfare topics. It is notable that for Health topics, Google searches form the basis of up to 92% of online information seeking. It is also notable that in those limited instances where mothers indicated use of a specific source, the majority did not identify a specific source. Our nurses also discussed a preference for Google searches amongst mothers and attempts to direct mothers to state sources. However, our findings suggest that our mothers have a very low awareness and/or use of state sources of online health information.

The majority of our mothers believe that they can use computers, and find and read information without difficulty. Only two (7%) of our mothers indicated any difficulties. Our nurses disagreed with mothers' self-assessments, reporting that whilst mothers might be able to use social media, their skills to more broadly use technology and access and read information are limited. In relation, our nurses discussed how some mothers could conceal needs, and highlighted general issues of low self-efficacy. In similar disadvantaged circumstances, Buchanan and Tuckerman (2016) report a reluctance amongst adolescent participants to reveal difficulties with everyday tasks, with instances of secrecy and deception attibuted to self-protective behaviours (Chatman, 1996). Another possibllity is the existence of the Dunning-Kruger Effect, whereby people with low ability mistakenly assume greater ability through limited understanding (Kruger and Dunning, 1999). In support, Mahmood (2016) has previously reported the existence of the Dunning-Kruger effect in people's self-reported IL.

As part of overarching FNP programme self-efficacy goals, our nurses recognise the importance of developing IL in mothers, and believe that they have an important IL education role; however, the majority of our nurses are unfamiliar with IL concepts, none have received IL training, and none are familiar with IL frameworks. All felt that they would benfit from IL training, and are only 'somewhat' confident in their own abilities to develop IL skills in their clients. Consequntly, there is limited evidence of transitions to independent information seeking in clients, or underpinning pedagogical practices to achieve such goals, supporting previous findings in similar disadvantaged and dependent circumstances (Buchanan and Tuckerman, 2016; Buchanan et al, 2018). Our findings support previous reports of low IL in nurses (e.g. Alving et al, 2018; Wadson & Phillips, 2018), and notably, go beyond a common focus on the impact of low IL on evidence based practice, to raise important questions regarding nurse ability to develop healthcare self-efficacy in clients. It could be argued that our nurse participants do not have a responsibility for IL education in their clients, but if not them, then who? Librarians appear an obvious alternative, but this study supports previous findings (Buchanan et al, 2018a) that young mothers do not use libraries. In contrast, our nurses are used, and importantly, trusted by a vulnerable, stigmatised, and disengaged group (Shoveller and Johnson, 2006); and by the nature of their intermediary role, appear ideally placed to deliver IL education via meanfingul tasks focused on real needs, a factor considered integral to effective IL programs (Eisenberg, 2008), and evidence-based health practices (LoBiondo-Wood and Haber, 2017). Further, the

Scottish Government (2017), in their *Health Literacy Action Plan 2017-2025*, have articulated an important IL role amongst primary healthcare staff, and have a stated aim to, "embed ways to improve health literacy in policy and practice" (p21) that includes to, "develop practitioners and design services that are responsive to people's health literacy needs" (p39). Further, such goals are not exlusive to Scotland and transcend health models. For example, the US Department of Health and Human Services (2016) recommend that health professionals partner with educators to co-develop and deliver health literacy education programmes. Thus an IL role appears both evident in practice, and warranted in policy. The challenge appears to be how to extend healthcare practices beyond IL support to IL education; and within the everyday context.

How is, and should, IL education be approached in everyday problematic situations?

