Factors that influence online medication purchasing behaviour in pregnancy: a qualitative study

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ORIGINAL

Aim: To explore the factors that influence a pregnant woman's intention to purchase medication online.

Methods: Three online focus groups were conducted using asynchronous communication in a closed Facebook group during May 2018, to gauge a deeper understanding of this emerging phenomenon.

Results: A total of 23 women from six countries participated in the study. Strong predictive factors that influenced purchasing behaviour included the importance of rapid retrieval of information, cost-effectiveness, special offers, price comparison, time-efficiency and availability of more product options. Women had a lack of knowledge about medication safety and were likely to be influenced by product reviews and star ratings. Online purchasing enabled women to avoid consultations with health care providers and helped them feel more in control of their identity. Social norms impacted on women's decision making and women referred to the normalisation of online purchasing as being influential. Pregnancy groups/forums and social media were seen as influential sources of advice and previous experience of online purchasing was an important predictor of future behaviour.

Conclusion: Pregnant women who were internet-confident were more likely to have established online purchasing behaviour and therefore more inclined to purchase online medications. The internet offered women greater autonomy and rapid access to products.

Implications: Midwives need to be aware of this growing trend and ensure their knowledge about purchasing online medication safely is evidence-informed and that they facilitate pregnant women to make safe choices.

Keywords: pregnancy, medication, online purchasing, Facebook, theory of planned behaviour, social media

Introduction

Most pregnant women take at least one medication during their pregnancy despite limited evidence on the safe use of many medications (Mitchell 2011, Hartman et al 2016). The inclusion of pregnant women in randomised controlled trials (RCTs) raises ethical concerns, thereby creating a dependence on post-marketing epidemiologic studies to provide insight into the benefits and risks of medication use during pregnancy (van Gelder et al 2019a). The lack of evidence regarding the safety of medication use during pregnancy creates challenges for women and health care professionals when discussing or purchasing medication (Sinclair et al 2016).

Medication use in pregnancy can encompass a broad range of treatments from prescription-based pharmaceutical products to herbal, homeopathic and vitamin supplements. The term "Medicinal Product" is defined in Article 1 of Directive 2001/83/EC of the European Parliament and of the Council (2001):

'Any substance or combination of substances presented as having properties for treating or preventing disease in human beings…

Any substance or combination of substances which may be used in, or administered to, human beings, either with a view to restoring, correcting or modifying physiological functions by exerting pharmacological, immunological or metabolic action, or to making a medical diagnosis.'

As such, most herbal and homeopathic remedies fall under the remit of this definition of a medicinal product (Medicine and Healthcare products Regulatory Agency (MHRA) 2016a), and for the purpose of this study will be included within the context of discussion on medication.

Research studies highlight pregnant women's use of the internet to search for health-related information (Gao et al 2013, Song et al 2013, Weston & Anderson 2014, Lupton 2016, Wallwiener et al 2016)

particularly regarding what medications are safe to take in pregnancy (Hämeen-Anttila et al 2014, Sinclair et al 2018).

The evident ongoing virtual market of online pharmacy provision has been facilitated with the rapid expansion of the internet (Fittler et al 2013). An increase in digital eHealth, a movement towards self-diagnosis and self-medication has increased the general consumer experience of retail purchasing online, with easy accessibility of mail order trade and provision of access to products from different countries (Gabay 2015, Mackey & Nayyar 2016, Fittler et al 2018). The global online pharmacy (e-pharmacy) market in 2014 was estimated to be worth 29 billion US dollars and it is predicted to grow to around 128 billion dollars by 2023 (Statista 2015). This predicted extrapolated growth of the industry highlights worldwide demand for online medication sales.

Background

Much of the literature to date has focused on general online shopping behaviour (Kennedy & Wilson 2017, Katta & Patro 2018, Sharma et al 2019), with limited studies exploring purchasing online or purchasing behaviour in pregnancy (Little et al 2018). With the anticipated growth of the online medication industry, research is required to address the gap in the knowledge and explore the factors that influence a pregnant woman's online medication purchasing behaviour.

Consumer behaviour involves complex, multi-dynamic processes. When selecting the theoretical framework for the study, pregnant women who purchase medication online were viewed as purchasers, therefore it was appropriate to select a theoretical framework that focused on the pregnant woman as a consumer. Ajzen (1991) postulates that intentions to perform behaviours can be predicted with a high level of accuracy from attitudes towards a behaviour, subjective norms and perceived behavioural control; and these intentions, together with the perception of behavioural control, account for considerable variance in actual behaviour (Figure 1). As such, the Theory of Planned Behaviour (TPB) (Ajzen 1985) was selected to underpin this study and aid understanding of the modifiable factors that influence a pregnant women's intention to purchase medication.

Understanding online medication purchasing behaviour in pregnancy is important to enhance communications between health care professionals and pregnant women. It will also provide information for regulation, policy and guidelines on medication safety and inform the creation of technology applications to promote eHealth for pregnant women in the future. This paper reports the influencing factors that affect a pregnant woman's online purchase intention.

