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Pregnancy-related lumbopelvic pain: exploring the use of digital media for condition-related information provision

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ABSTRACT

Background: Online health information-seeking is thought to be common among pregnant women, and the use of digital media has been widely adopted.

Women with pregnancy-related lumbopelvic pain (PLPP) are often disappointed with the volume and content of condition-related information offered by their health care providers and alternative modes of information provision therefore need to be explored. The widespread adoption of digital media suggests that such platforms may provide a convenient alternative for information delivery.

Aims: To explore the PLPP-related information-seeking practices of women experiencing this condition and the attitudes of National Health Service (NHS) service users and healthcare professionals towards the use of digital media for PLPP-related information provision.

Ethical approval: Ethical and HRA approvals were gained for this study (REC reference 15/NI/0270).

Methods: Multi-method qualitative study: individual semi-structured interviews with seven NHS service users and two single-profession focus groups, one with six NHS-based midwives and one with four NHS-based physiotherapists. A framework method of thematic analysis was used. No member checking was undertaken.

Results: All service users were aged 21–36 years, with gestational age <32 weeks.

All midwives were >10 years post-qualification and had experience of an antenatal clinic setting.

Two physiotherapists were five–10 years post qualification, two were >10 years post-qualification. All had relevant experience of treating women with PPLP.

Searching online for condition-related information was reported by all service users and complex drivers for this behaviour were described. All stakeholder groups shared concerns about the quality and trustworthiness of PLPP-related information available online. The use of apps for condition-related information provision was viewed positively by all groups, but the majority of service users stated a lack of trust in health information obtained via social media.

Conclusion: The development of an app-based intervention to facilitate the management of PLPP is supported by this study and is therefore worthy of further exploration.

Keywords: pregnancy, low back pain, pelvic girdle pain, lumbopelvic pain, qualitative, digital media, mobile phone applications, apps, social media, online information-seeking, Evidence Based Midwifery

Background

Pregnant women are acknowledged as mass consumers of online health-related information (Gleeson et al 2019, Mackintosh et al 2020) and are thought to use the internet for multiple purposes, including searching for information relating to pregnancy symptoms (Kraschnewski et al 2014) and to aid decision making relating to pregnancy, childbirth and future parenting (Prescott & Mackie 2017, Wright et al 2019).

Around 95 per cent of digitally active women are thought to search the internet for health-related information during the perinatal period (Mackintosh et al 2020) and evidence suggests that parity (Camacho-Morell & Esparcia 2020), educational attainment (Sayakhot & Carolan-Olah 2016), and level of health literacy (Shieh et al 2009) may all influence such behaviours.

The volume of literature relating to the use of pregnancy-related websites, social media platforms (SoMe) and smartphone apps (herein collectively referred to as digital media) is growing rapidly in keeping with the widespread uptake of these media among the pregnant population (Sayakhot & Carolan-Olah 2016).

Pregnant women are known to use digital media in a healthcare context for multiple purposes including self-screening (Peyton et al 2014) and preparing for health care appointments (Maslen & Lupton 2018). Both health care providers (HCPs) and commercial companies have therefore capitalised on this knowledge, developing multiple interventions for pregnancy-related conditions (such as gestational diabetes) using various forms of digital media as platforms for delivery (Chan & Chen 2019).

One of the most common causes of work absence among pregnant women in European countries is pregnancy-related lumbopelvic pain (PLPP) (Backhausen et al 2018). PLPP is an overarching term that encompasses both pregnancy-related lower back pain (PLBP) and pregnancy-related pelvic girdle pain (PPGP) (Vleeming et al 2008). Up to 80 per cent of pregnant women are thought to experience PLPP at some point during their pregnancy (Kovacs et al 2012) and around 25 per cent of these women will experience severe pain (Wu et al 2004).

It is common practice in the United Kingdom (UK) for those experiencing PLPP to be referred for treatment by a physiotherapist (Bishop et al 2016). Waiting lists for physiotherapy services often vary due to local availability, meaning that women may be required to self-manage their symptoms while awaiting input from a physiotherapist. Online PLPP-related information resources may therefore play an important role during this period.

