National Maternity Bereavement Experience Survey

Early pregnancy loss:

A scoping review of research in Ireland

About the National Care Experience Programme

The National Care Experience Programme seeks to improve the quality of health and social care services in Ireland by asking people about their experiences of care and acting on their feedback. The National Care Experience Programme is a joint initiative by the Health Information and Quality Authority (HIQA), the Health Service Executive (HSE) and the Department of Health.

The National Care Experience Programme has a suite of surveys that capture the experiences of people using our services. The Programme implements the annual National Inpatient Experience Survey, the National Maternity Experience Survey, and is currently developing the National Maternity Bereavement Experience Survey, National Nursing Home Experience Survey and National End of Life Survey.

The surveys aim to learn from people's feedback about the care received in health and social care services to find out what is working well, and what needs to be improved.

A National Care Experience Programme Survey Hub is available to provide support, guidance, information and resources to assist providers to develop, conduct and analyse their own surveys, and act upon the findings.

Find out more at www.yourexperience.ie.

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Key findings

- This scoping review summarises research conducted in Ireland on first trimester miscarriage, ectopic pregnancy and molar pregnancy, focusing on incidence and prevalence, women's experiences, and public awareness of early pregnancy loss. Nine studies published since 2010 were identified and included in this review, of which two reported on the incidence of early miscarriage or ectopic pregnancy hospitalisations, four focused on women's or parent's experiences of (early) pregnancy loss, and three reported on public awareness. No national surveys of women's experiences of early pregnancy loss were identified.
- The overall incidence of early miscarriage hospitalisation (before 14 completed weeks) between 2005 and 2016 was 63.0 per 1,000 deliveries (95% CI 62.5 to 63.6), with a rate of 49.7 per 1,000 deliveries in 2016. The overall incidence of ectopic pregnancy hospitalisation between 2005 and 2016 was 15.1 per 1,000 deliveries, with a rate of 17.7 per 1,000 deliveries in 2016.
- Three studies explored public awareness of early miscarriage, of which two were based on a cross-sectional survey of third level students from one Irish university. Over half (59%) of students correctly identified the most common features of first trimester miscarriage — with women, older students, those studying medicine or another health discipline and those who were in a relationship more likely to correctly identify the signs and symptoms of first trimester miscarriage. A fifth of students correctly identified the estimated rate of first trimester miscarriage to be 20%, with 30% of students believing that miscarriage occurs in less than 10% of pregnancies. Women, older students, those studying arts and social science or medicine and health and those who knew someone who had a miscarriage were more likely to correctly identify the rate of miscarriage.
- A national telephone survey of Irish adults reported that 28% correctly estimated that first trimester miscarriage occurs in 21-30% of pregnancies. Men, respondents without children and those living in urban areas were more likely to underestimate the prevalence of first trimester miscarriage. The survey found that 40% of respondents incorrectly defined miscarriage as a pregnancy loss after 24 weeks.

- A comparison of self-reported grief after different types of early pregnancy loss found that the severity of grief experienced by women appeared similar for early miscarriage, ectopic pregnancy and molar pregnancy.
- Qualitative studies highlighted the sadness, anger, confusion and blame experienced by bereaved parents. Grief was often hidden due to lack of public acknowledgement and recognition, leaving women and couples feeling isolated and alone. Parents stressed the importance of clear and detailed information about diagnosis, treatment options and the potential impact of the loss on future fertility. The hospital environment, particularly the presence of couples with ongoing pregnancies, and medical terminology surrounding pregnancy loss were described as insensitive and challenging for parents. Women who had experienced early pregnancy loss also reported increased levels of anxiety during subsequent pregnancies.
- The studies included in this review suggest limited awareness and knowledge of early pregnancy loss among the general public. The lack of agreement between studies on what was considered the 'correct' rate of first trimester miscarriage should be noted, highlighting differences in how miscarriage rates are estimated, as well as the difficulty in identifying women who have experienced early pregnancy losses.
- No studies focusing exclusively on molar pregnancy were identified. Two of the qualitative studies were not specific to early pregnancy loss and included women who experienced a second trimester or late miscarriage.
- Administrative data on first trimester miscarriage, ectopic pregnancy or molar pregnancy are not routinely collected or reported in Ireland. Given the lack of available data, the limited public awareness of early pregnancy loss reported by studies included in this review is not surprising. Early pregnancy loss is a distressing and traumatic experience for parents, who require dedicated supports and services. Capturing and reporting complete and accurate data on all types of pregnancy loss occurring in Ireland could help to raise public awareness and inform healthcare planning and practice.
- The lack of national data leads to challenges in identifying women who would be eligible to participate in a survey to capture experiences of early pregnancy loss. Additional work is required to determine the best approach and methodology.

Background

The National Maternity Bereavement Experience Survey

The first National Maternity Experience Survey was completed in 2020, with over 3,200 women who gave birth in October and November 2019 taking part and sharing their maternity care experiences. During the development of the National Maternity Experience Survey, focus group participants identified that a dedicated survey was required to explore the experiences of bereaved parents in order to capture meaningful information on their experiences of care in a sensitive and appropriate manner. The National Care Experience Programme is developing the National Maternity Bereavement Experience Survey to provide an opportunity for parents who experienced a second trimester miscarriage, a stillborn infant or the early neonatal death of a baby to describe their experiences of care. The aim of the survey is to find out about parents' experiences and to use their feedback to acknowledge areas of good experience and identify areas needing improvement. The first National Maternity Bereavement Experience Survey will not include women who have experienced a first trimester miscarriage, ectopic pregnancy or molar pregnancy. This is due in part to the lack of nationally standardised, accurate and reliable data reported or documented on all types of pregnancy losses in Ireland.

About this report

It is difficult to identify all women in Ireland who have experienced early pregnancy losses, including early miscarriages (<12 weeks gestation),[1] molar pregnancy[2] and ectopic pregnancy,[3] as only women who are admitted to hospital are captured in routinely collected administrative data. In many cases, women experiencing an early pregnancy loss are managed in outpatient or general practice (GP) settings, while some women with first trimester miscarriage do not interact with healthcare services at all. Considering the differences in care settings, contact with healthcare services and treatment options, women's maternity care experiences of early pregnancy loss are outside of the scope of the first National Maternity Bereavement Experience Survey. Nevertheless, it is important to understand the experiences of these women, the services they interact with, and how they can best be cared for. This scoping review provides an overview of Irish research on early pregnancy losses, including first trimester miscarriage, ectopic and molar pregnancies.

[1] Early miscarriage generally refers to pregnancy loss before 12 weeks of pregnancy.
[2] Molar pregnancy is a non viable pregnancy that involves the development of abnormal cells in the womb.
[3] Ectopic pregnancy is a pregnancy that develops outside the womb.

