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Barriers to assessing vulnerability in pregnant women. A cross-sectional survey in Danish general practice

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Background: Undetected vulnerability in pregnancy contributes to inequality in maternal and perinatal health and is associated with negative birth outcomes and adverse child outcomes. Nationwide reports indicate important barriers to assessing vulnerability among Danish general practitioners.

Objective: To explore general practitioners perceived barriers to vulnerability assessment in pregnant women and whether the barriers are associated with practice organization of antenatal care, general practitioner, and practice characteristics.

Methods: The questionnaire was sent to all Danish general practitioners ($N = 3,465$). Descriptive statistics described the barriers to assessing vulnerability in pregnant women. Analytical statistics with ordered logistic regression models were used to describe the association between selected barriers to vulnerability assessment and antenatal care organization, and general practitioner and practice characteristics.

Results: 760 general practitioners (22%) answered. Barriers to vulnerability assessment were related to lacking routines for addressing vulnerability, lacking attention to and record-keeping on vulnerability indicators, an insufficient overview of vulnerable pregnant women, and perceived insufficient remuneration for antenatal care consultations. Not prioritizing extra time when caring for vulnerable pregnant women was associated with experiencing more barriers. Always prioritizing continuity of care was associated with experiencing fewer barriers. General practitioners of either young age, male gender, or who did not prioritize extra time to care for vulnerable pregnant women experienced more barriers.

Conclusion: Barriers to vulnerability assessment among pregnant women do exist in general practice and are associated with organizational characteristics such as lacking prioritization of extra time and continuity in antenatal care consultations. Also, general practitioner characteristics like male gender and relatively young age are associated with barriers to vulnerability assessment.

Lay summary

Identifying vulnerability in pregnant women is essential to prevent pregnancy-related depression or problems of mother-child attachment, and these women need extra support during pregnancy. In Denmark, all pregnant women are offered pregnancy care by their general practitioner (GP). However, identifying vulnerable pregnant women is challenging for the GPs. This questionnaire study among 760 GPs explores whether the GPs perceived barriers to identifying vulnerable pregnant women are lack of attention to and overview of vulnerable women in their clinic, insufficient record-keeping of vulnerability indicators, and insufficient communicative routines in addressing vulnerability. Additionally, lack of monetary incentives, i.e. not getting paid for spending extra time to talk about vulnerability, was perceived as a barrier. These barriers to identifying vulnerable pregnant women are related to e.g. characteristics of the GP, the practice, and the antenatal care organization in general practice. Young GPs, male GPs, and GPs who did not spend as much time caring for vulnerable pregnant women experienced the most barriers. Contrary, GPs who always prioritized continuity of care experienced fewer barriers. Continuity of care and extra time is important for improving the care of vulnerable pregnant women. Health commissioners may consider supporting the GPs in mobilizing extra time and resources to enhance their care for vulnerable pregnant women.

Key words: behavioural medicine, continuity of care, depression/mood disorder, doctor–patient relationship, family health, frailty, maternity care, mental health, quality of care, risk assessment, social determinants of health

Background

Undetected vulnerability in pregnancy contributes to inequality in maternal and perinatal health.^{1,2} Vulnerability indicators in pregnancy comprise e.g. social, psychological, or physical strains, combined with a lack of adequate coping skills or support in the women or their surroundings.³ Vulnerability constitutes a risk factor for antenatal or postpartum depression,^{4–7} and it is significantly associated with negative birth outcomes, such as fetal growth restriction and preterm birth,

and adverse child outcomes, such as emotional disturbances in the child.^{8–11}

In Denmark, all pregnant women are offered first antenatal care (ANC) consultation with their general practitioner (GP) to assess comorbid risks and psychosocial resources and guide the decision on the level of care for the individual woman during pregnancy.¹² GPs have a broad understanding of factors contributing to vulnerability in pregnancy,¹³ although nationwide reports in Denmark and

Key messages

- Vulnerability assessment in pregnancy is crucial to prevent antenatal depression.
- GPs experience several barriers to assessing vulnerability in pregnant women.
- Barriers include a lack of attention, communicative routines, and record-keeping.
- The barriers are associated with lacking time and continuity in antenatal care.

the UK indicate existing barriers to assessing vulnerability among GPs.^{14,15}

Prior studies have focused on GP's barriers to managing perinatal health problems, mainly postpartum depression,¹⁶⁻¹⁹ and not on the broad concept of vulnerability involving physical illness, mental health problems, and social problems.^{13,20} Questionnaire studies from the UK, Ireland, Australia, and the United States of America found that GPs have low awareness of antenatal depression compared to postpartum depression.¹⁶⁻¹⁹ A qualitative study found several GP barriers to vulnerability assessment in pregnancy, most notably low professional confidence due to a lack of a continuous, strong, and trusting doctor-patient relation.²¹ Knowledge of how the organization of ANC, the GP, and practice characteristics are related to barriers to vulnerability assessment in pregnancy is sparse.²² In this questionnaire study among Danish GPs, we aim to (i) investigate the GPs' perceived barriers to vulnerability assessment and (ii) explore possible associations with practice organization of ANC, GP, and practice characteristics. Such insights are essential to enable potential amendments, e.g. organizational changes to improve the care of vulnerable pregnant women in general practice.

