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Addressing gaps in asthma management during childbearing age and pregnancy: insights from a survey of Italian physicians and patients

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ABSTRACT

Background: Asthma is a common condition among women of childbearing age, requiring careful management, particularly during pregnancy. Despite existing guidelines, significant gaps remain in asthma management during pregnancy, notably for women with moderate-to-severe asthma.

Aim: This study aimed to explore the awareness, limitations, and challenges of asthma management during childbearing age and pregnancy from both asthmatic women (AW) and physician perspectives in Italy. Additionally, it sought to identify unmet needs and collect real-life experiences from Italian centers specialized in severe asthma care.

Methods: An anonymous online survey was disseminated through scientific networks and patient associations. Separate questionnaires were developed for doctors and AW by a task force of specialists.

Results: 76 doctors and 54 AW completed the survey, with 70% of AW reporting moderate-to-severe asthma. While most physicians had experience managing asthma in pregnancy, 40% lacked systematic collaboration with gynecologists recognizing the need for integrated care. Despite guidelines supporting asthma medication continuity, 60% of doctors reported discontinuing treatments due to perceived risks. However, surveyed AW generally expressed greater confidence in medication safety. Physicians and AW highlighted the lack of pre-pregnancy counseling, with 55% of AW reporting they had never discussed pregnancy plans when starting asthma treatment. Both groups emphasized the need for improved interdisciplinary collaboration and structured asthma care pathways during pregnancy.

Conclusions: This study reveals significant gaps in asthma management for women of childbearing age and during pregnancy, especially those with moderate-to-severe asthma. Improving outcomes requires better education for patients and healthcare providers, along with a structured multidisciplinary network.

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Introduction

Asthma is a common condition in women of childbearing age, and its management requires careful consideration, especially during pregnancy. In Europe, asthma affects up to 8% of pregnant women, but there may be an underestimation given the difficulty of distinguishing asthma symptoms from other clinical manifestations related to physiological changes in a pregnant woman, such as dyspnea due to temporary weight gain or cough caused by gastroesophageal reflux or gravidarum rhinitis (1).

Substantial data suggest that asthma is associated with increased risks of several adverse perinatal outcomes, including preeclampsia, preterm birth, and low birthweight (2–6). These risks of adverse outcomes are highest among women with poorly controlled or more severe asthma (3,4). A meta-analytic review of 14 studies conducted before 1990 reported that one-third of pregnant asthmatic women experience asthma improvement, one-third asthma worsening, and one-third no change in asthma (4). More recent data suggest different proportions, with asthma worsening in only 18% of the patients (7).

Strategies to improve asthma management during pregnancy showed that good asthma control can be achieved for many asthmatic women (8,9). This generally requires frequent assessments of symptoms, pulmonary function, and/or biomarkers, such as fractional exhaled nitric oxide (FeNO) (10–12). Educating women of childbearing age on asthma management before pregnancy can greatly improve pregnancy outcomes. However, there are currently no specific educational programs for this purpose, even for women with moderate to severe asthma.

Women with severe asthma require high-dose inhaled corticosteroid therapy combined with additional controller medications and face a higher risk of asthma exacerbations—factors that elevate the likelihood of adverse events during pregnancy for both mother and fetus.

However, current international guidelines on severe asthma do not provide specific intervention strategies tailored to women of childbearing age with moderate to severe asthma.

Furthermore, there is limited evidence on the use and safety of asthma biologics while pregnant.

This is primarily due to the exclusion of pregnant women from clinical trials, with most available information derived from expert consensus statements (13). Real-world evidence on the most effective interventions for managing severe asthma in women of childbearing age remains limited.

This knowledge gap has practical implications: uncertainty regarding optimal asthma management during pregnancy and poor interdisciplinary collaboration contribute to poor adherence to prescribed medications, often due to concerns about drug safety. Discontinuation of asthma therapy, especially inhaled corticosteroids (ICS), can compromise asthma control, potentially worsening pregnancy outcomes.

Given these challenges, our study aims to shed light on the uncertainties and concerns surrounding asthma management in women of childbearing age and during pregnancy in Italy, from both the medical and patient perspectives.

Specifically, through an online survey directed at both physicians and asthmatic women, we sought to:

- Assess awareness, limitations, and challenges from the perspectives of both patients and healthcare providers.
- Identify unmet needs in the management and treatment of moderate-to-severe asthma during pregnancy.
- Collect real-world experiences from Italian centers specializing in severe asthma care.

