





ORIGINAL RESEARCH

Prevalence and associated factors of intimate partner violence against pregnant women who attend antenatal care in Denmark and Spain: A digital screening approach

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Abstract

Introduction: Intimate partner violence against women is a global health issue. Exposure to intimate partner violence during pregnancy leads to health-related problems for both the mother and the newborn. However, current knowledge on its occurrence varies widely and assessing the problem using standardized tools in different contexts is needed. This study aimed to estimate the prevalence and associated factors of IPV in pregnant women in Denmark and Spain through digital screening tools. **Material and Methods:** A cross-sectional design was used to systematically screen for intimate partner violence among pregnant women attending antenatal care by using standardized digital screening tools, Woman Abuse Screening Tool and Abuse Assessment Screen.

Results: A total of 17 220 pregnant women in Denmark and 2222 pregnant women in Spain were invited to participate. The response rate was high in both countries (77.3% and 92.5%, respectively). Overall, 6.9% ($n=913$) and 13.7% ($n=282$) screened positive in Denmark and Spain, respectively. Logistic regressions estimated crude and adjusted odds ratio with 95% confidence intervals of the relationship between sociodemographic variables and intimate partner violence. In both countries, being unmarried and lacking social support were risk factors of intimate partner violence. Additionally, in Denmark, pregnant women older than 40 years, unemployed or foreign, were at higher risk, while having higher educational levels was a protective factor. In Spain, not having a partner at the time of questionnaire completion and having at least one child prior to the current pregnancy were risk factors of intimate partner violence.

Abbreviations: AAS, Abuse Assessment Screen; aOR, Adjusted Odds Ratio; CI, Confidence Interval; cOR, Crude Odds Ratio; IPV, Intimate Partner Violence; WAST, Woman Abuse Screening Tool.

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Conclusions: Prevalence results and found associated factors contribute to a more comprehensive understanding of the occurrence of intimate partner violence during pregnancy in Denmark and Spain, while highlighting the feasibility of digital systematic screening in antenatal settings.

KEYWORDS

antenatal care, digital tools, intimate partner violence, pregnancy, prevalence, screening

1 | INTRODUCTION

Intimate partner violence (IPV) against women is a major public health problem and a violation of human rights. IPV is defined as any act of physical, sexual, and/or emotional abuse perpetrated against a woman by a current or former partner.¹ IPV is associated with numerous physical and mental health consequences, including conditions that impact the reproductive, cardiovascular, and central nervous systems.² Additionally, it is linked to depression,³ anxiety,⁴ post-traumatic stress,⁵ and substance abuse.² Moreover, exposure to IPV may negatively affect outcomes of pregnancy⁶⁻¹¹, leading to premature birth, low birthweight, and fetal loss.¹² In the long term, children of mothers exposed to IPV are also more likely to develop behavioral problems.¹³

According to the Fundamental Rights Agency (FRA) European Union survey, 20% of women who experienced IPV reported that their current partner was violent during pregnancy.¹⁴ Using the NorVold Abuse Questionnaire (NorAQ), a multi-country study from 2008 to 2010 estimated the prevalence of IPV during pregnancy in Denmark to be 2.2% for emotional violence, 2.5% for physical violence, and 0.2% for sexual abuse.¹⁵ In Spain, studies ranged from 9.3% to 21% of pregnant women reporting psychological intimate partner violence within the last year, while 1.2% to 3.6% reported physical violence.^{11,16,17}

Antenatal care is viewed as a “window of opportunity” for detecting IPV because most women attend and have frequent contact with midwives throughout their pregnancy. Furthermore, screening for IPV in an antenatal context is recommended by several systematic reviews and meta-analyses.^{18,19} Studies have found that women in general²⁰ and women exposed to IPV²¹ find it acceptable to be screened for IPV during pregnancy within antenatal care. While there is no gold standard for IPV screening, Woman Abuse Screening Tool-Short (WAST)²² and the Abuse Assessment Screen (AAS)^{17,23} are screening tools that have been widely used for screening in relation to pregnancy. The general use of tools for digital screening is gaining attention in medical research,²⁴ as they have the potential to reach a larger population, are highly scalable, and may be a more acceptable approach than face-to-face screening. However, evidence on the use of digital screening for IPV is currently lacking.

While research on IPV among pregnant women has increased in recent years, studies continue to show variability with inconsistent

Key message

The 6.9% (Denmark) and 13.7% (Spain) of pregnant women in antenatal care screened intimate partner violence (IPV)-positive. IPV routine screening in antenatal settings using digital tools is strongly recommended. Comparative studies should identify factors associated with IPV for developing effective intervention strategies.

results. Both prevalence and risk factors are sensitive to different screening tools, study designs, settings, and timeframes.^{25,26} Moreover, a recent meta-analysis revealed poor methodological quality in prevalence studies, attributed to factors such as low sample sizes, the absence of validated IPV tools, and a predominant focus on physical abuse.^{27,28} This methodological variability leads to mixed and sometimes contradictory findings concerning the associated factors of IPV. As a result, drawing definitive conclusions about the main factors associated with IPV becomes challenging. These factors include employment, marital status, educational attainment, social support, and age.^{15,16,29-31} Hence, there is a need for new studies that address these methodological issues to provide more conclusive insights.