Introduction

Pregnancy loss can occur at any point during a pregnancy, from conception to the neonatal period. The most common complication of pregnancy is spontaneous miscarriage, which occurs in around 15-25% of pregnancies,[1-3] with an estimated 15,000 miscarriages in Ireland each year.[4] The majority of these occur in the first trimester, with the risk of pregnancy loss decreasing with advanced gestational age.[1, 5] Definitions of early pregnancy loss and miscarriage vary across countries and organisations, making international comparisons and estimates of the prevalence of pregnancy loss difficult.[1, 6] A consensus statement by the European Society of Human Reproduction and Embryology (ESHRE) early pregnancy special interest group defined early miscarriage as 'intrauterine pregnancy loss <10 weeks' size on ultrasound',[6] while the Institute of Obstetricians and Gynaecologists at the Royal College of Physicians in Ireland defines early pregnancy loss as a loss within the first 13 weeks of pregnancy.[4] Providing precise estimates of early pregnancy loss is challenging as some early miscarriages occur before the woman knows that she is pregnant. Many women who experience first trimester miscarriage are managed in outpatient or community settings, while some do not interact with healthcare services at all. Hospitalisation rates are likely to underestimate the true prevalence of early pregnancy loss, with an increase in the outpatient management and treatment of women who experience early pregnancy loss (first trimester miscarriage, ectopic or molar pregnancy) as a result of improved diagnostics and interventions.[2, 7]

Ectopic pregnancy is a serious, life-threatening complication of early pregnancy, involving the growth of a pregnancy outside of the womb.[8, 9] Maternal mortality from ectopic pregnancy, most commonly as a result of haemorrhage, infection or anaesthetic complications, has declined significantly as a result of earlier diagnosis and improved access to care.[10] In Ireland, the reported incidence of ectopic pregnancy was 16.8 per 1,000 deliveries in 2019, with a total of 978 ectopic pregnancies that year.[11] Treatment options include expectant management, which involves waiting to see if the ectopic pregnancy will end on its own, medical or surgical treatment.[8] Molar pregnancy, also known as gestational trophoblastic disease or hydatidiform mole, involves the development of abnormal cells in the womb,[12] which can progress and metastasize, resulting in significant morbidity and mortality if untreated.[13] Treatment involves medication or surgery to remove the abnormal tissue. Estimates of the incidence of molar pregnancy vary, with a reported 1 in 600 to 1 in 700 pregnancies in Ireland estimated to be molar pregnancies.[12, 14] The National Gestational Trophoblastic Disease Registry, Monitoring and Advisory Centre officially opened in 2018. However, while it is recommended that all women in Ireland who are diagnosed with a molar pregnancy are referred to and registered with this service, as of August 2021, registration is not

compulsory and is dependent on individual hospital and clinical referral. In 2020, the National Gestational Trophoblastic Disease Centre was notified of 132 molar pregnancies.[3] While the risk of molar pregnancy is significantly higher among women with previous molar pregnancy, over 98% of women who subsequently become pregnant will not experience a recurrence.[15]

The risk of experiencing a miscarriage increases with maternal age and the number of previous losses.[1, 16, 17] Early pregnancy loss presents a psychologically challenging event,[18] which is complicated by limited public acknowledgement of the impact of the loss and a lack of established rituals to support mourning.[19] The intensity and duration of grief following a pregnancy loss appears similar to that experienced following other significant losses.[19] The experience of perinatal loss significantly increases levels of anxiety and depression during subsequent pregnancies,[20] with women who have previously miscarried experiencing greater anxiety during subsequent pregnancies compared to women without prior miscarriage.[21]

A range of clinical supports are available to women who experience a miscarriage in Ireland, including Early Pregnancy Assessment Units (EPAUs), bereavement care, pregnancy loss or miscarriage clinics, charitable organisations and psychological support services.[22, 23] The Irish National Standards for Bereavement Care following Pregnancy Loss and Perinatal Death aim to 'enhance bereavement care services for parents who experience a pregnancy loss or perinatal death'.[23] The standards highlight the importance of delivering a range of multidisciplinary bereavement care services to address the needs of bereaved parents, recognising that improvements can and should be made in this area.[23] The Clinical Practice Guideline on Management of Early Pregnancy Miscarriage recommends that 'all professionals should be aware of the psychological sequelae associated with pregnancy loss and should provide support, follow-up and access to formal counselling when necessary'.[2] While the national standards encompass all types of pregnancy loss and perinatal death, the document acknowledges that there are limited or no national data available on certain types of pregnancy losses.[23]

Aim

The aim of this scoping review was to identify and summarise Irish research on first trimester miscarriages, ectopic pregnancy and molar pregnancy, published since 2010, with a view to informing the work of the National Care Experience Programme. This review focuses on incidence and prevalence, women's experiences, and public awareness of early pregnancy loss in Ireland.

Methods

This scoping review was conducted according to the following steps:

- Search relevant databases
- Screen identified studies against inclusion and exclusion criteria
- Extract data
- Summarise and report findings.

Information on the search strategy, search terms, data extraction and inclusion and exclusion criteria are included in Appendix 1.

Findings

A total of 1,042 records were identified from the database searches (Appendix 1), of which 1,033 were excluded following title, abstract or full text screening. Nine studies were included in this review (Appendix 2).[22, 24-31] Of these, two studies reported on the incidence of early miscarriage or ectopic pregnancy,[24, 25] four focused on women's experiences of early pregnancy loss,[28-31] and the remaining three reported on public awareness.[22, 26, 27] Four studies involved cross-sectional surveys,[22, 26, 27, 30] three were based on qualitative interviews,[28, 29, 31] with two retrospective administrative database studies.[24, 25]

Incidence or prevalence of first trimester miscarriage, ectopic or molar pregnancy in Ireland

No studies that reported the prevalence of early miscarriage, molar or ectopic pregnancy in Ireland were identified. Two studies considered the incidence of early miscarriage and ectopic pregnancy.[24, 25]

Incidence of early miscarriage

A retrospective study by Campillo et al. reported on the incidence of early miscarriage, based on hospitalisations for miscarriage before 14 completed weeks, using the Hospital In-Patient Enquiry (HIPE)[4] database.[25] Between 1 January 2005 and 31 December 2016, 50,538 hospitalisations for early miscarriage were identified across all maternity hospitals in the Republic of Ireland, with an overall incidence of early miscarriage hospitalisation of 63.0 per 1,000 deliveries (95% CI 62.5 to 63.6). The rate of hospitalisation reduced from 70.6 per 1,000 deliveries in 2005 (95% CI

[4] HIPE collects demographic, clinical and administrative data on discharges from, and deaths in, all acute public hospitals in Ireland. Gestational age is recorded in bands: <5 completed weeks, 5 to 13, 14 to 19, 20 to 25, 26 to 33 and 34 to 36 completed weeks of gestation.[2]

68.4 to 72.8) to 51.5 per 1,000 deliveries in 2016 (95% CI 49.7 to 53.3). 59.0% (n=29,835) of early miscarriages were diagnosed as incomplete miscarriage, and 99.4% (n=50,252) were between five to 13 weeks of gestation. The risk of being hospitalised for early miscarriage increased with age, with women aged 40 years or above being three times more likely to be hospitalised for early miscarriage compared to women under the age of 25 (aIRR[5] 3.34, 95% CI 3.22 to 3.45). The duration of hospital stay fluctuated over the 12-year study period, with an average duration of 1.2 days (SD 0.7). In total, 554 hospitalisations (1.1%) involved a blood transfusion, with the risk of transfusion increasing over time (aIRR 2.0, 95% CI 1.6 to 2.4). While this study provides population-based data regarding the national incidence rate of hospitalisation for early miscarriage, a significant proportion of women who experience early miscarriage will be treated as outpatients or by their GP. These women are not captured by HIPE, leading to an underestimate of the true rate of early miscarriage.

