

Nausea and vomiting in pregnancy: a cross-sectional study of community pharmacists in the UK

Bradley Payne¹, Olivia Righton², Melanie Nana¹, Sarah Chapman³, Catherine Williamson⁴, Shivali Lakhani⁵, Marsha Alter⁵, Zoe Bell², Angela C. Flynn^{6,*} 

¹Department of Women & Children's Health, School of Life Course & Population Sciences, King's College London, St Thomas' Hospital, Westminster Bridge Road, London, SE1 7EH, United Kingdom

²Department of Nutritional Sciences, School of Life Course & Population Sciences, King's College London, Franklin-Wilkins Building, 150 Stamford Street, London, SE1 9NH, United Kingdom

³Institute of Pharmaceutical Science, King's College London, Franklin-Wilkins Building, 150 Stamford Street, London, SE1 9NH, United Kingdom

⁴Institute of Reproductive and Developmental Biology, Imperial College London, Hammersmith Hospital, 72 Du Cane Road, London, W12 0NN, United Kingdom

⁵The Middlesex Pharmaceutical Group of LPCs, 1278 High Road, Whetstone, London N20 9HH, United Kingdom

⁶School of Population Health, Royal College of Surgeons in Ireland, Beaux Lane House, Lower Mercer Street, Dublin 2, D02 DH60, Ireland

*Corresponding author. School of Population Health, Royal College of Surgeons in Ireland, Beaux Lane House, Lower Mercer Street, Dublin 2, D02 DH60, Ireland. E-mail: angelafllynn@rcsi.ie

Abstract

Objectives: To assess the content and frequency of advice community pharmacists (CPs) provide to pregnant women with nausea and vomiting, their confidence in providing advice, and their knowledge of the safety of medication used to manage the condition.

Methods: An online questionnaire of closed- and open-ended questions was distributed to CPs in the UK in May 2023. Closed-ended questions were analysed quantitatively, and conventional content analysis was utilised for open-ended responses.

Key findings: One hundred and eighty-one respondents completed the questionnaire, 24 responses were excluded, leaving data from 157 available for analysis. The majority (90.4%) of participants reported having experience in providing advice on nausea and vomiting with varying levels of confidence. Advice provided included using over-the-counter products, lifestyle modifications, reassurance, medication advice, and referring to other healthcare professionals. Knowledge of first-line antiemetics considered safe in pregnancy varied; cyclizine was correctly identified as safe during pregnancy by 57.3%, followed by 37.6% for promethazine and 31.2% for prochlorperazine. Self-reported confidence and having experience providing advice were related to higher medication safety identification rates. Five percent of participants reported previous training on the condition, while 70% reported wanting further education, preferably delivered via an online medium.

Conclusions: This study showed that although 90% of CPs provide advice on nausea and vomiting in pregnancy, their medication safety knowledge varied. The majority of CPs reported wanting further education that would ensure women could access reliable information and evidence-based advice to optimise management of the condition.

Keywords: community pharmacists; surveys and questionnaires; nausea and vomiting in pregnancy

Introduction

Nausea and vomiting in pregnancy (NVP) affects up to 70%–80% of pregnancies with symptoms typically beginning around 4–7 weeks of gestation [1, 2]. Eighty percent of women with NVP experience all-day nausea, impacting daily functioning and quality of life [3]. While most women with NVP do not require pharmacological management [2], those with more severity do. Hyperemesis gravidarum (HG) is a severe form of NVP which affects up to 3% of the pregnancy population [4] and is one of the most common causes of hospitalisation during pregnancy [5].

HG can result in weight loss, electrolyte disturbances, nutritional deficiencies, and oesophageal tears [6, 7]. HG has also been shown to be associated with anxiety, depression [8, 9], and in severe cases, pregnancy termination and suicidal ideation [10]. Early recognition and optimal management are

essential to improve quality of life and prevent associated maternal physical and mental health complications.