Cross-country studies offer the advantage of standardizing methods across diverse settings. This allows for the pooling of data from multiple populations and enhances the generalizability of findings. As a result, these studies provide more comprehensive insights into IPV across different cultural contexts. Employing standardized tools across settings facilitates the comparison of various types of IPV prevalence and its associated factors between countries. An optimal understanding of the prevalence of IPV during pregnancy, its different types, and its associated factors is essential for developing appropriate prevention strategies and effective interventions in antenatal care.

Therefore, the primary objective of this study is to estimate the prevalence of IPV during pregnancy and to identify its associated factors, employing a similar digital screening approach, research methodology, and validated screening questionnaires in antenatal care settings across two European countries, Denmark and Spain.

2 | MATERIAL AND METHODS

2.1 | Design, setting, and participants

This was a cross-sectional study conducted within the framework of the European Stop Intimate Partner Violence in Pregnancy (STOP) project, described elsewhere.³² The general objective of STOP was to implement systematic digital screening within antenatal care to detect exposure to IPV and to offer screen-positive women a supportive digital empowerment intervention. Pregnant women in Denmark and Spain responded to screening questions through digital questionnaires between February 2021 and July 2022.

Participants in both settings were excluded if they met any of the following criteria: (1) aged under 16 years, (2) did not understand Danish/Spanish, (3) lacked the mental or physical capacity to participate in the study, (4) did not have a partner in the previous 12 months, or (5) could not be informed about the study privately, without their partners or other family members knowing about it.

In the Danish setting, the screening was conducted through the Patient Reported Outcome (PRO) data questionnaire—a digital questionnaire assessing lifestyle factors and offered to all pregnant women in the first trimester who attend antenatal care in the Region of Southern Denmark. In Denmark, 99% of pregnant women attend antenatal care. Women completed the questionnaire at home before their initial antenatal care appointment with a midwife at one of the four hospitals in the region of Southern Denmark: Southwest Jutland Hospital, Lillebaelt Hospital, South Jutland Hospital, and Odense University Hospital/Svendborg Hospital.

In the Spanish setting, the screening was conducted by trained midwives who were recruited from 76 public primary healthcare centers in the region of Andalusia. These centers were selected to be representative of the broader population, encompassing urban, large-town, small-town, and rural areas across four provinces with diverse socioeconomic characteristics. In Spain, 98% of the pregnant women attend antenatal care. Midwives participated in a two-hour training course conducted by a researcher specialized in IPV. The course covered recommendations and best practices for IPV screening, along with instructions on how to use the digital screening tools. Midwives recruited eligible pregnant women during their first antenatal care visit within the first trimester of pregnancy at the primary public healthcare centers. Pregnant women who met the inclusion criteria were invited to participate by completing the informed consent process, screening questionnaires, and providing sociodemographic information. This process involved using a digital tool specifically designed as a tablet app for this study.

2.2 | Data collection instruments

To conduct the IPV screening, all participating pregnant women were offered the Woman Abuse Screening Tool-Short (WAST-Short)

and the Abuse Assessment Screen (AAS). In Denmark, the WAST-Short was incorporated into the screening process of the STOP study 2 months after its commencement. In Spain, both the WAST-Short and AAS were offered from the beginning of the data collection period.

WAST-Short is a questionnaire that measures tension and conflicts with the partner through two items: “In general, how would you describe your relationship?” and “Do you and your partner work out arguments with...?” The response form ranges from 0 (no tension or no difficulty) to 2 (a lot of tension or great difficulty).²² The cutoff score was 2, which could be obtained by selecting an extreme response on either item, or by selecting two intermediate responses on both items. This instrument has been validated as a reliable screening tool for IPV showing a sensitivity of 91.4% and a specificity of 76.2% in primary healthcare settings.³³ Its accuracy has also been tested among pregnant women in primary care, demonstrating similar reliability to the AAS.¹⁷

The AAS is a 5-item tool designed specifically to screen for IPV in antenatal care.^{23,34} In this study, the first item of the original version was not considered, as it did not inquire about violence perpetrated by a partner or ex-partner within the previous 12 months. Therefore, only items 2 to 5 were considered in the analyses. Items 2 to 4 measured whether the woman had suffered any kind of violence within the previous 12 months (for emotional violence: “Have you been humiliated, insulted, belittled, threatened or caused any form any other emotional harm?”; for physical violence: “Have you been pushed, hit, slapped, kicked or physically injured?”; for sexual violence: “Have you been forced to have sex?”). When answering “yes” to any of these items, the woman specified who perpetrated the action: “partner/ex-partner/stranger/others.” Item 5 of the AAS, which asks about experiencing feelings of fear toward the partner/ex-partner, was included in a separate analysis, since it can be considered a proxy of IPV.^{23,35}

2.3 | Definitions

Women were classified as “IPV-positive” if they scored 2 or higher in the WAST-Short and/or reported exposure to either emotional, physical, or sexual violence by a current or former partner within the previous 12 months in the AAS questionnaire.

While being afraid of one's partner can be considered a proxy of violence, pregnant women who only responded positively to the AAS item regarding fear were not considered as IPV-positive. However, in line with the latest IPV macro-survey conducted in Spain,³⁵ a separate analysis for this item was computed.