Aim

To explore the factors that influence a pregnant woman's intention to purchase medication online.

Design

With the advancement and popularity of internet technology the options for participant recruitment and data collection in health care have expanded dramatically (Tuttas 2015). Facebook is a global social media platform with over 2.38 billion monthly active members (Statista 2019) with over 80 million people using the group feature each month (Guynn 2016). The popularity of social media platforms such as Facebook have recently led researchers to investigate ways of recruiting and carrying out qualitative research in closed groups to enhance their empirical research (Medley-Rath 2019).

Online focus groups are valid for research purposes as interacting with participants on the internet avoids a significant amount of travel, expense and provides a more internationally representative sample (Moore et al 2015). Online focus groups have been identified as having equal potential as in-person focus groups for gathering high-quality information from hard-to-reach populations on sensitive topics (Wilkerson et al 2014).

In this study, online focus groups using asynchronous communication on the social media platform Facebook were selected. This allowed an in-depth examination of the experiences and perceptions of pregnant woman when purchasing medication online and provided a greater understanding of the theoretical constructs of purchase intention in the TPB (Ajzen 1985).

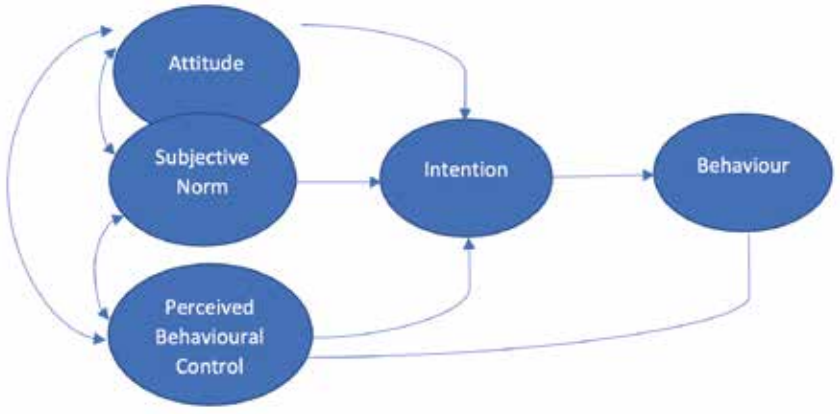

Figure 1. Theory of Planned Behaviour (Ajzen 1985).

Sample/participants

Women who had previously completed an online survey regarding online medication purchasing behaviour and were willing to engage in a closed Facebook focus group were invited to take part. A list was formulated of the women who had or had not purchased medication online during pregnancy so the focus group samples could be composed of different grouped women who had similar profiles regarding medication purchasing.

A purposeful sample of each grouping was then selected and an email of invitation with a Participant Information Sheet (PIS) attached was sent to each potential participant. If the woman wanted to contact the researcher directly for more information the researcher could be contacted by email or mobile telephone from a secure mobile purchased for the sole use of the research study.

All women were pregnant or had been pregnant in the past two years, were aged over 18 years and able to understand English. Women were added to the group by the researcher who controlled the group administration. The researcher invited each woman to join the focus group by clicking on the 'Invite by email' option in the top right-hand corner of the Facebook group page. This activated an email to each woman providing an invitation and link to join the closed Facebook group. If the woman had a Facebook account, they could automatically join the group at this point. If someone wished to participate who did not have a Facebook account, guidance on how to set up a personal account to join the group would be provided at this stage.

Data collection

Women were recruited into three focus groups: women who had purchased medication online during pregnancy (n=9) those who had not (n=8) and a mixed group of those who had/had not purchased medication online during pregnancy (n=6).

Online focus groups can be conducted synchronously or asynchronously (Williams et al 2012). For the purpose of this study an asynchronous communication method was adopted to allow participants time and freedom to respond at their own rate and pace allowing time for reflection prior to submitting a response (Reisner et al 2018). This was particularly important as the population involved were either pregnant or had young children and asynchronous communication would allow women to give responses at a time that was convenient to them (Medley-Rath 2019). This is particularly effective when participants are across different time zones and facilitates group participation from an internationally selective group. Questions were based on the TPB and followed a semi-structured format. The Facebook group was monitored three times a day by the researcher. The researcher allowed a period of one week following completion of questions asked in the focus group to allow time for any further comments. Following this period, the Facebook group was closed and all data transferred for analysis.

Ethical considerations

Ethical approval was sought and granted by the Ulster University Ethics Filter Committee. With current concerns regarding the protection of online identities, researchers must ensure online safety to protect anonymity, provide confidentiality and make women feel confident to participate and share their knowledge and experiences in the research process (Woodfield 2018). The group was a closed Facebook group account so that only members in the group could find and see posts, it was not accessible to the general public, therefore protecting the confidentiality of the members of group. The researcher also held the group administration role thereby controlling who could access the group. Participation in the online discussion was taken as an indication of voluntary consent. If any participant wished to withdraw from the focus group at any time they could do so.