NVP can occur early in pregnancy before antenatal care is established, and management includes advice and treatment with antiemetic medication largely from community primary healthcare providers [1, 11]. It is critical that healthcare professionals such as general practitioners (GPs) and community pharmacists (CPs) provide evidence-based information to women and have sufficient knowledge of medicines used in the management of NVP. A recent cross-sectional study showed varying levels of safety knowledge of medicines used to treat HG in GPs in Wales, with the majority reporting a need for further education [12].

CPs are highly accessible in the community and are frequently accessed by women to seek information about medicines during pregnancy [13]. However, knowledge, communication,

and dispensing of over-the-counter (OTC) and prescription medication to women during pregnancy has been shown to be suboptimal in pharmacists in the UK. In a UK study consisting of an online survey and nested interviews, women described pharmacists who refused to dispense prescribed medication for depression and those who suggested prescribed medication for HG was not necessary [14].

Beyond providing advice, CPs are well placed to provide intervention as appropriate during pregnancy. CP consultations in early pregnancy focussing on medication and pregnancy-specific conditions have been shown to be feasible [15]. Furthermore, in an intervention study in 14 community pharmacies in Norway, maternal well-being and quality of life were assessed following a pharmacist consultation focussing on NVP [16]. Although the intervention did not affect quality of life scores, the pregnant women found the consultation useful [16].

It is therefore critical to assess the capacity of CPs to provide evidence-based advice to women with NVP. The aim of this study was to assess the content and frequency of advice CPs provide to pregnant women with NVP, their confidence in providing advice, and their knowledge of the safety of medication used to manage the condition. An additional aim was to examine educational needs of CPs to support optimal management of women with NVP in the UK.

Methods

Study design, setting, and population

An online cross-sectional survey study was conducted amongst CPs working in the UK.

Ethical approval and reporting

Ethical approval for this study was granted by the King's College London Research Ethics Office (reference LRS/DP-21/22-33590, 03 October 2022), and the study adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines.

Data collection

A questionnaire previously utilised to assess knowledge and advice provided to women with NVP by GPs [12] was built using the online platform Qualtrics ([Supplementary material S1](#)). The questionnaire consisted of 22 questions and was modified for use in CPs in consultation with multidisciplinary academics and healthcare professionals. The questionnaire included a combination of closed- and open-ended questions and assessed CPs experiences with providing advice on NVP, OTC recommendations, safety profiles of prescribed drugs, confidence on providing advice, and educational needs. The questionnaire was piloted by three CPs, an obstetric medicine specialist and a health psychologist.

An email with a link to complete the questionnaire was distributed by Dynata, a first-party data company, to pharmacists who self-identify as 'community pharmacists' in the UK in May 2023. At the time of data collection, Dynata had 385 CPs on their database. Up to four reminders were sent to the participants to complete the questionnaire. This method has been previously used to recruit CPs for cancer research [17]. Participants were required to answer every question; however, some questions were only visible to participants who selected specific responses to previous questions, thus the response

number for each question varies. All data were submitted anonymously, and CPs were offered a token of thanks for their participation in the survey.

Data and statistical analysis

Data were imported into IBM SPSS (version 28) and quality checked for entry errors. Questionnaires were excluded if filled out by an individual who was not a CP if the questionnaire was incomplete or completed in an unrealistic time frame [17].

Drug safety questions were categorised according to the Royal College of Obstetricians and Gynaecologists (RCOG) green top guidelines for the treatment of NVP [11]. In the RCOG guidelines, drug classifications are informed by drug safety results from various relevant study designs and reviews, ranging from meta-analyses to case-control studies. First-line antiemetics include cyclizine, prochlorperazine, and promethazine. Second-line antiemetics include metoclopramide, domperidone, and ondansetron.

Following distributional checks, for continuous variables, results were presented as means and standard deviations for normally distributed variables or median and interquartile range (IQR) for non-normally distributed variables. Numbers and percentages were presented for categorical and binary variables. Descriptive statistics were used to identify the percentage of CPs who correctly identified each of the list of antiemetics as safe during the first trimester or safe throughout pregnancy.