2.4 | Data curation procedure

To ensure accurate estimates of IPV prevalence and regression analyses, the screening data were curated. This involved addressing missing information and eliminating duplicates, resulting in a

dataset comprising unique subjects who provided any information about IPV. Pregnant women who did not provide any answers to the IPV questionnaires were excluded from the analyses. In cases where women had multiple pregnancies during the screening period, only data from the initial screening were included in the analyses.

2.5 | Sociodemographic variables

The following sociodemographic variables were collected in Denmark and Spain: age (intervals in years: 16–29, 30–39, 40–50), marital status (married, unmarried living together with the partner, unmarried not living together with the partner, or no partner), educational level (primary school, secondary school, or college/university), employment status (employed or unemployed), nationality (Danish/Spanish or other), and number of children. Additionally, to measure social support networks, one question was adapted in each country to fit the cultural contexts. In Denmark, the following question was asked: “Do you have anybody to talk to if you have any problems?” In Spain, the question was adapted to: “Do you have a person you can trust when you have difficulties or problems of any kind in your life?”

2.6 | Statistical analyses

Sociodemographics were converted into categorical variables for comparison, and frequency tables were generated for them. Percentages were calculated to estimate the general prevalence of IPV (positive in WAST and/or AAS questionnaires) based on the defined cutoff criteria (refer to Data Collection Instruments and Definitions for details).

The percentages of positive responses to WAST-Short and the different types of violence assessed by the AAS items individually (emotional, physical, or sexual) were also calculated. Chi-square tests of independence were employed to determine cross-country differences in IPV positivity, WAST-Short scores, and individual AAS items.

To identify sociodemographic variables associated with IPV positivity, logistic regression models were utilized to calculate crude (cOR) and adjusted odds ratio (aOR) with 95% confidence intervals (CI). A separate regression model for the AAS “being afraid” item was conducted. Statistical significance was set at $p < 0.05$. Statistical analyses were performed using IBM SPSS Statistics 28.

3 | RESULTS

A total of 17220 and 2222 pregnant women were invited to participate in the screening process in Denmark and Spain, respectively. The response rate of eligible women in both countries was high: 77.3% ($n = 13306$) in Denmark and 92.5% ($n = 2055$) in Spain.

Figure 1 displays a flow diagram of the participants in the Danish and Spanish settings, while Table 1 provides a detailed description of the sociodemographic characteristics of both samples.

Table 2 presents the results of the WAST-Short and the different types of IPV according to the AAS items individually. In Denmark, 6.9% of the pregnant women screened positive for IPV in the last 12 months. Specifically, 6.0% of pregnant women showed positive results on the WAST-Short. Based on the AAS questionnaire, 1% reported experiencing psychological IPV within the last 12 months, 0.3% reported physical IPV, and 0.1% reported sexual IPV. Additionally, 0.5% stated that they were afraid of their partner.

In Spain, 13.7% of the pregnant women participating in the study screened positive for IPV within the last 12 months. Specifically, 11.9% of pregnant women screened positive on the WAST-Short. The analysis based solely on the AAS questionnaire revealed a prevalence of 2.4% for psychological IPV, 0.4% for physical IPV, and 0.2% for sexual IPV. Moreover, 4.9% of the respondents reported having felt afraid of their partner or ex-partner.

Chi-squared test of independence revealed that the IPV prevalence of pregnant women in Spain was higher than in Denmark for general IPV positivity ($\chi^2 (1, N = 15361) = 116.80, p < 0.01$), WAST-Short positivity ($\chi^2 (1, N = 15358) = 737.86, p < 0.01$), and AAS psychological violence ($\chi^2 (1, N = 15265) = 29.47, p < 0.01$). No cross-country differences were found in the prevalence of physical ($\chi^2 (1, N = 15305) = 0.8, p = 0.37$) and sexual violence ($\chi^2 (1, N = 15314) = 1.51, p = 0.22$). Additionally, Spanish pregnant women were more likely to report being afraid of their partner than Danish pregnant women ($\chi^2 (1, N = 15355) = 310.35, p < 0.01$).

Table 3 displays results from both crude and adjusted models for factors associated with IPV positivity in Danish and Spanish samples. In Denmark, variables significantly linked to IPV in the adjusted model include pregnant women aged 40–50 years, unmarried, and living together or not living together with their partner, being unemployed and being foreign. Lack of social support emerged as the strongest risk factor, while a higher education level was protective against IPV.

In Spain, significant IPV risk factors in the adjusted model included being unmarried, regardless of current cohabitation or not. Having no partner at the time of questionnaire completion but having had one in the last 12 months and having children prior to the current pregnancy also increased the likelihood of screening positive for IPV. Finally, the lack of social support emerged as the strongest associated variable with experiencing IPV during pregnancy.

Table 4 presents the results of the logistic regression analysis for the item “being afraid of the partner” in the AAS questionnaire within the Danish and Spanish samples. In Denmark, pregnant women who were unemployed were more likely to report fear of their partner, while those with higher education (college education) were less likely to report fear. For Spanish women, those who reported not having a current partner were more likely to be afraid of their ex-partner.