Methods

The setting of general practice and antenatal care in Denmark

The Danish health care system is tax-funded, free of charge for the patient, and 98% of all citizens are registered with a GP. Among Danish GPs, only 6% are salaried doctors (employed doctors or locums), whereas 94% are self-employed,²³ and responsible for organizing antenatal care in their clinics. The GPs contracts with the public funding authorities, and the contract includes a fee schedule with reimbursable services. GPs are organized in single-handed or partnership practices with 2-10 GPs per practice.²⁴ The Danish ANC is a formal collaboration between GPs, midwives, the obstetric departments, and community health visitors.¹² General practice is the first point of entry into the health care system for the pregnant woman, with a preventive first antenatal care consultation in gestational week 6-10.

Study design and theoretical frame

We conducted a cross-sectional questionnaire study among Danish self-employed GPs ($N = 3,465$). Exclusion criteria were locum GPs, and GPs employed in union clinics. The study was designed to assess the 14 psychological, behavioural domains of the Theoretical Domains Framework (TDF) identified by Michie et al.²⁵, since the TDF applies to identifying influences of behaviour, i.e. barriers to implementing a behaviour.²⁶

Questionnaire development

The items in the questionnaire were developed and tested in five steps resumed below to achieve content and face validity, acceptability, and feasibility:

1. Literature search on the concept of vulnerability and barriers to vulnerability assessment in general practice.^{1,2,4-6,9,15-20,27-32}
2. Five focus group interviews with 20 GPs.^{3,21,33}
3. Operationalization of the constructs based on discussions in the clinically experienced research group and central findings from the literature search and interviews. Inspirations were taken from validated TDF questionnaires about health professionals' behaviour change.²⁵
4. Seven cognitive pilot tests to test time consumption, content validity, acceptability, and feasibility (³⁴ p.123), leading to minor revisions.
5. A field test among twelve GPs. A single TDF construct was removed due to overlap.

The final questionnaire measured the GPs' perceived barriers to vulnerability assessment in pregnant women grouped by the 14 TDF domains with 18 underlying constructs. The TDF domains are knowledge, skills, memory and attention, behavioural regulation, environmental context and resources, social influences, social and professional role, belief in capability, belief in consequences, goal, intentions, emotions, optimism, and reinforcement. The questions concerned barriers to vulnerability assessment related to the individual GP, the practice organization of ANC, and the health care system. Responses to questions were scored on 5-point Likert scales (from fully agree to fully disagree), and a category of 'don't know/not relevant' was included. The questionnaire further contained items on ANC organization in general practice and practice characteristics. The questionnaire is shown in [Supplementary Appendix 1](#).

Data collection

The online survey was undertaken from October 2021 to February 2022, and GPs were invited to participate via a posted invitation letter. Two reminder letters were mailed to non-respondents. Information on GP characteristics (age and gender), and practice characteristics (practice type and location) were collected from publicly available registers, as shown in the codebook in [Supplementary Appendix 2](#).

Statistical analysis

Descriptive statistics were applied to describe the ANC organization, and GP and practice characteristics and to compare the characteristics of non-responders where data is available. Moreover, based on TDF constructs, the barriers to assessing vulnerability in pregnant women were described.

From the descriptive statistics, six constructs measuring barriers to assessment of vulnerability were selected as

outcome variables for the regression analyses. The choice of barriers was based on the following criteria: clinical relevance, variation in responses, and potential for behaviour change. We investigated the associations with ANC organization, GP, and practice characteristics using six separate univariable and multivariable ordered logistic regression models. In the multivariable regression models, we controlled for confounding of ANC organization (allocated time to first ANC consultation, allocated extra time to ANC for vulnerable pregnant women, the delegation of ANC consultations to practice staff or GP trainees, and prioritization of provider-patient continuity in ANC consultations), GP (gender and age), and general practice characteristics (practice type, patient load, i.e. number of patients per full-time GP capacity, and region). Standard errors were modelled as cluster robust at the general practice level to account for correlation between GPs from the same general practice. ‘Don’t know/not relevant’ responses on the barrier measures were omitted from the analysis. Missing data on GP characteristics (four missing values on age) and practice characteristics (9 missing answers) were imputed by allocation to the most frequent response categories (³⁴ p.135).

Results

Among 3,465 invited GPs, responses from 760 GPs (22%) were included in this survey. The flowchart is shown in Fig. 1.