By addressing these objectives, our study seeks to increase di level of knowledge useful to contribute to the development of more structured, multidisciplinary approaches that optimize care and improve outcomes for pregnant women with asthma.

Methods

This study was conducted as an anonymous online survey, which was implemented using REDCap (Research Electronic Data Capture) and available on dedicated websites.

Doctors and patients were asked to complete different questionnaires (one for doctors and another for AW) that were created by a task force of researchers and specialists in allergology and pulmonology of the Severe Asthma Network in Italy (SANI) (14).

Some of the main scientific networks in Italy (SANI, the Italian Respiratory Society, and GINA Italy working group) were involved in disseminating and promoting adhesion to this initiative. The Italian Associations of Asthma Patients were also engaged in enabling patients to access the specific website for completing the questionnaire.

The survey was conducted in the context of the observational study protocol of SANI which was approved by the Local Ethical Committee of Area Vasta NORD-OVEST Toscana (Protocol Number

73714, December 2016). The ethical conduct of the study was based on the latest revision of the Helsinki Declaration and the Oviedo Declaration. Informed consent was obtained by each patient and doctor for the use of personal data.

The questionnaires were anonymous. The questions were related to the doctors' and patients' perceptions and opinions regarding asthma management during pregnancy, with reference to real-life experience. Questions were differently formulated for doctors and patients. The original questionnaires used in this study are reported in the Appendix.

Doctors were asked to share their experience in managing asthma during pregnancy by indicating the severity of the disease based on the level of therapy required for asthma control, in alignment with international guidelines defining mild, moderate, and severe asthma (15,16).

Women who participated in the survey were classified as having mild, moderate, or severe asthma based on their most recent specialist assessment and the reported level of inhalation therapy used. Patients receiving high doses of ICS + LABA or biological treatments were categorized as having severe asthma.

Data are reported as mean ± *SD* for continuous variables and as absolute frequencies and percentages for nominal variables.

Table 1. Journey of an asthmatic women starting a pregnancy, according to doctors and patients.

Question: Expectations at the beginning of a pregnancy?	% Positive responses from pulmonary and allergology doctors	% Positive responses from asthmatic patients
1. The gynecologist refers to a pulmonary/allergology specialist for asthma	26.8%	41.7%
2. The family doctor refers to a pulmonary/allergology specialist for asthma	14.1%	4.2%
3. The patient asks the family doctor for referral to a specialist (allergist or pulmonologist)	22.5%	33.3%
4. The patient is referred to a specialist only in cases of worsening asthma symptoms	36.6%	20.8%
Question: In planning a pregnancy, which doctor will be consulted for asthmatic condition/treatment?	% Positive responses from pulmonary and allergology doctors	% Positive responses from asthmatic patients
1. The family doctor and then the allergist or pulmonologist	73.2%	4.2%
2. The gynecologist	7.0%	31.3%
3. The pulmonary/allergology specialist	19.7%	89.6%

Results

A total of 76 doctors and 54 asthmatic women completed the survey. Among the doctors, 53% were pulmonologists, and 43% were allergologists, primarily working in hospital centers for severe asthma. Of these doctors, 45% managed up to 10 pregnant asthmatic women per year, 42% up to 50, and the rest over 50. Despite this, 40% lacked systematic collaboration with gynecology centers. Doctors noted that among the patients they managed for asthma during pregnancy, 54.5% had mild asthma, 35.4% moderate, and 10.1% severe.

The asthmatic women respondents were aged 19–42. At the survey time, 15% were pregnant, 22% planning pregnancy, 45% had been pregnant, and the rest were of childbearing age. Among them, 50% suffered from moderate asthma, 20% severe, and the rest mild. 80% were on regular ICS and LABA treatment, with 93% adherence. Fourteen asthmatic women used biologics: mepolizumab (8), omalizumab (4), dupilumab (1), and benralizumab (1).

Opinions on common practice and fears during pregnancy

Referral to specialists

36.6% of doctors stated that pregnant women with asthma are referred to pulmonologists or allergologists only when their asthma worsens.

On the other hand, asthmatic women most commonly believed that gynecologists or general practitioners should refer them to a specialist to assess asthma control at the beginning of pregnancy.

Doctors believed that optimal asthma management during pregnancy requires an integrated, multidisciplinary approach (Table 1).