Currently, there is no gold standard treatment for PLPP, with exercise, manual therapy, pelvic support

belts, and advice all listed as viable treatment options in recent published guidance (Clinton et al 2017). Explicit recommendations have however been made in the literature that condition-related information provision should form part of routine practice (Elden et al 2014, Close et al 2016). Despite this, patients are often disappointed by the volume and quality of information provided by their HCPs (Close et al 2016, Mackenzie et al 2018) and therefore seek advice from non-medical sources such as peers, family members or the internet (Wuytack et al 2015b).

As the quality and trustworthiness of online health-related information has been shown to be variable (Daraz et al 2019), a clear potential for confusion and misinformation exists (Hämeen-Anttila et al 2014, Carpenter et al 2016). The availability of high-quality information relating to PLPP would therefore be of benefit, and digital media could provide a convenient platform for delivery.

To understand the potential utility of digital media in the management of PLPP, it is essential to explore how women experiencing the condition choose to seek health-related information, and to explore their preferred modes of condition-related information provision. The successful implementation of a digital media-based intervention to support the management of PLPP would also require full endorsement by the HCPs caring for these patients. It is therefore important to investigate the perspective of such clinicians; to understand their perceptions of the information-seeking practices of their patients, and their attitudes towards the use of digital media for condition-related information provision.

The objectives of the current study were therefore as follows:

- To explore the PLPP-related information-seeking practices of women currently experiencing this condition
- To explore the attitudes of both NHS service users and NHS-based antenatal HCPs regarding the use of digital media for the provision of PLPP-related information
- To explore the acceptability and perceived utility of the notion of a digital media-based intervention to support the self-management of PLPP.

Methods

This study was a multi-method qualitative study that utilised individual semi-structured interviews with NHS antenatal service users experiencing PLPP, in addition to two focus groups; one with NHS-based midwives and another with NHS-based physiotherapists.

Otherwise healthy pregnant women currently experiencing PLPP, aged 18 years or over, with a gestational age of 12–32 weeks, were invited by their

treating clinician to participate in the study when they attended a routine antenatal visit at the host NHS trust. Those with known pregnancy-related complications, multiple pregnancies, and those without an adequate understanding of written and spoken English were ineligible.

NHS-based midwives and physiotherapists involved in the management of women experiencing PLPP were recruited via email invitation disseminated via their line managers. All potential participants received a written information leaflet about the study to aid their decision regarding participation.

Written informed consent was recorded by the researcher from each individual participant prior to data collection.

Semi-structured interviews

For the NHS service users, a semi-structured interview schedule was devised in order to ensure the specific research questions for this study were addressed sufficiently, and also to allow additional insights offered by the participants to be explored (Green & Thorogood 2009). The interview schedule aimed to address the following key areas of interest:

- If/how participants currently use digital media in relation to their pregnancy
- How participants perceive the use of the internet to access health information and how this differs from information obtained directly from an HCP
- How participants consider online health information should be presented in order to be most useful
- Participants' perceptions and beliefs about using a digital media-based intervention for the management of PLPP.

All interviews were undertaken by the lead author (MM) who is a qualified physiotherapist with a special interest in PLPP and who has experience of qualitative research. Interviews were undertaken either in person, in a quiet, private room at the host NHS trust's antenatal clinic, or via telephone. All interviews lasted between 20 and 60 minutes.

Focus groups

Small focus groups of four to six participants were utilised with the NHS-based HCPs. These focus groups provided an opportunity to access insights that may not be available from individuals and allowed group members to shape and reflect on their own perspectives after hearing those of others (Barbour & Kitzinger 1999).

Both focus groups were single profession: this decision was made to capitalise on the shared culture existent within each professional group and to ensure that differing professional perspectives could not

become a cause of conflict (Barbour & Kitzinger 1999).

Each focus group was moderated by the lead author and lasted around 90 minutes. The midwifery and physiotherapy focus groups were held in quiet, private rooms within the respective clinical departments of the host NHS trusts.

