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PREGNANCY AND ITS SCIENTIFIC STUDY

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Abstract:

Pregnancy is the fertilization and development of one or more offspring, known as an embryo or fetus, in a woman's uterus. In a pregnancy, there can be multiple gestations, as in the case of twins or triplets. Childbirth usually occurs about 38 weeks after conception; in women who have a menstrual cycle length of four weeks, this is approximately 40 weeks from the start of the last normal menstrual period (LNMP). Human pregnancy is the most studied of all mammalian pregnancies. Conception can be achieved through sexual intercourse or assisted reproductive technology.

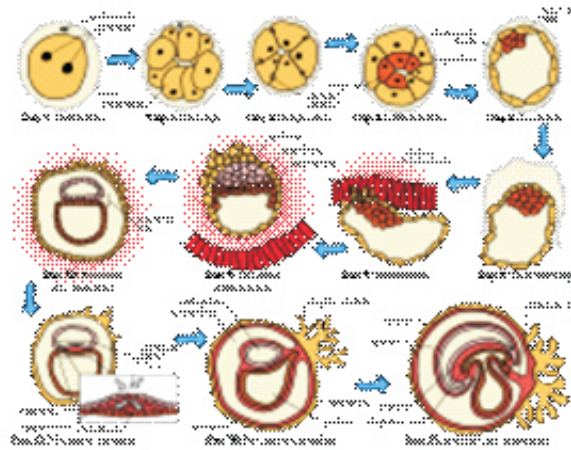
INTRODUCTION

An embryo is the developing offspring during the first 8 weeks following conception, and subsequently the term fetus is used henceforth until birth.[1][2] 40% of pregnancies in the United States and United Kingdom are unplanned, and between a quarter and half of those unplanned pregnancies were unwanted pregnancies.[3][4] Of those unintended pregnancies that occurred in the US, 60% of the women used birth control to some extent during the month pregnancy occurred.[5]

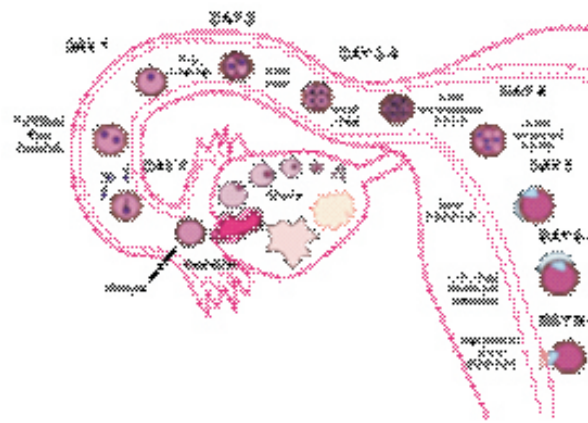
In many societies' medical or legal definitions, human pregnancy is somewhat arbitrarily divided into three trimester periods, as a means to simplify reference to the different stages of prenatal development. The first trimester carries the highest risk of miscarriage (natural death of embryo or fetus). During the second trimester, the development of the fetus can be more easily monitored and diagnosed. The beginning of the third trimester often approximates the point of viability, or the ability of the fetus to survive, with or without medical help, outside of the uterus.[6]

One scientific term for the state of pregnancy is gravidity (adjective "gravid"), Latin for "heavy" and a pregnant female is sometimes referred to as a gravida.[7] Similarly, the term parity (abbreviated as "para") is used for the number of times a female has given birth, counting twins and other multiple births as one pregnancy, and usually including stillbirths. Medically, a woman who has never been pregnant is referred to as a nulligravida, a woman who is (or has been only) pregnant for the first time as a primigravida,[8] and a woman in subsequent pregnancies as a multigravida or multiparous.[7][9] Hence, during a second pregnancy a woman would be described as gravida 2, para 1 and upon live delivery as gravida 2, para 2. An in-progress pregnancy, as well as abortions, miscarriages, or stillbirths account for parity values being less than the gravida number. In the case of twins, triplets etc., gravida number and parity value are increased by one only. Women who have never carried a pregnancy achieving more than 20 weeks of gestation age are referred to as nulliparous.[10]

INITIATION



The initial stages of human embryogenesis.