Medication concerns and sources of information

- Many doctors noted that pregnant women often stop asthma treatment due to concerns about medication safety, influenced by general practitioners (GPs), gynecologists, or personal choice.
- Most doctors believed that AW receive information about asthma treatment during pregnancy from gynecologists or GPs.
- By contrast, AW surveyed reported that they had received information about asthma treatment during pregnancy from a pulmonary/allergology specialist (Figure 1).

Attitudes toward asthma treatment during pregnancy and the role of pre-pregnancy counseling

- Only 23% of AW were concerned about the safety of asthma medications during pregnancy.
- The majority prioritized continuous treatment, fearing that uncontrolled asthma could pose a greater risk to the fetus (Figure 2).
- 55% of AW reported that their future pregnancy plans were not discussed when they first started asthma treatment.
- Over 50% of doctors admitted that they do not routinely consider pregnancy-related implications when prescribing asthma therapy (Table 2).
- 98% of AW believed that discussing asthma management before pregnancy would be beneficial, with 30% concerned that asthma medications could reduce fertility (Figure 3).

Doctors' perspectives on asthma management in pregnancy

- Fewer than 50% of doctors felt confident managing asthma in pregnant women without additional information on the safety of asthma medications.
- 76% of doctors expressed a need for greater collaboration with gynecologists and family doctors to improve patient care.

Real-world clinical experience

Doctors' experience managing severe asthma in pregnancy

- 58.2% of doctors surveyed had managed up to five cases of severe asthma during pregnancy, 28.4% handled 5–10 cases, and 13.4% treated more than 10 cases.
- Before pregnancy, asthma control was reported as good in 60% of cases, partial in 30%, and poor in 10%.
- During pregnancy, asthma improved in 35% of women, remained stable in 52%, and worsened in 13%.
- Some doctors reported pregnancy complications, primarily asthma exacerbations (Table 3A).

Changes in asthma treatment during pregnancy

60% of doctors discontinued some asthma treatments due to safety concerns or patient fears, including: 55% who stopped biologics and 45% who halted oral medications (Table 3B).

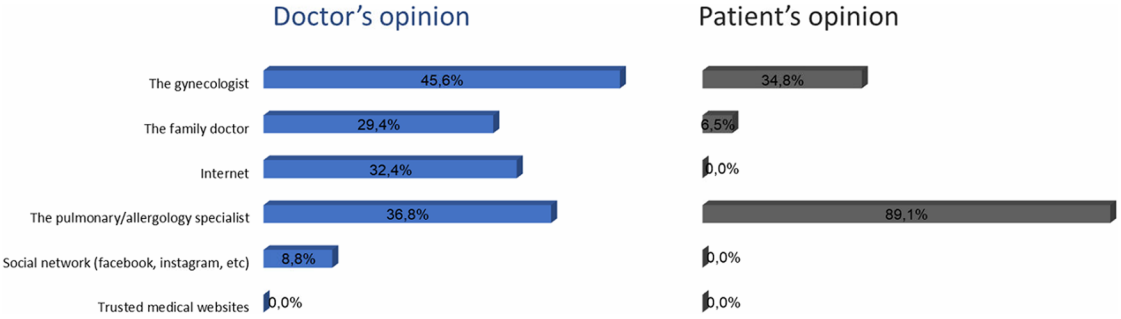

Figure 1. Sources of information for asthmatic women starting a pregnancy.

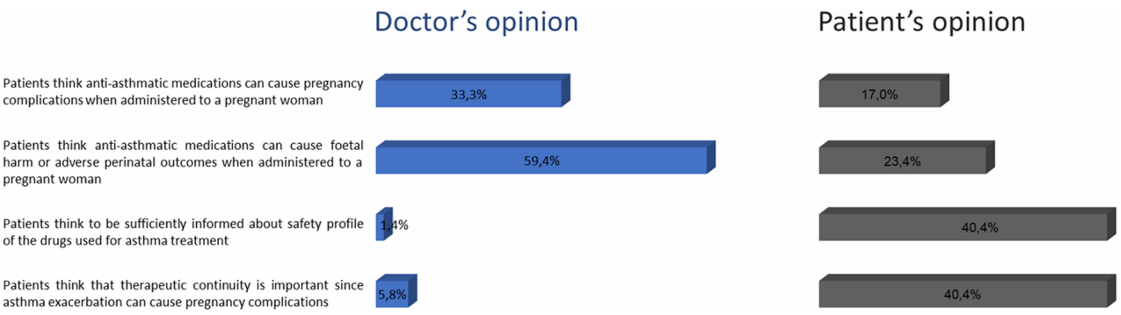

Figure 2. Concerns on asthma treatment, for asthmatic women starting a pregnancy, according to doctor's and patient's opinion.