The focus group guide was developed to address the following key issues and was the same for both groups of clinicians:

- If/how clinicians currently use digital media in their professional lives
- Participants' views on the use of digital media for the provision of PLPP-related information
- How participants considered digital media-based interventions for PLPP might be integrated within their current clinical practice
- The potential barriers and facilitators perceived to the implementation of a digital media-based PLPP-related intervention in an NHS setting.

Due to the exploratory nature of this study, the notion of data saturation was not considered the sole determinant of the sample size (Braun & Clarke 2021). The sample size was largely influenced by the richness of the data generated across all interviews and focus groups, and pragmatic considerations, including the availability of participants and the resources available to complete the study.

All interviews and focus groups were audio-recorded and reflexive notes were taken throughout the data collection process to help inform the analysis. The audio-recordings were transcribed in an intelligent verbatim format. Data were analysed inductively, and as the study aims were clear at the outset, the framework method of analysis was chosen (Gale et al 2013). Framework analysis involves five key steps: 1) familiarisation; 2) constructing a thematic framework; 3) indexing; 4) charting; 5) abstraction and interpretation (Ritchie et al 2014).

Insights provided by the service user group were given priority, as understanding their needs and preferences was deemed essential in fulfilling the aims of this study. Data collected from this group were therefore coded first and an initial thematic framework was constructed. The transcripts from both clinician focus groups were then coded, and individual thematic frameworks were drawn up for each. These three frameworks were then synthesised into one thematic framework that could be used to organise the entire dataset.

The resulting consolidated thematic framework was reviewed and agreed by the entire research team following in-depth reflexive discussions, then re-applied across the entire dataset. A thematic chart was then constructed using Microsoft Excel to

allow participants' responses to be compared. Key dimensions in those responses were then presented as themes and subthemes. Both the thematic charts and lists of key dimensions were reviewed and agreed by all members of the research team.

Ethical approval had not been sought to contact participants again after data collection was completed, therefore no member checking was undertaken.

Results

Seven service users, six midwives and four physiotherapists consented to take part in the study. An overview of participant characteristics can be found in Table 1.

Table 1. Participant characteristics.

Characteristics of service users n=7	
Age range	21–36
Number of service users who were primiparous	3
Number of service users who were multiparous	4
Number of service users who hold a university degree	4
Number of service users who had experienced PLPP in a previous pregnancy	3
Characteristics of midwives n=6	
Number of midwives working in antenatal setting	6
Number of midwives with 5–10 years clinical experience	0
Number of midwives with >10 years clinical experience	6
Characteristics of physiotherapists n=4	
Number of physiotherapists working in a musculoskeletal setting	2
Number of physiotherapists working in a women's health setting	2
Number of physiotherapists with 5–10 years clinical experience	2
Number of physiotherapists with >10 years clinical experience	2

Two overarching themes were identified across the dataset:

- **Theme 1:** Information seeking and information provision in the context of PLPP
- **Theme 2:** Attitudes towards digital media as platforms for information provision.

Within each of these themes, four subthemes emerged, see Figures 1 and 2.

Theme 1: Information seeking and information provision in the context of PLPP

Subtheme 1.1 Online health information-seeking behaviours

HCPs perceived the reasons patients choose to seek information online as rather simplistic; either to clarify information gathered during a clinical consultation or as a substitute for face-to-face information provision when access to an HCP was not possible.

'I think it's difficult with the NHS, the way it is ... resources are so stretched and so that healthcare professionals aren't that easily accessible, so people are much more media savvy, tech savvy' (Midwife 6).

However, the actual reasons for seeking information online, as described by the service users, were far more complex.