Fertilization and implantation in humans.

Although pregnancy begins with implantation, the process leading to pregnancy occurs earlier as the result of the female gamete, or oocyte, merging with the male gamete, spermatozoon. In medicine, this process is referred to as fertilization; in lay terms, it is more commonly known as “conception.” After the point of fertilization, the fused product of the female and male gamete is referred to as a zygote or fertilized egg. The fusion of male and female gametes usually occurs following the act of sexual intercourse, resulting in spontaneous pregnancy. However, the advent of assisted reproductive technology such as artificial insemination and in vitro fertilisation have made achieving pregnancy possible without engaging in sexual intercourse. This approach may be undertaken as a voluntary choice or due to infertility.

The process of fertilization occurs in several steps, and the interruption of any of them can lead to failure. Through fertilization, the egg is activated to begin its developmental process, and the haploid nuclei of the two gametes come together to form the genome of a new diploid organism.

At the beginning of the process, the sperm undergoes a series of changes, as freshly ejaculated sperm is unable or poorly able to fertilize.[11] The sperm must undergo capacitation in the female's reproductive tract over several hours, which increases its motility and destabilizes its membrane, preparing it for the acrosome reaction, the enzymatic penetration of the egg's tough membrane, the zona pellucida, which surrounds the oocyte. The sperm and the egg cell, which has been released from one of the female's two ovaries, unite in one of the two fallopian tubes. The fertilized egg, known as a zygote, then moves toward the uterus, a journey that can take up to a week to complete. Cell division begins approximately 24 to 36 hours after the male and female cells unite. Cell division continues at a rapid rate and the cells then

develop into what is known as a blastocyst. The blastocyst is made up of three layers: the ectoderm (which will become the skin and nervous system), the endoderm (which will become the digestive and respiratory systems), and the mesoderm (which will become the muscle and skeletal systems). Finally, the blastocyst arrives at the uterus and attaches to the uterine wall, a process known as implantation.

The mass of cells, now known as an embryo, begins the embryonic stage, which continues until cell differentiation is almost complete at eight weeks. Structures important to the support of the embryo develop, including the placenta and umbilical cord. During this time, cells begin to differentiate into the various body systems. The basic outlines of the organ, body, and nervous systems are established. By the end of the embryonic stage, the beginnings of features such as fingers, eyes, mouth, and ears become visible.

Once cell differentiation is mostly complete, the embryo enters the final stage and becomes known as a fetus. The early body systems and structures that were established in the embryonic stage continue to develop. Sex organs begin to appear during the third month of gestation. The fetus continues to grow in both weight and length, although the majority of the physical growth occurs in the last weeks of pregnancy.

Duration

Healthcare professionals name three different dates as the start of pregnancy:

the first day of the woman's last normal menstrual period, and the resulting fetal age is called the gestational age
 the date of conception (about two weeks before her next expected menstrual period), with the age called fertilization age
 the date of implantation (about one week after conception).

Since these are spread over a significant period of time, the duration of pregnancy necessarily depends on the date selected as the starting point chosen.

As measured on a reference group of women with a menstrual cycle of exactly 28-days prior to pregnancy, and who had spontaneous onset of labor, the mean pregnancy length has been estimated to be 283.4 days of gestational age as timed from the first day of the last menstrual period as recalled by the mother, and 280.6 days when the gestational age was retrospectively estimated by obstetric ultrasound measurement of the fetal biparietal diameter (BPD) in the second trimester.[12] Other algorithms take into account a variety of other variables, such as whether this is the first or subsequent child (i.e., pregnant woman is a primipara or a multipara, respectively), the mother's race, parental age, length of menstrual cycle, and menstrual regularity), but these are rarely used by healthcare professionals. In order to have a standard reference point, the normal pregnancy duration is generally assumed to be 280 days (or 40 weeks) of gestational age.