To assess associations between drug safety and confidence (confident/not confident), experience in providing advice on NVP (yes/no), and prescriber status (yes/no), a chi-squared test was used.

Open responses were exported from Dynata into SPSS for analysis. One author (B.P.) conducted conventional content analysis [18] which was then cross checked by another author (Z.B.). First, all open responses were read, and then upon re-reading, each response was assigned a code. These codes were then grouped into clusters of related meaning to form categories. Non-coherent or irrelevant responses to the question were not coded during analysis. This was repeated for each open-response question. The prominent categories arising from the content analysis were reported narratively.

Results

A link to the questionnaire was sent to 385 potential participants, of which 181 engaged with the questionnaire. Of these, 24 responses were excluded due to completion under 2 min ($n = 18$), incomplete questionnaires ($n = 5$), or respondents not being a community pharmacist ($n = 1$). After exclusion, 157 questionnaires were available for analysis. The majority of participants worked in England (86.6%), while the median number of years working as a CP was 20. Over half of the participants reported working in an urban environment (55.4%) and 66.2% were men. Forty percent of participants reported being prescribing pharmacists ([Table 1](#)).

Experience, advice, and drug safety knowledge

Ninety percent of participants reported experience in providing NVP advice with just over half (51.6%) reporting that they receive questions relating to NVP on a monthly basis and 16.6% on a weekly basis. When participants were asked about confidence in providing advice on NVP, their responses

Table 1. Characteristics of the respondents.

Characteristics	Number of respondents	<i>n</i> (%) or median [IQR] ^a
Sex	157	
Men		104 (66.2)
Women		53 (33.8)
Qualified as a prescriber	156	
Yes		63 (40.4)
No		93 (59.6)
Country	157	
England		136 (86.6)
Wales		6 (3.8)
Scotland		7 (4.5)
Northern Ireland		8 (5.1)
Place of work	157	
Urban		87 (55.4)
Suburban		59 (37.6)
Rural		11 (7.0)
Years working as a community pharmacist	157	20 [14]

^aData presented as *n* (%) or median [IQR].

varied from 'somewhat confident' (58.0%) to 'not very confident' (31.8%, [Table 2](#)).

In the first open-response question (*n* = 146), participants were asked about the type of advice they provide to women with NVP. Responses were grouped into categories including (i) OTC products: ginger, acid suppressants, oral rehydration sachets, and acupressure bands, (ii) lifestyle advice: eating smaller and more frequent meals, increasing fluid intake, avoiding triggers, and increasing rest, (iii) healthcare professional involvement: referral to GP or midwife, particularly for severe symptoms, (iv) medication: most commonly cyclizine, and (v) reassurance: related to NVP being 'common' and 'normal', usually resolving later in pregnancy ([Supplementary material S2](#)).

When further asked about OTC products for managing NVP, 41.3% of participants reported recommending products ([Table 2](#)). In the second open-response question (*n* = 51), participants were asked which OTC products they would recommend. Responses were grouped into three categories including ginger (e.g. ginger chews, ginger tea, and ginger sweets), non-pharmaceutical products (e.g. acupressure bands, aromatherapy, and rehydration sachets), and other pharmaceutical products (e.g. acid suppressants) ([Supplementary material S3](#)).

When asked about the safety of first-line antiemetic medications for NVP as included in the RCOG green top guidelines (cyclizine, promethazine, and prochlorperazine) [11], 20.4% of participants correctly identified all three medications as safe throughout pregnancy ([Table 2](#)). Cyclizine was correctly identified as safe during pregnancy by 57.3% of participants, followed by 37.6% for promethazine, and 31.2% for prochlorperazine. For second-line antiemetics (metoclopramide, domperidone, ondansetron) [11], correct identification was 43.3%, 21.7%, and 24.2%, respectively. The percentages varied for medications that were classed as

Table 2. Experience, advice, and broad knowledge of first-line treatment.