Table 1 shows the ANC organization, GP, and general practice characteristics. Compared to non-responders, the responding GPs were roughly evenly distributed across gender and age. Slightly fewer GPs above 60 years of age from single-handed practices and the Capital Region responded to the survey. Most GPs allocated 30 min or more to the first ANC consultation, and 49.2% rarely or never allocated extra time to ANC for vulnerable pregnant women. 20.0% of GPs delegated the ANC consultations entirely to practice staff, and

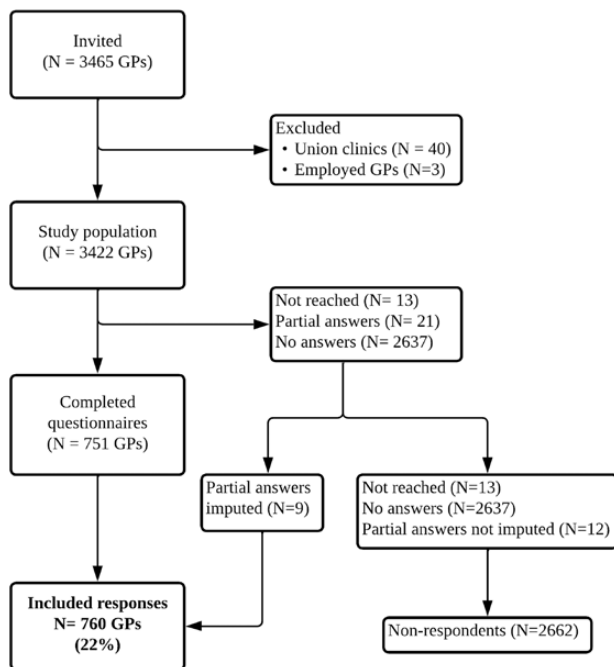


Fig. 1. Flow of participants.

52.5% of GPs answered that GP trainees sometimes conducted the first ANC consultation. Respectively 65.0% and 27.1% of GPs reported that they often or always prioritize continuity in ANC care.

Descriptive results for the TDF domains and constructs are shown in Table 2. In the following text, the TDF domain belonging to each barrier is illustrated with capital letters. In general, responses showed considerable variation, and barriers to vulnerability assessment were found in some TDF domains. The barriers were grouped according to their level, i.e. related to either the individual GP, the practice organization, or the system, as illustrated in Table 3. As an individual GP level barrier, 17.8% of GPs fully agreed or agreed that they ‘lacked routines in addressing vulnerability (D)’. Practice organizational barriers included ‘lack of shared attention on vulnerability assessment (C)’ among GPs and practice staff (17.6%), ‘insufficient medical record-keeping of indicators of vulnerability (F)’ (37.1%), and ‘lack of overview of whether assessing vulnerability (H.1) (25.9%)’. The delegation of ANC consultations to others could be perceived as an organizational barrier. Some GPs reported a ‘lack of overview of the care for vulnerable pregnant women due to delegating ANC to practice staff (H.2)’ (15.1%), or ‘to GP trainees (H.3)’ (17.0%). System-level barriers were the ‘socio-political context (E.2)’ where 42.9% disagreed or fully disagreed that the size of remuneration for ANC is sufficient, and the ‘reinforcement (M)’ where 39.9% would be motivated to spend extra time in the assessment if additional remuneration was achievable.

Analyses of the associations between barriers to vulnerability assessment and characteristics of the ANC organization, GP, and practice characteristics included the following six outcome measures: lacking routines (D), lacking attention (C), lacking medical record-keeping (F), lacking overview (H.1), perceived sufficiency of ANC remuneration for vulnerability assessment (E.2), and increased motivation from extra remuneration (M). The results from the multivariable models are shown in Table 3, and the univariable models appear in Supplementary Appendix 3.

Individual GP barrier

Lacking routines in how to address vulnerability (D). GPs who always prioritized continuity (relative to sometimes) had lower odds of expressing lacking routines [OR = 0.35 (0.16–0.75)]. Male GPs and GPs younger than 45 years old had higher odds of expressing lacking routines [OR = 1.60 (1.22–2.09)/OR 1.56 (1.14–2.12)].

Practice organizational barriers

GPs and practice staff lack shared attention on vulnerability assessment of pregnant women (C). GPs who never/rarely allocated extra time to ANC (relative to sometimes) had higher odds of expressing a lack of shared attention [OR = 1.78 (1.15–2.74)/OR 1.69 (1.18–2.41)]. This was also the case for Male GPs [OR = 1.30 (1.00–1.68)]. GPs who often/always prioritized continuity (relative to sometimes) had lower odds of expressing lack of shared attention [OR = 0.57 (0.33–0.97)/OR = 0.36 (0.19–0.68)].

Lacking medical record-keeping on indicators of vulnerability (F). GPs who allocated more than 30 min to the first ANC consultation and always allocated extra time to

Table 1. Descriptive statistics of GP and practice characteristics, and antenatal care organization among 760 Danish general practitioners (2021).