Data analysis

Online focus group data were collected during May 2018, then transcribed and thematically analysed using Braun & Clarke's (2006) framework for analysing qualitative data (Table 1).

Table 1. Phases of thematic analysis (Braun & Clarke 2006).

Phase	Description of the process
1	Familiarizing yourself with your data
2	Generating initial codes
3	Searching for themes
4	Reviewing themes
5	Defining and naming themes
6	Producing the report

Thematic analysis is a method of identifying themes and patterns of meaning across a dataset in relation to the research question (Braun & Clarke 2006). All group discussion was transcribed and checked for accuracy and formation of coding structure. The structure was then refined and categorised into codes and themes, verified with the research team and mapped to the TPB (Ajzen 1985).

In Phase 1, as the focus groups were carried out online using a closed Facebook group, the data were essentially already transcribed. The data were then transferred to a Word document and checked for accuracy with preliminary potential codes and ideas being noted.

In Phase 2 initial codes were generated from the data after reading the transcripts several times to enable the researcher to become familiar with the content. Phase 3 involved the interpretative analysis of collating all the codes into potential themes and

gathering all the data that were relevant to each potential theme (Braun & Clarke 2006). To facilitate theme development, codes were colour-coded beside the data on an Excel spreadsheet that allowed easy moving and pasting of themes during the process. An inductive approach to the data analysis was used where the themes came out of the data which were analysed without trying to fit them into a coding frame (Braun & Clarke 2006). This ensured pregnant women's experiences of purchasing medication online were well portrayed. To address the theoretical aspects of the study it was also necessary to explore the constructs of the TPB that influenced purchase intention, as such, a deductive or theoretical thematic analysis was carried out on the data and incorporated into the coding.

In Phase 4, all the themes were reviewed and a thematic map of the provisional themes and sub-themes was created to demonstrate the relationships between them. As the focus group questions were theory-driven, themes and sub-themes identified from the coding were mapped to the constructs of the TPB.

In Phase 5, the themes were reviewed and refined with clear names being given to each theme to reflect the overall story and ensure there was an appropriate fit to the theoretical constructs of the TPB. The researcher took care to identify themes that were reflective of what was portrayed in the data.

The final phase, Phase 6, involved writing up the findings to tell the story of the factors that influenced pregnant women purchasing medication online. Verbatim quotes from the data were included in the final write-up to support the development of the themes and sub-themes and highlight a clear audit trail.

Rigour and trustworthiness of the qualitative data

It was important that the study demonstrated methodological rigour so that an authentic and trustworthy reflection of pregnant women's experiences of purchasing medication online was achieved. To demonstrate trustworthiness in this study the four criteria of credibility, transferability, dependability and confirmability were incorporated (Lincoln & Guba 1985). The focus group transcripts were analysed and independently verified by an external assessor and the research team.

Credibility

Credibility is the truthful and accurate representation of a participant's lived experience and the measurement of internal consistency (Cypress 2017). Credibility was achieved by the researcher facilitating all the focus groups during data collection and this enhanced consistency by ensuring all questions were repeated and consistently stated (Singleton & Furber 2014).

Triangulation was achieved in this study by the research team members peer-validating the data coding, theme formation and interpretations to confirm consistency with the findings, helping to prevent bias in the analysis (Ritchie et al 2013). Verbatim quotes were used in the final report to provide 'thick descriptions' of factors that influenced women's online medication purchasing behaviour and to authenticate the study findings. An independent expert in qualitative analysis was used to independently analyse the data to confirm the findings.

Transferability

Transferability denotes the extent to which the findings from the study can be transferred or have applicability in other settings (Polit & Beck 2017). To enhance the transferability, women's demographic details were obtained during data collection which demonstrated the recruitment and representation of women from six different countries participating in the group. The participation of women from various countries enhances the generalisability of the study and provides descriptive data of the sample and settings so that similarities in some women from countries that were included could be observed in the discussion.

Dependability

Dependability refers to the stability of data over time under the same conditions (Lincoln & Guba 1985). In this study the researcher has provided a clear audit trail to demonstrate dependability to any external reviewers with a discussion of the analytic decision making throughout the research process detailing methodological decisions regarding recruitment, data collection, data analysis. Polit & Beck (2017) acknowledge that credibility cannot be attained in the absence of dependability. Consistent measures were taken during each focus group to use the same topic guide and questions which were well-defined, piloted and underpinned by the TPB to ensure dependability in the study. Verbatim quotes were used in the findings to demonstrate the formation of themes from the focus group data.

Confirmability

Confirmability refers to objectivity or the equivalence between independent people regarding the accuracy, relevance or meaning of the data (Polit & Beck 2017). This should be carried out to demonstrate the integrity of findings which should be devoid of any biases (Lincoln et al 2011). Throughout the study a clear audit trail was documented and reflexivity was demonstrated by the researcher carrying out a personal reflexive account to demonstrate how personal history and professional background influenced the philosophical aspects of the study.

Table 2. Demographic characteristics of the sample.