Table 2. Doctor's opinions about the safety of asthma management during pregnancy.

Question:	Large agreement	Fair agreement	Intermediate	Poor agreement	No agreement
When setting up asthma therapy in a woman of childbearing age, specialist doctors take into consideration the possibility of a future pregnancy	5.7%	35.7%	7.1%	47.1%	4.4%
When setting up asthma therapy in a woman of childbearing age, the impact of asthma therapy on fertility is adequately assessed by specialists	4.3%	25.7%	11.4%	47.1%	11.4%
Medical specialists feel confident in managing a pregnant woman with asthma	10.0%	37.1%	18.6%	32.9%	1.4%

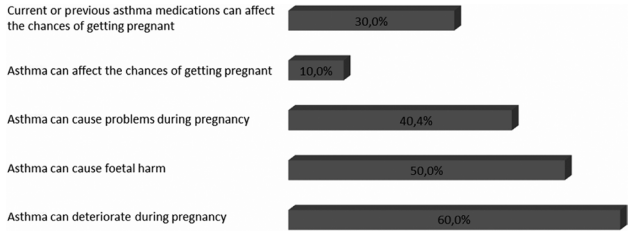

Figure 3. Concerns for asthmatic women starting a pregnancy.

Asthmatic women's pregnancy experiences

57.4% of AW surveyed had at least one prior pregnancy, reporting on a total of 38 pregnancies.

Asthma severity distribution during pregnancy

20% of surveyed women had severe asthma, 50% suffered with moderate asthma, and 30% had mild asthma.

Changes in asthma during pregnancy

62.2% of AW reported improvement, 29.7% remained stable, and 8.1% experienced worsening.

Medication use

- 10% of AW discontinued inhalation treatment at the start of pregnancy, while most continued.
- 31.5% changed or stopped medications based on their doctor's advice.
- 8% (7 AW) were using biologics at the start of pregnancy but discontinued them upon medical recommendation.
- All AW who used biologics found pre-pregnancy discussions about asthma treatment valuable, although only 40% had such discussions.

Reported pregnancy complications and neonatal and post natal outcomes

- Complications included gestational diabetes, hypertension, and preterm birth (10%), asthma exacerbations, and spontaneous abortion (5.4%) (Table 4).
- Most children born to AW were healthy, though some developed conditions such as atopic dermatitis (33.3%), food allergies (6%), allergic rhinitis, and asthma (11.4%).

Discussion

This survey provided valuable insights into the perspectives and experiences of both physicians and asthmatic women regarding asthma management during childbearing age and pregnancy in Italy. Our findings indicate that asthma management in this population remains far from optimal, supporting our initial hypothesis that significant gaps exist in patient communication, interdisciplinary collaboration, and knowledge regarding the safety of asthma medications during pregnancy.

In our sample, the physicians' reported substantial relevant experience with asthmatic women during pregnancy. Despite the limited number of participants who completed the survey, the characteristics of this cohort of doctors and asthmatic women may be considered very interesting because representative of a particular subgroup of asthmatic women with more difficoult-to-treat asthma.

With regards to the journey of the asthmatic women during pregnancy, as the surveyed doctors reported, gynecologists and GPs are the first evaluating the asthma control, and they send the patient to a pulmonary/allergology specialist only when asthma is not controlled. This means that, in general, there is no organization of a specific journey for these asthmatic women, which could involve different specialties (GPs, gynecologists, pulmonologists, and allergologists). On the other hand, both doctors and asthmatic women believe that a preliminary multidisciplinary assessment of asthma should be conducted in pregnancy, to give consistent information to the women and to optimize the follow-up during pregnancy. A recent paper reported the opinions of a relatively small sample of asthmatic women (17). In this study, asthmatic women were surveyed; 36% of them declared they did not have their asthma reviewed during

Table 3. Experience of doctors regarding asthma management during pregnancy.