The search for reassurance featured prominently in the narratives of five of the seven service users; either to establish whether the pain being experienced was normal, or to decide whether medical intervention was required. Additionally, online information-seeking was described by one service user as a way to modify the power dynamic between herself and her HCP: by acquiring information prior to her health care appointments, she felt able to interact with the HCP on a more equal basis and better able to critically assess any information provided to her:

'I like to have that knowledge before I go in to talk to someone. I don't like going in blind. I like to go

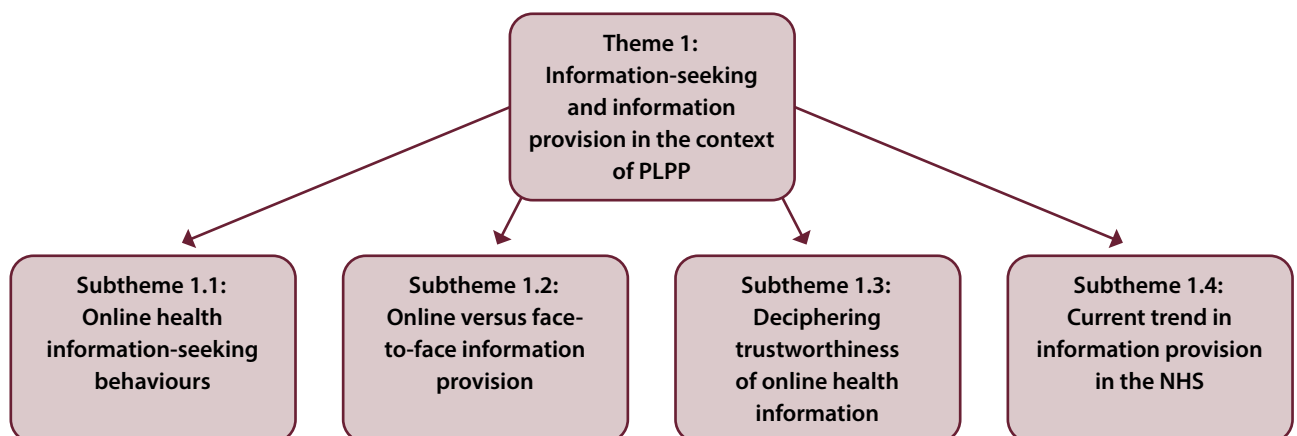


Figure 1. Relationship of Theme 1 to subthemes.

in armed with a little bit of something otherwise you can't ask questions and you're totally reliant on what they say' (Service user 1).

All seven service users specifically identified Google as their primary search tool for online PLPP-related information.

Subtheme 1.2 Online versus face-to-face information provision

The risk of misinterpretation of online information was a concern shared by all stakeholder groups, as was the perceived potential for online information to cause unnecessary panic or distress:

'... because you do google it and you hear horror stories about like 'my pelvis was shifted' or 'I had to go on crutches' or 'I was in a wheelchair' so then you think oh God!' (Service user 3).

Three of the seven service users described an overwhelming volume of online material and the difficulty faced when attempting to filter out the factually accurate information desired:

'I googled everything which is a massive mistake isn't it because the information you get is just ridiculous, there's so much and you don't know what to believe' (Service user 3).

This concern was echoed within the physiotherapy focus group.

Information provided by an HCP was believed by three service users to be more factually accurate and more reassuring than that found online. Conversely, two service users felt that the inability of some HCPs to answer questions about PLPP may create a barrier to information exchange between the patient and the professional:

'It's quite a quick appointment that you're in for when you're with your midwife. You have your blood pressure checked, you know, the water sample check and then you're kind of out then. So like you don't feel you've got a long enough appointment you know [to ask questions]' (Service user 2).

Both the midwives and physiotherapists detailed the perceived negative consequences of their patients independently seeking information online. The risk of a missed differential diagnosis was of significant concern; particularly that symptoms indicative of serious pathology may inadvertently be overlooked.

Subtheme 1.3 Deciphering the trustworthiness of online health information

The ability to decipher the trustworthiness of online health information was a concern highlighted across all stakeholder groups. HCPs described a perception that their patients may struggle to differentiate high-quality, trustworthy information from misinformation or hearsay. Directing patients to trusted online

resources was therefore seen as essential:

'I think if you google stuff, then it causes more panic that it actually resolves ... So, what you do is you just make sure that, especially for pregnant women, that it's only the NHS website [that they use to search information], and make sure it's trusted information basically' (Midwife 6).

