JOGNN

REVIEW

Scoping Review on the Consequences of Falls in Women During the Perinatal Period

Sandra Risso, Tânia Soares, Luís Octávio de Sá, Luís Miranda, Rita Rosado, Sílvia Deus, and Cristina Marques-Vieira

Correspondence
Sandra Risso, MScN, RN, Department of Maternal and Obstetric Health Nursing, Nursing School of Lisbon, Avenida Prof Egas Moniz 1600 - 190 Lisboa, Portugal.
srisso@esel.pt

Keywords
accident consequences
accidental falls
maternal–child nursing
obstetric labor
postpartum period
pregnant women

ABSTRACT

Objective: To identify consequences of falls in women during the perinatal period.

Data Sources: Academic Search Complete (EBSCO), CINAHL Ultimate (EBSCO), MEDLINE Ultimate (EBSCO), Cochrane Central Register of Controlled Trials (EBSCO), Cochrane Clinical Answers (EBSCO), Cochrane Database of Systematic Reviews (EBSCO), Cochrane Methodology Register (EBSCO), MedicLatina (EBSCO), Repositórios Científicos de Acesso Aberto de Portugal (RCAAP), SciELO, Scopus, and Web of Science.

Study Selection: We included quantitative or qualitative primary studies, literature reviews, systematic reviews, expert opinion papers, organizational guidelines, and conference abstracts regarding consequences of falls in women during the perinatal period, in any context of care, that were published until November 11, 2024, in English, French, Portuguese, and Spanish.

Data Extraction: We extracted the following data from the included reports: author(s), year, country, aim, study design, type of report, sample size, setting, types and consequences of falls, prevalence, and risk factors for falls.

Data Synthesis: From a total of 33 articles, 27 were related to the consequences of falls during pregnancy, 3 were related to consequences of falls during both pregnancy and the postpartum period, 2 were related to consequences of falls during the perinatal period in which one does not identify the specific stage, and 1 was related to the postpartum period. We did not identify any reports of falls during childbirth. Injuries were common consequences of falls among women during the perinatal period, and the severity of falls varied from minor to severe. Obstetric injuries were severe and unique to pregnant women.

Conclusion: Pregnant women sustain varied injuries after falls and often need health care. Further research is warranted regarding the consequences of falls during childbirth and the postpartum period.

JOGNN, ■, ■–■; 2025. https://doi.org/10.1016/j.jogn.2025.12.002

Accepted December 4, 2025; Published online December 27, 2025

Sandra Risso, MScN, RN, is a PhD student, Faculdade de Ciências da Saúde e Enfermagem, Universidade Católica Portuguesa, Lisbon, Portugal, Innovation and Development Centre of Lisbon (CIDNUR), and professor, Nursing School of Lisbon, Lisbon, Portugal.
https://orcid.org/0000-0002-7169-5570

(Continued)

According to the World Health Organization (WHO, 2021a), more than 37 million falls that are severe enough to require medical attention occur each year. A fall is defined as "an event which results in a person coming to rest inadvertently on the ground or floor or other lower level" (WHO, 2021a, "Key Facts," para. 1). Children, adolescents, workers in high-risk occupations, and the elderly are at great risk for falls and injuries (WHO, 2021b). However, these accidental events can affect patients who receive nursing care in any context.

During the perinatal period, defined in this review as pregnancy, labor, and the postpartum period (up to 1 year after birth), women have unique risks for falls, for example, because of decreases in postural stability (El-Shamy et al., 2016; Opala-Berdzik et al., 2015; Shingala et al., 2019).

When falls take place during the perinatal period, women and their fetuses or newborns can sustain injuries. Tinker et al. (2010) reported that during pregnancy more than half of the causes of maternal injuries were related to falls. To further investigate the effect of falls during the perinatal period, we searched for reviews on the subject using the terms "consequences," "falls," "pregnancy," "childbirth/labor," and "postpartum/puerperium" in CINAHL Ultimate (EBSCO), MEDLINE Ultimate (EBSCO), Cochrane Database of

© 2025 AWHONN. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

The extent of women's injuries from falls during the perinatal period is understudied.

Tânia Soares, MScN, RN, is a PhD student, Faculdade de Ciências da Saúde e Enfermagem, Universidade Católica Portuguesa, Lisbon, Portugal, President, Southern Regional Nursing Council, Ordem dos Enfermeiros, Portugal, and a surgical-medical nurse, Centro Hospitalar Barreiro-Montijo, EPE, Barreiro, Portugal.
https://orcid.org/0000-0002-7993-1267

Luís Octávio de Sá, PhD, MSc, RN, is an associate professor, Faculdade de Ciências da Saúde e Enfermagem, Universidade Católica Portuguesa, Centro de Investigação Interdisciplinar em Saúde, Porto, Portugal.
https://orcid.org/0000-0001-9687-413X

Luís Miranda, MScN, RN, Management in Health Care PGD, is a professor, Department of Nursing, Egas Moniz School of Health & Science, Almada, Portugal, and a nurse manager, Obstetrics Department, Unidade Local de Saúde Arco Ribeirinho, EPE, Barreiro, Portugal.
https://orcid.org/0000-0001-6625-8256

Rita Rosado, MScN, RN, is a nurse-midwife, Obstetrics Department, Unidade Local de Saúde Arco Ribeirinho, EPE, Barreiro, Portugal.
https://orcid.org/0000-0003-2085-0697

Sílvia Deus, MScN, RN, is a nurse-midwife, Obstetrics Department, Unidade Local de Saúde Arco Ribeirinho, EPE, Barreiro, Portugal.

Systematic Reviews, and Joanna Briggs Institute (JBI) of Evidence Synthesis databases. The Merriam-Webster Dictionary defines "consequence" as "something produced by a cause or necessarily following from a set of conditions" (Merriam-Webster, n.d., Definition 2). We decided to investigate the effect of falls in a comprehensive manner, including other possible results beyond injuries. Thus, we chose the term "consequences" in our search. We found no scoping or systematic reviews on consequences of falls during the perinatal period. We identified two related reviews: one on the risk factors for falls during pregnancy (Hrvatin & Rugelj, 2022) and one about intrinsic factors during pregnancy that can contribute to the risk for falls (Wu & Yeoh, 2014).

Hrvatin and Rugelj (2022) included 14 studies in their systematic review and identified intrinsic and extrinsic risk factors for falls. They suggested the need for future research on the risk factors for falls during pregnancy, methods to improve postural stability in pregnant women to prevent falls, and fall prevention interventions (Hrvatin & Rugelj, 2022). Wu and Yeoh (2014) conducted a review to identify intrinsic factors during pregnancy that could contribute to the risk for falls. They reviewed 67 studies and concluded that weight increase and changes in body center of mass, followed by biomechanical alterations to compensate, musculoskeletal alterations caused by the action of relaxing in ligaments that affect joint laxity, sensory system modifications related to proprioceptive and vestibular functions altered in pregnant women, and psychological factors related to altered attention and anxiety, are major contributing risk factors for falls during pregnancy. These two reviews focused solely on falls during one stage of the perinatal period (i.e., pregnancy). Therefore, we decided to conduct a scoping review on the reported consequences of falls during all stages of the perinatal period.

Methods

We followed the JBI methodology for scoping reviews (Aromataris et al., 2024; Peters et al., 2021). We chose to conduct a scoping review rather than another type of review because this methodology allows for a broader exploration of the concept under investigation. During scoping reviews, reviewers use rigorous methods, and these methods are appropriate when reviewers intend to identify characteristics, concepts, factors, or methods related to a specific topic (Munn et al., 2018). We used the Preferred Reporting Items for Systematic Reviews and Meta-analysis extension for scoping reviews checklist (Tricco et al., 2018) to guide writing the review. We developed a scoping review protocol that was registered in the Open Science Framework (Risso et al., 2021). In the protocol, we defined the objectives, defined the methodology, and planned the reporting of the evidence according to Peters et al. (2022).

Review Questions

We developed three questions to guide the review according to the Population, Concept, Context framework (Peters et al., 2022). Our population of interest was women during the perinatal period, our primary concept was the consequences of falls, and we considered all contexts in which falls might occur (e.g., at home, in the community, in the hospital). The primary review question was as follows: What are the reported consequences of falls in women during the perinatal period? Our secondary review questions included the following: What is the reported prevalence of falls? and What risk factors for falls have been reported?

Search Strategy

We used a three-step search strategy according to the JBI methodology for scoping reviews (Peters et al., 2021). First, we searched for appropriate keywords and index terms in titles and abstracts of records related to our concept in the CINAHL (EBSCO) and Medline (EBSCO) databases. Then, we conducted comprehensive searches in the following databases: Academic Search Complete (EBSCO), CINAHL Ultimate (EBSCO), MEDLINE Ultimate (EBSCO), Cochrane Central Register of Controlled Trials (EBSCO), Cochrane Clinical Answers (EBSCO), Cochrane Database of Systematic Reviews (EBSCO), Cochrane Methodology Register (EBSCO), MedicLatina (EBSCO), Repositórios Científicos de Acesso Aberto de Portugal (RCAAP), SciELO, Scopus, and Web of Science. Search terms included, for example, "accidental falls" (MeSH [Medical Subject Heading] term), "consequences," "obstetric labor," "postpartum period," and "pregnant women." The complete search strategies are provided in Supplementary Table S1. Lastly, we searched the reference lists of included reports for additional relevant sources.

Inclusion Criteria

We included reports of qualitative or quantitative studies, case studies, reviews, and gray literature related to women during the perinatal period that addressed consequences of falls related to any context of care or location. We included all reports published through November 11, 2024. We did not apply a publication date restriction (e.g., limiting to the past 5 or 10 years) because this could result in the exclusion of relevant studies pertinent to our review topic. Given the limited evidence available on falls in women during the perinatal period, we aimed to address the subject with a broader and more inclusive approach. We included reports published in English, French, Portuguese, and Spanish because we are fluent in these languages.

Study Selection

Across all database searches, we identified 658 relevant records. We uploaded the records to Rayyan software (Ouzzani et al., 2016), which we used to identify and remove duplicate records ($n = 246$). Next, independently, two reviewers (S.R. and T.S.) screened 412 titles and abstracts and applied the inclusion criteria to the results in the Rayyan software. We excluded 222 records because they were related to different populations. When a disagreement happened, a third reviewer (C.M.V.) decided whether to include the source. Then, we (S.R. and T.S.) sought 190 full text reports for analysis. Three reports were not retrievable. We (S.R. and T.S.) split the articles in half (i.e., S.R. read 95 and T.S. read 95). and then we compared results and the reasons for exclusion; we resolved any disagreements by discussion. We excluded 162 reports because the researchers did not specify the type of trauma that resulted from the falls or because the outcomes were not related to consequences of falls. We also included reports identified by other methods, that is, 10 reports that originated from citation searching when reading the full texts of the reports found through database search as well as 1 report from a Google Scholar search. After reading the content of these reports, we excluded 3 because they mentioned injuries during pregnancy but did not specify the reason, which could include motor vehicle accidents, falls, or other causes. The final sample was 33 reports. The search and selection process is depicted in Figure 1 in a flowchart (Page et al., 2021). We did not conduct a critical appraisal of the records because such an appraisal is not mandatory in scoping reviews (Peters et al., 2022).

