Measures of pregnancy intention: why use them and what do they tell us?

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I / we certify that:

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Abstract

Understanding pregnancy intention is an important public health measure that captures the ability of individuals to access information, resources, and services needed to plan the timing and spacing of pregnancies. Pregnancy intention is a complex construct impacted by social, emotional, financial cultural and contextual factors. In this review we will examine the range of available tools for individuals and populations to evaluate pregnancy intention, the timing of the tools in relation to pregnancy, their interpretation and use for policy and practice. Traditionally, pregnancy intention was only assessed in population health surveys however more sophisticated tools, and measures have been developed. These tools can be used at several timepoints: before pregnancy; during pregnancy; or after the pregnancy has ended. It is important to appreciate the varied contexts globally for women and their partners when assessing pregnancy intention, and the ability of a given tool to capture this when used retrospectively or prospectively. These tools can inform targeted delivery of services for a person or couple before, during and after pregnancy. This knowledge can inform strategies at an individual, community, and population level as an indicator of access to sexual and reproductive health information and knowledge and uptake of preconception health.

Introduction.

Capturing pregnancy intention is an important public health measure as it can be used to identify and monitor trends in reproductive health behaviours, to inform areas of need, and design health care services both for pregnancy prevention and pregnancy preparation.(1, 2) The prevention of unintended conceptions is a critical reproductive health issue globally as over half of unintended pregnancies end in abortion, (3) many in unsafe circumstances that risk the mother's health and life. Women who continue an unintended pregnancy through to antenatal care and birth have been found to experience worse maternal, neonatal and child health outcomes compared to planned pregnancies including preterm birth, low birthweight, postnatal depression, lower levels of breastfeeding, and poorer long term child health, growth and developmental trajectories. (4-9) Nevertheless, an estimated 48% all pregnancies are unintended globally. (3) Certain populations are at higher risk of unintended pregnancies: those of younger age, those without partners, those from socio-economic disadvantage and those from low- and middle-income countries (LMICs). (3, 10, 11) Higher parity is also associated with increased rates of unintended pregnancy. (12-14)

The concept of an unintended pregnancy is relatively recent, emerging only in the 20th century with the development, increasing availability and uptake of effective methods of contraception. (15) Decreasing unintended pregnancy has been a frequent policy aim, and as a result there have been many attempts worldwide to measure the levels of intended pregnancy, varying from strategies in which the concept is assumed to be self-evident to more sophisticated measurement efforts. The United States (U.S.) has the longest history of asking about pregnancy intention, with national surveys from the 1950s onwards, with the most recent federally sponsored National Survey of Family Growth (NSFG) beginning in 1973. (16, 17) These surveys have used suites of questions to allocate pregnancies to the categories of "intended" (wanted at the time of conception), "mistimed" (a pregnancy that is wanted at some time but occurred soon than was wanted), and "unwanted" (a pregnancy that was not wanted at any time). The "mistimed" and "unwanted" categories are then combined to estimate "unintended" pregnancies. (18) The U.S. approach to measuring pregnancy intention has been highly influential, with the concepts of "mistimed" and "unwanted" incorporated into many surveys, including the Demographic and Health Surveys

(DHS) which are widely used throughout LMICs. (19) In developed countries outside the U.S. there has been substantially more variation in ways of assessing pregnancy intention and since 2010 The National Surveys of Sexual Attitudes and Lifestyles (Natsal) in the UK has used a validated measure. (15)

Around the turn of the century, when it was clear that rates of unintended pregnancy were not falling in the way it had once been expected they would, there was growing recognition that pregnancy intention was a more complex construct, involving social, emotional, financial, cultural, and contextual factors.(2) The limitations of existing measurement strategies were also becoming apparent.(1, 20, 21) As a response, more sophisticated measurement strategies were developed, often capitalizing on more robust measurement methods such as psychometrics which is now often used to develop health measures.(22, 23)

In this review we will examine the range of tools available to evaluate pregnancy intention in individuals and populations, the timing of the tools in relation to pregnancy and their interpretation and implications for individuals, public health policy and practice. It is important to define our focus on the measurement pregnancy intentions, by which we mean women's thoughts, feelings and plans about a particular pregnancy either current, near future or recent past. This is in contrast to fertility intentions; a demographic concept which relates to how many children a woman would like to have in total across her whole reproductive lifecourse.