Incidence of ectopic pregnancy

A similar retrospective study reported on the incidence of ectopic pregnancy, based on ectopic pregnancy hospitalisations using the HIPE database.[24] A total of 12,098 hospitalisations for ectopic pregnancy were recorded from 1 January 2005 to 31 December 2016 across all maternity hospitals. The rate of hospitalisation for ectopic pregnancy increased from 12.8 per 1,000 deliveries in 2005 (95% CI 11.9 to 13.7 per 1,000) to 17.7 per 1,000 deliveries in 2016 (95% CI 16.6 to 18.7 per 1,000), with an overall incidence of 15.1 per 1,000 deliveries (95% CI 14.8 to 15.4). Of the hospitalisations, 71.2% were classified as tubal ectopic pregnancy (n=8,608), followed by unspecified (n=2,541; 21.0%) and other (n=775; 6.4%). The majority of ectopic pregnancies (n=11,119; 91.9%) were between 5-13 weeks gestation. 57.5% of cases (n=6,953) underwent surgical treatment for ectopic pregnancy, with 14.3% (n=1,726) receiving medical management using methotrexate. As the HIPE database includes data for hospitalisations only, women who were treated for ectopic pregnancy on an outpatient basis were excluded. While the majority of women with ectopic pregnancy in Ireland receive inpatient treatment, the total burden of ectopic pregnancy is likely to be underestimated. The authors concluded that more research is needed to explore the patterns of care and clinical indications in both outpatient and inpatient settings in order to improve protocols for ectopic pregnancy management and the care provided.[24]

[5] aIRR: adjusted incidence rate ratio

Incidence of molar pregnancy

No studies that reported on the incidence of molar pregnancy in Ireland were identified.

Women's experiences of first trimester miscarriage, molar or ectopic pregnancy

Four studies explored the experiences of women or couples who had ectopic pregnancies or early miscarriage.[28-31] Two of these studies were not specific to early pregnancy loss and also included women who experienced their pregnancy loss during the second trimester.[28, 29] The majority of these studies were qualitative,[28, 29, 31] with one cross-sectional study.[30]

Cross-sectional studies

A cross-sectional study by Purandare et al. explored whether the type of early pregnancy loss experienced by women influenced the severity of their grief,[30] using the Perinatal Grief Scale.[32] Seventy-five women attending a pregnancy loss clinic six weeks after an early miscarriage (defined as miscarriage prior to 16 weeks), molar pregnancy or ectopic pregnancy took part. Type of pregnancy loss did not appear to affect the severity of grief experienced; however, for women with ectopic pregnancy, grief appeared to be more intense for those who had no living children compared to those who did. For women who had a living child, grief intensity appeared to increase with the number of miscarriages. As only women attending a miscarriage clinic in one maternity hospital in Ireland were recruited, there is a potential for selection bias, with women who required the most support likely to be overrepresented in this study. Indeed, the authors noted that the proportion of women with ectopic or molar pregnancy who participated in the study was higher than the percentage of early pregnancy losses that are attributable to molar or ectopic pregnancy in the general population.

Qualitative studies

A qualitative study by Meaney et al. described the experiences of 10 women and six men, four of whom were couples, who had experienced first or second trimester miscarriage.[28] Six themes were identified: acknowledgement of miscarriage as a valid loss; misperceptions of miscarriage; the hospital environment and management of miscarriage; support and coping; reproductive history and implications for future pregnancies. Participants highlighted the importance of healthcare professionals and society in general acknowledging their loss, noting a lack of discussion about miscarriage in the public domain. Participants reported dissatisfaction with the sensitivity shown to them by the hospital system as they waited in the emergency department, surrounded by women with continuing pregnancies. Dedicated services,

such as the early pregnancy loss clinic and the specialist bereavement midwife, were seen as more sensitive and supportive. Women reported concerns regarding their fertility following miscarriage, particularly those who did not have other children, while men felt that their primary role was to support their partners through the loss. Increased levels of anxiety were reported during subsequent pregnancies, with earlier and more frequent scans at the early pregnancy loss clinic providing reassurance. Women suggested that eligibility for medical investigation of recurrent miscarriage should take into account factors other than number of miscarriages alone, including maternal age.

Mulvihill et al. explored the experiences of rural hospital care among eight women who experienced first or second trimester pregnancy loss.[29] The participants reported feelings of shock, depression, anger, self-blame and hidden grief, which was not acknowledged publicly. Interviewees felt that, in general, people did not understand what the bereaved parents were going through and therefore did not know what to say to comfort or support them. This resulted in avoidance of the topic in conversation which compounded their disenfranchised grief. Flaws with the hospital records system were highlighted, with participants describing the pain of having to recount their story repeatedly to various healthcare staff who were unaware of their loss. The use of medical terminology, such as 'products of conception', was found to dehumanise the loss for women and further complicated their grief. Other events that intensified the bereaved mothers' grief were the pregnancies of others and passing the due date of their lost pregnancy. All participants acknowledged the need for post-discharge support, with most expressing a desire for proactive follow-up contact from the hospital. Half of the women (four) included in this study experienced a second trimester loss, with the authors noting that the experiences of participants may not be typical, weighted towards those still seeking to understand their losses.[29]

A qualitative study by Spillane et al. explored the experiences of seven Irish women who had experienced ectopic pregnancy.[31] The diagnosis of ectopic pregnancy resulted in intense sadness, confusion and blame. It also destroyed the participants' hopes and expectations for a healthy pregnancy, with some women reporting that it was easier to keep their diagnosis to themselves rather than having to explain the loss to friends or colleagues. Clear and detailed information about their diagnosis, treatment options and potential impact on future fertility was important in order to allow women to process what was involved and what to expect. Taking methotrexate to terminate an ectopic pregnancy was a devastating experience for women, while seeing couples with ongoing pregnancies in the maternity unit hampered their recovery. In some cases, the location of the foetus was not known to the women, which was challenging for those who would have liked to know where their baby was growing in order to process what had happened. Participants

struggled with the terminology used to describe their loss in these cases, including the use of terms such as 'out of place' and 'unknown location'.[31]

Public knowledge and awareness of first trimester miscarriage, ectopic pregnancy and molar pregnancy in Ireland

Three cross-sectional studies explored public awareness of early miscarriage,[22, 26, 27] of which two were based on the same survey of third level students in one Irish university.[22, 26] Two studies focused on the awareness of the general public or university students of the incidence, causes and risk factors of first trimester miscarriage,[26, 27] while one study explored university students' knowledge of the signs and symptoms of first trimester miscarriage.[22]

Signs and symptoms of first trimester miscarriage

Campillo et al. conducted an online cross-sectional survey, which was circulated to a random sample of 2,202 students of University College Cork, with 746 eligible responses.[22] The authors reported that 59.2% of participants correctly identified the most common features of a first trimester miscarriage, with male students being more likely to have a poorer knowledge of features of miscarriage compared to female students (adjusted OR 2.0, 95% CI 1.3 to 3.0). Those who were more likely to correctly identify the signs and symptoms included older students, those studying medicine or another health discipline and those who were married, cohabitating or in a relationship. Just over one in four (27.7%) participants correctly identified that a cause could be found for an estimated 50-60% of first trimester miscarriages, while 53.6% underestimated and 18.5% overestimated this rate. Most students identified Google as their preferred source of information with regards to miscarriage, followed by their general practitioner (GP), the hospital and less commonly Wikipedia and mobile applications. The authors concluded that students' lack of reproductive health information about miscarriage indicated the need for health education programmes to improve pregnancy-related decision-making.[22]