Fall-related injuries during the perinatal period can cause negative health outcomes for women and their newborns.

Data Extraction

We extracted the following data from the included reports: author(s), year, country, aim, study design, type of report, sample size, setting, types and consequences of injuries, prevalence (if reported), and risk factors (if reported; Supplementary Table S2).

Data Synthesis

We organized the data extracted according to stages of the perinatal period in which women experienced falls (i.e., pregnancy, labor, or the postpartum period) and described the reported data on consequences, prevalence, and risk factors of falls during each stage.

Results

Sample

Our sample consisted of 33 reports of studies on the consequences of falls during the perinatal period (Supplementary Table S2). Of these studies, 20 were conducted in the United States (Brewin & Nannini, 2014; Cakmak et al., 2016; Connolly et al., 1997; Dunning et al., 2003, 2010; El Kady et al., 2004, 2006; Fildes et al., 1992; Gaffey, 2015; Heafner et al., 2013; Huzel & Remsburg-Bell, 1996; McCrory et al., 2010, 2011; Mendez-Figueroa et al., 2013; Nannini et al., 2008; Petrone et al., 2019; Schiff, 2008; Vladutiu et al., 2010; Wallberg et al., 2021; Weiss et al., 2008), 2 in the Netherlands (Van der Knoop et al., 2015, 2018), 2 in Nigeria (Awoleke et al., 2019; Okeke et al., 2014), 2 in Turkey (Aşci et al., 2021; Genc et al., 2023), 2 in the United Kingdom (Demetriou et al., 2024; Eaton et al., 1991), 1 in China (Zhang et al., 2014), 1 in Montenegro (Kezunovic et al., 2017), 1 in Iran (Zangene et al., 2015), 1 in Italy (Di Girolamo et al., 1978), and 1 in Taiwan (Chen et al., 2010). Reports were published from 1978 to 2024.

Nine studies had retrospective designs (Aşci et al., 2021; Connolly et al., 1997; Dunning et al., 2003; Eaton et al., 1991; El Kady et al., 2006; Genc et al., 2023; Nannini et al., 2008; Schiff, 2008; Weiss et al., 2008). Five reports were literature reviews (Cakmak et al., 2016; Gaffey, 2015; Huzel & Remsburg-Bell, 1996; Mendez-Figueroa et al., 2013; Petrone et al., 2019). Five studies had

Cristina Marques-Vieira, PhD, MSc, RN, is a professor, Department of Rehabilitation Nursing, Nursing School of Lisbon, Lisbon, Portugal, Center for Interdisciplinary Health Research (CIIS), Universidade Católica Portuguesa, Faculdade de Ciências da Saúde e Enfermagem, Lisbon, Portugal, Innovation and Development Centre of Lisbon (CIDNUR), Nursing School of Lisbon, Lisbon, Portugal.
https://orcid.org/0000-0002-4409-7911

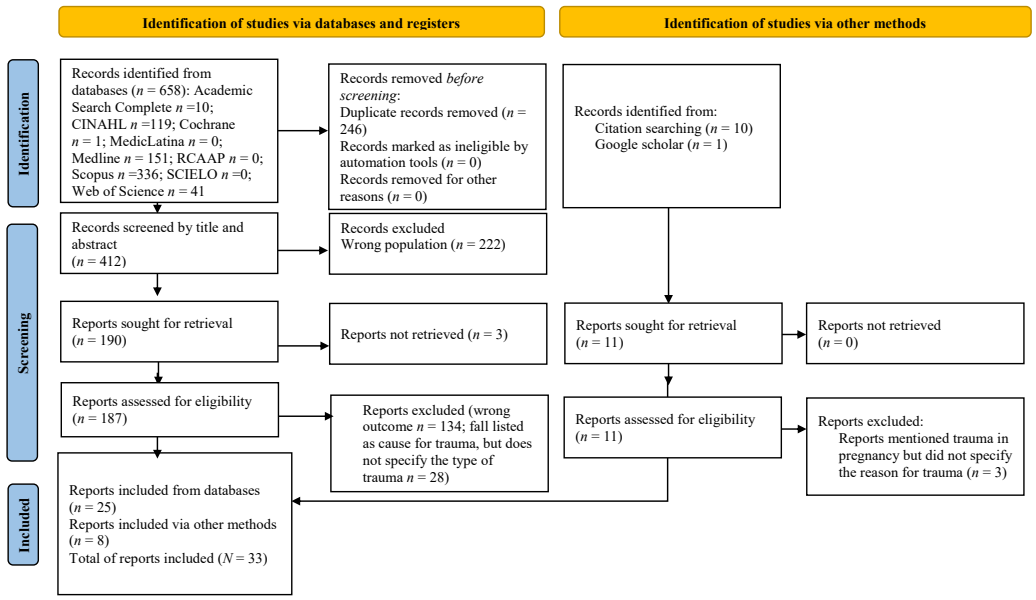

Figure 1. Flowchart depicting the search and selection process.

cross-sectional designs (Awoleke et al., 2019; Demetriou et al., 2024; McCrory et al., 2010; Okeke et al., 2014; Wallberg et al., 2021). Four were case reports (Di Girolamo et al., 1978; Eaton et al., 1991; Kezunovic et al., 2017; Zhang et al., 2014). Three studies had prospective designs (Chen et al., 2010; Van der Knoop et al., 2015; Vladutiu et al., 2010). Two studies had descriptive designs (Brewin & Nannini, 2014; Zangene et al., 2015). One study had a cohort design (Dunning et al., 2010), one was an epidemiological study (Fildes et al., 1992), one was a description of a program implementation (Heafner et al., 2013), one had an experimental design (McCrory et al., 2011), and one was a case-control study (Van der Knoop et al., 2018).

One case report (from 1978) was available online only in abstract form. It briefly described the consequences of fall-related major injuries in a 15-year-old pregnant adolescent. Although there are reports of great inconsistency between abstracts and full texts (Li et al., 2017), we decided to include this abstract in our review for the following reasons: It was the only available source of the case report, the subject of our review was very specific and we obtained limited evidence, and we aimed to include all possible sources of information regarding the subject under study (Peters et al., 2022).

We described the reports and results according to the stage of the perinatal period. From the total of 33 articles, we identified 27 studies on consequences of falls during pregnancy, 3 studies on falls during both pregnancy and the postpartum period (Brewin & Nannini, 2014; Gaffey, 2015; Kezunovic et al., 2017), 2 studies during the perinatal period in general (Fildes et al., 1992; Heafner et al., 2013), and 1 study on falls during the postpartum period (Chen et al., 2010). The results are mapped in Supplementary Table S3.

Pregnancy

We identified 32 reports in which the authors discussed falls in pregnant women (27 during pregnancy, 3 during both pregnancy and the postpartum period, and 2 during the perinatal period in general). The consequences varied from minor to severe. In pregnant women who sustained falls, subsequent injuries included bruises (Aşci et al., 2021; Dunning et al., 2010; Vladutiu et al., 2010); back pain, sprain/strains (Aşci et al., 2021; Dunning et al., 2010; McCrory et al., 2010; Schiff, 2008; Wallberg et al., 2021); nondisclosed injury in the hip (Kezunovic et al., 2017); abdomen and groin pain, twisted ankle (Aşci et al., 2021; Dunning et al., 2010); hip/leg pain (Aşci et al., 2021); cuts/lacerations (Aşci et al., 2021; Dunning et al., 2010; McCrory et al., 2010; Vladutiu et al., 2010); contusions, internal organ injury (Wallberg et al., 2021); concussions (Vladutiu et al., 2010); and fractures (Aşci et al., 2021; Dunning et al., 2010; El Kady et al., 2006; Schiff, 2008; Van der Knoop et al., 2018; Wallberg et al., 2021). Absenteeism from

work attributed to falls occurring in and outside the workplace was reported (Dunning et al., 2003).

Following falls, pregnant women sought help. Some called their spouses and/or consulted family/friends, whereas others called a physician or a nurse (Aşci et al., 2021; Brewin & Nannini, 2014) or resorted to health services (Aşci et al., 2021; Brewin & Nannini, 2014; Dunning et al., 2010; Nannini et al., 2008; Okeke et al., 2014; Schiff, 2008; Zangene et al., 2015). Some pregnant women were hospitalized (Dunning et al., 2003, 2010; Okeke et al., 2014; Schiff, 2008; Vladutiu et al., 2010).

Obstetric consequences of falls during pregnancy. Obstetric consequences were described in pregnant women who sustained injuries following falls such as uterine contractions (Awoleke et al., 2019; Huzel & Remsburg-Bell, 1996; Van der Knoop et al., 2015); pelvic pain (Connolly et al., 1997); vaginal bleeding (Eaton et al., 1991); antepartum hemorrhage/abruptio placentae (Awoleke et al., 2019; Connolly et al., 1997; Genc et al., 2023; Huzel & Remsburg-Bell, 1996; Schiff, 2008; Zangene et al., 2015); ruptured membranes (Awoleke et al., 2019; Genc et al., 2023; Zangene et al., 2015); labor onset (Zangene et al., 2015); uterine rupture (Di Girolamo et al., 1978; Zangene et al., 2015); transvaginal impalement injury (woman at 5 months gestation who fell from a scaffold when picking fruit and was impaled on a wooden stick; positive outcomes were reported for this woman, who later gave birth to a healthy newborn; Zhang et al., 2014); preterm labor/birth (Genc et al., 2023; Schiff, 2008); cesarean birth (Schiff, 2008; Weiss et al., 2008); and birth on the same day as the trauma, preeclampsia with woman transferred to the intensive care unit (Genc et al., 2023). Fildes et al. (1992) conducted a study that reviewed files with records of women who died and found 95 maternal deaths, of which 4.5% were attributed to falls.

Following falls among pregnant women, consequences for the fetus/newborn were also reported and included reduced or absent fetal movement (Awoleke et al., 2019; Eaton et al., 1991; Wallberg et al., 2021); reduced amniotic fluid (Eaton et al., 1991); fetal distress, fetal death (Connolly et al., 1997; El Kady et al., 2004; Genc et al., 2023; Schiff, 2008); expulsion of the fetus and placenta to the abdominal cavity due to uterine rupture (Di Girolamo et al., 1978); stillbirth (Zangene et al., 2015); meconium at birth (Schiff, 2008); fetus/newborn small for gestational age (Eaton et al., 1991; Genc et al., 2023; Schiff, 2008); newborn transferred to the NICU (Genc et al., 2023; Huzel & Remsburg-Bell, 1996); low birth weight (Weiss et al., 2008); and newborns weighing less than 4 kg in women with three or more falls (Awoleke et al., 2019).

Long-term consequences of falls during pregnancy on children. We identified one report in which researchers described potential long-term consequences of falls during pregnancy on the child. Van der Knoop et al. (2018) assessed neurobehavioral outcomes in children whose mothers sustained trauma during pregnancy. They described three cases in which women sustained traumatic falls while pregnant and the subsequent neurobehavioral problems in their children as teenagers, including aggressiveness and anxiety. However, overall, the authors stated that health and behavioral outcomes were similar in children born to mothers who sustained trauma during pregnancy compared with a matched control group except for a higher rate of childhood hospitalizations and a trend toward behavioral problems.