Why do we need to know about pregnancy intention?

Pregnancy intention and pregnancy outcomes

As previously noted, unintended pregnancies are associated with increased risks of adverse pregnancy and perinatal outcomes,and are more likely to end in abortion and expose

women to unsafe abortion that contributes to 9% of global maternal mortality and many millions more are left with lifelong complications. (24) Interpregnancy intervals are shorter in women with unintended pregnancies resulting in an increased rates of adverse pregnancy outcomes. (25, 26), an issue that is potentially preventable with education and postpartum contraception.

Pregnancy intention and preconception care

Women continuing unintended pregnancies demonstrate lower levels of healthy preconception and pregnancy care behaviours; they are more likely to smoke and have lower quality diets compared to women with planned pregnancies. (27) Of increasing importance in a world of rising non-communicable diseases, is the reduced opportunity for pre-pregnancy optimisation of chronic medical conditions such as diabetes and obesity as well as the impact on mental health conditions such as depression, or of the chance to review potentially teratogenic medications. (28).

Pregnancy intention and health service use

Women with an unintended pregnancy are less likely to present for antenatal care or if they do, do so later and have fewer episodes of care compared to women with a planned pregnancy. (29, 30) The World Health Organization (WHO) recommends a minimum of eight antenatal care visits to reduce adverse outcomes in pregnancy (31) but for many women this target is unachievable; particularly so those with unintended pregnancies in LMICs (29, 30, 32). In terms of other services use, they are also less likely to use postnatal contraception, or to access postnatal care and there have been mixed results for immunisation uptake for the children of unintended pregnancies. (33, 34)

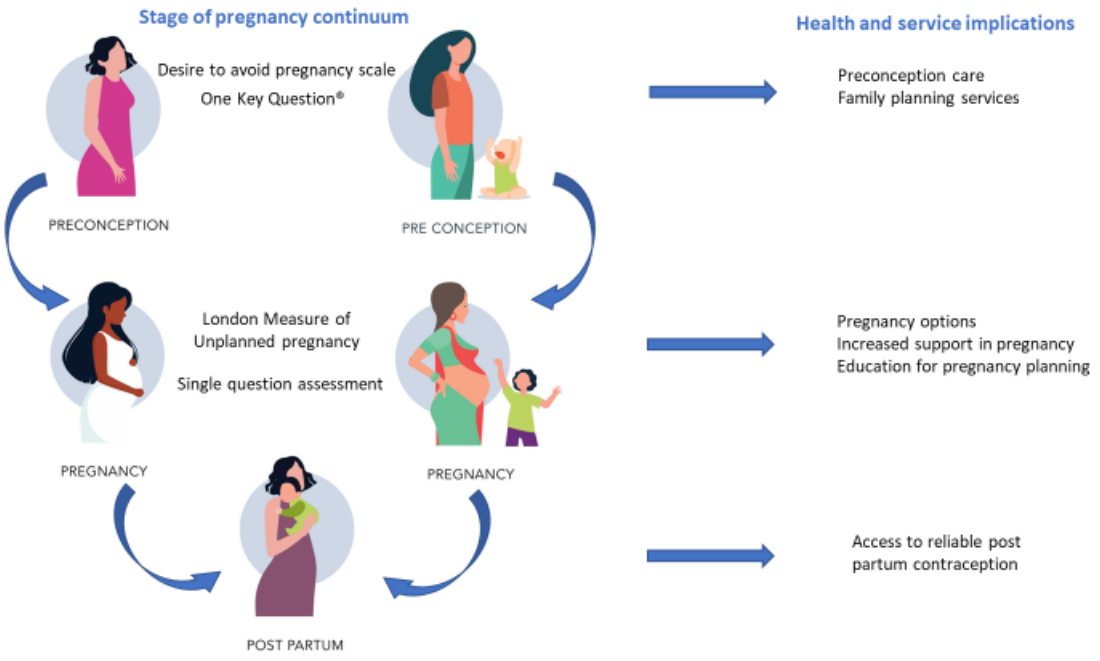
Pregnancy intention has been proposed as one of the nine key indicators of a woman's preconception wellness and has been put forward as a marker of *"…access to and use of reproductive health care".* (35) The selection and understanding of such measures was developed to monitor the delivery and performance of health systems to improve the delivery of preconception care.

How (and when) do we measure pregnancy intention?