	Number of respondents	<i>n</i> (%)
Experience in giving NVP advice	157	
Yes		142 (90.4)
No		15 (9.6)
Frequency of NVP questions	157	
Never		1 (0.6)
Every year		48 (30.6)
Every month		81 (51.6)
Every week		26 (16.6)
Every day		1 (0.6)
Confidence in giving advice about NVP	157	
Very confident		15 (9.6)
Somewhat confident		91 (58.0)
Not so confident		50 (31.8)
Not at all confident		1 (0.6)
Recommendation of OTC products	155	
Yes		64 (41.3)
No		91 (58.7)
Identified all first-line drugs as safe throughout pregnancy	157	
Yes		32 (20.4)
No		125 (79.6)

'unsure' with 51% unsure of the safety of the combination of doxylamine/pyridoxine ([Table 3](#)).

Role of the community pharmacist, resources used, and relevant training

Ninety percent of participants reported that management of NVP is important for maternal health and that providing advice on NVP forms part of the role of a community pharmacist ([Table 4](#)). When asked about the resources that participants use in practice, the most common was the British National Formulary, followed by the National Institute of Health and Care Excellence (NICE) guidelines and the Summary of Product Characteristics. Physical resources were less popular than digital resources ([Supplementary material S4](#)).

Five percent of participants reported receiving previous training or education related to NVP while 70% reported that they would like to receive additional education and resources ([Table 4](#)). When asked about the format of education, an online continuing professional development (CPD) course was preferred, although other online modes of teaching were also favoured ([Fig. 1](#)).

Factors associated with drug safety knowledge

The associations between medication safety and experience in providing advice, prescribing status, and confidence are shown in [Supplementary material S5](#). Confidence was associated with correctly identifying first-line medications as safe (*P* = 0.022) in addition to having experience in providing NVP advice (*P* = 0.039). Prescriber status was not associated with the correct identification of medications as being safe.

Table 3. Participant drug safety knowledge.

Drug names ^a	This drug is safe throughout pregnancy <i>n</i> (%)		This drug is only safe after the first trimester <i>n</i> (%)		This drug is not safe in pregnancy <i>n</i> (%)		Unsure <i>n</i> (%)		Missing <i>n</i> (%)	
Cyclizine	90	57.3	18	11.5	23	14.6	26	16.6	0	0.0
Promethazine	59	37.6	17	10.8	42	26.8	38	24.2	1	0.6
Ondansetron	38	24.2	49	31.2	25	15.9	45	28.7	0	0.0
Domperidone	34	21.7	18	11.5	47	29.9	57	36.3	1	0.6
Metoclopramide	68	43.3	22	14.0	21	13.4	46	29.3	0	0.0
Prochlorperazine	49	31.2	19	12.1	35	22.3	53	33.8	1	0.6
Prednisolone	33	21.0	19	12.1	39	24.8	63	40.1	3	1.9
Thiamine	89	56.7	9	5.7	11	7.0	47	29.9	1	0.6
Pyridoxine	90	57.3	11	7.0	10	6.4	44	28.0	2	1.3
Doxylamine/pyridoxine	50	31.8	8	5.1	16	10.2	80	51.0	3	1.9
Lansoprazole	43	27.4	15	9.6	48	30.6	48	30.6	3	1.9
Omeprazole	81	51.6	18	11.5	20	12.7	38	24.2	0	0.0
Ranitidine	37	23.6	8	5.1	47	29.9	65	41.4	0	0.0

^aAll drugs are safe throughout pregnancy.

Table 4. Perceived role and education of participants.