Explanatory variables	Category	Respondents	Non-respondents
		N (%)	N (%)
Respondents	Total	760 (100.0)	2,662 (100.0)
GP and practice characteristics			
GP gender	Male	330 (43.4)	1,083 (40.7)
	Female	430 (56.6)	1,579 (59.3)
GP age in years	≤45	210 (27.6)	578 (21.7)
	>45 and ≤60	422 (55.5)	1,424 (53.5)
	>60	128 (16.8)	660 (24.8)
Practice type	Single-handed	119 (15.7)	545 (20.5)
	Partnership	641 (84.3)	2,117 (79.5)
Number of full-time capacities	1	176 (23.2)	N/A
	2–4	495 (65.1)	N/A
	5–	89 (11.7)	N/A
Patient load (number of patients/GP)	<1500	122 (16.1)	N/A
	1500–2000	558 (73.4)	N/A
	>2000	80 (10.5)	N/A
Region	Capital Region	193 (25.4)	879 (33.0)
	Region Zealand	87 (11.4)	351 (13.2)
	Region of Southern Denmark	208 (27.4)	587 (22.1)
	Central Denmark Region	215 (28.3)	596 (22.4)
	Region of Northern Denmark	57 (7.5)	249 (9.3)
Organization of ANC			
Time to 1st ANC consultation in minutes	<30 min	68 (8.9)	N/A
	30 min	347 (45.7)	N/A
	>30 min	345 (45.4)	N/A
Allocating extra time to ANC for vulnerable pregnant women	Never	144 (18.9)	N/A
	Rarely	230 (30.3)	N/A
	Sometimes	189 (24.9)	N/A
	Often	132 (17.4)	N/A
	Always	65 (8.6)	N/A
Delegating ANC consultations fully to practice staff	No	608 (80.0)	N/A
	Yes	152 (20.0)	N/A
GP trainees doing 1st ANC consultation	Always/often	49 (6.4)	N/A
	Sometimes	399 (52.5)	N/A
	Rarely	151 (19.9)	N/A
	Never	23 (3.0)	N/A
	No trainees	138 (18.2)	N/A
Prioritizing continuity in ANC between HCP and pregnant woman	Never	8 (1.1)	N/A
	Rarely	13 (1.7)	N/A
	Sometimes	39 (5.1)	N/A
	Often	494 (65.0)	N/A
	Always	206 (27.1)	N/A

For respondents, there were four missing values on GP age and 9 missing values on practice characteristics. For non-respondents, there were two missing values on gender, 18 on GP age and two on practice type. Missing data for responders and non-responders were allocated to the most frequent response categories.

GPs: general practitioners; ANC: antenatal care; HCP: healthcare professional; N/A, not answered.

ANC for vulnerable women had lower odds of lacking record-keeping [OR = 0.63 (0.47–0.84)]/(OR = 0.47 (0.27–0.82)). The same goes for GPs delegating ANC fully to practice staff [OR = 0.70 (0.50–0.98)] and for GPs always prioritizing continuity in ANC [OR = 0.45 (0.24–0.86)]. In contrast, older GPs had higher odds of lacking record-keeping [OR = 1.55 (1.08–2.22)].

Lacking overview on whether assessing all pregnant women who are vulnerable (H.1). Among GPs having GP trainees in the clinic, GPs who never had their GP trainees conducting first ANC consultations had higher odds of lacking an overview of vulnerability assessment [OR = 2.72 (1.20–6.17)]. Also, male GPs had higher odds of lacking

Table 2. Barriers to assessing vulnerability in pregnant women among 760 general practitioners (2022).

TDF domain	Construct	Item	Fully agree/agree		Neither agree nor disagree		Disagree/fully disagree	
			N (%)	N (%)	N (%)	N (%)		
A) Knowledge	Knowledge of condition	Lacking knowledge of indicators of vulnerability in pregnancy	61 (8.0%)	169 (22.2%)	528 (69.5%)			
B) Skills (reversed)	Competence	Perceived competence in vulnerability assessment	610 (80.3%)	120 (15.8%)	21 (2.8%)			
C) Memory attention and decision making	Shared attention	GPs and staff lacking shared attention on vulnerability assessment	134 (17.6%)	219 (28.8%)	376 (49.5%)			
D) Behavioural regulation	Action planning/routines	Lacking routines in how to address vulnerability	135 (17.8%)	181 (23.8%)	439 (57.8%)			
E.1) Environmental context and resources	Time limits	Time limits the possibility of assessing vulnerability	48 (6.3%)	121 (15.9%)	585 (77.0%)			
E.2) Environmental context and resources (reversed)	Socio-political context—remuneration	Perceived sufficiency of ANC remuneration for vulnerability assessment	210 (27.6%)	206 (27.1%)	326 (42.9%)			
F) Social influences	Organizational culture—medical record-keeping	Insufficient medical record-keeping on indicators of vulnerability	282 (37.1%)	204 (26.8%)	240 (31.6%)			
G) Social/Professional role and identity (reversed)	Obligation and role	Perceived obligation and role regarding vulnerability assessment in pregnancy	715 (94.1%)	42 (5.5%)	2 (0.3%)			
H.1) Believes about capabilities	Control of behaviour, and social environment	Lacking overview whether assessing all pregnant women who are vulnerable	197 (25.9%)	236 (31.1%)	314 (41.3%)			
H.2) Believes about capabilities	Control of environment—delegating to Staff*	Lacking overview of vulnerability assessment due to delegating ANC to staff*	23 (15.1%)	34 (22.4%)	95 (62.5%)			
H.3) Believes about capabilities	Control of environment—delegating to GP trainees**	Lacking overview of vulnerability assessment due to delegating ANC to GP trainees**	106 (17.0%)	148 (23.8%)	339 (54.5%)			
H.4) Believes about capabilities	Self-efficacy	Perceived low self-efficacy in vulnerability assessment	28 (3.7%)	127 (16.7%)	596 (78.4%)			
I) Believes about consequences	Outcome expectancies	Perceived adverse outcome expectancies regarding patient relation	38 (5.0%)	102 (13.4%)	614 (80.8%)			
J) Goal	Priority	Perceived inferior priority of vulnerability assessment	53 (7.0%)	256 (33.7%)	441 (58.0%)			
K) Intention (reversed)	Commitment	Commitment in relation to vulnerability assessment	720 (94.7%)	34 (4.5%)	5 (0.7%)			
L) Emotion	Cognitive overload	Cognitive overload in relation to vulnerability assessment	15 (2.0%)	134 (17.6%)	603 (79.3%)			
M) Reinforcement	Incentives	Increased motivation to spend extra time on vulnerability assessment in case of extra remuneration	303 (39.9%)	250 (32.9%)	183 (24.1%)			
N) Optimism (reversed)	Usefulness	Perceived usefulness of assessing vulnerability	716 (94.2%)	33 (4.3%)	9 (1.2%)			