Pregnancy intention can be assessed at several timepoints, prospectively before a woman is pregnant, or retrospectively (asking about a pregnancy that has already happened) whilst a woman is pregnant or after her pregnancy has ended. Tools used to assess pregnancy intention exist in several forms; individual questions with a dichotomous outcome, sets of questions on a topic and psychometrically validated measures (Figure 1). A psychometrically validated measure is one that has undergone rigorous development and evaluation to confirm it fulfils its measurement aim and is effective for use in clinical care or research. (36)

To date, data on pregnancy intention has predominantly been collected during research or public health surveillance to provide information on the levels of unplanned pregnancy and inform service development. (17, 19) There has been less implementation of pregnancy intention measures in clinical services, though this is gradually changing. It is important to understand the tools available to explore pregnancy intention at these different timepoints, their strengths and limitations and how they may be utilised.

Figure 1: Tools to assess pregnancy intention



Retrospective assessment

The field of measurement of intention relating to a pregnancy that has already occurred (retrospective) is more advanced, with tools that have been in use for decades. Assessment

is ideally asked when a woman is pregnant or as soon after the end of pregnancy as possible, before long periods of time or feelings about post-pregnancy circumstances affect recall. (37, 38) For non-biased population level assessment it should be asked of all women attending for early pregnancy services, termination services or antenatal care regardless of partner or contraception status, or of whether a pregnancy was achieved through assisted reproductive technology means. When asked in antenatal care, this has traditionally been with a dichotomous question of if a pregnancy was planned or unplanned. In research, sets of survey questions used in the U.S. The National Survey of Family Growth (NSFG) and DHS, have been widely used. (16, 19)

The London Measure of Unplanned Pregnancy (LMUP) (also known as the 'Circumstances of Pregnancy' questionnaire) is a psychometrically valid and reliable measure of pregnancy intention, based on lay views, that asks about a pregnancy that has already occurred. (23) It comprises six questions and produces a score 0-12, a higher score indicating a more intended/planned pregnancy. (39) It has now been validated for use in many countries and is widely used. (40, 41) Its advantages are that it is quick and easy to complete, it is highly acceptable, makes no assumptions about the nature of women's relationships nor relies on women having fully formed childbearing plans, and it can be used with any pregnancy regardless of outcome. Several other measures and questions have been developed but have not been widely used. (42, 43)

The routine use of the LMUP, in place of the single question with a binary outcome, is being piloted in antenatal care in selected centres in both the United Kingdom and Australia. Evaluations of this are exploring midwives' opinions on asking the LMUP questions and women's perspectives on being asked them in the booking appointment. If used nationally, and supplemented with data from termination services, this would form a population level surveillance system of unplanned pregnancy that would provide information on the scale of the problem, determinants, causal pathways and consequences of unplanned pregnancy. This information could be used to further the case for investment in contraception and preconception health services. On an individual level, referral pathways can be implemented to support women with unplanned pregnancies to consider their options of

whether to continue the pregnancy and, if they do, to support them and provide services to mitigate adverse outcomes.

Prospective assessment

There has been less population-level research conducted on prospective pregnancy intentions. This is due in part to the fact that it was only in 2019 that a psychometrically validated measure was published. (22) The Desire to Avoid Pregnancy (DAP) Scale assesses 14 items across three domains to give an average score from 0- 4, with a higher score indicating a higher desire to avoid pregnancy and therefore a lower pregnancy intention. (22) As a new measure there is as yet limited published research, but it has already been adapted for use in a range of settings including the UK, Brazil and Botswana and Kenya. (44) This is a potentially valuable research tool that will enable an exploration of the factors associated with pregnancy intention, how these change over time and how pregnancy intention is related to behaviours such as contraception use and other issues such as reproductive autonomy. (45)

For clinical use, a 14-item measure such as the DAP is unlikely to be appropriate in a face-to-face encounter, though could be used in pre-appointment questionnaires or other formats. A shorter version of the DAP would be preferable and could be used by health care professionals to identify who needs contraception advice, preconception advice or both. For this empirical cut points need to be developed and work needs to be done on how to translate the DAP score into useful information for clinicians and their clients. Other approaches to identifying patient's needs in this way, which are clinical tools rather than measures, include the One Key Question® *"Would you like to be become pregnant in the next year?"* with four possible response of "Yes, I'm not sure, I don't mind either way, No or methods based on reproductive life planning. (46, 47) Evidence suggests that these are feasible and acceptable but as yet there is little evidence of the impact of these on contraception use or pregnancy planning.