	Number of respondents	<i>n</i> (%)
Agreement that NVP is important to the health of the expectant mother	156	
Strongly disagree		6 (3.8)
Disagree		0 (0.0)
Neutral		9 (5.8)
Agree		62 (39.7)
Strongly agree		79 (50.6)
Agreement that providing NVP advice is a part of the role of a community pharmacist	157	
Strongly disagree		5 (3.2)
Disagree		1 (0.6)
Neutral		16 (10.2)
Agree		82 (52.2)
Strongly agree		53 (33.8)
Previous training or teaching on NVP	157	
Yes		8 (5.1)
No		143 (91.1)
Unsure		6 (3.8)
Additional education/access to NVP resources required	157	
Yes		110 (70.1)
No		9 (5.7)
Maybe		38 (24.2)

Discussion

Main findings

This study aimed to assess the advice provided by UK CPs to women with NVP and their knowledge of treatment approaches to the condition. The findings show that CPs commonly provide advice related to NVP, with varying levels of confidence. Importantly, the majority of CPs

showed gaps in knowledge of NVP treatment, with only 20% of respondents identifying all first-line antiemetics as safe for use in pregnancy. Cyclizine was the most correctly identified drug as being safe for use in pregnancy. Correct identification was associated with confidence and prior experience in providing advice related to NVP. In addition, the majority of CPs reported a need for further education on the condition.

Strengths and limitations

To the best of our knowledge, this is the first study in the UK to assess the role of CPs in providing advice to women with NVP, and their knowledge of the safety profile of drugs used to treat the condition. The inclusion of open-ended questions in the questionnaire provided nuanced insights into the types of advice provided. The link to the survey was distributed through Dynata, which increases the integrity of the data compared to using social media and other channels by only distributing the link to verified CP participants. Several measures were implemented including the removal of incomplete questionnaires and those that were not completed in a realistic time frame to aid data quality. Finally, the study included a diverse range of CPs working in various settings around the UK including those with varying levels of experience and inclusion of prescribing pharmacists.

The study had limitations. The study may be subject to self-selection bias with participants being more engaged than the general population of CPs. Sixty six percent of our sample were men compared to the wider CP population (37.5%) [19], although this is consistent with a previous survey in UK CPs [17]. In addition, the majority of the participants were based in England, which reduces the representativeness of the sample and the generalisability of the findings to the rest of the UK. The data collected from this survey were self-reported; therefore, the findings may be subject to self-report bias. Finally, the open-response questions were answered with varying levels of detail by each participant, making in-depth analysis difficult.

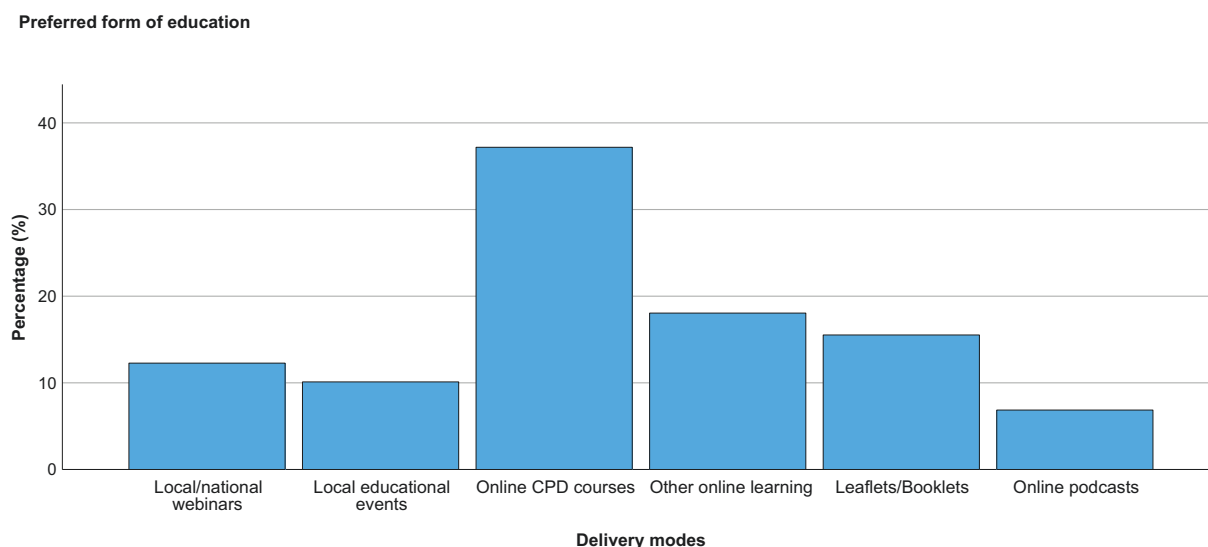


Figure 1. Preferred delivery modes of further training in NVP.