Prevalence, causes and risk factors of first trimester miscarriage

A second paper by Campillo et al., based on findings from the same survey of university students, focused on students' understanding of prevalence, causes and risk factors of miscarriage.[26] One in five students (20.1%, n=149) correctly identified the estimated rate of first trimester miscarriage to be 20%, while 30.7% (n=207) believed that miscarriage occurs in less than 10% of pregnancies. Women were more likely to correctly identify the rate of miscarriage than men (21.8% vs 14.5%), as were older students, students studying arts and social science or medicine and health, and those who knew someone who had a miscarriage. The majority of students correctly identified well-established risk factors for miscarriage, including drugs, a maternal medical condition and alcohol, while 42.4% (n=316) of

participants correctly identified chromosomal abnormality as the most common cause of first trimester miscarriage. Women, students over the age of 23, those studying medicine or another health discipline and those who were married, cohabitating or in a relationship were more likely to correctly identify chromosomal abnormalities as the most common cause of first trimester miscarriage. While there is no conclusive link between stress and miscarriage, participants identified stress more frequently than established risk factors such as advanced maternal age, smoking, previous termination of pregnancy and being overweight or underweight.

A cross-sectional study by McCarthy et al. assessed the general population's knowledge of first trimester miscarriage and health information seeking behaviour, using a national telephone survey of 967 Irish adults over 18 years of age.[27] The authors found that 28.2% of respondents (n=197 of 699) correctly estimated that first trimester miscarriage occurs in 21-30% of pregnancies, with 60.8% (n=425 of 699) underestimating and 8% (n=77) overestimating this rate. Men were more likely than women to underestimate the prevalence of first trimester miscarriage (adjusted OR 3.5, 95% CI 2.4 to 4.9), as were those without children (adjusted OR 1.7, 95% CI 1.2 to 2.6) and those living in urban areas (adjusted OR 1.6, 95% CI 1.0 to 2.4). The majority of respondents (82.7%, n=800) were aware of someone who had experienced a miscarriage, with 9.3% (n=90) of respondents and 6.3% (n=61) of partners experiencing a miscarriage themselves. Almost two in five (39.7%) respondents incorrectly defined miscarriage as a pregnancy loss after 24 weeks. Preferred sources of information on miscarriage included the Internet, GPs and hospitals. The authors highlighted the need for increased public health interventions to improve reproductive health education and raise awareness of the potential adverse outcomes of pregnancy.[27]

Knowledge and awareness of ectopic or molar pregnancy

No studies were found that focused on knowledge or awareness of molar pregnancy or ectopic pregnancy.

Discussion

This scoping review aimed to identify and summarise Irish research on first trimester miscarriages, ectopic pregnancy and molar pregnancy, focusing on incidence and prevalence, women's experiences, and public awareness of early pregnancy loss in Ireland. There is a lack of standardised recording and reporting of early pregnancy loss in Ireland, with the National Standards for Bereavement Care following Pregnancy Loss and Perinatal Death acknowledging that there are limited or no national data available on certain types of pregnancy losses.[23] This review identified

two studies that reported on the incidence of hospitalisations for ectopic pregnancy and early miscarriage.[24, 25] However, the true incidence of these pregnancy losses is likely to be considerably higher, as many women will be treated as outpatients or day cases, and others may not present to healthcare services at all.

No studies reporting the incidence of molar pregnancy, or the prevalence of early miscarriage, ectopic pregnancy or molar pregnancy in Ireland were identified. This uncertainty in the incidence and prevalence of early pregnancy loss is reflected in the range of estimates cited in published studies, including those used to assess the level of awareness of pregnancy loss among the general public. The National Clinical Guideline on Diagnosis, Staging and Treatment of Patients with Gestational Trophoblastic Disease highlights the difficulty in measuring the incidence of molar pregnancy, stating that 'not all cases will be reported or recognised'.[33]

There is a lack of national survey data on women's experiences of first trimester miscarriage, ectopic or molar pregnancy. This review identified four studies of experiences of early pregnancy loss; however, participants for each of these studies were recruited through one maternity hospital or unit only. The small number of studies included in this review further suggest limited awareness and knowledge of early pregnancy loss among students and the general public.[22, 26, 27] However, it should be noted that studies on public awareness of miscarriage in Ireland disagreed on what was considered the 'correct' rate of first trimester miscarriage, highlighting differences in the methods and definitions used to estimate these rates, as well as the difficulty in identifying women who have experienced early pregnancy loss. Clinical practice guidelines acknowledge the negative psychological impact of early pregnancy loss on women and their families and suggest that parents' needs should be identified and assistance and referral offered to support grieving.[2] However, a lack of awareness of the prevalence of miscarriage and of available supports may affect the use of support services.[27] The qualitative studies similarly highlight the hidden and 'disenfranchised' grief experienced by parents with early pregnancy loss, which is often not acknowledged publicly and affects the extent to which women and their partners feel comfortable discussing their loss with family, friends or colleagues.[28, 29, 31] Women who had experienced early pregnancy loss also reported increased levels of anxiety during subsequent pregnancies, and may require additional support.

Of the four studies of experiences of early pregnancy loss identified by this review, one study included partners. While the men who participated in this study considered their primary role to be supporting their partners through the loss,[28] it is important to acknowledge that men are also affected by pregnancy loss and require support. A thematic synthesis of qualitative research noted men's perceptions of marginalisation related to pregnancy loss, as social expectations and relationships

with healthcare professionals hindered their ability to articulate unexpected emotions or a need for support.[34]

The qualitative studies highlighted the hospital environment, particularly privacy and sharing a space with women and couples with continuing pregnancies, as challenging for parents experiencing early pregnancy loss. Busy maternity wards and hearing other babies crying can compound the distress and trauma experienced by bereaved families, reminding them of how things 'should have been'.[29, 35] Both the National Standards for Bereavement Care following Pregnancy Loss and Perinatal Death and the report on the Implementation of the National Standards for Bereavement Care following Pregnancy Loss and Perinatal Death stress that bereavement care is should be provided in a physical environment that facilitates privacy and dignity and supports high-quality care.[3, 23] Clinical practice guidelines recommend that 'all maternity units should provide a dedicated early pregnancy assessment unit (EPAU) for the care of women with an early pregnancy loss',[2] with participants in one study noting the importance of this service in terms of providing dedicated and sensitive support to women with early pregnancy loss.[28] The report on the Implementation of the National Standards further recommends that early pregnancy assessment units (EPAU) and pregnancy loss services should be led by senior obstetricians.[3]

The qualitative studies included in this review found that medical terminology surrounding pregnancy loss is seen as insensitive and distressing for bereaved parents. A documentary analysis of public inquiry reports into pregnancy loss and bereavement services in Ireland, while not specific to early pregnancy loss, similarly highlighted the importance of clear communication of complex issues during what is a challenging and emotional time for families, as medical jargon and a lack of clear information can exacerbate confusion, discomfort and anxiety for bereaved parents.[35]

Limitations

This scoping review has some limitations. The searches are unlikely to be exhaustive, and there may be other relevant research conducted in Ireland that was not identified. While a scoping review is broader than a systematic review, aiming to identify how much research has been reported on a particular topic, studies on risk factors and outcomes of pregnancy loss were not included in this review. Studies published prior to 2010 were excluded, as these may not reflect current maternity bereavement care and services. As the primary aim was to identify and summarise existing research, no formal quality appraisal of included studies was conducted. However, some limitations of the studies included in this review should be noted. Definitions of early pregnancy loss, particularly early miscarriage, varied across studies, with differences in how the threshold between early and late miscarriage

was characterised and whether or not clinically unrecognised pregnancies were included in incidence estimates.