Prevalence of falls during pregnancy. Among the 32 studies on consequences of falls among pregnant women, prevalence of falls was described in 18 reports. The highest prevalence reported was 68% in a sample of 153 pregnant women (Genc et al., 2023). The lowest reported prevalence was 8.4% in a sample of 128 pregnant women (Wallberg et al., 2021). Additional information on prevalence is provided in Supplementary Table S2.

Risk factors for falls during pregnancy. Among the 32 studies that were related to the consequences of falls among pregnant women, there were 19 reports that described risk factors and included physiologic and environmental risk factors, using drugs, and other types of factors. Regarding physiologic risk factors, researchers showed that being taller than 1.60 m (Okeke et al., 2014), experiencing dizziness (Aşci et al., 2021; Wallberg et al., 2021), and stage of pregnancy were risk factors for falls in pregnancy. More falls occurred during the third trimester (Aşci et al., 2021; Awoleke et al., 2019; Dunning et al., 2003, 2010; Okeke et al., 2014; Schiff, 2008), followed by the second trimester (Aşci et al., 2021). On the contrary, Wallberg et al. (2021) reported that 50.9% of falls occurred during the second trimester; Weiss et al. (2008) also found that falls

peaked at the middle of pregnancy and then decreased. There was no consensus about the influence of the age of pregnant women on the risk for falls. Some researchers reported more falls in women younger than 24 years (Dunning et al., 2010; Wallberg et al., 2021; Weiss et al., 2008) and in women younger than 30 years (Okeke et al., 2014; Schiff, 2008), whereas other researchers found that women older than 30 years sustained more falls (Awoleke et al., 2019). There was also no consensus regarding the influence of parity on the risk for falls; in one study, researchers reported that primigravid women experienced more falls (Okeke et al., 2014), whereas other researchers found that multiparous women experienced more falls (Awoleke et al., 2019).

Regarding environmental risk factors, reports showed that pregnant women experienced falls in a variety of settings: indoor (Aşci et al., 2021; Dunning et al., 2010), in the street or in the garden (Aşci et al., 2021), when using stairs (Aşci et al., 2021; Awoleke et al., 2019; Connolly et al., 1997; Dunning et al., 2010; Okeke et al., 2014; Schiff, 2008), when walking on wet/slippery surfaces (Aşci et al., 2021; Awoleke et al., 2019; Dunning et al., 2010; Okeke et al., 2014; Wallberg et al., 2021), when walking on uneven ground or in untidy surroundings (Aşci et al., 2021; Dunning et al., 2010), when walking in environments with poor lighting (Dunning et al., 2010), when carrying children/objects (Awoleke et al., 2019; Dunning et al., 2010; Wallberg et al., 2021), when falling from a height (Zhang et al., 2014), and when running/rushing (Dunning et al., 2010; Okeke et al., 2014).

Regarding the use of drugs during pregnancy, some researchers mentioned that medication (type unspecified; Aşci et al., 2021) or other substances (Wallberg et al., 2021) may contribute to the risk for falls.

Other risk factors for falls during pregnancy were a previous history of falls (Aşci et al., 2021; Okeke et al., 2014), wearing loose clothes (Aşci et al., 2021; Wallberg et al., 2021), and wearing inappropriate shoes (Awoleke et al., 2019; Dunning et al., 2010; Wallberg et al., 2021). Dunning et al. (2003) reported type of employment as a contributing factor; 13.2% of pregnant women who experienced falls worked in food service and other services such as beauticians and housecleaners,12.8% worked in teaching, and 10.2% worked in child care. The same authors reported that 58.3% of food service workers fell due to slippery floors; 40% of nurses fell due to cluttered environments; health care professionals, sales, and management professionals fell due to shoe issues; food service, administration, management and professional, and health care professional occupations fell due to hurrying up. There was also reference to violence as a cause for falls, that is, pregnant women who were pushed or struck accidentally or intentionally (i.e., women subjected to violence; Dunning et al., 2010).

Childbirth

We did not identify any reports related to consequences of falls during childbirth.

Postpartum Period

We identified five reports regarding the consequences of falls among women during the postpartum period. Of these five reports, three were primary studies (Brewin & Nannini, 2014; Chen et al., 2010; Kezunovic et al., 2017) and two were other article types (Gaffey et al., 2015; Heafner et al., 2013). Regarding the three primary studies, one was solely related to falls in women during the postpartum period (Chen et al., 2010) and the other two were related to falls in women during both pregnancy and the postpartum period (Brewin & Nannini, 2014; Kezunovic et al., 2017). In one of these studies, the authors stated that women during the postpartum period fell, and those women who fell searched for health assistance (Brewin & Nannini, 2014). Chen et al. (2010) investigated fall prevention in women during the postpartum period and reported injuries following falls such as bruises, lacerations, fractures, and intracranial hemorrhage. The authors also reported the financial and social burdens related to fall injuries in women during the postpartum period when falls were associated with an extended hospital stay and with the need for additional care (Chen et al., 2010). Kezunovic et al. (2017) discussed a case report of a woman who fell during approximately the eighth month of pregnancy. During the postpartum period, immediately after childbirth, she sustained another fall and injured her right hip when getting out of bed with a nurse's assistance. She experienced rare bilateral femoral neck fractures with a long but complete recovery (Kezunovic et al., 2017).

The other two articles about the consequences of falls among women during the postpartum period included a patient safety overview about falls during the perinatal period (Gaffey, 2015), from

which two relevant primary studies cited were included in our review (Dunning et al., 2010; Weiss et al., 2008). The other article (Heafner et al., 2013) described the potential adverse consequences of maternal falls and the development and implementation of a fall risk assessment tool.

Prevalence of falls during the postpartum period. In a qualitative study by Brewin and Nannini (2014; $N = 31$), 11 women (35.5%) reported falling during pregnancy and 1 woman (3%) reported falling during the postpartum period. In another report, researchers identified an incidence of falls, defined as the total number of postpartum falls per total patient-days, of 14.24 per 1,000 patient-days (Chen et al., 2010).

Risk factors for falls during the postpartum period. In three of the five reports about the consequences of falls during the postpartum period, the authors also discussed risk factors for falls. They reported the following types of risk factors for falls during the postpartum period: physiologic, environmental, using drugs, and others. Physiologic risk factors for falls included anemia, preeclampsia, hemorrhage (Chen et al., 2010; Heafner et al., 2013); diabetes, unspecified chronic diseases (Chen et al., 2010); and blurred vision, dizziness, orthostatic hypotension, placental abruption or placenta previa, thrombocytopenia, visual impairment, weakness (Heafner et al., 2013). Researchers reported the following drugs as risk factors for falls during the postpartum period: anti-hypertensives, epidurals, and opioids (Heafner et al., 2013). Environmental risk factors for falls included the lack of use of safety features such as grab bars and bed rails (Chen et al., 2010). Other risk factors for falls during the postpartum period were bed rest, prior history of falls (Heafner et al., 2013), holding the newborn while walking, rapidly changing position or standing up, being alone during hospitalization (Chen et al., 2010), and getting up during the postpartum period (Kezunovic et al., 2017).

Discussion

Summary and Interpretation

We reviewed 33 reports of consequences of falls in women during the perinatal period and compiled information on injuries, other types of consequences, prevalence, and risk factors of falls at the various stages of the perinatal period. We summarized evidence on women's injuries from falls during the perinatal period that ranged from minor to severe, similar to the consequences of falls in other populations (Yosef et al., 2024). However, in our scoping review we highlighted that obstetric-related injuries for women, such as hemorrhage (Awoleke et al., 2019; Connolly et al., 1997; Genc et al., 2023; Huzel & Remsburg-Bell, 1996; Schiff, 2008; Zangene et al., 2015) and preterm labor/birth (Genc et al., 2023; Schiff, 2008), and injuries to the fetuses, such as reduced or absent fetal movement (Awoleke et al., 2019; Eaton et al., 1991; Wallberg et al., 2021) and fetal distress (Connolly et al., 1997; El Kady et al., 2004; Genc et al., 2023; Schiff, 2008), are consequences of falls unique to the perinatal period. Falls were not uncommon during pregnancy, with prevalence in study samples ranging from 8.4% to 68%, and obstetric consequences of falls were sometimes severe (Fildes et al., 1992; Genc et al., 2023; Zangene et al., 2015). The prevalence of falls during the perinatal period varies widely, but some researchers of the review sample found a higher prevalence of falls in pregnant women than the prevalence of falls in other specific populations such as older adults (26.5%; Salari et al., 2022).

Injuries of an obstetric nature are the most reported consequences of falls during pregnancy and the postpartum period.

Regarding the prevalence of falls during childbirth, Baker and Dupree (2015) reported 10 falls in a year in a labor and delivery unit at a medical center with 2,200 births/year. We did not include this study in our sample because it did not report specific consequences of falls. We contacted the authors for further information. In their study, the women had no fall-related injuries and were already hospitalized in the labor and delivery unit. We highlight the importance of this study (Baker & Dupree, 2015) regarding the prevalence of falls during childbirth because there a gap of knowledge during this period. We believe that further studies about falls during childbirth need to be conducted.

Risk factors for falls during the perinatal period were both similar, such as physiologic factors such as dizziness (Aşci et al., 2021; Heafner et al., 2013; Wallberg et al., 2021), environmental risk factors such as using stairs (Aşci et al., 2021; Awoleke et al., 2019; Connolly et al., 1997; Dunning et al., 2010; Okeke et al., 2014; Schiff, 2008), and untidy environments

(Aşci et al., 2021; Dunning et al., 2010), and different, such as physiologic factors such as being in the third trimester (Aşci et al., 2021; Awoleke et al., 2019; Dunning et al., 2003, 2010; Okeke et al., 2014; Schiff, 2008), preeclampsia (Chen et al., 2010; Heafner et al., 2013), and holding the newborn while walking (Chen et al., 2010), compared with risk factors in other populations (Kendrick et al., 2016; Lee, 2021; Li et al., 2024). Therefore, similar to emphasizing fall prevention in the older population (Marques-Vieira et al., 2021; Thomas et al., 2019), nurses and other health care personnel need to become more aware of risk factors and advocate for prevention of falls during the perinatal period. In addition, Whatley et al. (2022) reported that fall-related near misses, events where women slipped, tripped, or lost their balance but did not necessarily descend to the floor, resulted in injuries to newborns. Although these events might not be counted as maternal falls, they were certainly fall-related and in the future require more attention for preventive measures.

The obstetric consequences of falls may extend into childbirth and the postpartum period, thereby conditioning the experience of motherhood. During the transition to motherhood, women are expected to develop the skills needed for self-care and for taking care of their newborns. When unexpected events such as falls take place, the expected pattern of experiencing the transition to motherhood may be affected and lead to complications (Hattar-Pollara, 2010).

Limitations

Our scoping review had several limitations. Our primary objective was to identify the consequences of falls among women during the perinatal period. As such, our search and inclusion criteria were related to studies about consequences of falls. We extracted data on prevalence and risk factors for falls during the perinatal period only within the literature on consequences of falls. Separate and more comprehensive reviews could be conducted on prevalence and risk factors of falls during the perinatal period. Although we extracted information on prevalence from the included reports, we did not conduct a meta-analysis. We did not assess the methodological quality of the reports included in our review because this assessment is not usually part of a scoping review (Peters et al., 2021).