Two service users echoed this concern and described the difficulty they experienced in deciphering the trustworthiness of health information obtained online:

'I'm always searching something [online]. I think it's great in terms of the volume of information, but in regard to what is trusted information, that could be more helpful' (Service user 6).

In all but one case, service users described seeking information from a pre-defined list of trusted resources, including the NHS website, as a way of ensuring access to trustworthy information. The implicit trust in the NHS website was predominantly owing to the belief that information would be vetted prior to publication:

'Well if it's on the NHS one [NHS website] then that should be right shouldn't it? I don't think they'd be allowed to put anything on there that's not true' (Service user 3).

The accuracy of information obtained online was also an issue raised by HCPs, with the midwives predominantly concerned at the lack of professional control over online content:

'I think it's important that the information is out there but being able to police it being the right information is key. Because we know we haven't got any control over that have we, as healthcare professionals ... the problem is if they're just googling' (Midwife 1).

The physiotherapists were concerned that independent online information-seeking may lead their patients to engage with unregulated online forums rather than trusted online information resources.

Subtheme 1.4 Current trends in information provision in the NHS

Service users described a range of experiences relating to the volume, quality, and format of PLPP-related information provided to them by their antenatal health care providers, with paper-based leaflets the most frequently cited mode of information provision. However, for some, the failure of HCPs to provide sufficient condition-related information had led to frustration and disappointment:

'And like with my midwife, I wasn't offered any information on pelvic girdle pain or sciatica and I was made to feel like, just get on with it really' (Service user 2).

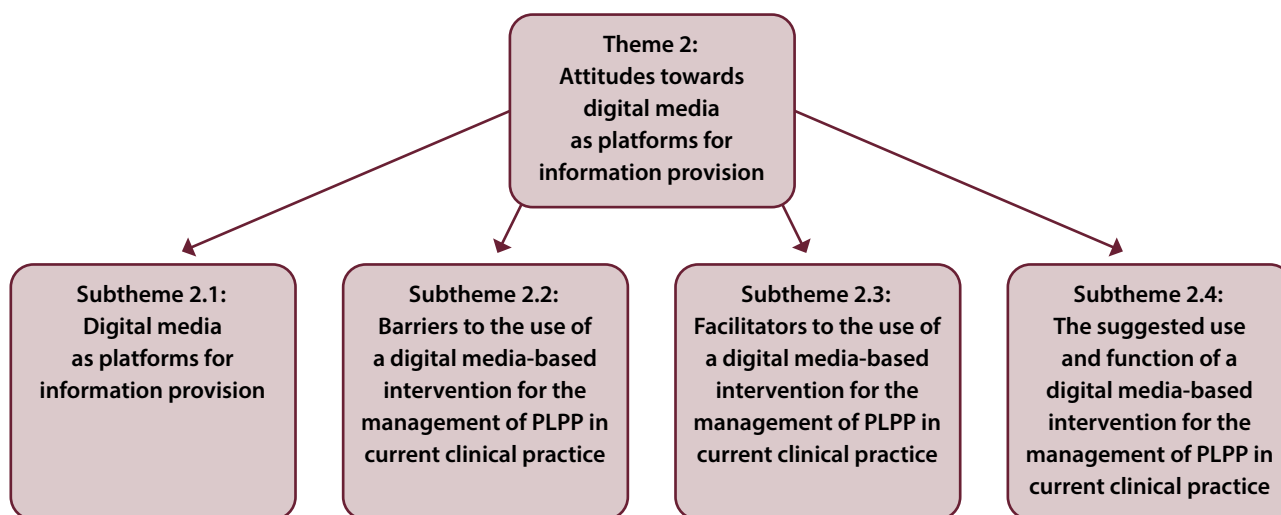


Figure 2. Relationship of Theme 2 to subthemes.

One physiotherapist stated that she will occasionally direct patients towards trusted online resources, however the group as a whole described a current reliance on paper-based resources:

‘... but if I’m going to recommend something, then I tend to only recommend the websites that are in the booklets we give out’ (Physiotherapist 4).