Our nurses have primary care responsibilities and prioritised learning outcomes to deliver as prescribed by the FNP programme. Additional responsibility for IL education appears unrealistic unless simplified and integrated within existing nurse-mother information interactions. However, to develop fundamental metacognitive skills nonetheless requires interactions to be framed within an overarching metamodel, with potential for unwelcome complexity. Our nurses were receptive to framing interactions within such a model, but were unsure if clients would understand it. Nurses also voiced concerns regarding mother capacity for additional learning. In consideration, participants felt that nurse led practical and demonstrative step-by-step instruction would work best, based on addressing real needs in the problematic context. Nurses would lead by example, and encourage metacognition in clients by relating demonstrated problem-solving steps back to more abstract stages within an IL model, and in so doing, facilitate client understanding of good practices, reinforced by repitition as new needs arose as part of a gradual process of learning transfer. In so doing, two of three aspects of an effective IL education program would be put in place: tasks based on real needs, and systematic process (Eisenberg, 2008). The third important aspect, integrated technology, would be achieved via applied utilisation of digital resources as part of the problem-solving process. A not insignificant challenge for nurses would be to be able to do so in semi-stuctured everyday situations, as nurses support a wide range of everyday information needs (Buchanan et al, 2018a). Attempting to prelocate and/or prepare information resources for all possiblle interactions would be both complex and unrealistic. Addressing a similar issue within the academic context, Eisenberg recommends that, "Effective information skills instruction starts with selecting existing curriculum units which are best suited to integrated instruction" [2008, p45]. We believe that this principle can also be applied here by identifying appropriate topics involving and/or benefiting from digital interactions. A degree of tailored resource preparation could then precede integrated instruction.

Whilst a pedagocial approach to IL education in semi-structured everyday situations is outlined above, it is important to note that models, methods, and resources have to be identified and/or developed in full, and trialled in the problematic context. Complexity should not be undestimated in detailed design. We evidence from this study and previous work (Buchanan et al, 2018a) that young mothers have multiple, interrelated, and at times competing needs, often within sensitive situations, and not always revealed, or understood as information needs. Consequently, need recognition is often not straightforward (Buchanan et al, 2018a). Whilst a fundamental first step in most IL models, problem/need recognition is arguably not addressed in sufficient depth for semi-structured situations such as this. There is a need for more prescriptive guidance including methods to assist with elicitation and specification of information need in the problematic context. We also know from our participants and previous work (Buchanan et al, 2018a), that many young mothers have difficulties understanding information due to learning difficulties, and issues of cognitive load. Such issues point to the need for incremental and iterative learning cycles, and personalised information.

Finallly, it is also important to note that whilst our nurses recognise the role of digital media during client interations; in practice digital use is limited due to issues of preference and access. Our findings remind us of enduring human preferences for interpersonal communication (Case and Given, 2016); however, digital nonetheless has a role and is a core aspect of public service reforms in health and social care (Scottish Government, 2018). Our study draws further attention to access issues amongst disadvantaged populations, and evidences such issues extending to the primary healthcare staff providing outreach support, professionals who prior to provison of tablet PCs as part of this study, were unequiped to access digital in the field beyond via their own personal phones. Beyond technical barriers, several of our nurses also felt that they would benefit from training in digital technologies. In an era of digital transitions, our findings raise important questions regarding the true reach of UK Public health policy and digital health strategies.

6 Limitations and further research

Whilst drawing on the cumulative experience of a team of primary healthcare professionals, and incorporating client perspectives and needs; we nonetheless report within the constraints of a single case study. Given the significance of our findings, we would call for further empirical studies with further groups.

We also call for further research into appropriate pedagogical approaches to IL education adaptable to semi-structured everyday situations, and implementable by non-information professionals in the problematic

context. In particular, further research is required into appropriate methods to facilitate information need recognition.

7   Conclusion

Our young majority expectant mothers have multiple information needs across multiple topics spanning issues of parenting, poverty and personal development. Whilst some could articulate needs, others could not, and some acknowledged unawareness of needs. Several described feeling overwhelmed, and some actively avoided information to reduce stress. When looking online for information, our mothers predominantly do so via Google searches. Our findings suggest issues of need recognition, and low awareness and/or use of State online information resources.

Our nurses play an important role in recognising, understanding, and progressing the information needs of young mothers. An important information intermediary role is evident, but with limited evidence of transitions to independence in clients or underpinning pedagogical practices to achieve such goals. Our nurses all believe that they have an important role in developing IL in clients, but are majority unfamiliar with IL concepts, have not received IL training, and are not familiar with IL models/frameworks. Consequently, their confidence in their own ability to develop IL skills in clients is limited. Further challenges include how to incorporate IL education into primary care responsibilities, and issues of digital access.

