1. Background

Pregnancy recognition matters; it is the critical first step influencing subsequent pregnancy-related care, including antenatal and abortion care. The 'trajectories' of pregnancy recognition are the time-bound, varied processes that lead to a person knowing they are pregnant [1]. These vary considerably across individuals and contexts, have no universal start or end point, and include both non-recognition of a pregnancy and recognition of no pregnancy. Despite decades-long calls to better understand pregnancy recognition [1, 2], to date there has been no conceptual framework to facilitate this work.

Across disciplines, studies that include reference to pregnancy recognition often treat it as a point in time rather than a process. Health research in particular tends to focus on a binary of 'early' or 'late' recognition [3]. Such approaches de-centre the myriad, complex, and nuanced ways in which pregnancy recognition can occur, and the multiple dynamics at play, including a pregnant person's own experiences and desires. Existing research has typically concentrated on specific components of pregnancy recognition, such as when a person suspects they might be pregnant [4], their awareness they are pregnant [5], and the use of tests and/or other methods of confirming they are pregnant [6]. The time and experiences at various domains of a recognition trajectory – which can include recognition of not being pregnant as well as no recognition of a pregnancy until an outcome such as birth or miscarriage – varies substantially.

We developed a novel conceptual framework to comprehensively capture pregnancy recognition trajectories (PRT). Our framework grapples with the complexities and nuances of pregnancy recognition. We use the concept of 'trajectories' to incorporate the spatial and temporal components of pregnancy recognition, informed by the trajectories of abortion-related care framework [7]. Our framework aims to support research and policies that will fill the current lacuna in evidence and understandings of pregnancy recognition trajectories.

2. Methods

We developed our conceptual framework through a three-pronged, iterative approach: an inductive saturation approach to a corpus of published material systematically identified in academic databases, receiving feedback on the framework at a series of expert workshops and research seminars, and author experiences. We conducted a systematic search of studies relating to pregnancy recognition on IBSS, Medline (Ovid), PsycInfo, CINAHL, and CABI Direct, for studies published between 2000 and 2023 from across all global contexts. Our screening of studies relevant to pregnancy recognition used an inductive saturation approach, which sought maximum diversity across the literature [8]. We presented each iteration of the framework for comment, criticism, and feedback from a range of experts across disciplines and institutions. This included adding to the framework relevant literature not captured in the searches. The authors' experiences – personal and interpersonal – of pregnancy recognition were used to test the framework against lived experiences. The results in this abstract are partial; indicative citations are used, and content reflects the key components of each domain that will be further explicated in the full framework.

2.1. Positionality

The authors bring to this framework a variety of epistemological positions, including sociological, anthropological, demographic, and public health. Conscious of the role of author disciplines and approaches to pregnancy, our workshops and research seminars purposively included experts from across disciplines and areas of pregnancy care. As scholars who were trained and work in Global North institutions, we are also conscious that our conceptualisations and experiences of concepts such as a pregnancy, as well as our approach to developing conceptual frameworks, are reflective of our positions. This framework is designed to be able to be iterated, adapted, contested, and further developed as it is exposed and examined across contexts, disciplines, and spaces.