TDF: Theoretical Domains Framework; ANC: Antenatal care.

* N = 152, as only GPs who delegated ANC fully to practice staff received this question.

** N = 622, as only GPs having GP trainees in their clinic received this question. To comply with general data protection requirements for cells with small numbers (<5), categories for fully agree/agree and fully disagree/disagree are combined, while the category don't know/not relevant is omitted from the table. Therefore the sum of responses does not equal 760.

Table 3. Association between six barriers to vulnerability assessment and antenatal care organization, GP, and practice characteristics.

Outcome variable	TDF domain	Individual GP barrier			Practice organizational barriers			System-level barriers			
		Behavioural regulation	Memory and attention	Social influences	Believe in capability	Environmental context and resources	Reinforcement				
	Construct	Lacking routines in how to address vulnerability (D)	GP's and staff lacking shared attention on assessing vulnerability (C)	Insufficient organizational culture—Lacking medical record-keeping (F)	Lacking overview whether managing assessment of vulnerability (H.1)	Perceived sufficiency of socio-political context—remuneration (E.2) (reversed)	Increased motivation from extra remuneration (M)				
Explanatory variable	Text	aOR (CI)	aOR (CI)	aOR (CI)	aOR (CI)	aOR (CI)	aOR (CI)	aOR (CI)			
Time to 1st ANC consultation in minutes ^a	<30 30 >30	1.16 (0.70–1.92) 1.00 (1.00–1.00) 1.03 (0.77–1.37)	0.94 (0.56–1.56) 1.00 (1.00–1.00) 0.90 (0.68–1.20)	0.82 (0.53–1.29) 1.00 (1.00–1.00) 0.63 (0.47–0.84)**	1.01 (0.60–1.71) 1.00 (1.00–1.00) 1.07 (0.80–1.43)	0.65 (0.38–1.10) 1.00 (1.00–1.00) 1.52 (1.14–2.01)**	1.29 (0.75–2.21) 1.00 (1.00–1.00) 1.08 (0.81–1.42)				
Allocating extra time to ANC for vulnerable pregnant women ^a	Never Rarely Sometimes Often	1.43 (0.93–2.21) 1.41 (0.98–2.04) 1.00 (1.00–1.00) 0.85 (0.57–1.29)	1.78 (1.15–2.74)** 1.69 (1.18–2.41)** 1.00 (1.00–1.00) 0.92 (0.62–1.37)	0.75 (0.48–1.15) 1.09 (0.77–1.54) 1.00 (1.00–1.00) 0.76 (0.52–1.13)	1.43 (0.93–2.20) 1.25 (0.89–1.75) 1.00 (1.00–1.00) 0.81 (0.53–1.24)	0.50 (0.32–0.78)** 0.85 (0.59–1.22) 1.00 (1.00–1.00) 1.39 (0.95–2.04)	0.52 (0.34–0.80)** 0.92 (0.65–1.31) 1.00 (1.00–1.00) 0.96 (0.68–1.38)				
Delegating ANC consultations fully to practice staff ^a	Always No Yes	0.93 (0.52–1.63) 1.00 (1.00–1.00) 0.77 (0.55–1.08)	0.89 (0.52–1.53) 1.00 (1.00–1.00) 0.92 (0.64–1.33)	0.47 (0.27–0.82)** 1.00 (1.00–1.00) 0.70 (0.50–0.99)*	0.67 (0.40–1.12) 1.00 (1.00–1.00) 0.74 (0.52–1.05)	1.60 (0.89–2.88) 1.00 (1.00–1.00) 1.17 (0.83–1.65)	0.85 (0.49–1.49) 1.00 (1.00–1.00) 1.10 (0.79–1.54)				
GP trainees doing 1st ANC consultation ^a	Always/often Sometimes Rarely Never No trainees	0.83 (0.47–1.46) 1.00 (1.00–1.00) 1.33 (0.93–1.90) 1.51 (0.69–3.30) 1.29 (0.79–2.11)	0.96 (0.59–1.57) 1.00 (1.00–1.00) 0.84 (0.60–1.18) 1.57 (0.67–3.71) 0.90 (0.57–1.43)	0.71 (0.40–1.26) 1.00 (1.00–1.00) 0.98 (0.70–1.38) 1.27 (0.59–2.75) 0.96 (0.61–1.49)	0.81 (0.46–1.40) 1.00 (1.00–1.00) 1.01 (0.71–1.43) 2.72 (1.20–6.17)* 0.90 (0.55–1.49)	1.09 (0.61–1.95) 1.00 (1.00–1.00) 1.63 (1.15–2.31)** 2.56 (1.02–6.42)* 1.25 (0.77–2.02)	0.84 (0.49–1.44) 1.00 (1.00–1.00) 1.53 (1.08–2.18)* 3.57 (1.49–8.56)** 1.14 (0.75–1.73)				