Implications for Nursing

Results from scoping reviews are most useful for directing future research and systematic reviews. Because a quality assessment was not conducted, the application of results to practice should be done with caution (Munn et al., 2018). However, our findings may increase nurses' awareness of and knowledge about the problem of falls during the perinatal period. To provide high-quality nursing care focused on the safety of women, nurses must understand the scope of the problem and its outcomes and be equipped with the knowledge to develop interventions that address risk factors to prevent the problem from occurring. Falls that happen during pregnancy and the postpartum period may cause serious consequences for the woman and fetus/newborn. Nurses can use this information to assist them during assessment and decision-making in developing fall prevention strategies, which should include providing education to women about the consequences and risk factors for falls. Using fall risk assessment instruments validated for women during the perinatal period can support nurses' clinical judgment in delivering care to both mothers and their newborns (Risso et al., 2024).

Conclusion

In this scoping review, we aimed to identify consequences of falls in women during the perinatal period. Through our findings, we concluded that the most common consequences were injuries that ranged from minor to severe and often led to the need for health care interventions. Obstetric injuries are exclusive to women during the perinatal period and can affect the childbirth experience. Data on consequences of falls during the postpartum period are limited. We recommend that researchers further investigate falls during the perinatal period, especially during childbirth and the postpartum period, to enhance nursing knowledge and support clinical decision-making and practice.

SUPPLEMENTARY MATERIAL

Note: To access the supplementary material that accompanies this article, visit the online version of the *Journal of Obstetric, Gynecologic, & Neonatal Nursing* at http://jognn.org and at https://doi.org/10.1016/j.jogn.2025.12.002.

FUNDING

None.

CONFLICT OF INTEREST

The authors report no conflicts of interest or relevant financial relationships.

REFERENCES

Aromataris, E., Lockwood, C., Porritt, K., Pilla, B., & Jordan, Z. (Eds.). (2024). *JBI manual for evidence synthesis*. Joanna Briggs Institute. https://doi.org/10.46658/JBIMES-24-01

Aşci, Ö., Kocaoz, S., Kara, P., & Taş, F. (2021). Falls in Turkish women during pregnancy: Prevalence, affecting factors and treatment-seeking behavior. *Journal of Midwifery and Reproductive Health, 9*(2), 2725–2732. https://doi.org/10.22038/jmrh.2021.53270.1655

Awoleke, J. O., Olofinbiyi, B. A., Awoleke, A. O., & Omoyajowo, A. C. (2019). Obstetric correlates of maternal falls in Southern Nigeria. *Scientific World Journal, 2019*, Article 9716919. https://doi.org/10.1155/2019/9716919

Baker, B., & Dupree, J. (2015). Patient falls in labor and delivery. *Journal of Obstetric, Gynecologic, & Neonatal Nursing, 44*(Suppl 1), S17–S17. https://doi.org/10.1111/1552-6909.12683

Brewin, D., & Nannini, A. (2014). Women's perspectives on falls and fall prevention during pregnancy. *American Journal of Maternal/Child Nursing, 39*(5), 300–305. https://doi.org/10.1097/NMC.0000000000000064

Cakmak, B., Ribeiro, A. P., & Inanir, A. (2016). Postural balance and the risk of falling during pregnancy. *The Journal of Maternal–Fetal & Neonatal Medicine, 29*(10), 1623–1625. https://doi.org/10.3109/14767058.2015.1057490

Chen, K. H., Chen, L. R., & Su, S. (2010). Applying root cause analysis to improve patient safety: Decreasing falls in postpartum women. *BMJ Quality & Safety, 19*(2), 138–143. https://doi.org/10.1136/qshc.2008.028787

Connolly, A. M., Katz, V. L., Bash, K. L., McMahon, M. J., & Hansen, W. F. (1997). Trauma and pregnancy. *American Journal of Perinatology, 14*(6), 331–336. https://doi.org/10.1055/s-2007-994155

Demetriou, C., Avraam, A., Symonds, P., Eardley, W., & Hing, C. B. (2024). Maternal outcomes of pregnant patients after trauma: A retrospective study of the Trauma Registry of England and Wales. *The Annals of The Royal College of Surgeons of England, 106*(2), 160–166. https://doi.org/10.1308/rcsann.2023.0047

Di Girolamo, V., Ferrara, E., Prefumo, G., Leone, U., & Quadri, P. (1978). Rottura a scoppio d'utero gravido alla 29a settimana per grave trauma esterno in quindicenne [Explosive rupture of the pregnant uterus in the 29th week of pregnancy, caused by a serious external injury, in a 15-year-old girl]. *Minerva Ginecologica, 30*(12), 1153–1158. https://www.scopus.com/record/display.uri?eid=2-s2.0-0018235025&origin=resultslist

Dunning, K., LeMasters, G., & Bhattacharya, A. (2010). A major public health issue: The high incidence of falls during pregnancy. *Maternal and Child Health Journal, 14*(5), 720–725. https://doi.org/10.1007/s10995-009-0511-0

Dunning, K., LeMasters, G., Levin, L., Bhattacharya, A., Alterman, T., & Lordo, K. (2003). Falls in workers during pregnancy: Risk factors, job hazards, and high risk occupations. *American Journal of Industrial Medicine, 44*(6), 664–672. https://doi.org/10.1002/ajim.10318

Eaton, D., Ahmed, Y., & Dubowitz, L. (1991). Maternal trauma and cerebral lesions in preterm infants. Case reports. *BJOG: An International Journal of Obstetrics & Gynaecology, 98*(12), 1292–1294. https://doi.org/10.1111/j.1471-0528.1991.tb15406.x

El Kady, D., Gilbert, W. M., Anderson, J., Danielsen, B., Towner, D., & Smith, L. H. (2004). Trauma during pregnancy: An analysis of maternal and fetal outcomes in a large population. *American Journal of Obstetrics and Gynecology, 190*(6), 1661–1668. https://doi.org/10.1016/j.ajog.2004.02.051

El Kady, D., Gilbert, W. M., Xing, G., & Smith, L. H. (2006). Association of maternal fractures with adverse perinatal outcomes. *American Journal of Obstetrics and Gynecology, 195*(3), 711–716. https://doi.org/10.1016/j.ajog.2006.06.067

El-Shamy, F. F., Ghait, A. S., & Morsy, M. (2016). Evaluation of postural stability in pregnant women. *Evaluation, 11*(10), 1–5. https://doi.org/10.9734/BJMMR/2016/21551

Fildes, J., Reed, L., Jones, N., Martin, M., & Barrett, J. (1992). Trauma: The leading cause of maternal death. *Journal of Trauma and Acute Care Surgery, 32*(5), 643–645. https://journals.lww.com/jtrauma/Abstract/1992/05000/Trauma__The_Leading_Cause_of_Maternal_Death.17.aspx

Gaffey, A. D. (2015). Fall prevention in our healthiest patients: Assessing risk and preventing injury for moms and babies. *Journal of Healthcare Risk Management, 34*(3), 37–40. https://doi.org/10.1002/jhrm.21163

Genc, S., Ozalp, M., Aydın, E., Sahin, F., Bademler, N., Toplu, M.İ., … Mihmanli, V. (2023). Trauma in pregnancy: An analysis of the adverse perinatal outcomes and the injury severity score. *Turkish Journal of Trauma & Emergency Surgery, 29*(9), 1039–1050. https://doi.org/10.14744/tjtes.2023.21533

Hattar-Pollara, M. (2010). Developmental transitions. In A. I. Meleis (Ed.), *Transitions theory: Middle range and situation specific theories in nursing research and practice* (pp. 87–94). Springer.

Heafner, L., Suda, D., Casalenuovo, N., Leach, L. S., Erickson, V., & Gawlinski, A. (2013). Development of a tool to assess risk for falls in women in hospital obstetric units. *Nursing for Women's Health, 17*(2), 98–107. https://doi.org/10.1111/1751-486X.12018

Hrvatin, I., & Rugelj, D. (2022). Risk factors for accidental falls during pregnancy—A systematic literature review. *The Journal of Maternal–Fetal & Neonatal Medicine, 35*(25), 7015–7024. https://doi.org/10.1080/14767058.2021.1935849

Huzel, P. S., & Remsburg-Bell, E. A. (1996). Fetal complications related to minor maternal trauma. *Journal of Obstetric, Gynecologic, & Neonatal Nursing, 25*(2), 121–124. https://doi.org/10.1111/j.1552-6909.1996.tb02414.x

Kendrick, D., Zou, K., Ablewhite, J., Watson, M., Coupland, C., Kay, B., … Reading, R. (2016). Risk and protective factors for falls on stairs in young children: Multicentre case-control study. *Archives of Disease in Childhood, 101*(10), 909–916. https://doi.org/10.1136/archdischild-2015-308486

Kezunovic, M., Bulatovic, N., & Kadic, V. (2017). Bilateral subcapital femoral neck fracture in a 28 year old postpartum woman. *Medical Archives, 71*(2), 151–153. https://doi.org/10.5455/medarh.2017.71.151-153

Lee, S. (2021). Falls associated with indoor and outdoor environmental hazards among community-dwelling older adults between men and women. *BMC Geriatrics, 21*(1), Article 547. https://doi.org/10.1186/s12877-021-02499-x

Li, G., Abbade, L. P., Nwosu, I., Jin, Y., Leenus, A., Maaz, M., … Thabane, L. (2017). A scoping review of comparisons between abstracts and full reports in primary biomedical research. *BMC Medical Research Methodology, 17*(1), Article 181. https://doi.org/10.1186/s12874-017-0459-5

Li, Y., Smith, R. M., Whitney, S. L., Seemungal, B. M., & Ellmers, T. J. (2024). Association between dizziness and future falls and fall-related injuries in older adults: A systematic review and meta-analysis. *Age and Ageing, 53*(9), Article afae177. https://doi.org/10.1093/ageing/afae177

Marques-Vieira, C. M. A., Sousa, L. M. M. D., Baixinho, C. R. S. L., Reis, M. G. M. D., Pérez-Rivas, F. J., & Sousa, L. M. R. D. (2021). Validation of the international 7-item falls efficacy scale in Portuguese community-dwelling older adults. *Texto & Contexto-Enfermagem, 30*, Article e20190243. https://doi.org/10.1590/1980-265X-TCE-2019-0243

McCrory, J. L., Chambers, A. J., Daftary, A., & Redfern, M. S. (2010). Dynamic postural stability in pregnant fallers and non-fallers. *BJOG: An International Journal of Obstetrics & Gynaecology, 117*(8), 954–962. https://doi.org/10.1111/j.1471-0528.2010.02589.x

McCrory, J. L., Chambers, A. J., Daftary, A., & Redfern, M. S. (2011). Ground reaction forces during gait in pregnant fallers and non-fallers. *Gait & Posture, 34*(4), 524–528. https://doi.org/10.1016/j.gaitpost.2011.07.007

Mendez-Figueroa, H., Dahlke, J. D., Vrees, R. A., & Rouse, D. J. (2013). Trauma in pregnancy: An updated systematic review. *American Journal of Obstetrics and Gynecology, 209*(1), 1–10. https://doi.org/10.1016/j.ajog.2013.01.021

Merriam-Webster. (n.d.). Consequence. In Merriam-Webster.com dictionary. https://www.merriam-webster.com/dictionary/consequence.