3. Results

3.1. Pregnancy Recognition Trajectories: the framework

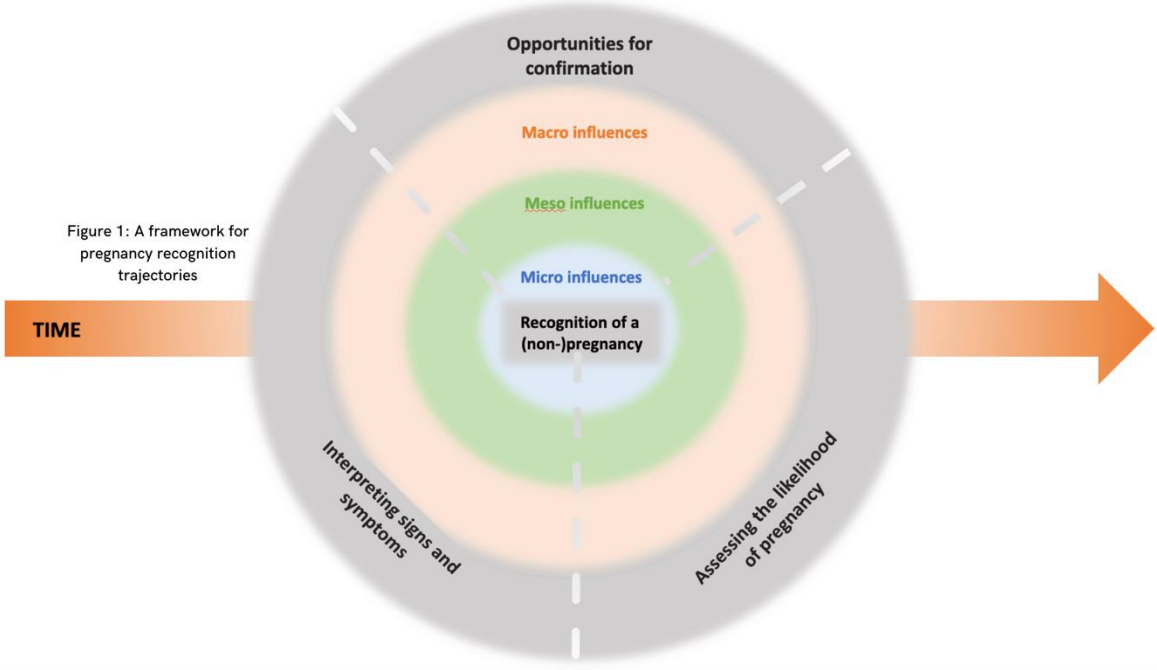

Figure 1: A framework for pregnancy recognition trajectories

Recognition of a (non-)pregnancy is the centre of this framework. This includes people who may not recognise they are pregnant before an outcome (e.g., birth) or may never recognise they are pregnant (e.g., miscarriage in early pregnancy duration). It is also sensitive to conceptualisations of what constitutes a pregnancy and when, which are embedded in social, cultural, and political contexts. Ambiguities around when a pregnancy occurs are critical in shaping a trajectory.

The framework compromises three key domains: assessing the likelihood of a pregnancy; interpreting signs and symptoms of a pregnancy, and; opportunities for confirmation. The blurred boundaries between levels and dotted lines between domains illustrated in Fig. 1 reflects that these are not distinct and separable but rather intersect and may overlap. The framework locates an individual within their lived environments and makes it possible to make visible the complex and intersecting factors that shape their recognition. It draws on an adapted socio-ecological model to conceptualise the micro-, meso-, and macro-level factors that shape each domain of a trajectory [9]. We conceptualise time as traversing this framework, explicitly highlighting the non-linear nature of pregnancy recognition. A person may experience any combination of domains along a trajectory; they may go backwards and forwards between different domains and/or experience multiple domains at the same time. While pregnancy age can be linear, time manifests in different ways across a trajectory.

3.2. Assessing the likelihood of a pregnancy

3.2.1. *Circumstances and possibilities of a pregnancy:* Assessment of the likelihood of a pregnancy is complex, reflecting the circumstances and experiences of a person and the encounter which could lead to a pregnancy. Different encounters impact a trajectory, for example, consensual sex with the aim of becoming pregnant, non-consensual sexual violence, sex with/out contraception, the use of assisted reproductive technologies, etc. At the meso- and macro-levels, the social acceptability of the circumstances can contribute to whether recognition or denial occurs [10].

3.2.2. *Knowledge and information on pregnancy likelihood:* Knowledge of the potential causes of a pregnancy, including the likelihood of a pregnancy, and access to related information can shape a trajectory. This includes knowledge and information about fertility cycles and times where penile-vaginal sex may be more likely to lead to a pregnancy [6].

3.2.3. *Perceptions of (in)fecundity*: Perceptions of fecundity may be shaped by a person's socio-demographics, such as age and gender; perimenopausal women may assume low or no risk of pregnancy or recently experiencing menarche can lead younger people to assume they cannot become pregnant because they are not yet fecund. Healthcare providers and interactions with the health system can be important, including sharing information that informs perceptions of fecundity [2].

3.2.4. *Current and past contraceptive use*: Current and historic use of contraception can complicate assessments of pregnancy chance; people using contraception at the time of a sexual encounter may be less likely to think that there is a chance of pregnancy. Prior use of contraceptives that impact menstrual cycles can intersect with perceptions of fecundity.

3.3. Interpreting signs and symptoms of a pregnancy

3.3.1. 'Typicality' of signs and symptoms: Understandings of typicality are plural and diverse and can be shaped by micro-, meso-, and macro-level factors. Signs and symptoms of pregnancy (menstrual changes, nausea, etc.) are often framed as 'typical' and are reified in education policies and programmes and public health campaigns. Knowledge of pregnancy signs can be influenced by prior pregnancy experiences; misinterpreting or ignoring signs and symptoms can lead to delayed recognition [11]. An individual actively trying to become pregnant might be more alert to potential signs and symptoms, relative to someone who does not consider themselves to be at risk of pregnancy.