Studies of women's experiences did not always distinguish between different types of pregnancy loss, with some including late miscarriage in addition to earlier losses. This is not unique to studies conducted in Ireland, as others have noted that pregnancy loss has been viewed as a single category in some studies of grief, with a lack of distinction drawn between early and late miscarriages, ectopic pregnancy, stillbirth and neonatal death.[19] Of the three studies on public awareness of early pregnancy loss, two were limited to university students, although the authors suggest that this would be a prime age for reproductive health interventions.[22] Campillo and colleagues also acknowledged their use of an unvalidated questionnaire and possible non-response bias among male students who did not know anyone who had experienced a miscarriage.[22, 26] The only Irish data available on incidence rates of early pregnancy loss are based on hospitalisations for early miscarriage or ectopic pregnancy, but these do not include those women treated as outpatients or who did not require or seek medical care. Accurate and complete data on miscarriage and other early pregnancy losses are required in order to determine the true burden of early pregnancy loss in Ireland, facilitate cross-country comparisons and improve patient care and policy development.[1]

The lack of accurate and complete national data on early pregnancy loss also affects the extent to which it is possible to conduct a national survey of women's experiences of all areas of maternity bereavement care using the current National Care Experience Programme survey framework, due to the absence of a reliable sampling frame or way of ascertaining all women who might be eligible to take part in a survey. While it may be possible to identify women hospitalised for ectopic pregnancy or a first trimester miscarriage using hospital discharge data, this would exclude the experiences of women treated as outpatients or in the community. In order to include women who have experienced early pregnancy losses, an alternate model and methodology would need further consideration and discussion as part of the National Care Experience Programme.

Conclusion

Administrative data on first trimester miscarriage, ectopic pregnancy or molar pregnancy are not routinely collected or reported in Ireland. The only available estimates of the rates of these early pregnancy losses are based on hospitalisations for early miscarriage or ectopic pregnancy; however, this excludes women who are treated as outpatients or in community settings, as well as those who do not require or seek medical care. There are currently no Irish data available on the incidence or prevalence of molar pregnancy. This lack of information on early pregnancy loss is reflected in the differing estimates of miscarriage rates included in studies of public

awareness, as well as the lack of a national survey of women's experiences of early pregnancy loss. Given the lack of available data, the limited public awareness of early pregnancy loss reported by studies included in this review is not surprising. Early pregnancy loss is a distressing and traumatic experience for parents, who require dedicated supports and services. Capturing and reporting complete and accurate data on all types of pregnancy loss occurring in Ireland could help to raise public awareness and inform healthcare planning and practice. The lack of national data leads to challenges in identifying women who would be eligible to participate, necessitating the development of an alternative survey model.

Appendix 1

Research questions

This scoping review considered three research questions:

1. What is the reported incidence and or prevalence of first trimester miscarriage, ectopic and molar pregnancy in Ireland?
2. What are women's experiences of first trimester miscarriage, molar or ectopic pregnancies in Ireland?
3. What is the level of public awareness of first trimester miscarriage, molar or ectopic pregnancies in Ireland?

PICoS framework

The PICoS (Population, Interest, Context, Study design) framework was used to develop the search strategies and define the inclusion and exclusion criteria for each research question.

Research question 1: What is the incidence and or prevalence of first trimester miscarriage, ectopic and molar pregnancy in Ireland?

Population	Women who have experienced a: ▪ First trimester miscarriage ▪ Ectopic pregnancy ▪ Molar pregnancy
Interest	Incidence and prevalence
Context	Studies conducted in Ireland
Study design	**Include** ▪ (non)randomised trials, cohort studies, case control studies, cross-sectional studies, qualitative studies **Exclude** ▪ Case reports or case studies, reviews, letters, discussion papers

Research question 2: What are women's experiences of first trimester miscarriage, molar or ectopic pregnancies in Ireland?

Population	Women who have experienced a: ▪ First trimester miscarriage ▪ Ectopic pregnancy ▪ Molar pregnancy
Interest	Women's experiences
Context	Studies conducted in Ireland
Study design	**Include** ▪ (non)randomised trials, cohort studies, case control studies, cross-sectional studies, qualitative studies **Exclude** ▪ Case reports or case studies, reviews, letters, discussion papers

Research question 3: What is the level of public awareness of first trimester miscarriage, molar or ectopic pregnancies in Ireland?

Population	General public (can include students)
Interest	Awareness of first trimester miscarriage, molar or ectopic pregnancies
Context	Studies conducted in Ireland
Study design	**Include** ▪ (non)randomised trials, cohort studies, case control studies, cross-sectional studies, qualitative studies **Exclude** ▪ Case reports or case studies, reviews, letters, discussion papers

Search strategy

The following databases and search engines were searched:

- PubMed
- CINAHL
- PsycINFO

- Web of Science
- Lenus
- Google and GoogleScholar
- Institutional repositories for Masters/PhD theses/dissertations
    - http://www.tara.tcd.ie/
    - https://researchrepository.ucd.ie
    - https://repository.rcsi.com/Theses_and_Dissertations
    - https://ulir.ul.ie
    - http://mural.maynoothuniversity.ie/ethesis/view/
    - https://www.dcu.ie/library/theses-dissertations
    - https://cora.ucc.ie/
    - https://aran.library.nuigalway.ie/
    - https://arrow.tudublin.ie/theses/