Conversely, the midwives (based within another NHS trust) described an institution-wide shift towards the use of online information resources in an attempt to reduce costs and save time:

‘I mean now ... we signpost and send electronic leaflets now don’t we? They [patients] don’t get the paper version. I think it was more of a cost-related thing for the trust’ (Midwife 1).

Theme 2: Attitudes towards digital media as platforms for information provision

Subtheme 2.1 Digital media as platforms for information provision

Each of the stakeholder groups acknowledged the potential utility of smartphone applications (apps) for information provision. Four of the seven service users reported the use of pregnancy-related apps during their current pregnancy. Two members of the physiotherapist group and three of the midwives also reported some experience of using apps to support clinical practice:

‘NHS Squeazy [app]. That’s a good one ... for pelvic floor exercises, it like reminds you to do them. It’s really good’ (Physiotherapist 2).

Four of the seven service users stated a definite preference for apps over SoMe for PLPP-related information provision and cited a lack of trust in information acquired via SoMe as the principal reason for this:

‘I think an app would be far more useful. I download apps all the time but like I said, I don’t use Facebook

any more or anything like that and I wouldn’t use social media to look for information. I wouldn’t trust information on there if I didn’t know where it was from’ (Service user 6).

Subtheme 2.2 Barriers to the use of a digital media-based intervention for the management of PLPP in current clinical practice

For the service users, significant barriers to the use of an app-based intervention included: content or layout that was not engaging; an excessive or overwhelming volume of information and excessive use of medical jargon. The cost of apps was also identified as a factor determining use by three service users; for one participant, the need to pay for access was an insurmountable barrier to uptake:

‘It’s an expensive time as it is, so you’re not going to pay for an app’ (Service user 2).

Perceived barriers to the implementation of a SoMe-based intervention into clinical practice highlighted by the physiotherapists included the lack of access to technology within different NHS trusts and limitations imposed by NHS IT servers. The possibility for SoMe platforms to become vehicles for misinformation was also a significant concern:

‘But I think that’s the thing about Facebook isn’t it, that it’s become a bit of a free-for-all, a bit of a [forum] doesn’t it turn into? And I know everyone will put their own opinion on’ (Physiotherapist 3).

The need to supply large amounts of personal data in order to access a digital media-based intervention was a barrier highlighted by one service user. The protection of personal data was also a concern for the midwives:

‘As long as there was none of that spyware attached or all the other ways that they collect your data that you don’t even know about’ (Midwife 2).

Subtheme 2.3 Facilitators to the use of a digital media-based intervention for the management of PLPP in current clinical practice

Several of the midwives specified that any intervention designed to support the management of PLPP would need to contain clear warnings about red flag signs and relevant safety-netting information for them to endorse it. Additionally, the physiotherapists wanted reassurance that all information included in the content would be consistent with current practice:

'If it's the same information you'd give out anyway ... As long as the information is consistent and doesn't contradict anything that we'd tell them [patients], then it'd help' (Physiotherapist 1).

Provision of a broad range of condition-related information and clear advice to aid self-management were identified by each service user as key facilitators to uptake:

'Well it would have been nice to be given all the information under that umbrella if you will, all of the information to help me ... just as much information as possible about the whole thing and what I could've done to help myself' (Service user 2).

Subtheme 2.4 The suggested use and function of a digital media-based intervention for the management of PLPP in current clinical practice

Staff in both the HCP focus groups believed that any digital media-based intervention for the management of PLPP should be distributed by a health care professional to allow the opportunity to screen for potential differential diagnoses:

'...Because if it's pelvic girdle pain, it could be masking a UTI or ... You do need to have a discussion about it to make sure that you get a proper diagnosis' (Midwife 2).

The physiotherapists suggested that midwives were best placed to distribute such an intervention as they would likely be the first professionals to whom the symptoms of PLPP are reported:

'... the women could be given an app at the first appointment that they mention it [PLPP] to the midwife' (Physiotherapist 2).