Comparison with existing literature

Studies assessing knowledge of CPs in relation to medication safety during pregnancy are limited. In this study, only 20% of CPs identified all first-line antiemetics as safe throughout pregnancy, indicating gaps in knowledge, which is consistent with previous studies [20–23]. In agreement with our findings, a cross-sectional survey of CPs in Saudi Arabia also showed knowledge gaps in relation to medication safety in pregnancy, although the safety of medication used to manage NVP was not assessed [20]. In a cross-sectional study of GPs in Wales, although 93% of participants correctly identified cyclizine as being safe in pregnancy, which is higher than 57% of CPs in the current study, no other drugs recommended in the RCOG guidelines were considered safe by more than 58% of GPs [12]. Inadequate knowledge reported in the current study may reflect the lack of education in NVP with only 5% of CPs reporting receiving prior training. In comparison, 38% of GPs reported previous teaching on HG [12].

This study showed that CPs frequently provide advice on NVP. This is consistent with a cross-sectional study of CPs in Kuwait, in which over 90% had experience providing services for pregnant women, with NVP reported as a common reason for women to consult the CP [24]. The current study additionally provides insights into the types of advice provided by CPs which include lifestyle management, reassurance, and referral to GPs/midwives in severe cases. In CPs that reported recommending OTC products, the most common included ginger, acupressure bands, acid suppressants, and oral rehydration sachets. In a small cross-sectional study of 49 midwives in a single tertiary centre in Australia, over 90% recommended ginger, and 4% recommended acupressure wristbands to manage NVP [25]. Both ginger and acupressure wristbands, worn at the correct position, have been shown to be effective for mild NVP symptoms compared to placebo [11, 26–28]. Regarding lifestyle advice, more research is needed on the efficacy of lifestyle modifications in managing NVP symptoms [6, 27].

Implications for practice

Seventy percent of CPs in this study reported that they would like to receive additional education and resources in relation

to NVP, with an online CPD course reported as the preferred mode of delivery. The results of this study, therefore, should be considered by current CPD providers. One of the most important roles of healthcare professionals, such as CPs, is to ensure the safety of medications prescribed or used in pregnancy and communicate this to women appropriately. It is imperative that CPs are adequately trained and are not a barrier to the provision of effective treatments for NVP and that women can access medication to treat the condition when required and without distress [29]. Improving CP confidence and knowledge about drug safety in pregnancy is essential. This study showed inadequate knowledge about the safety of medications used to treat NVP, although 40% self-reported as prescribing pharmacists. Further educational resources for CPs should consider pregnancy-specific information and guidelines. Such resources could include recommendations from the RCOG guidelines, UK Teratology Information Service (UKTIS) or the best use of medicine in pregnancy (BUMPS).

In addition, given how frequently advice is provided on NVP in a CP setting, and the impact of NVP on quality of life, further educational resources for daily management of the condition are needed in addition to recommending evidence-based OTC products. Furthermore, a small number of CPs reported referring women to healthcare professionals for severe symptoms. As CPs are accessible and NVP can occur before antenatal care is established, educational resources should additionally focus on the importance of referring in severe cases to ensure timely and optimal management.

Conclusion

This study has shown that although CPs frequently provide advice on NVP and perceive this as part of their role, their knowledge of the safety of the medication used in the management of the condition is suboptimal. In addition, greater awareness is needed on evidence-based treatments that could be recommended to women for mild symptoms. Although NVP is common, only a small percentage of CPs reported having prior training on the topic and the majority reported a need for further education in the form of a CPD course.