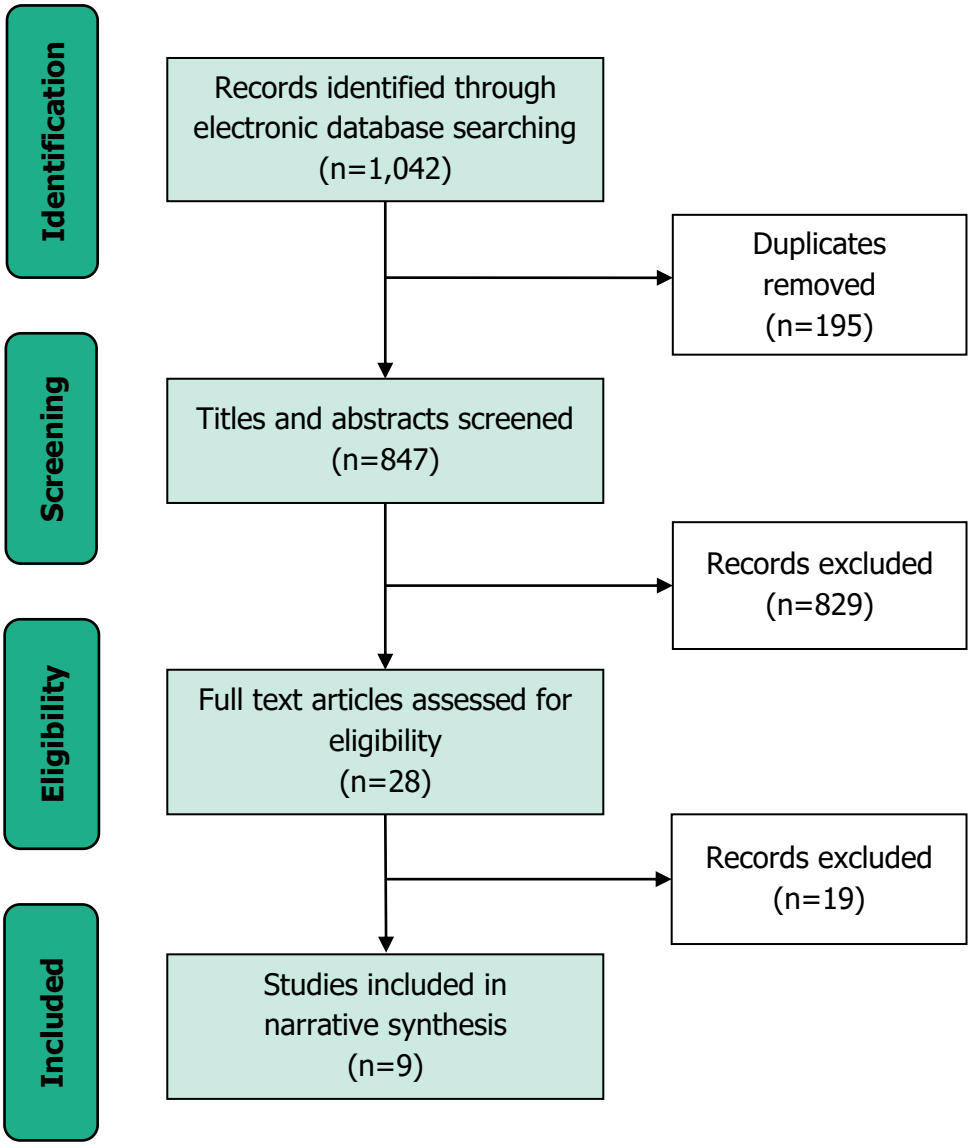
Databases were searched from 1 January 2010 to present. For Google, GoogleScholar and Lenus, the first five pages of results (published since 2010) were considered. The last searches were conducted on 21 June 2021.

Search terms

Variations of the following search terms were used:

('Early miscarriage' OR 'first trimester miscarriage' OR 'early pregnancy loss' OR 'first trimester pregnancy loss' OR 'ectopic pregnancy' OR 'molar pregnancy') AND (Ireland OR Irish)
PubMed search ((((‘ectopic pregnancy' OR 'ectopic pregnancies') OR ("Pregnancy, Ectopic"[Mesh])) OR ((("Hydatidiform Mole"[Mesh])) OR ('molar pregnancy' OR 'molar pregnancies'))) OR ((("Abortion, Spontaneous"[Mesh])) OR ('Early miscarriage' OR 'first trimester miscarriage' OR 'early pregnancy loss' OR 'first trimester pregnancy loss'))) AND (Ireland OR Irish)
Filter 2010-2021

Flow chart of studies included in this review



Data extraction

For each included study, data on the study design, population, setting and key findings were extracted (Appendix 2).

Appendix 2

Characteristics of included studies

Table 1. Incidence or prevalence of first trimester miscarriage, ectopic or molar pregnancy in Ireland

First author Year Study design DOI	Sample Setting Data source	Key findings	Comment
Campillo[24] 2018 Retrospective population-based database study https://doi.org/10.1016/j.ejogrb.2018.10.054	**Sample** N=12,098 hospitalisations for ectopic pregnancy (within 19 completed weeks). **Demographics** *Age* <25: n=1,254 (10.4%) 25-29: n=2,750 (22.7%) 30-34: n=4,300 (35.5%) 35-39: n=3,046 (25.2%) 40+: n=748 (6.2%) **Setting** All acute maternity hospitals/units in Ireland. **Data source** Hospital In-Patient Enquiry database (HIPE) from 1 January 2005 to 31 December 2016.	Overall, the hospitalisation rate for ectopic pregnancy was 15.1 per 1,000 deliveries (95% CI 14.8 to 15.4). Rates of hospitalisation for ectopic pregnancy increased from 12.8 per 1,000 deliveries in 2005 (95% CI 11.9 to 13.7 per 1,000) to 17.7 per 1,000 deliveries in 2016 (95% CI 16.6 to 18.7 per 1,000). 71.2% of hospitalisations were classified as tubal ectopic pregnancy (n=8608), followed by unspecified (n=2,541; 21.0%) and other (n=775; 6.4%). 91.9% (n=11,119) were between 5-13 weeks gestation. 57.5% of cases (n=6,953) underwent surgical treatment for ectopic pregnancy. 14.3% (n=1,726) received medical management using methotrexate. 580 (4.8%) cases had a blood transfusion. The risk of blood transfusion decreased over time (aIRR 0.8, 95% CI 0.6 to 0.9)*. The average length of stay for ectopic pregnancy was 2.4 days (SD 1.9). Women aged 40 years and above were twice as likely to require hospitalisation (aIRR 2.0, 95% CI 1.9 to 2.2)* and a blood transfusion (aIRR 2.1, 95% CI 1.4 to 3.1)* compared to those younger than 25 years.	This study excluded non-hospitalised ectopic pregnancies, leading to an underestimate of the burden of ectopic pregnancy. The authors concluded that more research is needed to explore the patterns of care and clinical indications at both outpatient and inpatient settings in order to improve protocols of management and the care provided.

Campillo[25] 2019 Retrospective database study https://doi.org/10.1186/s12978-019-0720-y	N=50,538 hospitalisations for early miscarriage before 14 completed weeks. **Demographics** *Age* <25: n=6,404 (12.7%) 25-29: n=9,071 (17.9%) 30-34: n=14,697 (29.1%) 35-39: n=14,250 (28.2%) 40+: n=6,166 (12.2%) **Setting** All acute maternity hospitals/units in Ireland. **Data source** Hospital In-Patient Enquiry database (HIPE), from 1 January 2005 to 31 December 2016.	Overall, the hospitalisation rate for early miscarriage was 63.0 per 1000 deliveries (95% CI 62.5 to 63.6). Rates of hospitalisation for early miscarriage reduced from 70.6 per 1,000 deliveries in 2005 (95% CI 68.4 to 72.8) to 51.5 per 1,000 deliveries in 2016 (95% CI 49.7 to 53.3). Women aged 40 years or older had an increased risk of being hospitalised compared to women under 25 years (aIRR 3.34, 95% CI 3.22 to 3.45). 59.0% (n=29,835) of early miscarriages were diagnosed as incomplete miscarriage, while 99.4% (n=50,252) were between 5 to 13 weeks of gestation. Evacuation of retained products of conception was undertaken in 45.3% of hospitalisations for early miscarriage (n=22,897), 2.8% were medically managed (n=1404). Half of the women were expectantly managed (n=26,225; 51.9%). 554 (1.1%) hospitalisations involved a blood transfusion. The risk of blood transfusion increased over time (aIRR 2.0, 95% CI 1.6 to 2.4). The average length of stay for early miscarriage fluctuated during the 12-year period from 1.3 days (SD 0.8) in 2005 to 1.2 (SD 0.7) days in 2016; with an overall average of 1.2 days (SD 0.7). 1,810 (3.6%) cases had a length of stay longer than 2 days.	This study excluded non-hospitalised early miscarriages, leading to an underestimate of the burden of early miscarriage. The authors concluded that more research is needed to explore both outpatient and inpatient settings in order to improve the management and care provided.