There was agreement among the three stakeholder groups that early access to such an intervention would be preferable to prevent the deterioration of symptoms and to avoid unnecessary condition-related anxiety. One midwife suggested that the intervention could be distributed to every pregnant woman in the early stages of pregnancy as a preventative measure:

'I'd like to give it [app-based intervention] to every woman at the first point of contact, and just say, look, this is something that might affect you in your pregnancy [PLPP], it might not, but you download the app and if you feel you need it, have a read through it and if you do feel like you need it for further support,

then you've got it' (Midwife 1).

However, three of the four physiotherapists and one service user questioned the wisdom of this approach due to the concern that PLPP-related information may seem irrelevant to those not experiencing symptoms:

'I think it would have been useful [to have received information about PLPP earlier in the pregnancy], but until you start having the pain, it's not really something you kind of take on board or look into' (Service user 4).

Discussion

The findings of this study underscore the complex drivers for online PLPP-related information-seeking among pregnant women and highlight the concerns shared by service users and clinicians regarding the accuracy and trustworthiness of online information.

The use of digital media for PLPP-related information provision was viewed positively by all three stakeholder groups, however there was a preference for the use of apps over SoMe among the majority of service users.

A range of barriers and facilitators to the implementation of a digital media-based intervention to support the management of PLPP in an NHS setting have been highlighted and need to be carefully considered.

Theme 1: Information-seeking and information provision in the context of PLPP

A recent survey by Snyder et al (2020) found that 96 per cent of the pregnant women sampled used the internet to search for nutritional information in the perinatal period. It is therefore unsurprising that, when discussing their information-seeking behaviours, each of the service users in our sample described the use of Google to search for PLPP-related information.

The stated reasons for searching for information online included: to provide reassurance; to facilitate self-screening; to alter the clinician-patient relationship dynamic and to aid decision-making regarding the need for HCP input. Similar reasons for online health information-seeking have previously been reported in the wider health information literature, highlighting the complexity involved in women's interactions with online information (Peyton et al 2014, Maslen & Lupton 2018).

These interactions were, however, poorly understood by the HCPs in this study, with both groups of clinicians taking an overly simplistic view of their patients' information-seeking practices; this observation may not be unique to our study sample (Higgins et al 2011).

Printed materials may not be the preferred format for information provision for pregnant women, as they are easily lost, misplaced or discarded (Peyton

et al 2014). The midwives in this study therefore predictably described a recent shift towards the use of online resources in place of former paper-based alternatives. This was however perceived to be a cost-saving exercise rather than an attempt to address the changing needs of the patient population. This trend has not yet been adopted by all health care institutions, as the physiotherapists in this study demonstrated.

The majority of service users in our sample believed information obtained via an HCP to be more factually accurate and more reassuring than that obtained online. These insights are in accord with previous research which demonstrated that women who use the internet to search for information relating to childbearing, tend to view online information as a supplement to that provided by their HCP, rather than as a substitute (Willis et al 2015, Gleeson et al 2019).

Both groups of clinicians in this study shared concerns about the accuracy of online PLPP-related information in addition to the potential for online information to be misinterpreted. Similar concerns have been previously highlighted in the midwifery literature, with one survey reporting that general pregnancy-related online information was perceived to be 'not very' or 'not at all' accurate by 19 per cent of the midwives who responded (Lagan et al 2011). Additionally, recent studies in other areas of health care have demonstrated huge variability in the quality (Daraz et al 2019), accuracy (Ferreira et al 2019) and readability (Rothrock et al 2019) of online health-related information, suggesting that the concerns of the clinicians in our study are not unfounded.

Several service users in our sample described difficulty deciphering the trustworthiness of online PLPP-related information. Others, however, reported preferentially seeking information from trusted resources — such as the NHS website — in order to avoid this issue. The trust placed in the NHS website was owing to the perception that there would be strict regulation of its content. This reflects existing evidence which suggests that women place greater trust in resources produced by government health department websites and those produced by high-profile non-government organisations (Maslen & Lupton 2018).

According to the NHS website's content policy, all clinical content published via this platform is reviewed by an '*appropriately qualified and experienced clinician*', supporting service users' expectation of accuracy and trustworthiness (NHS 2018:4.1.3).