3.3.2. *Experiences of menstruation and menstrual (non) changes:* Many pregnancy assessments rely on individuals both having missed or changed menstruation and recognising that this is a sign of a potential pregnancy. However, "irregular" periods, spotting between periods, and not missing periods are commonly reported across contexts as a result for not suspecting a pregnancy. Period tracking apps may support people connecting a missed period to pregnancy, or they may also misdirect a person through inaccurate information. Other reasons for disrupted menstruation such as hormonal care or chemotherapy may mean that menstrual changes are not interpreted as a sign or symptom of a pregnancy.

3.3.3. *Social context:* Partners, family, and community-members have been shown to play a critical role in interpreting signs and symptoms of pregnancy. A person's social context can mean that other people notice a pregnancy before they do, alerting them to this [4]. People may also seek members of their social network to help interpret signs and symptoms that they are experiencing. Women's perceptions of their choices around pregnancy outcomes can contribute to a delay in acknowledging a pregnancy [2]. In contexts where there is a concern around malignant forces threatening a pregnancy – e.g., witchcraft or evil spirits – women are incentivised to avoid recognition or to conceal a known pregnancy from the rest of the community [12].

3.3.4. *Epidemiological and health context:* The typicality of signs and symptoms, and a person's interpretation that these would be connected to a pregnancy, are embedded in their physical and psychosocial context. This includes the epidemiological profile of the context they live, which may include diseases (e.g.: malaria) with similar symptoms to a pregnancy and more plausible than a pregnancy [13].

3.4. Opportunities for confirmation

3.4.1. *Medical and embodied confirmation*: Approaches to 'confirmation' vary across the literature and between individuals. While much of the literature frames confirmation as occurring when a biomedical test is done (e.g., a urine or blood pregnancy test), some literature uses an individual's own account of confirmation, which can include bodily changes, missed periods, etc. [14]. Embodied knowledge, for example, the experience of foetal movement, may form the basis of pregnancy confirmation.

3.4.2. *Accessibility and acceptability of confirmation options*: Confirmation options may be differently accessible to an individual. For example, confirmation through online resources or a pregnancy checklist could be more accessible to those with internet and a certain level of health literacy. Opportunities to use different types of medical pregnancy confirmation tests (urine pregnancy test, ultrasound, etc) are shaped by in/accessibility. The affordability and costs associated with medical testing can also be important [4]. The macro social, political, and legal context of a pregnancy recognition trajectory can have important implications. Concerns may reflect fears of social repercussions as well as the political environment; where abortions are restricted, people may fear being observed buying a pregnancy test.

3.4.3. *Health systems and confirmation*: The health system can have important implications for whether and how a person obtains confirmation. This is particularly the case for medical confirmation, although the regulation of healthcare may mean that other sources of confirmation, such as midwives, healers, or other non-medical practitioners are less accessible and/or acceptable. Healthcare providers make assumptions about which populations should be offered pregnancy testing services [15]. Primary care providers may overlook pregnancy recognition desires among women in mid- and later-life assuming they cannot get pregnant.

3.4.4. *Confirmation of the end of a pregnancy / no pregnancy*: Confirmation also includes the confirmation of the end of a pregnancy or the confirmation of no pregnancy. For some people, this can be confirmed through resumption of menstruation. Post-abortion care includes providing various medical tests as part of abortion-care packages [16].

3.4.5. *Medical and research interventions*: Medical interventions can require pregnancy tests (e.g., [17]). Pregnancy confirmation – whilst not the focus of many research or intervention studies – is often incorporated into the research design – although how pregnancy confirmation was ascertained is often not made explicit.

4. Discussion

Our framework complicates research that takes a person being pregnant as the starting point of their subsequent care, showing the important role of pregnancy recognition on their lives. The framework can be used to assess the consequences of pregnancy recognition on a variety of different outcomes and experiences, beyond notions of 'timely' commencement of pregnancy-related care, including abortion care. The components of this framework are linked but distinct and can be researched in isolation or combination. This can inform future theoretical, empirical, and methodological thinking; particularly ways to go beyond retrospective research on pregnancy recognition to nuance our understandings.

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