Prioritizing continuity in ANC between HCP and pregnant woman ^a	Never Rarely Sometimes Often	1.30 (0.22–7.80) 0.96 (0.30–3.06) 1.00 (1.00–1.00) 0.67 (0.33–1.36)	1.04 (0.21–5.23) 0.58 (0.19–1.73) 1.00 (1.00–1.00) 0.57 (0.33–0.97)*	0.78 (0.11–5.69) 0.91 (0.34–2.44) 1.00 (1.00–1.00) 0.72 (0.40–1.30)	0.73 (0.13–4.05) 1.19 (0.57–2.51) 1.00 (1.00–1.00) 0.93 (0.51–1.69)	0.65 (0.04–11.24) 0.70 (0.29–1.69) 1.00 (1.00–1.00) 0.70 (0.37–1.31)	2.35 (0.48–11.45) 0.50 (0.10–2.43) 1.00 (1.00–1.00) 0.84 (0.42–1.68)				
GP gender ^a	Always Male Female	0.35 (0.16–0.75)** 1.60 (1.22–2.09)** 1.00 (1.00–1.00)	0.36 (0.19–0.68)** 1.30 (1.00–1.68)* 1.00 (1.00–1.00)	0.45 (0.24–0.86)* 0.85 (0.65–1.11) 1.00 (1.00–1.00)	0.47 (0.24–0.91)* 1.46 (1.11–1.93)** 1.00 (1.00–1.00)	0.52 (0.26–1.06) 0.79 (0.60–1.03) 1.00 (1.00–1.00)	0.54 (0.25–1.14) 1.06 (0.81–1.38) 1.00 (1.00–1.00)				
GP age in years ^a	≤45 46–60 >60	1.56 (1.14–2.12)** 1.00 (1.00–1.00) 0.97 (0.66–1.42)	1.11 (0.83–1.50) 1.00 (1.00–1.00) 1.30 (0.86–1.94)	1.03 (0.76–1.41) 1.00 (1.00–1.00) 1.55 (1.08–2.22)*	1.31 (0.94–1.82) 1.00 (1.00–1.00) 1.12 (0.77–1.63)	1.01 (0.74–1.39) 1.00 (1.00–1.00) 1.55 (1.08–2.22)*	1.42 (1.02–1.97)* 1.00 (1.00–1.00) 0.76 (0.52–1.10)				
Practice type ^a	Single-handed Partnership	0.68 (0.41–1.13) 1.00 (1.00–1.00)	1.00 (0.60–1.67) 1.00 (1.00–1.00)	0.92 (0.57–1.48) 1.00 (1.00–1.00)	0.80 (0.47–1.35) 1.00 (1.00–1.00)	1.33 (0.82–2.16) 1.00 (1.00–1.00)	0.94 (0.62–1.43) 1.00 (1.00–1.00)				

Table 3. Continued

Barrier level	Individual GP barrier		Practice organizational barriers			System-level barriers	
	TDF domain	Behavioural regulation	Memory and attention	Social influences	Believe in capability	Environmental context and resources	Reinforcement
Construct	Lacking routines in how to address vulnerability (D)		GPs and staff lacking shared attention on assessing vulnerability (C)	Insufficient organizational culture—Lacking medical record-keeping (F)	Lacking overview whether managing assessment of vulnerability (H.1)	Perceived sufficiency of socio-political context—remuneration (E.2) (reversed)	Increased motivation from extra remuneration (M)
		aOR (CI)	aOR (CI)	aOR (CI)	aOR (CI)	aOR (CI)	aOR (CI)
Explanatory variable	Text	aOR (CI)	aOR (CI)	aOR (CI)	aOR (CI)	aOR (CI)	aOR (CI)
Patient load (average number of patients/GP) ^a	<1500	1.21 (0.79–1.85)	1.15 (0.76–1.75)	0.81 (0.53–1.23)	1.14 (0.75–1.74)	1.25 (0.86–1.83)	0.98 (0.68–1.41)
	1500–2000	1.00 (1.00–1.00)	1.00 (1.00–1.00)	1.00 (1.00–1.00)	1.00 (1.00–1.00)	1.00 (1.00–1.00)	1.00 (1.00–1.00)
Region	>2000	1.04 (0.69–1.56)	0.81 (0.48–1.38)	0.80 (0.48–1.32)	0.69 (0.44–1.08)	0.73 (0.42–1.27)	0.84 (0.53–1.34)
	Capital Region	0.96 (0.65–1.41)	0.98 (0.66–1.46)	0.89 (0.60–1.32)	0.89 (0.61–1.31)	0.95 (0.65–1.38)	1.10 (0.75–1.63)
	Region Zealand	0.97 (0.58–1.63)	1.17 (0.77–1.78)	0.86 (0.57–1.31)	0.87 (0.52–1.45)	1.33 (0.82–2.16)	0.78 (0.49–1.22)
	Region of Southern Denmark	1.00 (1.00–1.00)	1.00 (1.00–1.00)	1.00 (1.00–1.00)	1.00 (1.00–1.00)	1.00 (1.00–1.00)	1.00 (1.00–1.00)
	Central Denmark Region	0.95 (0.67–1.34)	0.80 (0.55–1.16)	0.75 (0.53–1.06)	0.86 (0.60–1.22)	1.19 (0.82–1.73)	1.09 (0.74–1.60)
	Region of Northern Denmark	0.79 (0.48–1.30)	0.83 (0.47–1.47)	0.86 (0.52–1.44)	0.75 (0.43–1.33)	1.60 (1.00–2.58)	0.93 (0.57–1.51)