There is a standard deviation of 8–9 days surrounding due dates calculated with even the most accurate methods. This means that fewer than 5 percent of births occur on the day of being 40 weeks of gestational age; 50 percent of births are within a week of this duration, and about 80 percent are within 2 weeks.[2] It is much more useful and accurate, therefore, to consider a range of due dates, rather than one specific day, with some online due date calculators providing this information.[1]

The most common system used among healthcare professionals is Naegele's rule, which was developed in the early 19th century. This calculates the expected due date from the first day of the last normal menstrual period (LMP or LNMP) regardless of factors known to make this inaccurate, such as a shorter or longer menstrual cycle length. Pregnancy most commonly lasts for 40 weeks according to this LNMP-based method, assuming that the woman has a predictable menstrual cycle length of close to 28 days and conceives on the 14th day of that cycle

Accurate dating of pregnancy is important, because it is used in calculating the results of various prenatal tests, (for example, in the triple test). A decision may be made to induce labour if a fetus is perceived to be overdue. Furthermore, if LMP and ultrasound dating predict different respective due dates, with the latter being later, this might signify slowed fetal growth and therefore require closer review.

The age of fetal viability has been receding because of continued medical progress. Whereas it used to be 28 weeks, it has been brought back to as early as 23, or even 22 weeks in some countries.[citation needed]

Preterm, term and postterm

Further information: Preterm birth and Postterm pregnancy

Pregnancy is considered "at term" when gestation has lasted 37 complete weeks (occurring at the transition from the 37th to the 38th week of gestation), but is less than 42 weeks of gestational age (occurring at the transition from the 42st week to the 43rd week of gestation, or between 259 and 294 days since LMP). "Full term" refers to the gestation having lasted 40 weeks from the first day of the mother's last menstrual period. This is the end of gestation on average. Alternatively expressed, this corresponds to a gestational age of 40 weeks and 0 days, or 280 days, or approximately 9 months, and occurs at the transition from the 40th to the 41st week of gestation. On average, it corresponds to an embryonic age of 38 weeks or 266 days.

Events before completion of 37 weeks (259 days) are considered preterm; from week 42 (294 days) events are considered postterm.[14]When a pregnancy exceeds 42 weeks (294 days), the risk of complications for both the woman and the fetus increases significantly.[7][8] Therefore, in an otherwise uncomplicated pregnancy, obstetricians usually prefer to induce labour at some stage between 41 and 42 weeks.9

Birth before 39 weeks, even if considered "at term", increases the risk of complications and premature death, from factors including underdeveloped lungs, infection due to underdeveloped immune system, problems feeding due to underdeveloped brain, and jaundicefrom underdeveloped liver. Some hospitals in the United States have noted a significant increase in neonatal intensive care unit patients when women schedule deliveries for convenience and are taking steps to reduce induction for non-medical reasons.[19] Complications from Caesarean section are more common than for live births.

Recent medical literature prefers the terminology preterm and postterm to premature and postmature. Preterm and postterm are unambiguously defined as above, whereas premature and postmature have historical meaning and relate more to the infant's size and state of development rather than to the stage of pregnancy.

Childbirth

Childbirth is the process whereby an infant is born.

A woman is considered to be in labour when she begins experiencing regular uterine contractions, accompanied by changes of her cervix – primarily effacement and dilation. While childbirth is widely experienced as painful, some women do report painless labours, while others find that concentrating on the birth helps to quicken labour and lessen the sensations. Most births are successful vaginal births, but sometimes complications arise and a woman may undergo a cesarean section.

During the time immediately after birth, both the mother and the baby are hormonally cued to bond, the mother through the release of oxytocin, a hormone also released during breastfeeding. Studies show that skin-to-skin contact between a mother and her newborn immediately after birth is beneficial for both the mother and baby. A review done by the World Health Organization found that skin-to-skin contact between mothers and babies after birth reduces crying, improves mother-infant interaction, and helps mothers to breastfeed successfully. They recommend that neonates be allowed to bond with the mother during their first two hours after birth, the period that they tend to be more alert than in the following hours of early life.[10]

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