To extend primary healthcare practices beyond IL support to IL education requires not only staff training, but also an appropriate pedagogical approach flexibly adaptable to semi-structured and problematic everyday situations. Complexity should not be underestimated, design not limited to adoption and/or adaptation of an existing IL model. Needs amongst disadvantaged populations are multiple, and not always recognised as information problems, or revealed, required considered approaches to need recognition. Consideration must also be given to individual learning needs and issues of cognitive load, with resources tailored accordingly to facilitate integrated and meaningful interactions. IL education must therefore be approached holistically and at multiple levels to address issues of access and behavior in the socio-economic context.

Beyond empirical and theoretical contributions, our findings also have practical implications. We raise important questions regarding approaches to developing healthcare self-efficacy in disadvantaged populations; and in an era of public service reforms and digital transitions, raise important questions regarding the true reach of UK Public Health policy.

Acknowledgments

References

Alving, B.E., Christensen, J.B. and Thrysøe, L., 2018. Hospital nurses' information retrieval behaviours in relation to evidence based nursing: a literature review. *Health Information & Libraries Journal*, *35*(1), pp.3-23.

American Library Association.   (1989) *Presidential Committee on Information Literacy: final report*.   Chicago: American Library Association.

Bawden, D. and Robinson, L (2009). The dark side of information: overload, anxiety and other paradoxes and pathologies. *Journal of information science*, *35*(2),180-191.

Bennett, I. M., Frasso, R., Bellamy, S. L., Wortham, S., and Gross, K. S.   (2013)   Pre-teen literacy and subsequent teenage childbearing in a US population. *Contraception 87*(4), 459-464.

Berkman, N.D., Sheridan, S.L., Donahue, K.E., Halpern, D.J. and Crotty, K. (2011) Low health literacy and health outcomes: an updated systematic review. *Annals of internal medicine*, *155*(2), 97-107.

Brand, G., Morrison, P., and Down, B.   (2014) How do health professionals support pregnant and young mothers in the community? *Women and Birth*, *27*(3), 174-178.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101.

Buchanan, S., and Tuckerman, L. (2016) The Information Behaviours of Disadvantaged and Disengaged Adolescents, *Journal of Documentation*, *72*(3), 527-548.

Buchanan, S., Jardine, C., and Ruthven, I.   (2018a)   Information Behaviours in Disadvantaged and Dependent

Circumstances and the Role of Information Intermediaries. *Journal of the American Society for Information Science and Technology,* in press.

Buchanan S., Jardine C., Ruthven I. (2018b) Developing Information Literacy in Dependent and Disadvantaged Circumstances: A Transitional Approach in the Digital Health Context. In: Kurbanoğlu S., Boustany J., Špiranec S., Grassian E., Mizrachi D., Roy L. (eds) Information Literacy in the Workplace. ECIL 2017. *Communications in Computer and Information Science*, 810, 409-418. Springer, Cham.

Case, D.O., & Given, L.M. eds. (2016). *Looking for Information: A Survey of Research on Information Seeking, Needs, and Behavior.* Emerald Group Publishing.

Chatman, E. A. (1996). The impoverished life-world of outsiders. *Journal of the American Society for Information Science*, *47*(3), 193-206.

Eisenberg, M.B.   (2008) Information literacy: Essential skills for the information age. *DESIDOC Journal of Library & Information Technology*, 28(2), 39-47.

Harron, K., Gilbert, R., Cromwell, D., Oddie, S., and Van der Meulen, J.   (2016) Adversity and risk of poor birth and infant outcomes for young mothers: a population-based data-linkage cohort study. *The Lancet*, *388*, S54.

Kruger, J., and Dunning, D. (1999). Unskilled and unaware of it: how difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of personality and social psychology*, *77*(6), 1121.

LoBiondo-Wood, G. and Haber, J. (2017). *Nursing Research-E-Book: Methods and Critical Appraisal for Evidence-Based Practice*. Elsevier Health Sciences.