*aIRR: adjusted incidence rate ratio

Table 2. Women's experiences of first trimester miscarriage, ectopic pregnancy or molar pregnancy

First author Year Study design DOI	Sample Setting	Key findings	Comments and conclusion
Meaney[28] 2016 Qualitative https://doi.org/10.1136/bmjopen-2016-011382	**Sample** N=16 people who experienced miscarriage (defined as any pregnancy loss before 24 weeks gestation in a foetus weighing <500g). Gestation of most recent loss ranged from 5 to 16 weeks. All participants had experienced at least 2 miscarriages. **Demographics** *Sex* Female: n=10 (62.5%) Male: n=6 (37.5%) (4 couples) **Data collection** Individual interviews. **Setting** One Irish maternity hospital. Dates not reported.	*Acknowledgement of miscarriage as valid loss* Participants highlighted the devastation they experienced following a miscarriage, and the importance of healthcare professionals and society in general acknowledging their loss. Participants discussed various ways of marking or remembering their loss, particularly around the anniversary of the miscarriage. *Misperceptions of miscarriage* Participants highlighted the lack of discussion about miscarriage in the public domain, and how naïve they felt during their first experience of miscarriage. *The hospital environment and management of miscarriage* Negative experiences in the hospital resulted from the administration or physical design of the hospital, including the emergency department, where those experiencing miscarriage could be surrounded by other pregnant women. The early pregnancy clinic was seen as a better, more private environment. Women who miscarried at a later gestation highlighted feeling unprepared for the extent of the bleeding. *Support and coping* Keeping busy helped participants cope with their loss, particularly for those who had children, while men felt that their primary role was to support their partners through the loss. Participants experienced high levels of anxiety during subsequent pregnancies, but indicated their	5 of the 16 participants had miscarriages after the first trimester. A dedicated early pregnancy loss clinic is not available in all hospitals, and the authors note that the presence of this team may have influenced how other staff cared for the participants. The authors highlighted the need for increased awareness of the frequency of miscarriage, as well as improved communication between healthcare professionals and patients to better counsel patients through the miscarriage and provide reassurance in subsequent pregnancies.

		satisfaction with the early pregnancy loss clinic, which provided reassurance by facilitating earlier and more frequent scans and appointments, and with the emotional support provided by the specialist bereavement midwife. *Reproductive history and implications for future pregnancies* Participants who already had children were better able to reassure themselves that they could successfully get pregnant and give birth. Participants expressed frustration that medical investigations were not offered to them following a second miscarriage, especially for older women.	
Mulvihill[29] 2014 Qualitative https://doi.org/10.1093/bjsw/bct078	**Sample** N=8 women who had experienced a miscarriage 10-14 months prior to interview. **Demographics** *Age* Range: 30-42 years *Marital status* Married: n=8 (100.0%) *Type of loss* First trimester miscarriage (0-12 weeks): n=4 (50.0%) Second trimester miscarriage (13-28 weeks): n=4 (50.0%) *Living children* Living children: n=6 (75.0%) No living children: n=2 (25.0%)	*Importance of communication* Breaking of bad news, communication between staff and patients, timely provision of information, issues with the hospital records system. Most participants commented positively on the way in which doctors informed them of their loss and how other hospital staff related to them. Importance of sensitivity was emphasised. Flaws with the hospital records system were highlighted repeatedly and participants described the pain of having to retell their story to various professionals post discharge. *Physical hospital environment* Participants varied in terms of whether they preferred a maternity or general ward and a single or multi occupancy room. Participants stressed the importance of respecting privacy at such an emotionally difficult time. *The presence of disenfranchised grief* Women described a wide range of feelings including shock, devastation, depression, self-blame, anger and searching for an explanation. Emotional reactions were exacerbated by a lack of appreciation of their loss, with participants describing a sense of disenfranchised grief. Disenfranchised grief was experienced through the language used by professionals (such	4 of the 8 participants had miscarriages after the first trimester. The authors noted that their participants may represent an atypical range of experiences, weighted towards those still seeking to understand their losses.

	Half had experienced multiple losses. **Data collection** Qualitative interview. **Setting** One maternity unit in the west of Ireland, 2010.	as 'products of conception'), through others' insensitive comments and through a perceived lack of social support. A number of women spoke of the effect of other pregnant women in their networks, and described the time of their baby's due date as emotionally difficult. *Follow-up support* All participants acknowledged the need for post-discharge support, with most actively expressing a desire for follow-up contact from the hospital but not all necessarily needing (or wanting) sustained supports.	
Purandare[30] 2012 Cross-sectional http://archive.imj.ie//ViewArticleDetails.aspx?ArticleID=9933	**Sample** N=75 women who experienced an early pregnancy loss and attended a miscarriage clinic, recruited 6 weeks after their loss. Response rate not reported. **Demographics** *Age* Not reported. *Type of loss* Miscarriage (prior to 16 weeks): n=43 (57.3%) Recurrent miscarriage: 5 (6.7%) Ectopic pregnancy: n=20 (26.7%) Molar pregnancy: n=7 (9.3%) *Living children* Living children: n=30 (44.1%) No living children: n=38 (55.9%) **Data collection**	The type of miscarriage did not appear to impact on the severity of grief experienced by women. For women who had an ectopic pregnancy, grief was more severe if they had no living children. For women with a living child, grief severity appeared to increase with the number of miscarriages The authors noted that the proportion of women with ectopic or molar pregnancy who participated in the study was higher than would be expected based on the percentage of early pregnancy losses that are attributable to molar or ectopic pregnancy.	Potential for sampling bias as only women attending a miscarriage clinic in one maternity hospital were invited to participate. Results were not adjusted for potential confounders and analyses may be underpowered due to small numbers in some groups.