Our findings highlighted a shared concern among all three stakeholder groups regarding the potential for online information-seeking to cause unnecessary panic or distress. This is not unreasonable given that

previous research has identified a positive association between health anxiety and health information seeking (McMullan et al 2019), and exposure to conflicting health information has been shown to cause confusion, frustration, and anxiety (Bianchi et al 2016).

The physiotherapists were concerned that unregulated content accessed via online forums may present a risk of misinformation and unnecessary condition-related anxiety if accepted without appropriate critique. This concern is understandable given the variable quality of advice contained in online discussion threads (Cole et al 2016).

Theme 2: Attitudes towards mobile phone apps and social media as platforms for information provision

The use of a digital media-based intervention to support the management of PLPP was viewed positively by all stakeholder groups in this study, however there was a preference for the use of apps over SoMe for PLPP-related information provision among the majority of service users. A lack of trust in information obtained via SoMe was the most common reason given for this opinion.

This finding was unexpected given that pregnant women have previously been shown to be highly engaged with SoMe (Zhu et al 2019) and to view the information obtained via these channels to be useful and trusted (Larsson 2009). The conflict between our findings and those of previous work could be due to demographic differences in the study populations sampled, the different research contexts in which the studies were undertaken, or the fact that service users in our study were describing the search for specific condition-related information rather than generic pregnancy-related information.

Each of the stakeholder groups identified several general barriers to the use of a digital media-based intervention for the management of PLPP within an NHS setting: cost, data security, commercial advertising, excessive information, and limited resources were all proposed by participants. These are largely in keeping with barriers to implementation of app-based interventions identified in other areas of health care (Velu et al 2017). However, evidence also suggests that levels of clinician engagement with mobile health interventions may vary across settings (Leigh et al 2020, Kerst et al 2020) and that the usability of an app may impact on patients' willingness to engage (Bayambasuren et al 2020). These additional barriers would therefore also need to be considered and mitigated throughout the intervention development process.

Many of the pitfalls of online information-seeking could be minimised if clinicians openly discussed the information obtained online with their patients; providing an opportunity for the correction of misinformation and appropriate provision of

reassurance (Sayakhot & Carolan-Olah 2016, Tan & Goonawardene 2017). However, evidence suggests that patients are often reluctant to discuss their information-seeking behaviours with their clinician unless the clinician initiates the conversation, due to concerns over potential negative judgement (Tan & Goonawardene 2017). It is also acknowledged that clinical time pressures often present significant barriers to these discussions (Vennedey et al 2020).

An intervention that provides high-quality PLPP-related information may therefore reduce the need for service users to tackle huge volumes of online material by ensuring their information needs are appropriately met with access to an accurate, trustworthy resource. The positive perception of the use of apps for information provision identified in this study suggests that an app-based intervention to support the management of PLPP is worthy of further exploration.

Strengths and limitations of this study

The strengths of this study are that priority was given to the voice of the service users in order to ensure their information needs were understood, but views from all relevant stakeholder groups were collected. The focus of the study was kept purposely broad, exploring the use of multiple digital media as opposed to any single medium in isolation.

The main limitation of this study is that the coding framework was initially constructed by a single team member (MM) prior to review by the research team, and no member-checking was employed.

Conclusion

While this is a small-scale study and the findings may not be generalisable across settings, this work has demonstrated that the online information-seeking behaviours of women with PLPP are complex and the use of the internet to search for condition-related information is common.

Difficulties deciphering the trustworthiness of online PLPP-related information were highlighted, as were concerns regarding the accuracy of online information. NHS-based service users and HCPs viewed the notion of a digital media-based intervention to support the management of PLPP in a positive light. A preference for apps over SoMe for information provision was stated by the majority of service users, owing to a lack of trust in information obtained via SoMe. The notion of an app-based intervention to support the management of PLPP is therefore worthy of further exploration.

Funding

No external funding was sought or received for the completion of this study.

Conflicts of interest

Following completion of this study, the lead author has consulted with the commercial company 'Living With Ltd' to develop an app-based intervention to support the management of PLPP. This arrangement provides no financial benefit to the authors.

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