Measures	Predictors	Frequency	Percentage
Age group	25-34 years	12	52.2%
	35-44 years	11	47.8%
Education	Technical college/Diploma	1	4.3%
	Undergraduate degree	12	52.2%
	Postgraduate degree	10	43.5%
Employment	Full-time	15	65.2%
	Part-time	4	17.4%
	Unemployed	1	4.3%
	Student full-time	2	8.7%
	Other	1	4.3%
Country	Australia	2	8.7%
	Canada	1	4.3%
	Ireland	2	8.7%
	Portugal	1	4.3%
	Sweden	1	4.3%
	UK and Northern Ireland	16	69.6%

Results

Participant characteristics

Women from six different countries participated in the study. Ages ranged from 25-45 years and the majority (65%) were employed full-time, with almost everyone educated to degree level (96%) (See Table 2). Less than a quarter of the women who took part (22%) paid for prescription medications during pregnancy and 30% of the sample took medications for a medical condition prior to becoming pregnant. Medical conditions described by women included asthma, bipolar disorder, diabetes, hyperlipidemia, hypertension, polycystic ovarian syndrome and stomach ulcer. Ten women had previously purchased medication or herbal supplements online during pregnancy.

The transcripts were analysed and structured under themes and sub-themes which were mapped to the TPB constructs of attitude towards a behaviour, subjective norm and perceived behavioural control (Figure 2).

Attitude

Knowledge of medication use in pregnancy

Women across all groups identified a lack of knowledge about medication safety in general. They also highlighted a lack of discussion with their health care providers regarding medication usage:

'This is my second pregnancy and I haven't had any conversations with a HCP about medications in general to be honest, let alone online purchasing'. FG1 200-202 P9

Women in the mixed focus group reported searching for information and purchasing homeopathic medications online:

'…I think there definitely is a growth in a holistic approach to many illnesses, which will lead to people researching a more natural approach to whatever and buying vitamins / supplements etc. I would be confident in ordering whatever from a chemist, such as the ones previously mentioned, online.' FG3 78-84 P3

Influence of online information on medication use in pregnancy

Women indicated a lack of basic information on safe medication consumption during pregnancy and a lack of understanding of the safety of online purchasing. They identified health/medical websites as reputable and they would use their advice to assist with decision making, self-diagnosis and self-medication:

'…I wouldn't think to prefer an independent medical source; I would just try to find sites that look official (an organization or science-y or government)' FG2 245-247 P5

A common pattern of behaviour was described when women searched for information on common ailments and found themselves getting redirected to pharmacy websites to purchase medications:

'…Google symptoms such as "restless legs" or whatever, and being led to a reputable pharmacy which sells something to resolve or alleviate the problem.' FG3 61-62 P3

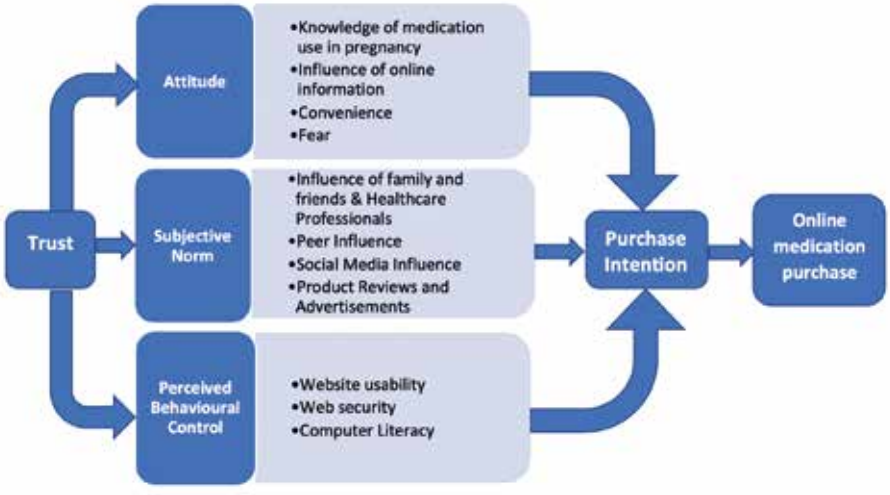

Figure 2. Themes and sub-themes mapped to the Theory of Planned Behaviour.

Convenience of purchasing medication online during pregnancy

Convenience is a key factor in purchasing behaviour:

'…Yes, convenience! Especially if you have morning sickness/other children, etc. Also, it could be perhaps a little easier to compare brands and prices while in the comfort of your own home instead of having to stand & look at your options while probably fairly tired...' FG2 66-70 P5

'I think it's cheaper and convenience that and u can just easily go online if u know what u want and have it delivered to your door the next day if u use amazon prime or something like that.' FG1 73-75 P7

Other aspects of convenience were 24-hour accessibility, optional delivery times, the ability to purchase medications as part of the weekly grocery shop and a reduction in effort required to go to a general practitioner (GP) whilst feeling unwell:

'…I can never be bothered to make a doc appointment for something like meds just easier to go online and buy! I had to take aspirin in pregnancy and used to buy with my Tesco groceries online for 30p! Also I believe we should pay for meds like that which cost the NHS £1000 but we can buy for so little else where! Also when I was on 'bedrest' for 10 wks. it was very handy to get my meds delivered to my door!' FG1 106-113 P7

Several women highlighted the lack of availability of timely GP appointments and the strain on GP services as contributing to purchasing medication online as a convenient solution:

'…Convenience, plus there is no need to make an appointment with your GP. Well it takes a couple of weeks to get an appointment in our surgery' FG1 66, 71 P6

'…If I needed prescription medications I probably would go through HCP first but if I didn't get what I needed I would be happy to buy online' FG1 287-288 P4

Women highlighted that purchasing medication online gave them the freedom to choose what they needed without judgement and confidentially, without having a face-to-face consultation with a health care provider. Anonymity and control were identified as benefits to purchasing medications, with women commenting they specifically like purchasing medication in early pregnancy without having to make the pregnancy public knowledge:

'… I think anonymity is a big thing, especially in the first 12 weeks when you might not have told anyone you're pregnant' FG1 258-259 P9

Fear of purchasing medication online during pregnancy

Women were concerned about the quality of the medication purchased online:

'…I would need to make sure it was from a source I was happy with; I would worry the quality might not be as good or it might not be what it actually says it is.' FG1 182-184 P9

Women also had concerns about whether the products were safe to take in pregnancy and whether the dosages were correct. Women who hadn't purchased medication online had reservations about purchasing without discussing with a health care professional:

'…I would be v cautious about buying meds online, especially when pregnant. When pregnant, I am generally a little more cautious anyway. I think I would rather present my bump to a pharmacist just to reinforce that I am pregnant and to make sure the meds are suitable' FG3 131-132, 137-139 P3

Women also suggested that, often, an online medical consultation service for a prescription is not free nor is it available on the NHS, despite demands on GPs being so high. Women highlighted their concerns regarding the ability of pregnant women to distinguish fake from real pharmacy websites to make a secure purchase:

'…I would know, but a lot of people wouldn't have the same understanding or the ability to distinguish between "fake" and real online pharmacies and might believe anything on them.' FG1 177-179 P5

By self-diagnosing and self-medicating women had concerns that by bypassing a health care professional's advice they may purchase medications contraindicated for pregnancy:

'…Maybe some women might make a conscious choice to purchase medication online if they don't think it is something they should be taking in pregnancy and maybe are worried to ask for it from a doctor or pharmacy…similarly if women bypass the doctor and pharmacy it may lead to them taking medications that are unsafe in pregnancy' FG1 96-100, 102-104, P5

Concerns about purchasing termination of pregnancy medication online to avoid judgement or prosecution were presented:

'…Some women may be embarrassed to purchase particular medications in person and may find that doing it online is much more discrete and private. Although dangers come with this with medications such as misoprostol being available online to buy. These women would not be receiving the support that they should from healthcare professionals.' FG3 193-197 P1

Subjective norm

Influence of family, friends and health care professionals

Women in the focus groups who had experience of purchasing medication online predominantly felt

confident to make their own purchasing decisions. Those women who had previously purchased medication online are not strongly influenced by family or friends, nor would ask their opinion. They tended to be more influenced by product reviews or star ratings:

'…Many of my family were concerned but it didn't stop me buying them...' FG1 391-392 P8

Women in the focus groups who had not purchased medication online had a perception that people including family and friends would disapprove as it is considered 'taboo' and would have concerns regarding the side-effects of the medications on the safety of the baby:

'…I think if I said to my family "oh I bought these tablets online" they would be horrified! I think there is a perception of buying medications online that makes people worried…' FG3 236-238 P3

'…Family and friends probably would advise against if the purchase would be made without doctor's approval or consent...' FG3 228-229 P4

Women viewed purchasing vitamins or homeopathic remedies online as safe and acceptable, and believed that health care professionals would find this acceptable:

'…I think HCPs approval/disapproval would be based on what drugs you were ordering…paracetamol or pregnancare that's ok in pregnancy I think their attitude would be different if you were buying something that wasn't licensed in pregnancy.' FG1 454-455, 458-460 P9

Variation in opinions from family/friends and health care professionals made the decisions difficult and this was not helped by some of the reviews:

'…I've definitely had lots of confusion!! Lots of different people say lots of different things. Some encourage some things whilst others discourage it or don't think it matters. This is what confused me, differences of opinion. eg My doctor said Panadol is fine but others (online, friends) strongly discouraged me from using it.' FG2 111-115 P5

Peer influence/effect

Some of the women in the group felt they would be judged by their peers for purchasing medication online during pregnancy as it was perceived by some as 'not something you do' social norms appear to impact on women's decision making and women referred to the normalisation of online purchasing as being influential:

'…I don't think I would ask others as part of me thinks it sounds stupid so therefore it's wrong others would then think I was being foolish and judge me. But as others have said, if it was more common practice among people I know, then I wouldn't be so wary of it.' FG2 279-283 P1