Barriers represented by selected domains of the Theoretical Domain Framework, N = 760.

GP: general practitioner; ANC: Antenatal care.

^aAdjusted for ANC organization, GP and practice characteristics.

****P* < 0.001, ***P* < 0.01, **P* < 0.05.

overview [OR 1.46 (1.11–1.93)]. GPs who always prioritized continuity expressed lower odds of lacking overview [OR 0.47 (0.24–0.91)].

System-level barriers

The perceived sufficiency of remuneration for ANC concerning assessment (E.2). GPs who allocated more than 30 min to the first ANC consultation had higher odds of disagreeing that remuneration is sufficient [OR 1.52 (1.14–2.01)], while GPs who never allocated extra time to ANC for vulnerable women had lower odds of disagreeing that remuneration is sufficient [OR 0.50 (0.32–0.78)]. GPs who rarely/never had GP trainees conducting ANC consultations, had higher odds of disagreeing that remuneration is sufficient {[OR = 1.63 (1.15–2.31)]/[OR = 2.56 (1.02–6.42)]}. The elderly GP, compared to the middle-aged group, had higher odds of disagreeing that remuneration is sufficient [OR = 1.55 (1.08–2.22)].

Increased motivation to spend extra time in case of additional remuneration (M). GPs who never allocated extra time to ANC had lower odds of being motivated to spend extra time if additional remuneration was achievable [OR 0.52 (0.34–0.80)]. GPs who rarely/never had GP trainees conducting ANC consultations had a higher odds of being motivated to spend extra time on vulnerability assessment if additional remuneration was achievable [OR = 1.53 (1.08–2.18)]/[OR = 3.57 (1.49–8.56)]. The same goes for young GPs (relative to the middle-aged group) [OR 1.42 (1.02–1.97)].

Discussion

Main findings

In this cross-sectional survey, GP-reported barriers to the assessment of vulnerability in pregnancy were lacking routines in addressing vulnerability, lacking shared attention on vulnerability assessment among GPs and practice staff, lacking record-keeping on indicators of vulnerability, lacking overview of assessment, disagreeing that remuneration is sufficient, and lacking monetary incentives—i.e. being motivated to spend additional time to assessment if extra remuneration was achievable. Barriers were associated with the level of continuity of care, the allocation of time to ANC for vulnerable pregnant women, and the GPs' gender and age.

Seemingly crucial factors are the level of continuity of care, the time spend on ANC in general, and the allocation of extra time to ANC for vulnerable pregnant women. This means that GPs who spend longer time on the first ANC consultation, allocate extra time to ANC for vulnerable women, and prioritize continuity generally experience fewer barriers to vulnerability assessment. GPs who spend more time on ANC consultations perceive remuneration to be insufficient, whereas those who never allocate extra time to ANC for vulnerable women perceive remuneration to be sufficient and will not be motivated to spend extra time by additional pay. Male GPs and younger GPs tend to experience more barriers to vulnerability assessment in general.

Relationship to existing knowledge

This study adds to previous findings on GPs' barriers to assessing perinatal mental health problems, e.g. antenatal or postpartum depression,^{15–17,19,35} and qualitative findings on

vulnerability in pregnancy as a broader concept.^{13,21} Even though the responding GPs reported having skills and self-efficacy in assessing vulnerability, considerable barriers were seen in relation to lacking attention and routines in the assessing and addressing of vulnerability in pregnant women. Also, research indicates that GPs lack confidence in assessment.^{15–17,19,21} Likewise, in this study a frequently reported barrier was the GP's low confidence due to a lacking overview of whether assessing all vulnerable pregnant women. This points to the fact that vulnerability is a broad concept, which hampers the possibility of auditing the assessment quality.