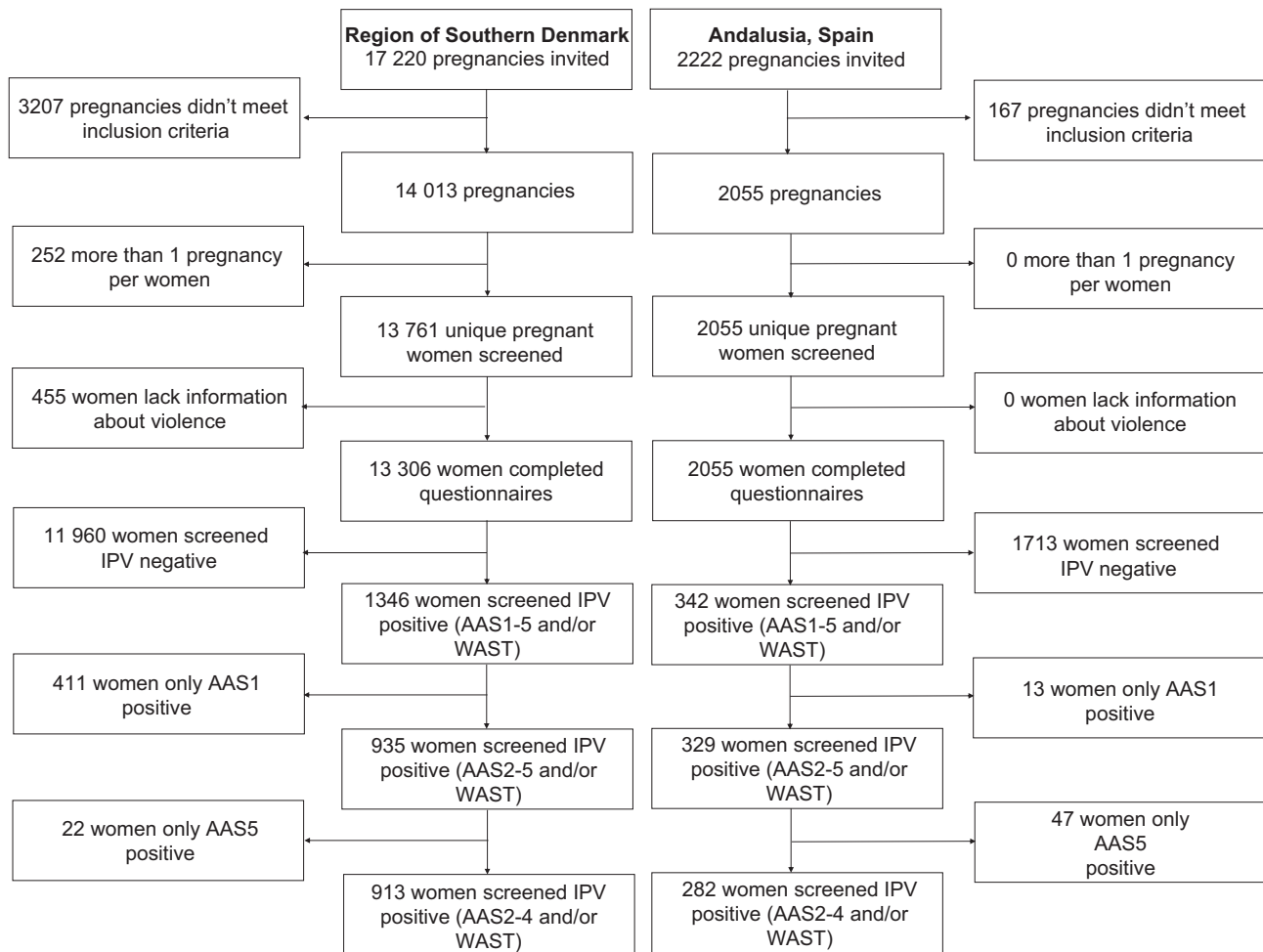


FIGURE 1 Flowchart of the screening process in the Danish and Spanish settings. AAS, Abuse Assessment Screen; IPV, Intimate Partner Violence; WAST, Woman Abuse Screening Tool.

4 | DISCUSSION

In this study, pregnant women underwent routine screening for IPV using digital tools in the antenatal care public systems of Denmark and Spain. This study represents the first prevalence study of IPV to implement digital screening tools in both Denmark and Spain. Additionally, in Denmark, PRO Data were utilized to reach a larger number of pregnant women, streamlining the screening process in antenatal care settings. The study revealed a prevalence of 6.9% for IPV in the Danish setting and 13.7% in Spain, making it the most up-to-date examination of IPV prevalence in pregnancy. Notably, the latest prevalence study of IPV during pregnancy in Denmark was conducted in 2014, revealing a prevalence of IPV within the last 12 months of around 3.3%.¹⁵ In Spain, the first prevalence study of IPV during pregnancy was conducted in 2019,¹¹ finding a prevalence of psychological abuse of 21%. The discrepancies in the prevalence of psychological violence compared to the present study may be attributed to differences in the selected screening tools and how data are categorized. The previous study utilized a more comprehensive behavioral questionnaire, the Index of Spouse Abuse, which includes items about

controlling behaviors. Unlike the screening tools employed in the present study (WAST and AAS), the Index of Spouse Abuse does not necessarily require awareness of being a victim, as it captures a broader range of behaviors. Consequently, while the Index of Spouse Abuse assesses various aspects of psychological violence, our measures focus specifically on the emotional aspect of psychological violence. However, also the differences in the health context (hospitals vs. antenatal care consultations) or variations in the timeframe when the research was conducted (postpartum period vs. first midwife consultation) may primarily contribute to these discrepancies. One more recent IPV prevalence study in Spain (2022) was conducted in antenatal visits during pregnancy using WHO questionnaire, and 9.3% of psychological violence and 1.2% of physical violence were reported.¹⁷ In comparison, the prevalence of psychological violence reported in our study was higher compared to the most similar and recent studies conducted in Denmark¹⁵ and Spain.¹⁷ However, our figures for physical violence were comparatively lower than those reported in these studies. This variance may be attributed to methodological differences, as the aforementioned studies employed multiple items to assess such violence, whereas we used a single item derived

TABLE 1 Sociodemographic characteristics of the Danish (N = 13306) and Spanish (N = 2055) sample of pregnant women.