Peer pressure for normal and natural was a strong belief amongst some and taking medication or purchasing medication online would be frowned upon and this would reduce the likelihood of online purchasing:

'…There is a very strong social push in Australia to do and be "natural" - to not have any medical intervention pre, during and post birth. You are seen more favorably socially if you don't have any medical intervention I guess.' FG2 135-138 P5

Others thought differently:

'…Don't think I considered other's approval or not when buying online I guess it's more influenced by general purchasing behaviour.' FG1 483-484 P3

Social media influence

Pregnancy groups/forums and social media were seen as influential sources of advice for women and can affect a pregnant woman's decision to purchase:

'…Think Facebook and Twitter etc. would play a massive part if things are advertised there we tend to take note even if subconsciously!' FG1 497-498 P7

Other mothers and friends on social media were thought to be influential and increased their intention to purchase medications online during pregnancy:

'…I purchased some non-prescription medicine as recommended on a Facebook group on trying to conceive when breastfeeding. I started taking Floradix on the recommendation of a colleague and regularly purchase this online.' FG1 431-436 P3

Some voiced concerns in the focus groups as to the reliability of the advice provided on social media and pregnancy forums:

'…Most pregnant and new moms are in social media groups were they have access to multiple opinions and suggestions regarding symptoms of pregnancy and newborns... in a situation of discomfort they may be induced to buy online without doctor / pharmacist opinion...' FG3 254-257 P4

Product reviews and advertisements

Product reviews and advertisements had a strong impact:

'…The online star rating is one feature I would check before buying! And reviews to check that others have been satisfied with the product when it have arrived with them' FG1 515-517 P7

'…wouldn't look twice unless there were quite a number of reviews and obviously the majority positive. I would be swayed by any negative reviews to avoid purchasing.' FG3 291-293 P1

Online products with a celebrity endorsement positively influence a woman's intention to purchase medication online, as would visual imagery of a

healthy mum and healthy baby:

'…Yes I agree, recommendations and advertising plays a big role. Pregnancy is a time when I feel women will do anything to ensure the health of her baby, so if adverts or other mothers say a product is the best then the woman will want to purchase it' FG1 504-507 P5

Perceived behavioural control

Website usability

Women wanted to be able to find the product they were looking for with ease and the convenience of being able to make purchases in three clicks:

'…I can buy in three clicks. If there is difficult signing in, remembering passwords, looking for payment cards etc. I can be put off' FG3 305-308 P1

Women also favoured websites that facilitated prompt delivery timeframes, low shipping costs, free delivery, ensuring medication stability during transit with signed for delivery, displayed content and possible drug interactions to ensure it was safe to take in pregnancy before deciding to purchase.

Web security

Website financial security was also a major factor in a woman's decision to purchase online, with PayPal being the most commonly discussed in groups and trusted for safety:

'…if PayPal is an option I tend to trust the website. I know there is a backup if something goes wrong and also its PayPal which has my information and not the actual website.' FG1 531-534 P5

Women wanted not only financial security but also security around their personal data, with some women not wishing their details to go to third parties in order to minimise spam emails from other suppliers. Women also acknowledged difficulty in distinguishing between real and fake pharmacy sites prior to sharing and providing personal details:

'…I would know they were legit and there are so many websites claiming to be pharmacies but I think it would be hard to distinguish them.' FG1 545-546 P5

Computer literacy

Throughout all the focus groups, access to the internet was not discussed by any of the women as a factor that would influence purchasing, which is in keeping with the underlying assumption that almost everyone has internet availability. Pregnant women are of a younger population who are more internet-confident, more likely to have established online purchasing behaviour and therefore more inclined to purchase medication online if required:

'…the younger population would be more accepting …mostly because they are more likely to have done online purchasing before but with other products.' FG2 261-262, 267-268 P3

None of the participants in the focus groups expressed concerns about their ability to navigate websites or carry out an online purchase.

Trust

Trust was identified as an underlying theme demonstrated throughout all of the constructs relating to purchase intention in the Theory of Planned Behaviour. Women commented they would only search for information or medications on websites they trusted. Trust was linked to brand familiarity with familiar high street shops that have online retail outlets. A combination of these factors relating to trust increased a woman's intention to purchase medication online.

'…For me, it would have to be sources that are well known. For example, Boots, supermarkets etc. I think for me it's about brands I know and recognise'. FG1 191-195 P9

'…I would probably only use a company that I am already familiar with e.g. Boots or my local pharmacy (if they had an online option)'. FG3 298-300 P3

Discussion

In relation to the TPB construct Attitude, this study demonstrated that women perceive they have inadequate information about the safety of medications during pregnancy and seek support from the internet. Medication safety advice is one of the most commonly searched topics on the internet for pregnant women (Hamëen-Anttila et al 2014, Sinclair et al 2018). Women are concerned about the evidence retrieved and cannot always tell real from fake pharmacy sites. Although the UK, US and other countries also have medication safety information that can be accessed online from UKTIS, FASS, Safe for Two, women still need advice from their midwives and doctors who can advise on medication usage in view of their clinical picture.