The context of measuring pregnancy intention

It is important to appreciate the varied contexts globally for women and their partners when assessing pregnancy intention, and the ability of a given tool to capture this when used retrospectively or prospectively.

The notion that women have the capacity to plan their pregnancies may not be universal. While intended pregnancies have been seen in all settings where pregnancy intention has been assessed, women's capacity to translate their own desires for pregnancy may be circumscribed by cultural expectations, limited access to health services and resources or reproductive coercion. (48) Some research has found that the influence of partners on pregnancy intention and in general is not well captured (49) or that the desire to avoid pregnancy may relate to conception with a particular partner. While a single question, with a dichotomous answer is potentially too crude to capture the complexity of pregnancy intention and may lead to misclassification,in certain care settings it may be all that is feasible to record with an appreciation of this limitation embedded in the interpretation.

Over time, an appreciation of the importance of ambivalence or uncertainty regarding pregnancy intention has also developed. Changes to survey questions to reflect this has seen such options chosen by 13-15% of women. (50) A study that applied a new more relaxed construct concluded that current measures of unintended pregnancy may overestimate rates and that ambivalence may not be well captured.(41) The LMUP captures ambivalence in both the individual questions responses and overall total score.

The importance of language choice for questions has also been identified, as a woman's desires and behaviours may not always be aligned. Even when women report that they wish to avoid pregnancy their contraceptive behaviours are not always congruent with their stated desires. (51) A potential contradiction in pregnancy intention tools that only explore one aspect is that planning or intending to become pregnant may be distinct from wanting to be pregnant.(21) With a comprehensive measurement strategy, such as a psychometric measure, this should all be taken into account.

With all tools, consideration must also be given to the "changing realities" and that a person's prospective pregnancy intention may change over time with changing personal scenarios. (2) With prospective assessment, given a person's intention for pregnancy may change over time as circumstances change, this needs to be asked regularly to have

meaningful healthcare impact. To understand the impact on health outcomes this also needs to be compared with antenatal care and pregnancy outcomes which is often difficult given the split in service delivery and data collection between primary and hospital care.

What can we do with the information?

As previously mentioned a prospective understanding of pregnancy intention can inform who needs which kind of adviceand can empower individuals or couples to formulate and achieve their reproductive intentions. (2, 52) Such assessment allows the healthcare worker to provide contraception information or preconception care which may prevent unintended pregnancy, or enable people to optimise their health prior to pregnancy.(53). Several pilot studies regarding One Key Question® have shown feasibility and acceptability and formal studies are underway to assess the impact of this tool on reproductive health. (54)

Retrospective assessment allows identification of women who may require more targeted care in pregnancy, because they may be at risk of adverse pregnancy and postpartum outcomes. This can include a discussion on continuation of a pregnancy, increased psychological support while pregnant, education for subsequent pregnancy planning and access to post-partum contraception. Using this information at a population level can identify populations with an unmet need for contraception and it has also been suggested a key metric to document a preconception wellness. (35)

Regular assessment can also identify and monitor trends in pregnancy intention that may be associated with certain demographics or contextual factors. (55) A recent study in the United Kingdom explored the impact of COVID-19 lockdowns and the rates of unintended pregnancy. (56) This study showed women reported increasing difficulty in accessing contraception post lockdown, and that these women were likely to have a more unplanned pregnancy than those who could access contraception more readily.

Areas requiring more research

We recognise that there is still much to learn about the measurement and application of unintended pregnancy. There has been limited work for example in assessing the intention of a potential partner in the pregnancy avoidance or planning process and most research to

date has been conducted only on cis-gendered women. The association between unintended pregnancy and adverse health outcomes has been examined in LMIC,(13, 57) but less so in high income settings. One of the key challenges with the use of these tools is to ensure that they don't only measure the issue but also inspire change in clinical care.

Conclusion

Assessing pregnancy intention is important for individual care and as a public health measure. It can inform targeted delivery of services for a person or couple before, during and after pregnancy. If captured routinely, rather than a reliance on intermittent collection through surveys, this knowledge can inform strategies at an individual, community and population level and serve as an indicator of a person's and population's preconception health.

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