University curricula and CPD providers should ensure up to date, accessible and evidence-based training is available to CPs in the UK. CPs in the UK should be an accessible health-care professional for women to obtain reliable information and evidence-based advice on the optimal management of NVP.

Acknowledgements

We gratefully acknowledge the contribution of the CPs who took part in the study.

Supplementary material

Supplementary data are available at *International journal of Pharmacy Practice* online.

Author contribution

A.C.F., N.M. and S.C. designed the study; B.P. carried out the research; B.P., O.R., and Z.B. analysed the data; B.P., O.R., Z.B., and A.C.F. wrote the manuscript; all authors reviewed the manuscript.

Conflict of interest

The authors declare that there are no conflicts of interest.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data accessibility

The authors collected and had complete access to the study data.

Data availability

Data are available on request.

References

1. Austin K, Wilson K, Saha S. Hyperemesis Gravidarum. *Nutr Clin Pract* 2019;34:226–41. <https://doi.org/10.1002/ncp.10205>
2. Festin M. Nausea and vomiting in early pregnancy. *BMJ Clin Evid* 2014;2014:1405.
3. Fejzo MS, Trovik J, Grooten IJ et al. Nausea and vomiting of pregnancy and hyperemesis gravidarum. *Nat Rev Dis Primers* 2019;5:62. <https://doi.org/10.1038/s41572-019-0110-3>
4. Jennings LK, Mahdy H. *Hyperemesis Gravidarum*. StatPearls. Treasure Island (FL): StatPearls Publishing, 2023.
5. Boelig RC, Barton SJ, Saccone G et al. Interventions for treating hyperemesis gravidarum: a Cochrane systematic review and meta-analysis. *J Matern Fetal Neonatal Med* 2018;31:2492–505. <https://doi.org/10.1080/14767058.2017.1342805>
6. Maslin K, Dean C. Nutritional consequences and management of hyperemesis gravidarum: a narrative review. *Nutr Res Rev* 2022;35:308–18. <https://doi.org/10.1017/S0954422421000305>
7. Nana M, Tydeman F, Bevan G et al. Termination of wanted pregnancy and suicidal ideation in hyperemesis gravidarum: a mixed methods study. *Obstet Med* 2022;15:180–4. <https://doi.org/10.1177/1753495X211040926>
8. Poursharif B, Korst LM, Fejzo MS et al. The psychosocial burden of hyperemesis gravidarum. *J Perinatol* 2008;28:176–81. <https://doi.org/10.1038/sj.jp.7211906>
9. Yıldırım E, Demir E. The relationship of hyperemesis gravidarum with sleep disorders, anxiety and depression. *J Obstet Gynaecol* 2019;39:793–8. <https://doi.org/10.1080/01443615.2019.1572725>
10. Nana M, Tydeman F, Bevan G et al. Hyperemesis gravidarum is associated with increased rates of termination of pregnancy and suicidal ideation: results from a survey completed by >5000 participants. *Am J Obstet Gynecol* 2021;224:629–31. <https://doi.org/10.1016/j.ajog.2021.03.006>
11. RCOG. *The Management of Nausea and Vomiting of Pregnancy and Hyperemesis Gravidarum* 2016 [Green top guidelines]. <https://rcog.org.uk/media/y3fen1x1/gtg69-hyperemesis.pdf> (14 April 2023, date last accessed).
12. Nana M, Morgan H, Ahmed H et al. Hyperemesis gravidarum in the primary care setting: cross-sectional study of GPs. *BJGP Open* 2022;6:BJGPO.2021.0119. <https://doi.org/10.3399/BJGPO.2021.0119>
13. Hämeen-Anttila K, Jyrkkä J, Enlund H et al. Medicines information needs during pregnancy: a multinational comparison. *BMJ Open* 2013;3:e002594. <https://doi.org/10.1136/bmjopen-2013-002594>