	Denmark		Spain	
	Total	%	Total	%
Age (years)				
16–29	6852	51.5	484	23.5
30–39	6120	46.0	1112	54.1
40–50	322	2.4	130	6.3
Missing	12	0.1	329	16
Marital status				
Married	5604	42.1	1352	65.8
Partner living together	6893	51.8	578	28.1
Partner not living together	352	2.6	71	3.5
No current partner ^a	339	2.5	49	2.4
Missing	118	0.9	5	0.2
Educational level				
Primary	702	5.3	274	13.3
Secondary school	2897	21.8	995	48.4
College	9296	69.9	778	37.9
Missing	411	3.1	8	0.4
Employment status				
Employed	11 532	86.7	1452	70.7
Unemployed	1169	8.8	597	29.1
Missing	605	4.5	6	0.3
Nationality				
Native	9770	73.4	1893	92.1
Foreign	1220	9.2	157	7.6
Missing	2316	17.4	5	0.2
Social support				
Have a person	11 313	85.0	2007	97.7
Do not have a person	78	0.6	39	1.9
Missing	1915	14.4	9	0.4
Child				
Have at least one child	7140	53.7	1066	51.9
No child	6090	45.8	984	47.9
Missing	76	0.6	5	0.2

^aAt the time of questionnaire completion but having had one in the last 12 months.

from the AAS questionnaire. Besides, in our study, cross-country significant differences were found in IPV positivity, WAST-Short, and psychological IPV according to AAS. The WHO Multi-country Study on Women's Health and Domestic Violence is an excellent example of high-quality cross-country research using standardized methods³⁶. Building on this strong foundation, there is a need for updated cross-country research,²⁶ leveraging digital tools to improve consistency in data collection and facilitate more accurate comparisons of IPV prevalence across diverse contexts. Furthermore, it is important to note that the categorization of

data can significantly impact prevalence and screening rates. For instance, the cohort profile of the STOP study reported a screen-positive rate of 8.5% in Denmark and 17.03% in Spain,³² whereas our substudy revealed an IPV prevalence rate of 6.9% in Denmark and 13.7% in Spain. The variation in these rates can be attributed to differences in how IPV prevalence is defined and how data are categorized. The cohort profile article employed more lenient criteria to maximize the inclusion of women for an intervention, prioritizing greater sensitivity despite the risk of encountering false positives. In contrast, for the present study, which aimed at estimating IPV prevalence in pregnancy, a stricter criterion was applied to ensure both specificity and the absence of false positives, thus enhancing the generalizability of the findings.

Adjusted model results revealed shared factors associated with the presence of IPV in both Denmark and Spain. In both settings, unmarried pregnant women faced an increased risk of IPV, consistent with findings from a previous prevalence study in Spain,¹⁶ suggesting a similar influencing factor in Denmark. Notably, the strongest shared associated factor for IPV in both countries was the lack of social support, although caution is needed due to the low sample of women reporting it. This factor has also been linked to IPV in both non-pregnant³⁷ and pregnant women in previous IPV studies in Spain.¹⁶ Evidence suggests that maintaining regular communication with social support network members (e.g., friends, family, classmates, and coworkers) is associated with lower odds of experiencing IPV during pregnancy.³⁸ Therefore, it is essential for healthcare professionals to pay particular attention to assessing this factor in healthcare settings.

In addition to these shared associated factors, specific variables were identified that were associated with IPV during pregnancy in one country but not in the other. Remarkably, being pregnant in the age range of 40–50 years emerged as a risk factor in Denmark but not in Spain. This contrasts with findings from other prevalence studies within similar cultural settings with the general population, where younger women are typically identified as being at a higher risk of last year IPV.^{39,40} The association between woman's age and violence during pregnancy was not observed in the Spanish context, aligning with findings from prior studies conducted within the country.¹⁶ Therefore, additional research on this population should be conducted.

In Spain, not having a partner at the time of questionnaire completion but having had one in the last 12 months emerged as a significant risk factor for suffering intimate partner violence during pregnancy. In Denmark, this factor was significant in the crude model but lost significance in the adjusted model, likely due to the influence of other variables such as social support or economic factors. However, the data suggest that recent separation from a partner is a risk factor for IPV in both countries, even if moderated by other factors in Denmark.

In Denmark, a higher educational level appears to be protective, while in Spain, this factor reached statistical significance in the crude model but not in the adjusted one. Previous prevalence studies have consistently indicated that educational level is a protective factor

TABLE 2 Prevalence and cross-country differences in IPV positivity, WAST-Short outcomes, and AAS-Defined IPV types in the Danish (N=13306) and Spanish (N=2055) samples of pregnant women.