A.	
Question: Asthma severity classification during pregnancy	% Positive responses of pulmonary/allergology doctors
1. Severe asthma	10.1%
2. Moderate asthma	35.4%
3. Mild	54.5%
4. Not known	/
Question: The course of asthma during pregnancy	% Positive responses of pulmonary/allergology doctors
1. Improved	34.7%
2. Unchanged	52.0%
3. Worsened	13.3%
Question: The most common complications asthmatic women experience during pregnancy	% Positive responses of pulmonary/allergology doctors
1. Asthma exacerbations during pregnancy	70.0%
2. Spontaneous abortion	20.0%
3. Preterm delivery	30.0%
4. Pre-eclampsia	10.0%
5. Low birth weight	10.0%
6. Postpartum complications	0.0%
7. Congenital anomalies	10.0%
8. Others	0.0%
B.	
Question: Reasons given for discontinuation of *inhalation therapy* for asthma during pregnancy	% Positive responses of pulmonary/allergology doctors
1. Uncertainty about continuing asthma treatment	41.7%
2. Pregnancy complications	0.0%
3. Lack of efficacy of drugs	0.0%
4. Lack of data on the safety of drugs during pregnancy	66.7%
Question: Reasons given for discontinuation of OCS therapy for asthma during pregnancy	% Positive responses of pulmonary/allergology doctors
1. Uncertainty about continuing asthma treatment	29.4%
2. Pregnancy complications	5.9%
3. Lack of efficacy of drugs	5.9%
4. Lack of data on the safety of drugs during pregnancy	76.5%
Question: Reasons given for discontinuation of biologic therapy for asthma during pregnancy	% Positive responses of pulmonary/allergology doctors
1. Uncertainty about continuing asthma treatment	42.9%
2. Pregnancy complications	0.0%
3. Lack of efficacy of biologic drugs	4.8%
4. Lack of data on the safety of biologic drugs during pregnancy	71.4%

Note. Doctors reported experiences with patients having moderate/severe asthma in 45% of the cases.

pregnancy, 31% had a written asthma action plan, 11% had their lung function assessed, and 35% had their inhaler technique reviewed. Furthermore, 65% were not questioned about their asthma symptoms, 85% were not asked about asthma triggers, 96% were not given information about vaccinations, and 95% did not receive information regarding smoking cessation, showing that the key recommendations for antenatal asthma management were not always provided. Thus, there clearly remains a need for better collaboration between different specialists, with specific well-organized journeys for asthmatic pregnant women.

In general, asthmatic women expressed many concerns; they fear risks to the fetus, asthma deterioration, and effects of the drugs on pregnancy outcome. This is in line with the results of several prior observational studies, showing that asthma may deteriorate during pregnancy and that complications for the fetus may occur (4,18). Additionally, while asthmatic women feared the effects of the drugs on fertility, literature data suggest that the use of inhaled corticosteroids (ICS) seems to improve this outcome (17,19).

Furthermore, our survey revealed different perspectives between physicians and asthmatic women on asthma treatment during pregnancy. Existing literature and guidelines advocate for the continuation of regular asthma treatment following specialist evaluation (15,20–22) but, many sources of literature reported that asthmatic women still discontinue ICS and bronchodilators during pregnancy (23,24). Doctors involved in our survey also stated that asthmatic women often have significant concerns about using asthma medications during pregnancy and frequently stop their treatment. In contrast, asthmatic women surveyed generally felt more assured about the safety of these medications during pregnancy. This divergence in results between

Table 4. Experience of patients regarding asthma management during pregnancy.

Question: Asthma severity classification during pregnancy	% Positive responses of asthmatic patients
1. Severe asthma	19.4%
2. Moderate asthma	50.0%
3. Mild	27.8%
4. Not known	2.8%
Question: The course of asthma during pregnancy	**% Positive responses of asthmatic patients on 38 pregnancies**
1. Improved	62.2%
2. Unchanged	29.7%
3. Worsened	8.1%
Question: The most common complications asthmatic women experience during pregnancy	**% Positive responses of asthmatic patients**
1. Asthma exacerbations during pregnancy	5.4%
2. Spontaneous abortion	5.4%
3. Preterm delivery	10.8%
4. Pre-eclampsia	NA
5. Low birth weight	0.0%
6. Postpartum complications	0.0%
7. Congenital anomalies	10.8%
8. Others	10.8%

Note. Survey was completed by 77 asthmatic patients, of which 70% were affected by moderate/severe asthma. Participants reported data on 38 pregnancies.

doctors and asthmatic patients is likely due to the fact that asthmatic patients who responded to the survey predominantly reported having a moderate to severe form of asthma. Therefore, it can be assumed that these patients have a greater awareness of the disease, higher adherence to therapies, and more frequent monitoring visits compared to women with mild asthma.