14. Sanders J, Blaylock R, Dean C et al. Women's experiences of over-the-counter and prescription medication during pregnancy in the UK: findings from survey free-text responses and narrative interviews. *BMJ Open* 2023;13:e067987. <https://doi.org/10.1136/bmjopen-2022-067987>
15. Truong MB, Ngo E, Ariansen H et al. Community pharmacist counseling in early pregnancy—results from the SafeStart feasibility study. *PLoS One* 2019;14:e0219424. <https://doi.org/10.1371/journal.pone.0219424>
16. Truong MB, Ngo E, Ariansen H et al. The effect of a pharmacist consultation on pregnant women's quality of life with a special focus on nausea and vomiting: an intervention study. *BMC Pregnancy Childbirth* 2020;20:766. <https://doi.org/10.1186/s12884-020-03472-z>
17. Kerrison RS, Robinson A, Skrobanski H et al. Demographic and psychological predictors of community pharmacists' cancer-related conversations with patients: a cross-sectional analysis and survey study. *BMC Health Serv Res* 2022;22:1–11.
18. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res* 2005;15:1277–88. <https://doi.org/10.1177/1049732305276687>
19. GPhC Register Diversity Report (all nations)—September 2023. <https://www.pharmacyregulation.org/about-us/research/gphc-registers-data> (28 October 2023, date last accessed).
20. Alrabiah Z, Al-Arifi MN, Alghadeer SM et al. Knowledge of community pharmacists about the risks of medication use during pregnancy in central region of Saudi Arabia. *Saudi Pharm J* 2017;25:1093–6. <https://doi.org/10.1016/j.jsps.2017.05.005>
21. Narayana G, Pandey P, Gullakunta A et al. Knowledge, attitude and practice of community pharmacists on medication safety during pregnancy: a cross-sectional study. *Int J Pharm Investig* 2019;9:215–9.
22. Grincevičienė S, Kubilienė L, Ivanauskas K et al. Experiences of community pharmacists advising pregnant women. *Int J Clin Pharm* 2015;37:636–44. <https://doi.org/10.1007/s11096-015-0111-6>
23. Abdul Rouf P, Thomas B, Elkassem W et al. Knowledge and practice characteristics of pharmacists in Qatar towards medication use in pregnancy: a cross-sectional survey. *East Mediterr Health J* 2018;24:137–45. <https://doi.org/10.26719/2018.24.2.137>
24. Albassam A, Awad A. Community pharmacists' services for women during pregnancy and breast feeding in Kuwait: a cross-sectional study. *BMJ Open* 2018;8:e018980. <https://doi.org/10.1136/bmjopen-2017-018980>
25. Wills G, Forster D. Nausea and vomiting in pregnancy: what advice do midwives give? *Midwifery* 2008;24:390–8. <https://doi.org/10.1016/j.midw.2007.05.002>

26. Helmreich RJ, Shiao SY, Dune LS. Meta-analysis of acustimulation effects on nausea and vomiting in pregnant women. *Explore (NY)* 2006;2:412–21. <https://doi.org/10.1016/j.explore.2006.06.002>
27. O'Donnell A, McParlin C, Robson SC *et al.* Treatments for hyperemesis gravidarum and nausea and vomiting in pregnancy: a systematic review and economic assessment. *Health Technol Assess* 2016;20:1–268. <https://doi.org/10.3310/hta20740>
28. WHO. WHO Recommendations on Antenatal Care for a Positive Pregnancy Experience 2017 [WHO Maternal Guidelines of NVP]. <https://iris.who.int/bitstream/handle/10665/250796/9789241549912-eng.pdf?sequence=1> (13 January 2024, date last accessed).
29. Hsiao HF, Thomas A, Kay-Smith C *et al.* Pregnant women report being denied medications to treat severe nausea and vomiting of pregnancy or hyperemesis gravidarum—findings from an Australian online survey. *Aust N Z J Obstet Gynaecol* 2021;61:616–20. <https://doi.org/10.1111/ajo.13359>