Criteria/Questions	Denmark n (%)	Spain n (%)	χ^2 p-value
IPV Positivity (WAST-Short and/or AAS)	913 (6.9)	282 (13.7)	<0.01
WAST-Short	802 (6.0)	245 (11.9)	<0.01
AAS—Within the last year, have you been emotionally abused by your partner or someone important to you? For example: constant insults, humiliation, intimidation (destroying things, etc.) or threats			
No	13083 (98.3)	1996 (97.1)	<0.01
Yes	136 (1.0)	50 (2.4)	
Partner	27 (0.2)	32 (1.6)	
Ex-partner	109 (0.8)	18 (0.9)	
Missing	87 (0.7)	9 (0.4)	
AAS—Within the last year, have you been hit, slapped, kicked, pushed shoved or otherwise physically hurt by someone?			
No	13213 (99.3)	2041 (99.3)	0.37
Yes	42 (0.3)	9 (0.4)	
Partner	8 (0.1)	3 (0.1)	
Ex-partner	34 (0.3)	6 (0.3)	
Missing	51 (0.4)	5 (0.2)	
AAS—Within the last year has anyone forced you to have sexual activities?			
No	13251 (99.6)	2046 (99.6)	0.22
Yes	13 (0.1)	4 (0.2)	
Partner	3 (0.0)	1 (0.1)	
Ex-partner	10 (0.1)	3 (0.1)	
Missing	42 (0.3)	5 (0.4)	
AAS—Are you afraid of your partner/ex-partner?			
No	13237 (99.5)	1949 (94.8)	<0.01
Yes	69 (0.5)	100 (4.9)	
Missing	0 (0)	6 (0.3)	

Abbreviations: AAS, Abuse Assessment Screen; IPV, Intimate Partner Violence; WAST, Woman Abuse Screening Tool; χ^2 , Chi-square.

against IPV during pregnancy.⁴¹ However, in Spain, prior research has shown that educational attainment loses its protective effect after adjusting for socioeconomic factors.¹⁶ This finding suggests a notable cross-country difference in the impact of educational level as a protective factor against experiencing IPV during pregnancy.

In Denmark, immigrant status also emerged as a significant factor associated with IPV in both crude and adjusted models, unlike in Spain where it was not significant in the adjusted model. However, caution is needed due to language barriers potentially leading to the omission of at-risk immigrant women during screening. This implies a potential underestimation of IPV risk for immigrant individuals during pregnancy. Previous research in Spain shows that immigrant population is at an increased risk of experiencing IPV.⁴² Nonetheless, the current findings indicate that the immigrant population in Denmark faces a greater risk of IPV during pregnancy compared to Spain. Future research should delve into the various cultural and linguistic barriers affecting IPV screening in antenatal care within each setting, aiming to identify strategies to effectively address these challenges.

Unemployment was also identified as a risk factor for the presence of IPV in the crude and adjusted model in Denmark. However, in Spain, both models indicate that employment status was not associated with the presence of IPV, contradicting previous Spanish prevalence results.¹⁶ It is crucial to note a significant difference in the unemployment rates among pregnant women in Denmark (9.6%) and Spain (28.7%). For reference, the latest general unemployment rates among women in Denmark and Spain stand at 2.8% and 13.2%, respectively. This disparity makes it challenging to draw firm conclusions regarding the cross-country differences in the relationship between unemployment and IPV.

Lastly, a history of previous childbirth emerged as a risk factor for IPV during pregnancy in Spain within the adjusted model, yet not in Denmark. This association has been observed in various contexts, suggesting that the number of children consistently correlates with the presence of IPV.⁴³ One possible explanation to this finding is that as couples have more children, the increase in economic pressure and parenting-related stress may lead to heightened conflict. Cross-country socioeconomic differences might explain the disparity found

TABLE 3 Crude and adjusted logistic regression analyses for associated factors of IPV in the Danish (N = 13306) and Spanish (N = 2055) samples of pregnant women.