Munn, Z., Peters, M. D., Stern, C., Tufanaru, C., McArthur, A., & Aromataris, E. (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medical Research Methodology, 18*(1), Article 143. https://doi.org/10.1186/s12874-018-0611-x

Nannini, A., Lazar, J., Berg, C., Tomashek, K., Cabral, H., Barger, M., … Kotelchuck, M. (2008). Injury: A major cause of pregnancy-associated morbidity in Massachusetts. *Journal of Midwifery & Women's Health, 53*(1), 3–10. https://doi.org/10.1016/j.jmwh.2007.07.018

Okeke, T. C., Ugwu, E. O., Ikeako, L. C., Adiri, C. O., Ezenyeaku, C. C. T., Ekwuazi, K. E., & Okoro, O. S. (2014). Falls among pregnant women in Enugu, Southeast Nigeria. *Nigerian Journal of Clinical Practice, 17*(3), 292–295. https://doi.org/10.4103/1119-3077.130228

Opala-Berdzik, A., Błaszczyk, J. W., Bacik, B., Cieślińska-Świder, J., Świder, D., Sobota, G., & Markiewicz, A. (2015). Static postural stability in women during and after pregnancy: A prospective longitudinal study. *PLoS One, 10*(6), Article e124207. https://doi.org/10.1371/journal.pone.0124207

Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan—A web and mobile app for systematic reviews. *Systematic Reviews, 5*(1), Article 210. https://doi.org/10.1186/s13643-016-0384-4

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ, 372*(71). https://doi.org/10.1136/bmj.n71

Peters, M. D., Godfrey, C., McInerney, P., Khalil, H., Larsen, P., Marnie, C., … Munn, Z. (2022). Best practice guidance and reporting items for the development of scoping review protocols. *JBI Evidence Synthesis, 20*(4), 953–968. https://doi.org/10.11124/JBIES-21-00242

Peters, M. D., Marnie, C., Colquhoun, H., Garritty, C. M., Hempel, S., Horsley, T., … Tricco, A. C. (2021). Scoping reviews: Reinforcing and advancing the methodology and application. *Systematic Reviews, 10*, Article 263. https://doi.org/10.1186/s13643-021-01821-3

Petrone, P., Jiménez-Morillas, P., Axelrad, A., & Marini, C. P. (2019). Traumatic injuries to the pregnant patient: A critical literature review. *European Journal of Trauma and Emergency Surgery, 45*, 383–392. https://doi.org/10.1007/s00068-017-0839-x

Risso, S., Soares, T., & Marques-Vieira, C. (2021, May 10). Falls in the obstetric population—A scoping review protocol. *Open Science Framework*https://doi.org/10.17605/OSF.IO/5XBNK

Risso, S., Soares, T., & Marques-Vieira, C. (2024). Scoping review of fall risk assessment tools for women who receive maternity care. *Journal of Obstetric, Gynecologic, & Neonatal Nursing, 53*(3), 234–244. https://doi.org/10.1016/j.jogn.2023.11.012

Salari, N., Darvishi, N., Ahmadipanah, M., Shohaimi, S., & Mohammadi, M. (2022). Global prevalence of falls in the older adults: A comprehensive systematic review and meta-analysis. *Journal of Orthopaedic Surgery and Research, 17*(1), Article 334. https://doi.org/10.1186/s13018-022-03222-1

Schiff, M. A. (2008). Pregnancy outcomes following hospitalisation for a fall in Washington State from 1987 to 2004. *BJOG: An International Journal of Obstetrics & Gynaecology, 115*(13), 1648–1654. https://doi.org/10.1111/j.1471-0528.2008.01905.x

Shingala, R. K., Desai, M., Honkalas, P., & Kumar, A. (2019). Evaluation of postural balance in third trimester pregnancy. *International Journal of Physiotherapy and Research, 7*(4), 3109–3112. https://doi.org/10.16965/ijpr.2019.113

Thomas, E., Battaglia, G., Patti, A., Brusa, J., Leonardi, V., Palma, A., & Bellafiore, M. (2019). Physical activity programs for balance and fall prevention in elderly: A systematic review. *Medicine, 98*(27), Article e16218. https://doi.org/10.1097/MD.0000000000016218

Tinker, S. C., Reefhuis, J., Dellinger, A. M., & Jamieson, D. J. (2010). Epidemiology of maternal injuries during pregnancy in a population-based study, 1997–2005. *Journal of Women's Health, 19*(12), 2211–2218. https://doi.org/10.1089/jwh.2010.2160

Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., … Straus, S. E. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. *Annals of Internal Medicine, 169*(7), 467–473. https://doi.org/10.7326/M18-0850

Van der Knoop, B. J., Oostrom, K. J., Zonnenberg, I. A., Van Weissenbruch, M. M., Vermeulen, R. J., & de Vries, J. I. P. (2018). Neurobehavioural outcome in 6–18 year old children after trauma in pregnancy: Case-control study. *European Journal of Paediatric Neurology, 22*(5), 845–853. https://doi.org/10.1016/j.ejpn.2018.04.004

Van der Knoop, B. J., van Schie, P. E., Vermeulen, R. J., Pistorius, L. R., van Weissenbruch, M. M., & de Vries, J. I. (2015). Effect of (minor or major) maternal trauma on fetal motility: A prospective study. *Early Human Development, 91*(9), 511–517. https://doi.org/10.1016/j.earlhumdev.2015.06.003

Vladutiu, C. J., Evenson, K. R., & Marshall, S. W. (2010). Physical activity and injuries during pregnancy. *Journal of Physical Activity and Health, 7*(6), 761–769. https://doi.org/10.1123/jpah.7.6.761

Wallberg, C. D., Smart, D. M., Mackelprang, J. L., & Graves, J. M. (2021). Stair-related injuries among pregnant women treated in United States emergency departments. *Maternal and Child Health Journal, 25*(6), 892–899. https://doi.org/10.1007/s10995-021-03141-3

Weiss, H. B., Sauber-Schatz, E. K., & Cook, L. J. (2008). The epidemiology of pregnancy-associated emergency department injury visits and their impact on birth outcomes. *Accident Analysis & Prevention, 40*(3), 1088–1095. https://doi.org/10.1016/j.aap.2007.11.011

Whatley, C., Schlogl, J., Whalen, B. L., & Holmes, A. V. (2022). A longitudinal study of a multifaceted intervention to reduce newborn falls while preserving rooming-in on a mother–baby unit. *The Joint Commission Journal on Quality and Patient Safety, 48*(10), 521–528. https://doi.org/10.1016/j.jcjq.2022.06.007

World Health Organization. (2021a). *Falls*. https://www.who.int/en/news-room/fact-sheets/detail/falls

World Health Organization. (2021b). *Step safely: Strategies for preventing and managing falls across the life-course*. https://www.who.int/publications/i/item/978924002191-4

Wu, X., & Yeoh, H. T. (2014). Intrinsic factors associated with pregnancy falls. *Workplace Health & Safety, 62*(10), 403–408. https://doi.org/10.3928/21650799-20140902-04

Yosef, T., Pasco, J. A., Tembo, M. C., Williams, L. J., & Holloway-Kew, K. L. (2024). Falls and fall-related injuries: Prevalence, characteristics, and treatment among participants of the Geelong Osteoporosis Study. *Frontiers in Public Health, 12*, Article 1454117. https://doi.org/10.3389/fpubh.2024.1454117

Zangene, M., Ebrahimi, B., & Najafi, F. (2015). Trauma in pregnancy and its consequences in Kermanshah, Iran from 2007 to 2010. *Global Journal of Health Science, 7*(2), 304–309. https://doi.org/10.5539/gjhs.v7n2p304

Zhang, C., Liu, Q., Li, B. J., Bi, G., Yi, P., Li, K., … Li, Y. F. (2014). Penetrating injury of the vagina, bladder and omentum in a woman with 5 months gestation: Case report and review of the literature. *International Urology and Nephrology, 46*, 1137–1140. https://doi.org/10.1007/s11255-013-0635-4

Supplementary Table S1: Search Strategies

CINAHL Ultimate (November 11, 2024)

Search ID	Search Expression	Number of Results
S1	TI consequence* OR AB consequence*	102,238
S2	TI outcome* OR AB outcome*	891,124
S3	TI effect* OR AB effect*	1,452,152
S4	TI sequel* OR AB sequel*	18,949
S5	TI injur* OR AB injur*	267,952
S6	TI result* OR AB result*	1,946,651
S7	(MH "Acidental Falls")	27,161
S8	TI pregnan* OR AB pregnan*	176,987
S9	TI "expectant mother*" OR AB "expectant mother*"	791
S10	TI "pregnant wom?n" OR AB "pregnant wom?n"	44,065
S11	TI "obstetric labor" OR AB "obstetric labor"	13
S12	(MH "Childbirth")	12,915
S13	TI birth OR AB birth	121,976
S14	TI "new mother*" OR AB "new mother*"	1,931
S15	(MH "Expectant Mothers")	15,948
S16	TI prenatal OR AB prenatal	34,517
S17	TI postnatal OR AB postnatal	20,703
S18	TI "postpartum period" OR AB "postpartum period"	4,843
S19	(MH "Obstetric patients")	652
S20	(MH "Obstetrics")	7,124
S21	(MH "Labor")	9,355
S22	(MH "Puerperium")	908
S23	(MH "Postnatal Period")	12,851
S24	TI obstetric OR AB obstetric	31,467
S25	(MH "Mothers")	39,437
S26	S1 AND S2 AND S3 AND S4 AND S5 AND S6	3,154,046
S27	S8 AND S9 AND S10 AND S11 AND S12 AND S13 AND S14 AND S15 AND S16 AND S17 AND S18 AND S19 AND S20 AND S21 AND S22 AND S23 AND S24 AND S25	346,688
S28	S7 AND S26 AND S27	119

MEDLINE Ultimate (November 11, 2024)

Search ID	Search Expression	Number of Results
S1	TI consequence* OR AB consequence*	534,347
S2	TI outcome* OR AB outcome*	2,517,618
S3	TI effect* OR AB effect*	9,112,510
S4	TI sequel* OR AB sequel*	94,783

(Continued)

Supplementary Table S1: Continued

MEDLINE Ultimate (November 11, 2024)