	Perinatal grief scale given to women at a miscarriage clinic. **Setting** Miscarriage clinic at the Rotunda Hospital, Dublin, 2008.		
Spillane[31] 2018 Qualitative https://doi.org/10.1016/j.srhc.2018.04.002	**Sample** N=7 women who had experienced ectopic pregnancy (50.0% response rate), 12-16 months following their loss. **Demographics** *Age* Range: 27-38 years. *Parity* Para 0: n=2 (28.6%) Para ≥1: n=5 (71.4%) **Data collection** Individual interview. **Setting** One Irish maternity hospital, 2014.	*Coping with shattered expectations* The diagnosis of an ectopic pregnancy shattered the hopes and expectations of a healthy pregnancy, resulting in intense sadness and feelings of not knowing what to grieve for. Women reported not anticipating potential problems with their pregnancy, with initial happiness replaced by confusion, grief and blame. Participants were selective in sharing their diagnosis with friends and colleagues in order to avoid having to explain their loss. *Management: a lack of regard for this loss by caregivers* Women reported that the outcome of the diagnosis allowed little time to process fertility worries and recover from the loss. The women struggled with repeat visits to the hospital, which in some cases were clinical and uncaring, and felt that they were not listened to. Clear and detailed information about their diagnosis, treatment options and potential impact on future fertility was important in order to allow women to process what was involved and what to expect. Seeing other couples in the maternity unit with ongoing pregnancies was difficult and hampered their acceptance and recovery. Taking methotrexate was a devastating experience for women. A lack of follow-up care resulted in a lack of resolution and prolonged the grieving process. *Bereavement care and acknowledgement of loss* Women reported a lack of debriefing and bereavement care, with those who had surgery feeling like their concerns about the risks of surgery	The authors note the potential for sampling bias, as half of the women invited chose not to participate in the study.

		were minimised. Caregivers underestimated the impact of their loss and did not provide enough sensitive support, which compounded their grieving and fear to try for another pregnancy. Women struggled with the terminology used to describe their loss ('out of place', 'unknown location').	

Table 3. Research question 3: What is the level of public awareness of first trimester miscarriage, molar or ectopic pregnancies in Ireland?

First author Year Study design DOI	Sample Data collection Setting	Key findings	Comments and conclusion
Campillo[22] 2021 Cross-sectional https://doi.org/10.1007/s10995-020-03017-y	**Sample** 746 university students. 10% (n=2202) of undergraduate and postgraduate students at one university were randomly selected, with 872 students responding (39.6% response rate), of whom 126 were excluded due to missing or extreme data. **Demographics** *Sex* Female: n=577 (77.3%) Male: n=169 (22.7%) *Age* Mean: 24.3 years (SD 6.6) *Marital status* Single: n=617 (82.7%) Married/cohabiting: n=129 (17.3%) *Level of study* Undergraduate: n=590 (79.1%) Postgraduate: n=156 (20.9%)	59.2% of students correctly identified the common features of first trimester miscarriage. Male students were more likely to have a poor knowledge of features of miscarriage compared to females (adjusted OR 2.0, 95% CI 1.3, 3.0). Poor knowledge of features of first trimester miscarriage was less common among older students and students who were married, cohabiting or in a relationship (adjusted OR 0.4, 95% CI 0.2, 0.6 and adjusted OR 0.4, 95% CI 0.3, 0.8 respectively). Medicine and Health students were more likely to identify any type of treatment for miscarriage compared to students from other disciplines. 27.7% of participants correctly identified that a cause could be identified for 50 to 60% of first trimester miscarriages, while 53.6% underestimated and 18.5% overestimated this rate. While 45.3% of participants could identify medical and surgical treatments as options, just 35.7% were aware that expectant/conservative management was also an option. Google was the preferred source of information about miscarriage (n=596, 79.9%), followed by the GP (n=414, 55.5%), hospital (n=198, 26.5%), Wikipedia (n=102, 13.7%) and mobile applications (n=21, 2.8%). Female students were more likely to seek information about miscarriage from their GP compared with male students, while students	The authors noted possible non-response bias among male students who did not know anyone who had had a miscarriage. 40.8% of the sample had poor knowledge of the features of first trimester miscarriage, highlighting the gap of knowledge regarding reproductive health information about miscarriage, particularly among university students. The authors emphasised the need to implement health education programs in the university community as a public health strategy

	Data collection Online questionnaire. **Setting** University College Cork, April-May 2016.	aged 23 years or older sought information about miscarriage at the GP or hospital more frequently than younger students.	to increase pregnancy-decision-making.
Campillo[26] 2018 Cross-sectional https://doi.org/10.1186/s12905-018-0682-1	**Sample** 746 university students (response rate not reported in this paper; see Campillo 2021 above). **Demographics** *Sex* Female: n=577 (77.3%) Male: n=169 (22.7%) *Age* Mean: 24.3 years (SD 6.6) *Marital status* Single: n=617 (82.7%) Married/cohabiting: n=129 (17.3%) **Data collection** Online questionnaire. **Setting** University College Cork, April-May 2016.	20.1% (n=149) of students correctly identified the estimated rate of first trimester miscarriage to be 20%, while 30.7% (n=207) incorrectly believed that miscarriage occurs in less than 10% of pregnancies. Women were more likely to correctly identify the rate of miscarriage than men (21.8% vs. 14.5%), as were older students, students studying arts and social science or medicine and health, and those who knew someone who had a miscarriage. 6.2% (n=54) of students were aware that miscarriage can happen from conception until 24 weeks of gestation. Male students were more likely to report that they did not know anyone who had a miscarriage compared to female students (23.9% vs. 9.6%). Students aged 23 years or older and those who had a partner, were married, cohabiting or divorced were more likely to report they knew someone who had a miscarriage. 42.4% (n=316) of participants correctly identified genetic abnormality as the main cause of miscarriage. Women, older students, students who reported married, divorced or cohabiting, those from medical and health disciplines and those who were aware of a celebrity who had a miscarriage were more likely to identify chromosomal abnormalities as a main cause. Stress was identified as a risk factor for miscarriage more frequently than advanced maternal age and smoking.	A higher percentage of female than male students responded to the survey. The authors noted that this study highlighted a lack of understanding about the prevalence and risk factors of miscarriage among students.

McCarthy[27] 2020 Cross-sectional https://doi.org/10.1016/j.ejogrb.2020.08.042	**Sample** 967 Irish adults over 18 years of age, recruited through random digit dialling. Quota sampling used according to age, gender, social class and region. Response rate not reported. **Demographics** *Sex* Female: n=428 (44.3%) Male: n=539 (55.7%) *Age* 18-24: n=90 (9.3%) 25-34: n=138 (14.3%) 35-44: n=178 (18.4%) 45-54: n=164 (17.0%) 55-64: n=209 (21.6%) 65+: n=188 (19.4%) **Data collection** Telephone survey. **Setting** General adult population. Dates not specified.	39.7% (n=384) of respondents defined miscarriage incorrectly as a pregnancy loss after 24 weeks. 28.2% of respondents (n=197 of 699) correctly estimated that first trimester miscarriage occurs in 21-30% of pregnancies; 60.8% (n=425 of 699) underestimated and 8.0% (n=77) overestimated this rate. The likelihood of underestimating the rate of miscarriage were higher for men (adjusted OR 3.5, 95% CI 2.4 to 4.9), those who did not have dependent children (adjusted OR 1.7, 95% CI 1.2 to 2.6) and those living in an urban area (adjusted OR 1.6, 95% CI 1.0 to 2.4). 82.7% (n=800) of respondents were aware of someone who had experienced a miscarriage, with 9.3% (n=90) of respondents and 6.3% (n=61) of partners experiencing a miscarriage themselves. Preferred sources of information on miscarriage included the internet, GPs and hospitals.	The authors suggested that their findings indicated a lack of factual awareness on miscarriage including its incidence, definition and consequences, highlighting the need for increased public health interventions to improve reproductive health education and to increase the awareness of potential adverse outcomes of pregnancy.

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National Maternity Bereavement Experience Survey

Health Information and Quality Authority
An tÚdarás Um Fhaisnéis agus Cáilíocht Sláinte

HSE

An Roinn Sláinte
Department of Health