	Denmark					Spain				
	IPV Yes n/N (%)	Crude		Adjusted		IPV Yes n/N (%)	Crude		Adjusted	
		OR	95%CI	OR	95%CI		OR	95%CI	OR	95%CI
Age (years)										
16–29	445/6862 (6.5)	1.0	1.0	1.0	1	75/484 (15.5)	1.0	1.0	1	1
30–39	427/6120 (7.0)	1.1	0.9–1.2	1.2	1.0–1.4	149/1112 (13.4)	0.8	0.6–1.1	1.2	0.8–1.7
40–50	34/322 (10.6)	1.7	1.2–2.5**	1.9	1.2–2.9**	19/130 (14.6)	0.9	0.5–1.6	1.1	0.6–2.0
Missing	7/12 (58.3)					39/329 (11.9)				
Marital status										
Married	325/5604 (5.8)	1.0	1.0	1.0	1	156/1352 (11.5)	1.0	1.0	1	1
Not married living together	478/6893 (6.9)	1.2	1.1–1.4*	1.4	1.2–1.7**	87/578 (15.1)	1.4	1.0–1.8*	1.6	1.2–2.2*
Not married not living together	62/352 (17.6)	3.5	2.6–4.7**	3.5	2.5–5.1**	19/71 (26.8)	2.8	1.6–4.9**	3.6	1.9–6.9**
No current partner ^a	43/339 (12.7)	2.4	1.7–3.3**	1.5	1.0–2.4	16/49 (32.7)	3.7	2.0–6.9**	2.9	1.4–5.9*
Missing	5/118 (4.2)					4/5 (80)				
Educational level										
Primary	94/702 (13.4)	1.0	1.0	1.0	1	50/274 (18.3)	1.0	1.0	1	1
Secondary school	245/2897 (8.5)	0.6	0.5–0.8**	0.6	0.4–0.8**	151/995 (15.2)	0.8	0.6–1.1	0.9	0.6–1.4
College	534/9296 (5.7)	0.4	0.3–0.5**	0.4	0.3–0.5**	75/778 (9.6)	0.5	0.3–0.7**	0.6	0.4–1.0
Missing	40/411 (9.7)					6/8 (75)				
Employment status										
Employed	728/11532 (6.3)	1.0	1.0	1.0	1	187/1452 (12.9)	1.0	1.0	1	1
Unemployed	132/1169 (11.3)	1.9	1.5–2.3**	1.3	1.0–1.6*	91/597 (15.2)	1.2	0.9–1.6	1	0.7–1.3
Missing	53/605 (8.8)					4/6 (66.7)				
Nationality										
Native	646/9770 (6.6)	1.0	1.0	1.0	1	246/1893 (13)	1.0	1.0	1	1
Foreign	127/1220 (10.4)	1.6	1.3–2.0**	1.6	1.3–2.0**	33/157 (21)	1.8	1.2–2.7**	1.5	0.9–2.4
Missing	140/2316 (6.0)					3/5 (60)				
Social support										
Have a person	782/11313 (6.9)	1.0	1.0	1.0	1	255/2007 (12.7)	1.0	1.0	1	1
Do not have	18/78 (23.1)	4.0	2.4–6.9**	4.2	2.4–7.6**	24/39 (61.5)	11.0	5.7–21.2**	6.2	2.8–13.8**
Missing	113/1915 (5.9)					3/9 (33.3)				
Child										
No child	397/6090 (6.5)	1.0	1.0	1.0	1	109/984 (11.1)	1.0	1.0	1	1
Have at least one child	511/7140 (7.2)	1.1	1.0–1.3	1.1	0.9–1.3	169/1066 (15.8)	1.5	1.2–2.0**	1.8	1.3–2.4**
Missing	5/73 (6.8)					4/5 (80)				

Note: All the variables were included in the adjusted model.

Abbreviations: IPV, Intimate Partner Violence.

^aAt the time of questionnaire completion but having had one in the last 12 months.

* $p < 0.05$. ** $p < 0.01$.

between Denmark and Spain. Although not specifically measured in this study, forced pregnancy or reproductive coercion is a recognized factor in IPV⁴⁴ and warrants further investigation.

Analysis of partner-related fear reveals that, in Denmark, unemployed women were at an increased risk of being afraid of their

partner, while college education emerged as a protective factor against it. In Spain, the only significant finding was an increased risk of partner fear among women who were single at the time of screening but had been in a relationship within the past year. Interestingly, social support was not associated with reporting fear, although it

TABLE 4 Adjusted logistic regression analysis for associated factors of the item “being afraid of the partner or ex-partner” of the AAS for the Danish ($N=13\,306$) and Spanish ($N=2055$) samples of pregnant women.

	Denmark						Spain					
	Afraid Yes		Afraid No		Adjusted		Afraid Yes		Afraid No		Adjusted	
	N	%	N	%	OR	95% CI	N	%	N	%	OR	95% CI
Age (years)												
16–29	12	0.2	6840	99.8	1	1	15	3.1	469	96.9	1	1
30–39	9	0.1	6111	99.8	1.0	0.3–3.3	24	2.2	1088	97.8	0.8	0.4–1.7
40–50	0	0.0	322	100	0	0	2	1.5	128	98.5	0.5	0.1–2.6
Missing	1	8.3	11	91.7			6	1.8	323	98.2		
Marital status												
Married	4	0.1	5600	99.9	1	1	23	1.7	1329	98.3	1	1
Not married living together	14	0.2	6879	99.8	2.7	0.7–11.0	17	2.9	561	97.1	1.5	0.7–3.0
Not married not living together	2	0.6	350	99.4	6.6	0.6–65.4	2	2.8	69	97.2	1.7	0.4–7.8
No current partner ^a	1	0.3	338	99.7	0	0	5	10.2	44	89.8	4.5	1.4–14.8*
Missing	1	0.9	117	99.1			0	0.0	5	100.0		
Educational level												
Primary	1	0.1	701	99.9	0	0	6	2.2	268	97.8	1	1
Secondary school	10	0.3	2887	99.7	1	1	27	2.7	968	97.3	1.3	0.5–3.4
College	9	0.1	9287	99.9	0.3	0.1–0.9*	14	1.8	764	98.2	0.9	0.3–2.8
Missing	2	0.5	409	99.5			0	0.0	8	100.0		
Employment status												
Employed	14	0.1	11518	99.9	1	1	35	2.4	1417	97.6	1	1
Unemployed	5	0.4	1164	99.6	4.1	1.1–15.2*	12	2.0	585	98.0	0.8	0.4–1.8
Missing	3	0.5	602	99.5			0	0.0	6	100.0		
Nationality												
Native	18	0.2	9752	99.8	1	1	42	2.2	1851	97.8	1	1
Foreign	2	0.2	1218	99.8	1.9	0.4–9.1	5	3.2	152	96.8	1.2	0.4–3.6
Missing	2	0.1	2314	99.9			0	0.0	5	100.0		
Social network												
Have a person	16	0.1	11297	99.8	1	0	45	2.2	1962	97.8	1	1
Do not have	0	0	78	100	0	0	2	5.1	37	94.9	2.0	0.4–9.8
Missing	6	0.3	1909	99.7			0	0.0	9	100.0		
Child												
No child	10	0.2	6080	99.8	1	1	24	2.4	960	97.6	1	1
Have at least one child	11	0.1	7129	99.9	1.0	0.3–3.5	23	2.2	1043	97.8	1.0	0.5–1.9
Missing	1	1.4	72	98.6			0	0.0	5	100.0		