Search ID	Search Expression	Number of Results
S5	TI injur* OR AB injur*	1,062,263
S6	TI result* OR AB result*	9,387,607
S7	(MH "Acidental Falls")	29,193
S8	TI pregnan* OR AB pregnan*	631,788
S9	TI "expectant mother*" OR AB "expectant mother*"	1,697
S10	TI "pregnant wom?n" OR AB "pregnant wom?n"	134,915
S11	TI "obstetric labor" OR AB "obstetric labor"	34
S12	(MH "Obstetrics")	25,288
S13	TI birth OR AB birth	398,992
S14	TI "new mother*" OR AB "new mother*"	2,319
S15	(MH "Mothers")	59,825
S16	TI prenatal OR AB prenatal	120,740
S17	TI postnatal OR AB postnatal	126,275
S18	TI "postpartum period" OR AB "postpartum period"	12,008
S19	(MH "Labor, Obstetric")	31,442
S20	(MH "Pregnant Women")	16,214
S21	(MH "Parturition")	15,160
S22	TI childbirth OR AB childbirth	24,894
S23	TI obstetric OR AB obstetric	95,615
S24	(MH "Postpartum Period")	32,896
S25	S1 AND S2 AND S3 AND S4 AND S5 AND S6	16,686,388
S26	S8 AND S9 AND S10 AND S11 AND S12 AND S13 AND S14 AND S15 AND S16 AND S17 AND S18 AND S19 AND S20 AND S21 AND S22 AND S23 AND S24	1,182,144
S27	S7 AND S25 AND S26	151

Academic Search Complete (November 11, 2024)

Search ID	Search Expression	Number of Results
S1	TI consequence* OR AB consequence*	510,791
S2	TI outcome* OR AB outcome*	1,584,821
S3	TI effect* OR AB effect*	7,929,313
S4	TI sequel* OR AB sequel*	41,976
S5	TI injur* OR AB injur*	556,243
S6	TI result* OR AB result*	11,131,792
S7	TI "accidental falls" OR AB "accidental falls"	336
S8	TI pregnan* OR AB pregnan*	328,444
S9	TI "expectant mother*" OR AB "expectant mother*"	1,264

(Continued)

Supplementary Table S1: Continued

Academic Search Complete (November 11, 2024)

Search ID	Search Expression	Number of Results
S10	TI "pregnant wom?n" OR AB "pregnant wom?n"	79,932
S11	TI "obstetric labor" OR AB "obstetric labor"	16
S12	TI birth OR AB birth	262,722
S13	TI "new mother*" OR AB "new mother*"	2,312
S14	TI prenatal OR AB prenatal	60,012
S15	TI postnatal OR AB postnatal	57,699
S16	TI "postpartum period" OR AB "postpartum period"	6,838
S17	TI childbirth OR AB childbirth	16,588
S18	TI obstetric OR AB obstetric	49,066
S19	TI parturition OR AB parturition	7,693
S20	TI labor OR AB labor	254,921
S21	TI obstetric* OR AB obstetric*	62,802
S22	TI mother* OR AB mother*	276,474
S23	S1 AND S2 AND S3 AND S4 AND S5 AND S6	15,885,571
S24	S8 AND S9 AND S10 AND S11 AND S12 AND S13 AND S14 AND S15 AND S16 AND S17 AND S18 AND S19 AND S20 AND S21 AND S22	1,041,371
S25	S7 AND S23 AND S24	10

Cochrane Central Register of Controlled Trials, Cochrane Clinical Answers, Cochrane Database of Systematic Reviews, Cochrane Methodology Register (November 11, 2024)

Search ID	Search Expression	Number of Results
S1	TI consequence* OR AB consequence*	23,464
S2	TI outcome* OR AB outcome*	751,732
S3	TI effect* OR AB effect*	1,236,924
S4	TI sequel* OR AB sequel*	6,056
S5	TI injur* OR AB injur*	67,501
S6	TI result* OR AB result*	994,142
S7	TI "acidental falls" OR AB "accidental falls"	95
S8	TI pregnan* OR AB pregnan*	78,111
S9	TI "expectant mother*" OR AB "expectant mother*"	189
S10	TI "pregnant wom?n" OR AB "pregnant wom?n"	20,862
S11	TI "obstetric labor" OR AB "obstetric labor"	15
S12	TI birth OR AB birth	38,215
S13	TI "new mother*" OR AB "new mother*"	349
S14	TI prenatal OR AB prenatal	5,680
S15	TI postnatal OR AB postnatal	5,875

(Continued)

Supplementary Table S1: Continued

Cochrane Central Register of Controlled Trials, Cochrane Clinical Answers, Cochrane Database of Systematic Reviews, Cochrane Methodology Register (November 11, 2024)

Search ID	Search Expression	Number of Results
S16	TI "postpartum period" OR AB "postpartum period"	1,535
S17	TI childbirth OR AB childbirth	5,862
S18	TI obstetric OR AB obstetric	10,492
S19	TI parturition OR AB parturition	292
S20	TI labor OR AB labor	18,887
S21	TI obstetric* OR AB obstetric*	13,083
S22	TI mother* OR AB mother*	26,442
S23	S1 AND S2 AND S3 AND S4 AND S5 AND S6	1,863,642
S24	S8 AND S9 AND S10 AND S11 AND S12 AND S13 AND S14 AND S15 AND S16 AND S17 AND S18 AND S19 AND S20 AND S21 AND S22	130,024
S25	S7 AND S23 AND S24	1

MedicLatina EBSCO (November 11, 2024)

Search ID	Search Expression	Number of Results
S1	TI consequence* OR AB consequence*	2,355
S2	TI outcome* OR AB outcome*	5,140
S3	TI effect* OR AB effect*	16,292
S4	TI sequel* OR AB sequel*	897
S5	TI injur* OR AB injur*	3,310
S6	TI result* OR AB result*	56,677
S7	TI "acidental falls" OR AB "accidental falls"	2
S8	TI pregnan* OR AB pregnan*	4,396
S9	TI "expectant mother*" OR AB "expectant mother*"	23
S10	TI "pregnant wom?n" OR AB "pregnant wom?n"	1,549
S11	TI "obstetric labor" OR AB "obstetric labor"	1
S12	TI birth OR AB birth	2,398
S13	TI "new mother*" OR AB "new mother*"	4
S14	TI prenatal OR AB prenatal	1,414
S15	TI postnatal OR AB postnatal	306
S16	TI "postpartum period" OR AB "postpartum period"	121
S17	TI childbirth OR AB childbirth	397
S18	TI obstetric OR AB obstetric	1,272
S19	TI parturition OR AB parturition	39
S20	TI labor OR AB labor	1,333
S21	TI obstetric* OR AB obstetric*	2,015

(Continued)

Supplementary Table S1: Continued

MedicLatina EBSCO (November 11, 2024)

Search ID	Search Expression	Number of Results
S22	TI mother* OR AB mother*	2,160
S23	S1 AND S2 AND S3 AND S4 AND S5 AND S6	65,118
S24	S8 AND S9 AND S10 AND S11 AND S12 AND S13 AND S14 AND S15 AND S16 AND S17 AND S18 AND S19 AND S20 AND S21 AND S22	9,488
S25	S7 AND S23 AND S24	0

Repositórios Científicos de Acesso Aberto de Portugal (RCAAP; November 11, 2024)

Search ID	Search Expression	Number of Results
S1	queda and gravidez and ferimentos	0
S2	queda and gravidez and consequências	0
S3	queda and gravidez and sequela	0
S4	queda and gravidez and resultado	0
S5	queda and gravidez and efeito	0
S6	queda and pós-parto and ferimentos	0
S7	queda and pós-parto and consequências	0
S8	queda and pós-parto and sequela	0
S9	queda and pós-parto and resultado	0
S10	queda and pós-parto and efeito	0
S11	queda and trabalho de parto and ferimentos	0
S12	queda and trabalho de parto and consequências	0
S13	queda and trabalho de parto and sequela	0
S14	queda and trabalho de parto and resultado	0
S15	queda and trabalho de parto and efeito	0

SciELO (November 11, 2024)

Search ID	Search Expression	Number pf Results
S1	(queda*) OR (acidentes por quedas)	10,499
S2	(consequência*) OR (resultado*) OR (efeito*) OR (sequela*) OR (ferimento*)	416,216
S3	(obstetr*) OR (grávida*) OR (gestantes) OR (“trabalho de parto”) OR (nascimento) OR (pós-natal) OR (período pós-parto)	31,948
S4	Expressão: (#1) AND (#2) AND (#3)	0

Scopus (November 11, 2024)

Search ID	Search Expression	Number of Results
S1	(TITLE-ABS-KEY (consequence*) OR TITLE-ABS-KEY (outcome*) OR TITLE-ABS-KEY (effect*) OR TITLE-ABS-KEY (sequel*) OR TITLE-ABS-KEY (injur*) OR TITLE-ABS-KEY (result*))	47,774,174
S2	TITLE-ABS-KEY ("accidental falls")	28,089
S3	(TITLE-ABS-KEY (obstetric*) OR TITLE-ABS-KEY (pregnan*) OR TITLE-ABS-KEY ("pregnant wom?n") OR TITLE-ABS-KEY ("expectant mother*") OR TITLE-ABS-KEY ("obstetric labor") OR TITLE-ABS-KEY (birth) OR TITLE-ABS-KEY ("new mother*") OR TITLE-ABS-KEY (prenatal) OR TITLE-ABS-KEY (postnatal) OR TITLE-ABS-KEY ("postpartum period") OR TITLE-ABS-KEY (childbirth) OR TITLE-ABS-KEY (parturition) OR TITLE-ABS-KEY (childbirth) OR TITLE-ABS-KEY (labor) OR TITLE-ABS-KEY (mother*))	2,723,502
S4	((TITLE-ABS-KEY (consequence*) OR TITLE-ABS-KEY (outcome* OR TITLE-ABS-KEY (effect*) OR TITLE-ABS-KEY (sequel*) OR TITLE-ABS-KEY (injur*) OR TITLE-ABS-KEY (result*))) AND (TITLE-ABS-KEY ("accidental falls")) AND ((TITLE-ABS-KEY (obstetric*) OR TITLE-ABS-KEY (pregnan*) OR TITLE-ABS-KEY ("pregnant wom?n") OR TITLE-ABS-KEY (expectant mother*") OR TITLE-ABS-KEY ("obstetric labor") OR TITLE-ABS-KEY (birth) OR TITLE-ABS-KEY ("new mother*") OR TITLE-ABS-KEY (prenatal) OR TITLE-ABS-KEY (postnatal) OR TITLE-ABS-KEY ("postpartum period") OR TITLE-ABS-KEY (childbirth) OR TITLE-ABS-KEY (parturition) OR TITLE-ABS-KEY (childbirth) OR TITLE-ABS-KEY (labor) OR TITLE-ABS-KEY (mother*)))	336

Web of Science (November 11, 2024)

Search ID	Search Expression	Number of Results
S1	"accidental falls"	2,893
S2	consequence* (All Fields) OR outcome* (All Fields) OR effect* (All Fields) OR sequel* (All Fields) OR injur* (All Fields) OR result*	35,108,954
S3	obstetric* (All Fields) OR pregnan* (All Fields) OR "expectant mother" (All Fields) OR "pregnant wom?n" (All Fields) OR "obstetric labor" (All Fields) OR birth (All Fields) OR "new mother*" (All Fields) OR prenatal (All Fields) OR postnatal (All fields) OR childbirth (All Fields) OR "postpartum period" (All Fields) OR parturition (All Fields) OR mother* (All Fields) OR labor (All Fields)	2,105,696
S4	#1 AND #2 AND #3	41