Continuity of care is one of the essential pillars of general practice.³⁶ Studies find that both GPs and pregnant women perceive a lack of continuity and trust in GP-patient relationships as barriers to assessing perinatal mental health problems.^{19,37,38} We found that prioritizing continuity in antenatal care was associated with fewer experienced barriers, i.e. lacking attention, routines, record-keeping, and overview of vulnerability assessment. This may indicate that prioritizing continuity between GPs and pregnant women might improve the assessment of vulnerability in pregnant women.

Increasing workloads and time constraints have been reported to limit the assessment of perinatal mental health problems in studies from Australia and Ireland.^{16,19} Among Danish GPs, we found that most GPs prioritized vulnerability assessment equal to other preventive tasks and felt capable of assessing vulnerability within the available time. A considerable proportion of GPs reported being increasingly motivated to spend extra time on vulnerability assessment if extra remuneration was achievable. However, GPs who never allocated extra time to ANC were less likely to be motivated to spend extra time due to extra remuneration. This could indicate that some GPs do not have the capacity or interest to spend more time in assessing vulnerability.

According to qualitative findings, the delegation of ANC to practice staff or GP trainees can be a barrier, due to compromising the GPs overview of vulnerability assessment.²¹ This partly supports the findings in this study, where one in seven GPs expressed limited overview due to delegating ANC to staff and about one in six due to delegating ANC to GP trainees.

Insufficient record-keeping on vulnerability indicators was perceived as a barrier to vulnerability assessment. This is supported by a retrospective cohort study of GP records from Scotland, showing that only 0.4% of patients in general practice had any record-keeping of adverse childhood experiences.³⁹

Male GPs and younger GPs experience more barriers to vulnerability assessment. Similarly, studies have found that female physicians have stronger interpersonal orientation and ask more questions on psychosocial issues than male physicians,⁴⁰ and that patients generally chose GPs of the same gender and age.⁴¹

Strengths and weaknesses

The application of TDF as a theoretical model was a strength as the TDF domains are aimed at understanding barriers in health professionals' behaviour.^{25,26,42} The questionnaire items were designed based on qualitative findings, which ensured in-depth elaboration on the barriers according to the TDF domains. The main limitation of this study is the relatively small sample size. Unfortunately, the COVID-19

incidence increased during the sampling period causing an additional administrative workload for the GPs. The small sample size increases the risk of sampling bias and thereby affects the generalizability of the findings. The responding GPs may have had a particular interest in ANC or vulnerable patient groups. Therefore, the perceived barriers for assessment may be downward biased, though the identified associations may still be valid. Participants were, compared with non-participants, roughly evenly distributed across gender and age, although the oldest GPs from single-handed practices seem somewhat underrepresented. This may have led to conservative estimates of barriers. Research shows that patients often chose GPs of the same age and gender.⁴¹ Hence pregnant women may be less often seen by the oldest GPs from single-handed practices, who are often males. GPs perceive consultations with vulnerable pregnant women as rare¹³ making the responses prone to recall bias. Also, the self-reported responses are prone to desirability bias; however, we sought to minimize this tendency with an introductory text justifying the ambiguity of the vulnerability concept and thoroughly explaining our aim.

Implications for clinicians and policymakers

GPs may consider prioritizing continuity of care and extra time to ANC for potentially vulnerable women to facilitate attention and overview on vulnerability assessment and improved routines in addressing vulnerability. Also, GPs may consider improving the culture of proper record-keeping on vulnerability indicators, and engaging the practice staff in differentiating women with suspected vulnerability. The findings indicate a possible need for continuous medical education, which may focus on improved awareness of vulnerability, gender differences in managing sensitive communication, and the possibility of improving the overview of managing vulnerability assessment. Policymakers may consider increasing remuneration to increase the incentive to the use of additional time for vulnerable women in ANC or vulnerable patients in general. This may possibly mobilize improved resources and enable increased attention and routines in assessing vulnerability in pregnant women among some GPs.

Conclusion

Barriers to assessment were related to lacking routines in addressing vulnerability, lacking shared attention on vulnerability assessment, lacking medical record-keeping on vulnerability indicators, and lacking an overview of whether managing to assess all vulnerable pregnant women. Many GPs perceived the remuneration for ANC as insufficient in relation to vulnerability assessment. An important pattern was that GPs who always prioritize continuity in ANC experience less barriers. On the contrary, GPs who do not allocate extra time to ANC, experience barriers to a higher degree.

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Supplementary material

Supplementary material is available at *Family Practice* online.

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Conflict of interests

The authors declare that they have no conflicting interests.

Ethics

The Research and Innovation Office at the University of Southern Denmark registered the study (ref. no. 10.307). The ethical committee of the Region of Southern Denmark waived the need for approval since no patient data was involved. The Danish Committee on Multipractice studies in General Practice assessed the study and recommended GPs to participate in the survey (MPU-24-2016).

Availability of data and materials

The datasets generated and analyzed in the current study are not publicly available due to the data protection regulations of the Danish Data Protection Agency. Access to data is strictly limited to the researchers who have obtained permission for data processing. This permission was given to the Research Unit of General Practice, Department of Public Health, University of Southern Denmark.

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