Note: All the variables were included in the adjusted model.

Abbreviation: IPV, Intimate Partner Violence.

^aAt the time of questionnaire completion.

* $p < 0.05$.

was strongly linked to the reporting of violence. However, previous analyses of fear reporting in the general population in Spain found that college education acted as a protective factor, while immigrant status was identified as a risk factor.³⁵ These patterns were not replicated in the current study. It is important to note that Table 4 serves as a sensitivity analysis, using fear as a proxy for IPV rather than a direct measure. This analysis provides additional insight but

should be interpreted with caution due to the small sample size for some variables. Nonetheless, it complements the findings in Table 3 and is valuable for healthcare workers detecting signs of intimate partner violence, particularly when comprehensive measures are impractical.⁴⁵

One of the main strengths of the present study is its substantial sample size. The inclusion of a large sample of pregnant women from

two different European countries, encompassing remote and rural locations across the regions, enhances the generalizability of the results. Moreover, the use of similar methodologies in both countries enables easy comparison and discussion of differences in the prevalence and associated factors of IPV between them. The utilization of digital tools not only facilitated easier questionnaire responses for pregnant women but also enhanced scalability, significantly contributing to the increase in sample size. Lastly, the high response rate and the brief time of completion in the screening questionnaires indicate that screening for IPV in antenatal contexts is feasible and well-received by pregnant women and healthcare workers. Considering the results of the present study, routinely screening for IPV in antenatal care using digital tools is strongly recommended for healthcare workers.

Regarding limitations, the language barrier must be considered. Immigrant pregnant women unable to read or understand the screening questionnaires were excluded, leading to the underrepresentation of this population in the sample, as well as illiterate women.

The time constraint of the screening process and the exploratory nature of the present study did not allow for an analysis of other relevant variables that might be associated with IPV in pregnant women. Future studies should explore the impact of partner's characteristics, perceptions, ideology regarding IPV, and history of abuse, as these factors are known to potentially influence the presence of IPV⁴⁶ and could be particularly relevant during pregnancy.

5 | CONCLUSION

IPV is a concerning public health issue that affects many pregnant women in Denmark and Spain. This study has provided a deeper understanding of the magnitude of IPV during pregnancy in both countries, offering insight into some of the factors related to its occurrence and the differences between them. Detecting and considering these factors is essential when addressing IPV in antenatal care settings.

The use of digital tools has been crucial to the development of this study, and their application for routine screening appears appropriate and justified, given the data collected in this work.

AUTHOR CONTRIBUTIONS

Rodrigo Fernández-López: Data curation, investigation, methodology, software, visualization, writing—original draft. **Karen Andreassen:** Data curation, investigation, methodology, software, writing—review and editing. **Lea Ankerstjerne:** Formal analysis, investigation, methodology, writing—review and editing. **Stella Martín-de-las-Heras** and **Vibeke Rasch:** Conceptualization, formal analysis, funding acquisition, project administration, resources, supervision, writing—review and editing. **Jesús L. Megías:** Conceptualization, funding acquisition, project administration, resources, supervision, writing—review and editing. **Ditte S. Linde:** Investigation, methodology, project administration, supervision, writing—review and editing. **Sabina de-León-de-León:** Investigation, methodology, writing—review and editing.

Berit Schei: Supervision, validation, writing—review and editing. **Chunsen Wu:** Data curation, formal analysis. **Alba Oviedo-Gutiérrez:** Formal analysis, investigation, writing—review and editing. **Antonella Ludmila Zapata-Calvente:** Conceptualization, methodology, supervision, writing—review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors have stated explicitly that there are no conflicts of interest in connection with this article.

ETHICS STATEMENT

In Denmark, the project was reviewed by the Regional Committees on Health Research Ethics for Southern Denmark (study code: S-20200013) on February 14, 2020, with the conclusion that the study did not require ethical approval. The Danish Data Protection Agency and the Capital Region of Denmark approved the study. In Spain, this study was approved by the Research Ethics Committees of Healthcare Centers, Healthcare Counselling, Andalusian Healthcare Service, Andalusian Government, Spain (Study code: 881648. Signed on July 21, 2020). In addition, in Spain the study was submitted to a data protection risk analysis by IUSTECDATA CUMPLIMIENTO, S.L, which also approved the study.

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