Supplementary Table S2: Characteristics of Included Reports—Consequences

Authors (Year), Country	Aim	Research Design/ Type of Report	Sample	Prevalence of Falls	Risk Factors for Falls	Findings (Consequences)		
						Non-obstetric Injuries	Obstetric injuries	Other Type of Consequences
Aşci et al. (2021), Turkey	To identify the prevalence of falls, risk factors for falls, fall-related injuries, and treatment-seeking behavior in pregnant women	Retrospective descriptive study	622 pregnant women	17.7%	Third trimester Home Environment Clothing Medication	Bruising/lividity; Back pain; Sprain/strain; Abdomen and groin pain; Twisted ankle; Hip/leg pain; Cut/laceration; Bone fracture	Not reported	Seeking health care assistance; Bed rest; Self-vigilance
Awoleke et al. (2019), Nigeria	To identify the prevalence, predictors, and obstetric correlates of falls during pregnancy	Cross-sectional cohort survey	1,175 pregnant women	25%	Multiparous women; Aged >30 years; >7 months gestation; Household chores; Carrying children/ objects	Not reported	Uterine contractions; Reduced or absent fetal movement; Hemorrhage; Ruptured membranes	Not reported
Brewin & Nannini (2014), United States	To assess women in the postpartum period's experiences and perspectives on falls and fall prevention strategies in pregnancy	Descriptive qualitative methodology	31 women during the postpartum period	35.5% during pregnancy and 3% during the postpartum period	Rushing/running; Carrying children/ objects; Tripping over objects, animals, or children;	Not reported	Not reported	Seeking health care; Calling health personnel

(Continued)

Supplementary Table S2: Continued

Authors (Year), Country	Aim	Research Design/ Type of Report	Sample	Prevalence of Falls	Risk Factors for Falls	Findings (Consequences)		
						Non-obstetric Injuries	Obstetric injuries	Other Type of Consequences
					Weather (raining); Slippers/high heels			
Cakmak et al. (2016), United States	To identify studies on changes in postural balance in pregnancy and risk of falls	Review of literature	22 reports	Not reported	Not reported	Bone fractures, contusions, sprains (Schiff, 2008)	Maternal death (Fildes et al., 1992); Preterm birth, abruption placenta, fetal distress, fetal hypoxia (Schiff, 2008)	Not reported
Chen et al. (2010), Taiwan	To assess the effectiveness of interventions to prevent falls in women in the postpartum period	Prospective longitudinal study	2,460 (intervention group) and 2,451 (control group) of women during the postpartum period	Incidence of falls of 14.24 per 1,000 patient-days	Anemia; Preeclampsia; Gestational diabetes; Postpartum hemorrhage	Bruises, lacerations, fractures and intracranial hemorrhage; Extended hospitalization; Social and financial burden	Not reported	Not reported
Connolly et al. (1997), United States	To describe injuries and mechanisms of injury in pregnant women	Retrospective study	Data from 476 pregnant women with fall-related injuries that	21.8% with fall-related injuries	25–30 weeks of gestational age; Using stairs	Not reported	Pelvic pain; Abruption placenta; Fetal death	Not reported

(Continued)

Supplementary Table S2: Continued

Authors (Year), Country	Aim	Research Design/ Type of Report	Sample	Prevalence of Falls	Risk Factors for Falls	Findings (Consequences)		
						Non-obstetric Injuries	Obstetric injuries	Other Type of Consequences
			were treated in a hospital					
Demetriou et al. (2024), United Kingdom	To identify incidence, management of trauma, and outcomes in pregnant women, reported in the Trauma Audit Research Network registry	Cross-sectional study	341 pregnant women with trauma	26.4%	Fall from a height less than 2 m and greater than 2 m	Not reported	1 maternal death	Not reported
Di Girolamo et al. (1978), Italy	To describe injuries and treatment following a fall in a pregnant woman	Case report	15-year-old, 29-week primigravida who fell from a height of 15 m	Not reported	Not reported	Not reported	Uterine rupture; Expulsion of the fetus and placenta to the abdominal cavity; Hysterorrhaphy	Not reported
Dunning et al. (2003), United States	To determine fall prevalence and risk factors in working pregnant women	Retrospective cohort study	3,997 pregnant women	26.8%	Between the 5th and 8th months of gestation; Indoors; Using stairs; Slippery floors; Occupation	Bruises; Cuts; Turned ankles; Sprain/strains; Fractures;	Not reported	Seeking health care; Hospital admission; Restricted activity

(Continued)

Supplementary Table S2: Continued

Authors (Year), Country	Aim	Research Design/ Type of Report	Sample	Prevalence of Falls	Risk Factors for Falls	Findings (Consequences)		
						Non-obstetric Injuries	Obstetric injuries	Other Type of Consequences
Dunning et al. (2010), United States	To determine fall prevalence and risk factors in pregnant women	Cohort study	3,997 pregnant women	27%; 35% fell two or more times	Between 6th and 8th months; Previous falls; Using stairs; Slippery floors; Uneven ground; Poor lighting; Cluttered area; Bathtub/ shower	Bruises; Cuts; Turned ankles; Sprains/strains; Broken bones	Premature labor/ birth	Seeking health care; Hospital admission; Restricted activity
Eaton et al. (1991), United Kingdom	To discuss maternal trauma and brain lesions in preterm children	Case reports	2 pregnant women with trauma: one with a 27-week pregnancy	Not reported	A pregnant woman fell while traveling on a bus	Not reported	Vaginal bleeding; Decreased fetal movement; Fetal heart rate decelerations; Emergent cesarean section	Not reported
El Kady et al. (2006), United States	To assess maternal and fetal/neonatal outcomes following fracture injuries	Retrospective cohort study	3,292 pregnant women with trauma	25% with fall-related fractures	Not reported	Fractures	Not reported	Not reported
El Kady et al. (2004), United States	To analyze injuries in pregnancy (rates, risk factors, and outcomes)	Retrospective cohort study	7,822 pregnant women (hospitalized) and 2,494 pregnant women (who birthed	Incidence between 0.09 and 0.30 per 1,000 births	Not reported	Not reported	Fetal and neonatal death	Not reported

(Continued)

Supplementary Table S2: Continued

Authors (Year), Country	Aim	Research Design/ Type of Report	Sample	Prevalence of Falls	Risk Factors for Falls	Findings (Consequences)		
						Non-obstetric Injuries	Obstetric injuries	Other Type of Consequences
			at the time of trauma hospitalization)					
Fildes et al. (1992), United States	To review records of maternal injury and related deaths	Epidemiological study	2,319 cases, 95 maternal deaths	4.5% with fall-related deaths	Not reported	Maternal death (the stage of the perinatal period in which the falls occurred was not identified)	Not reported	Not reported
Gaffey (2015), United States	To explore the issue of falls during pregnancy, labor, and postpartum period	Literature review on fall risk during pregnancy, labor, and the postpartum period	12 reports	27% during pregnancy (Dunning et al., 2010)	Pregnancy: between the 6th and 9th months, slippery floors, using stairs (Dunning, et al., 2010); Postpartum period, hypotension, preeclampsia, epidural, hemorrhage (Heafner et al., 2013)	Sprains, strains (Dunning et al., 2010)	Low birth weight (Weiss et al., 2008)	Not reported

(Continued)

Supplementary Table S2: Continued

Authors (Year), Country	Aim	Research Design/ Type of Report	Sample	Prevalence of Falls	Risk Factors for Falls	Findings (Consequences)		
						Non-obstetric Injuries	Obstetric injuries	Other Type of Consequences
Genc et al. (2023), Turkey	To assess perinatal outcomes after trauma	Retrospective cohort study	153 pregnant women aged 18–50 years who sustained trauma	67.97% with fall-related injuries	Not reported	Not reported	Premature rupture of membranes; Abruptio placentae; Preterm labor and birth; Newborn/mother transferred to intensive care unit; Fetal death	Not reported
Heafner et al. (2013), United States	To improve women's safety in obstetric units by implementing a fall risk assessment tool	Description of the program's implementation (literature review and review by expert panel)	Not reported	Not reported	Prior history; Cardiovascular factors; Hemorrhage; Neurological function and anesthesia; Motor activity; Medication	Not reported	Nondisclosed adverse consequences for the mother and fetus	Not reported
Huzel and Remsburg-Bell (1996), United States	To review the health care management of mother and fetus after injury	Review of literature; Case report	1 pregnant woman at 33 weeks	Not reported	Using stairs	Not reported	Intermittent contractions; Placental abruption; Newborn	Not reported

(Continued)

Supplementary Table S2: Continued

Authors (Year), Country	Aim	Research Design/ Type of Report	Sample	Prevalence of Falls	Risk Factors for Falls	Findings (Consequences)		
						Non-obstetric Injuries	Obstetric injuries	Other Type of Consequences
							transferred to the NICU	
Kezunovic et al. (2017), Montenegro	To discuss a case of a woman during the postpartum period who sustained falls	Case report	1 woman who had a fall during pregnancy and another fall during the postpartum period	Not reported	Getting up during the postpartum period	Femoral neck fracture; Injury in the right hip	Not reported	Needing assistance to be able to rest on the left leg during pregnancy
McCrory et al. (2010), United States	To compare pregnant fallers' postural stability with pregnant non-fallers and with a group of non-pregnant women	Longitudinal, cross-sectional study	81 women (41 pregnant women and a control group of 40 non-pregnant women)	37% in pregnant women	Not reported	Sprained ankle; Sprained knee; Knee laceration	Not reported	Seeking health care; Bed rest
McCrory et al. (2011), United States	To assess the influence, in walking, of pregnancy and fall history on ground reaction forces	Experimental study	41 pregnant women during the second and third trimesters and a control group of non-pregnant women	37% in pregnant women	Not reported	Not reported	Not reported	Bed rest
Mendez-Figueroa et al. (2013), United States	To review data on incidence, risk factors, outcomes, and management of trauma during pregnancy	Systematic review of literature	11 reports	6.3% in employed pregnant women (Dunning et al., 2003); 27% during	Not reported	Fractures (Schiff, 2008)	Preterm labor, placental abruption, fetal distress, fetal hypoxia (Schiff, 2008)	Not reported

(Continued)

Supplementary Table S2: Continued

Authors (Year), Country	Aim	Research Design/ Type of Report	Sample	Prevalence of Falls	Risk Factors for Falls	Findings (Consequences)		
						Non-obstetric Injuries	Obstetric injuries	Other Type of Consequences
				pregnancy (Dunning et al., 2010)				
Nannini et al. (2008), United States	To examine hospital visits due to injury in pregnancy and 1 year postpartum	Retrospective cohort study	100,051 women who had a birth	36 hospital visits after fall-related injury per 1,000 births	Not reported	Not reported	Not reported	Seeking health care
Okeke et al. (2014), Nigeria	To determine fall prevalence and risk factors during pregnancy	Cross-sectional study	332 pregnant women during labor	32.5% fell during pregnancy (37% of these women fell two or more times)	Aged 21–30 years; Height of 161–170 cm; First pregnancy; Third trimester; Household chores; Using stairs; Slippery floors; Hurrying up	Sustained injury (type of injury not disclosed)	Not reported	Seeking health care; Hospitalization
Petrone et al. (2019), United States	To review the literature on causes of trauma in pregnancy and fetal outcomes	Systematic review of literature	51 articles, with a total of 95,949 patients	Not reported	Weight gain, changes in the center of gravity; Third trimester (Schiff, 2008)	Not reported	Twofold increase in the risk of stillbirth; Induction of labor and emergency cesarean section (Schiff, 2008)	Hospitalization (Schiff, 2008)