Mahmood, K. (2016). Do people overestimate their information literacy skills? A systematic review of empirical evidence on the Dunning-Kruger effect. *Communications in Information Literacy*, *10*(2), 199-213.

Martzoukou, K., and Sayyad Abdi, E.   (2017) Towards an everyday life information literacy mind-set: a review of literature. *Journal of Documentation*, *73*(4), 634-665

McCormack, L., Thomas, V., Lewis, M.A., and Rudd, R.   (2017) Improving low health literacy and patient engagement: a social ecological approach. *Patient Education and Counseling*, *100*(1), 8-13.

McKenzie, P.J. (2003). A model of information practices in accounts of everyday-life information seeking. *Journal of Documentation*, *59*(1), 19-40.

O'Connor, S., Hanlon, P., O'Donnell, C.A., Garcia, S., Glanville, J. and Mair, F.S. (2016) Understanding factors affecting patient and public engagement and recruitment to digital health interventions: a systematic review of qualitative studies. BMC medical informatics and decision making, 16(1), 120.

O'Dea, B., Glozier, N., Purcell, R., McGorry, P. D., Scott, J., Feilds, K. L., and Hickie, I. B.   (2014) A cross-sectional exploration of the clinical characteristics of disengaged (NEET) young people in primary mental healthcare. *BMJ open*, *4*(12), e006378.

Princes Trust.   (2014) *The Princes Trust MacQuarie Youth Index 2014.*   Available at: http://www.princes-trust.org.uk/about_the_trust/what_we_do/research/youth_index_2014.aspx

Raskin, M., Easterbrooks, M.A., Lamoreau, R.S., Kotake, C., and Goldberg, J.   (2016) Depression Trajectories of Antenatally Depressed and Nondepressed Young Mothers: Implications for Child Socioemotional Development. *Women's Health Issues*, *26*(3), 344-350.

Scottish Government.   (2014) *Making it Easy: A health Literacy Action plan for Scotland*.   Edinburgh: Scottish Government.   Available at: http://www.gov.scot/publications/2014/06/9850

Scottish Government. (2016*) SIMD16 ranks and domain ranks*.   Available at: http://www.gov.scot/Topics/Statistics/SIMD

Scottish Government.   (2017) *Making it Easier: A Health Literacy Action Plan for Scotland 2017-2015*. Edinburgh: Scottish Government (2017).   Available at: http://www.gov.scot/Publications/2017/11/3510

Scottish Government (2017).   Realising Scotland's full potential in a digital world: A Digital Strategy for Scotland. Available at: https://www.gov.scot/Publications/2017/03/7843

Scottish Government (2018).   Scotland's Digital Health and Care Strategy - Enabling, Connecting and Empowering.   Available at: https://www.gov.scot/Publications/2018/04/3526/1

Shoveller, J. A., and Johnson, J. L.   (2006)   Risky groups, risky behaviour, and risky persons: Dominating discourses on youth sexual health. *Critical public health*, *16*(1), 47-60.

Taylor, R.S. (1968) Question-negotiation and information seeking in libraries. *College & research libraries*, *29*(3), 178-194.

Torvie, A. J., Callegari, L. S., Schiff, M. A., and Debiec, K. E.   (2015) Labor and delivery outcomes among young adolescents. *American journal of obstetrics and gynecology*, *213*(1), 95-e1

Trivedi, D., Bunn, F., Graham, M., and Wentz, R. (2007) *Update on the Review of Reviews on Teenage Pregnancy and parenthood.*   Centre for Research in Primary and Community Care. Available at: http://www.nice.org.uk/nicemedia/pdf/TeenagePregnancyUpdateReviewFeb08.pdf

US Department of Health and Human Services.   (2016) Build Knowledge to Improve Health Decisionmaking. Available at: https://health.gov/communication/literacy/quickguide/decision.htm

Wadson, K. and Phillips, L.A., 2018. Information literacy skills and training of licensed practical nurses in Alberta,

Canada: results of a survey. *Health Information & Libraries Journal*, *35*(2), pp.141-159.

Wilson, T.D. (1999). Models in information behaviour research. *Journal of documentation*, *55*(3), 249-270.