This study demonstrates that pregnant women are turning to the internet to purchase medications online for convenience, cost-effectiveness, better availability of products, with similar findings documented in the literature for general online medication purchasing sales (Kennedy & Wilson 2017, Tascu et al 2017). The ability to avoid consultations with health care providers strongly appealed to some women in this study to maintain privacy, anonymity and confidentiality, making online purchasing an attractive option. However, this is a concern, as a recent study found that 28.3% of women who took medication during pregnancy used medications classed as risky, including ibuprofen, metoclopramide and codeine (Trönnes et al 2017). This, with the combination of pregnant women avoiding health care professional

consultation and essentially self-medicating by purchasing medications online, highlights a real risk for pregnant women and the safety of their unborn baby. Targeting women preconceptionally, antenatally and in the inter-pregnancy period with safety information on how to purchase online medication safely can mitigate some of the potential risk, along with strict regulation of online medication sales.

A large proportion of women either worked full time or part time, with almost half the sample having purchased medication or vitamins online during pregnancy. This highlights how modern mothers have a greater incentive to purchase medication because of convenience. More worryingly, several women in the focus groups commented on using the internet to obtain medication due to long waiting times to obtain appointments to see GPs. The most recent GP Patient Survey (National Health Service (NHS) 2018a) found 24% of the population had to wait a week or more to get a GP appointment.

Although the literature would suggest that more than 90% of pregnant women take a prescribed or over-the-counter (OTC) medication at some stage during their pregnancy (Mitchell et al 2011), fear about product safety and teratogenic factors remains paramount (Twigg et al 2016, Lynch et al 2018). Fears discussed by women in the focus groups regarding online medication purchasing included whether the product they would receive would be of a good quality and the recommended dosage. Previous verification studies testing product content demonstrated considerable variation in the drug concentrations (Lagan et al 2014, Murtagh et al 2018). Studies have highlighted a shortfall in packaging, labelling and patient information by the Medicines and Healthcare products Regulatory Agency (MHRA 2016b) thus validating the concerns raised by women in this study. Women in the study also highlighted that they tried not to take medications during pregnancy for fear of harmful outcomes for their baby. Twigg et al (2016) found similar findings in their study with some women experiencing heartburn and UTIs and not treating the condition. Further research is required to address women's concerns, explore risk perception around medication use in pregnancy and improve medication adherence.

More caution was displayed by women in this study for online purchase of prescription medications, with women who had not previously purchased medication online being fearful. This was generally in relation to protecting the safety of their unborn baby and limiting the teratogenic risk to the fetus; a finding similar to that of general medication usage in pregnancy (Twigg et al 2016, Lynch et al 2018). The dangers of online medication purchasing have been highlighted and guidance provided by the Food and Drug Administration (FDA) and NHS (FDA 2018, NHS 2018b). However, women generally felt purchasing vitamins and herbal supplements was safer for them and their baby and felt their family and peers would not have any issues with obtaining them online. Abdollahi & Chareti (2019) found most pregnant women were advised to take herbal medications by their families and did not disclose what they had taken to a health care provider as they perceived their use to be safe. Herbal medicines have been perceived by pregnant women to be more natural and safer for use in pregnancy compared to prescribed medicines (Pallivalappila et al 2013). Women also feel products that could be purchased OTC, such as paracetamol, are not considered a 'medicine' and therefore do not have as many safety concerns in comparison to prescribed medications (Bowman et al 2019). Thus, the level of caution when purchasing vitamins, herbal medications and OTCs is less when purchasing online than for prescribed medication.

Women on the Web (www.womenonweb.org) provides a telemedicine service that provides information, health care support and access to abortion pills online for women with restrictive health care systems. A recent study found self-managed medication abortion using online telemedicine was often preferred over travel for women in countries where abortion is illegal due to its convenience and safety, however women found the experience dominated by fear and isolation due to the high associated risk of prosecution (Aiken et al 2018). With findings from a systematic review by Endler et al (2019) showing medical abortion through telemedicine being highly acceptable to women, this supportive form of online medication purchasing should be supported in the future. In countries that demonstrate a contentious political environment with severe restrictions on access to medicalised abortion, the concern is that the future of abortion may be 'unsupported, online, and in the mail' (Painter 2019).

In relation to subjective norms, buying OTC medications, vitamins and herbal medications online during pregnancy was considered by women in the study to be safe, especially if approved by health care professionals. However, Kennedy et al (2016) found herbal medications recommended to pregnant women by a health care professional were three times more likely to be for medications contraindicated for pregnancy. This is concerning and suggests further education for health care professionals is required on the effects of herbal medications during pregnancy.

Women who had previously purchased medications online were less likely to be influenced by family and friends and more favorably disposed towards reviews and star ratings. Younger adults' purchasing decisions are strongly influenced by average consumer ratings (von Helversen et al 2018). However, negative reviews can exert a stronger influence than positive ones (Purnawirawan et al 2015).

In the group of women who had not purchased medication online, peer influence was identified as a factor that influences online purchasing behaviour. Women clearly indicated that if online medication was more prevalent, and more of their peers were doing it, they too would purchase medication online.