(Continued)

Supplementary Table S2: Continued

Authors (Year), Country	Aim	Research Design/ Type of Report	Sample	Prevalence of Falls	Risk Factors for Falls	Findings (Consequences)		
						Non-obstetric Injuries	Obstetric injuries	Other Type of Consequences
Schiff (2008), United States	To assess outcomes in hospitalized pregnant women who sustained falls	Retrospective cohort study	Pregnant women who fell and were assisted in a hospital between 1987 and 2004	693 falls; Incidence rate of 48.9 pregnant fall hospitalizations per 100 000 births	Aged 20–29 years; Third trimester; Tripping, or stumbling; Using stairs	Mostly minor injuries; Fractures; Contusions; Sprains	Preterm labor and birth; Cesarean birth; Placental abruption; Birthweight <2,500 g; Fetal distress; Neonatal respiratory distress syndrome; Fetal death	Not reported
Van der Knoop et al. (2015), the Netherlands	To investigate fetuses' motility after maternal trauma	Prospective study using ultrasound after maternal trauma	16 fetuses at 20–38 weeks whose mothers had trauma during pregnancy	44% with fall-related trauma	Tripping	Mild abdominal pain	Contractions	Not reported
Van der Knoop et al. (2018), the Netherlands	To assess neurobehavioral outcomes on children of mothers who sustained trauma during pregnancy	Case-control	34 pregnant women who sustained trauma and a control group to compare the outcomes	29% with fall-related trauma	Using stairs	Complicated fracture of the leg and ankle	Labor induction to allow orthopedic surgery	Neurobehavioral issues in children born to mothers who fell during pregnancy (intellectual disorder, aggressiveness, anxiety)

(Continued)

Supplementary Table S2: Continued

Authors (Year), Country	Aim	Research Design/ Type of Report	Sample	Prevalence of Falls	Risk Factors for Falls	Findings (Consequences)		
						Non-obstetric Injuries	Obstetric injuries	Other Type of Consequences
Vladutiu et al. (2010), United States	To assess the incidence and type of injury in pregnant women following physical activity	Prospective study using data from the Pregnancy, Infection, and Nutrition (PIN3) Study	1,469 pregnant women, 44 injured	64% with fall-related injuries	Walking	Bruises; Lacerations; Concussion	Not reported	Seeking health care; Hospitalization
Wallberg et al. (2021), United States	To describe stair-related falls in pregnant women who were assisted in emergency departments	Cross-sectional analysis of National Electronic Injury Surveillance System data	1,466 cases of stair-related falls of pregnant women with injuries (national estimate of 57,512 in the 10-year study period)	Between 8.4% and 12.1% (from 2008 to 2017)	Aged 18–24 years; Second trimester; Wet/icy weather; Dizziness; Type of clothing or footwear; Carrying something; Animals; Other children; Substance use; Running	Contusion/ abrasion; Strain/sprain; Internal organ injury; Fracture; Hematoma; Dislocation; Nerve damage; Laceration; Concussion	Vaginal bleeding; Decreased fetal movement	Not reported
Weiss et al. (2008), United States	To describe injuries, mechanisms of injury, and risk of adverse birth outcomes of pregnant women	Retrospective cohort study	7,350 pregnant women, treated in emergency departments for trauma	18% with fall-related injuries	Middle of gestational age	Not reported	Cesarean section; Low birth weight	Not reported

(Continued)

Supplementary Table S2: Continued

Authors (Year), Country	Aim	Research Design/ Type of Report	Sample	Prevalence of Falls	Risk Factors for Falls	Findings (Consequences)		
						Non-obstetric Injuries	Obstetric injuries	Other Type of Consequences
Zangene et al. (2015), Iran	To determine prevalence, causes and consequences of trauma in pregnant women	Descriptive-analytical study	102 cases of pregnant women who sustained trauma, assisted at hospitals	26%	Not reported	Not reported	Placental abruption; Labor onset; Premature rupture of membranes; Uterine rupture; Stillbirth	Not reported
Zhang et al. (2014), China	To discuss a fall in a pregnant woman regarding assessment and management strategies and review the literature	Case report	1 5-month pregnant woman who fell from a scaffold and was impaled on a wooden stick	Not reported	Fall from a height: 1 m high	Transvaginal impalement injury (bladder rupture, vaginal rupture, uterine serosa contusion) Surgery	Not reported	Not reported

Supplementary Table S3: Results According to the Stage of the Perinatal Period

Pregnancy Prevalence Ranged From 8.4% (Wallberg et al., 2021) to 68% (Genc et al., 2023)			Labor	Postpartum Period Prevalence 3% (Brewin & Nannini, 2014); Incidence of Falls of 14.24 per 1,000 Patient-days (Chen et al., 2010)	
	Consequences	Risk Factors	Consequences/ Risk Factors	Consequences	Risk Factors
Injuries	*Minor injuries:* bruises (Aşci et al., 2021; Dunning et al., 2010; Vladutiu et al., 2010); back pain, sprains/strains (Aşci et al., 2021; Dunning et al., 2010; McCrory et al., 2010; Schiff, 2008; Wallberg et al., 2021); abdomen and groin pain (Aşci et al., 2021; Dunning et al., 2010; Van der Knoop et al., 2015); hip/leg pain (Aşci et al., 2021); cuts/lacerations (Aşci et al., 2021; Dunning et al., 2010; McCrory et al., 2010; Vladutiu et al., 2010); contusions (Schiff, 2008; Wallberg et al., 2021)	*Physiologic:* taller than 1.60 m (Okeke et al., 2014); dizziness (Aşci et al., 2021; Wallberg et al., 2021); third trimester of gestation (Aşci et al., 2021; Awoleke et al., 2019; Dunning et al., 2003, 2010; Okeke et al., 2014; Schiff, 2008); second trimester (Aşci et al., 2021; Wallberg et al., 2021; Weiss et al., 2008) *Environmental:* indoors (Aşci et al., 2021; Dunning et al., 2010); street or garden (Aşci et al., 2021); stairs (Aşci et al., 2021; Awoleke et al., 2019; Connolly et al., 1997; Dunning et al., 2010; Okeke et al., 2014; Schiff, 2008); wet/slippery surfaces (Aşci et al., 2021; Awoleke et al., 2019; Dunning et al., 2010; Okeke et al., 2014; Wallberg et al., 2021); uneven ground, untidy surroundings (Aşci et al., 2021; Dunning et al., 2010); poor lighting (Dunning et al., 2010); carrying children/objects (Awoleke et al., 2019;		*Minor injuries:* bruises, lacerations (Chen et al., 2010) *Severe injuries:* fractures and intracranial hemorrhage (Chen et al., 2010); femoral neck fracture; hip injury (Kezunovic et al., 2017)	*Physiologic:* anemia, preeclampsia, hemorrhage (Chen et al., 2010; Heafner et al., 2013); diabetes (Chen et al., 2010); blurred vision, dizziness, orthostatic hypotension, thrombocytopenia, visual impairment, weakness (Heafner et al., 2013) *Use of drugs:* anti-hypertensives, epidurals (Heafner et al., 2013); opioids (Heafner et al., 2013) *Environmental:* lack of facilities near the bedside (Chen et al., 2010) *Other:* bed rest, prior history of falls (Heafner et al., 2013); getting up (Kezunovic et al., 2017); holding the infant while walking, rapidly changing position or standing up, women alone during hospitalization (Chen et al., 2010)

(Continued)

Supplementary Table S3: Continued

Pregnancy Prevalence Ranged From 8.4% (Wallberg et al., 2021) to 68% (Genc et al., 2023)		Labor	Postpartum Period Prevalence 3% (Brewin & Nannini, 2014); Incidence of Falls of 14.24 per 1,000 Patient-days (Chen et al., 2010)	
Consequences	Risk Factors	Consequences/ Risk Factors	Consequences	Risk Factors
Obstetric injuries (mothers): uterine contractions (Awoleke et al., 2019; Huzel & Remsburg-Bell, 1996; Van der Knoop et al., 2015); vaginal bleeding (Eaton et al., 1991); antepartum hemorrhage/abruptio placentae (Awoleke et al., 2019; Genc et al., 2023; Huzel & Remsburg-Bell, 1996; Schiff, 2008; Zangene et al., 2015); ruptured membranes (Awoleke et al., 2019; Genc et al., 2023; Zangene et al., 2015); labor onset (Zangene et al., 2015); uterine rupture (Di Girolamo et al., 1978; Zangene et al., 2015); transvaginal injury (Zhang et al., 2014); preterm labor/birth (Genc et al., 2023; Schiff, 2008); cesarean birth (Schiff, 2008; Weiss et al., 2008); preeclampsia, mother transferred to the intensive care unit (Genc et al., 2023); maternal death (Demetriou et al., 2024; Fildes et al., 1992)	Dunning et al., 2010; Wallberg et al., 2021); running/rushing (Dunning et al., 2010; Okeke et al., 2014) *Use of drugs:* unspecified medication (Aşci et al., 2021); substances (Wallberg et al., 2021) *Other:* previous history of falls (Aşci et al., 2021; Okeke et al., 2014); loose clothes (Aşci et al., 2021; Wallberg et al., 2021); inappropriate shoes (Awoleke et al., 2019; Dunning et al., 2010; Wallberg et al., 2021); occupation (Dunning et al., 2003); violence (Dunning et al., 2010)			

(Continued)

Supplementary Table S3: Continued

Pregnancy Prevalence Ranged From 8.4% (Wallberg et al., 2021) to 68% (Genc et al., 2023)		Labor	Postpartum Period Prevalence 3% (Brewin & Nannini, 2014); Incidence of Falls of 14.24 per 1,000 Patient-days (Chen et al., 2010)	
Consequences	Risk Factors	Consequences/ Risk Factors	Consequences	Risk Factors
Obstetric injuries (fetus/newborn): reduced/ absent fetal movement (Awoleke et al., 2019; Eaton et al., 1991; Wallberg et al., 2021); reduced amniotic fluid (Eaton et al., 1991); fetal distress, fetal death (Connolly et al., 1997; Genc et al., 2023; Schiff, 2008; Zangene et al., 2015); meconium at birth (Schiff, 2008); newborn small for gestational age (Eaton et al., 1991; Genc et al., 2023; Schiff, 2008); newborn transferred to the NICU (Genc et al., 2023; Huzel & Remsburg-Bell, 1996); low birth weight (Weiss et al., 2008)				
Help-seeking behavior: from family/friends, health care personnel (Aşci et al., 2021; Brewin & Nannini, 2014); health care services (Aşci et al., 2021; Brewin & Nannini, 2014; Dunning et al., 2010; Nannini et al., 2008; Okeke et al., 2014; Schiff, 2008; Zangene et al., 2015)			Need for additional care and extended hospital stay (Chen et al., 2010)	
Other measures: praying, cryotherapy, using painkillers (Aşci et al., 2021); bed rest/activity restriction (Aşci et al., 2021; Dunning et al., 2010; McCrory et al., 2010, 2011; Okeke et al., 2014)				