Both doctors and asthmatic women agreed that poor consideration was given to evaluation of the impact of asthma and anti-asthma drugs on future pregnancies. This underlines a lack of focus on the needs of women of childbearing age and highlights the necessity of personalized approaches to improve outcomes for young asthmatic women.

With regards to the physicians' direct experience, few cases of asthma worsening during pregnancy were reported, and no significant complications were observed in terms of pregnancy outcomes. However, the majority of doctors believed that there is some risk in continuing oral corticosteroids (OCS) or biologics during pregnancy, due to the perception of limited evidence about the safety of these drugs during pregnancy. These opinions are partly supported by reports that systemic corticosteroids pose major risk to the fetus, including preterm delivery, low birth weight, and other adverse outcomes (25).

In all cases, preventing exacerbations during pregnancy is a major achievement, which may be obtained by using an appropriate maintenance dose of ICS. Indeed, it has been clearly demonstrated that regular ICS use is safe and associated with less risk to the mother and fetus during pregnancy compared with occasional or no treatment (26,27). Therefore, it is curious that, in our survey, many doctors still expressed some concerns about ICS use during pregnancy, likely related to some convincing data for a certain amount but not all corticosteroid molecules (28). On the other hand, the safety of the use of ICS and long-acting beta2-agonists (LABA) combinations during pregnancy is well known, particularly for those including LABA with a long history of use, such as salmeterol and formoterol (22,29).

Furthermore, doctors reported many concerns regarding the use of biologic drugs in pregnancy for patients with severe asthma. This is obviously due to the limited experience with these biologics during pregnancy, which substantially differs from one molecule to another. Notably, while omalizumab has been widely demonstrated to be safe during pregnancy, poor data are available for other more recent monoclonal antibodies.

The prospective observational study, EXPECT (the omalizumab pregnancy registry), included 191 pregnant women who were exposed to at least 1 dose of omalizumab within 8 weeks before conception, or at any time during pregnancy, and data were collected for 169 pregnant women at the time of data cutoff (30). The proportions of major congenital anomalies (4.4%), prematurity (14.5%), low birth weight (3.2%), and small for gestational age (SGA) (10.9%) observed in the EXPECT registry are consistent with findings from other studies in the general population with asthma. Thus, omalizumab does not appear to increase the risks of these complications beyond that seen in the general asthma population. These data have also been confirmed by some recent observational data (31). On the other hand, data regarding other anti-IL5/IL5R or anti-IL4/13 monoclonal antibodies are scarce (32–34). Recently, an international modified Delphi study involving 141 experts from 32 countries was conducted to support clinical decision-making on the use of asthma biologics during conception, pregnancy, and breastfeeding (35). The study emphasized the importance of risk-benefit discussions and shared decision-making in guiding clinical practice.

Our study has some limitations. First, as data collection was conducted through a survey, the method is inherently non-reproducible. Additionally, the findings are based on a limited number of observations.

However, surveys are a well-established research approach for systematically gathering data from a

predefined group of subjects, offering valuable insights into their opinions, behaviors, and experiences. Given the objectives of our project, we determined that a survey was the most effective method for obtaining the necessary information.

Moreover, although the sample size is limited, it represents a highly specific and carefully selected patient population (childbearing age and pregnant women predominantly affected by moderate to severe asthma). There is a notable lack of data on this group, both from clinical trials and real-world experiences, making our findings particularly relevant in addressing this gap.

Conclusions

This survey included several pulmonary specialists and allergists, as well as asthmatic women, who were mainly affected by moderate/severe asthma. The collected information confirms that asthma management during pregnancy is far from optimal and underlines a lack of focus on the needs of women of childbearing age.

The key issues identified include: poor coordination among different specialists involved in managing asthma during pregnancy, limited awareness and knowledge regarding the safest treatment options for pregnant asthmatic women, particularly concerning biologics, Insufficient attention to pre-pregnancy counseling for asthmatic women, emphasizing the need for targeted educational programs.

To address these gaps, stronger educational initiatives and organized care networks must be implemented to facilitate collaboration between GPs, pulmonologists, allergologists, gynecologists, and patients. By improving interdisciplinary communication and establishing clear asthma management pathways, we can optimize care for women with asthma during pregnancy and improve both maternal and fetal outcomes.

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Declaration of interest

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Data availability statement

The questionnaires and data that support the findings of this study are available from the corresponding author upon reasonable request.

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