Social media was seen as influential and increased a woman's intention to purchase if they received advice from others that a medication had been helpful to them. Using social media to gain advice has also been found to increase prenatal attachment (Harpel 2018). However, in this study some women did demonstrate concern about the reliability of the advice on social media and pregnancy forums and preferred to see endorsement by health care professionals. A recent study by van Gelder et al (2019b) reviewed social media posts on medication safety in pregnancy and found that the safety classification on strict indication drugs (93%) and medications with insufficient knowledge on their safety during pregnancy (76%) were more likely to be incorrectly perceived by the public compared to medications with the TIS classification safe (24%). Lynch et al (2018) identified that women had a lack of knowledge regarding the effect of medication on their baby and turned to social media and online blogs to assist with their decision making regarding what medications were safe to use in pregnancy.

In relation to perceived behavioural control, women expected to find what they were looking for quickly and easily. Specific online stores were preferred by women if they had a function to store personal details and card payments for repeated purchases or PayPal options. The potential for online fraud was perceived as the most important risk identified in online purchasing (Wang & Chang 2013, Pappas 2016).Women also favoured websites that facilitated prompt delivery time frames, low shipping costs, free delivery, medication stability assurances and signed for delivery.

Women required security about the use of their personal data and there was a significant direct effect of privacy concerns on both attitude and intention. This attitudinal construct is an important mediator in explaining online purchase intention, with privacy concerns having been found to have a negative impact on trust but a positive impact on perceived risk (Fortes et al 2017).

All aspects of the constructs of attitude, subjective norm and perceived behavioural control were relevant and important in predicting purchase intention from the focus group data. However, what was evident from the focus groups was a core theme of trust that ran through all data gathered on the constructs of the TPB. Trust is a known factor which influences behaviour and purchase intention (Hong 2015, Thomas et al 2018). The current population of pregnant women who are Generation Y and Z are internet-confident, more likely to have established online purchasing behaviour and therefore more inclined to purchase medication online.

Women in this study commented that they would only search for information or medications on websites they trusted. Trust was also linked to women's perceived risk of online purchasing associated with the product purchased online and concerns regarding pharmaceutical quality. Li et al (2014) highlight that the concept of trust is more important for internet purchases than offline as consumers perceive more risk in online purchasing due to their inability to visit a physical shop and examine the product they wish to purchase. Trust was linked to brand familiarity, with women commenting that they trusted familiar high street shops that had online retail outlets, as they were familiar with their products. Women in the study commented that they trusted positive online reviews with a stronger intention to purchase, and negative reviews with less inclination to purchase medication online. Wang & Chang (2013) found that when there is an element of risk involved in online purchasing, the amount of trust a consumer places on sources of information, recommendations and reviews influences their purchasing decision. Midwives are therefore in an optimum position to discuss medication usage with women, advise on how to make online medication purchases safely and signpost to legally endorsed pharmaceutical websites.

Generation Z expects various new devices and electronic processes to be widely available, offering consumers greater autonomy and faster transactions with which to make more informed shopping decisions online (Priporas et al 2017). Future planning for health care should develop services to facilitate online pharmacy and medication information for women during pregnancy to provide convenient, safe, streamlined, effective health care in the future in keeping with the Department of Health eHealth and Care Strategy (Department of Health 2016).

Limitations

A core strength of this study is the new theoretical knowledge that provides insight into the application of the TPB to pregnant women's purchasing behaviour. Limitations were the sample bias towards internet users who are more motivated to participate than a general population of pregnant women. In addition, the women who participated in the study were highly educated to degree level. Opinions of women from different educational backgrounds would have enhanced the generalisability of the findings. Asynchronous online focus groups also have a higher drop-out rate due to the timeframe taken to complete the discussion and can lack depth.

Conclusion

In conclusion the current findings in this study identify the predictors of pregnant women's

intention to purchase medication online using the TPB. However, intention alone may not be sufficient to determine behaviour. As such, future research should investigate specific areas of online medication purchasing. Midwives and health care professionals need to be aware that pregnant women are purchasing medications online to ensure that their knowledge of this behaviour is evidence-informed and that they offer pregnant women appropriate advice. Understanding online medication purchasing behaviour is important to shape future communications between health care professionals and pregnant women and assist managers and policy makers in creating guidelines for medication safety and devising eHealth technology for pregnant women in the future.

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Conflict of interest

No conflict of interest has been declared by the authors.

Author contributions

Criteria	Author initials
Made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data;	AL, MS, HZ, PG
Involved in drafting the manuscript or revising it critically for important intellectual content;	AL, MS, HZ, PG
Given final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content;	AL, MS, HZ, PG
Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.	AL, MS, HZ, PG

Funding

This study was funded by the Department for the Economy and the Southern Health and Social Care Trust in Northern Ireland.

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Little A, Sinclair M, Zheng H et al. MIDIRS Midwifery Digest, vol 30, no 2, June 2020, pp 159-171.

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