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Ultrasound in midwifery: A review

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Abstract
Ultrasound is widely used in pregnancy; it is part of routine care and is used for screening during pregnancy. Prenatal ultrasound is unique among other diagnostic tests because it allows parents to have direct access to embryo images; thus, it is a much wanted medical help. At present, ultrasound has become an essential part of modern prenatal care, both in developing countries and in industrialized countries. On the other hand, women often believe that ultrasound is an essential part of prenatal care and tend to have an ultrasound image as the first photograph of their child. Ultrasound in pregnancy and childbirth has a tremendous value, two of which are very important in this regard; i.e. determining the correct course of pregnancy and the discovery of fetal abnormalities. Studies have shown that ultrasound can reveal at least 35-50% of major embryonic anomalies with a specificity of 90- 100%. Also, the exact timing of pregnancy may affect the outcome of pregnancy.

Keywords: ultrasound, midwifery, review

Introduction
Ultrasound midwifery was first introduced by Professor Donald in 1958, revolutionizing the diagnostic process of prenatal care and surveillance of the fetus [1]. Ultrasound is widely used in pregnancy; it is part of routine care and is used for screening during pregnancy [2]. Prenatal ultrasound is unique among other diagnostic tests [3] because it allows parents to have direct access to embryo images; thus, it is a much wanted medical help. At present, ultrasound has become an essential part of modern prenatal care, both in developing countries and in industrialized countries [4]. On the other hand, women often believe that ultrasound is an essential part of prenatal care and tend to have an ultrasound image as the first photograph of their child [5]. Safe, portable, non-invasive ultrasonography is cheaper than other methods of imaging [6]; it, also, provides the possibility of measuring the true age of pregnancy as an essential practice in midwifery [7]. One of the main reasons for feeling happy is that ultrasound scan ensures the health of the baby and reveals the sex of the baby [8].The desire of doctors and the demands of pregnant women has led to the use of ultrasonography of pregnancy in many societies as a screening test [9]. Recent advances in prenatal diagnostic methods, especially in prenatal ultrasound, have led to a better understanding of congenital specific abnormalities and, consequently, improved surgical and medical procedures for the treatment of birth defects [10]. The potential benefits of this include the mother's satisfaction and her confidence in the health of the fetus which should be taken into account against the risk of unnecessary treatments due to ultrasound abnormal findings and costs [11]. The benefits of diagnostic ultrasound is accepted in both developed and developing regions [12].

Ultrasound
Performing routine ultrasound in pregnancy is a common component in the world of prenatal care packages [13]. 40 years has passes since Donald first started using ultrasound in obstetrics and midwifery; this technology has become quite dominant within the domain of midwifery during the last 20 years. Today, the use of ultrasound is also recommended as a screening tool or diagnostic test [14].

Ultrasound in pregnancy
Ultrasound is commonly used in the diagnosis and treatment of prenatal problems as general clinical applications for ultrasonography such as pregnancy confirmation, multi-pregnancy diagnosis, gestational age estimates, placenta placement, fetal health monitoring, cesarean section evaluation and examination of postpartum hemorrhage [15]. Also, many karyotype cases are subject to positive findings in ultrasound. It is worth noting that enough data can be obtained by using ultrasound on abnormalities such as empty kidney area [16]. Studies show that, apart from women living in rural areas and underdeveloped countries, there is rarely a single woman not having experienced pregnancy ultrasound; many women have 10 or more ultrasound scans [17].

Ultrasound and the estimation of embryo's weight
One of the important issues in midwifery is the estimation of the embryo's weight, which has been performed since the last decade as a routine pre-natal evaluation. Inappropriate estimation of the fetal weight leads to a lack of recognition of cases such as retardation of fetal development and macrosomia [18]. About 5-10% of embryos have growth

constraints; if these constraints are diagnosed correctly, possible complications, such as fetal heart disease, hypoglycemia, hypothermia, meconium aspiration and asphyxia at birth are preventable [19].

The incidence of macrosomia is 8-10% in non-diabetic mothers and 25- 42% in diabetic mothers. If diagnosed correctly, possible complications, such as dystocia pneumonia, shoulder dystocia, fetal rebellious network damage, uterine rupture, vaginal rupture, and bleeding are preventable. Suitable methods for estimating the embryo's weight are the priorities of delivery, which is usually done by two methods of clinical and ultrasound estimation [20].

Ultrasound and gestational age estimation

One of the important assessments in pregnancy care is determining the gestational age (GA) and estimated date of confinement (EDC) [21]. Accurate knowledge of gestational age is very important; since there may be complications during pregnancy, their optimal treatment depends on the gestational age. For example, in the event of preeclampsia at 38 weeks of gestation, delivery is considered to be the best treatment for mother and baby. If the problem occurs at week 28, the recommendation is for conservative treatment [22]. Misdiagnosis of gestational age might cause the implementation of improper medical care. For example, in most women, the sound of a fetal heart could be heard at 16-19th weeks, and in 80% of women the fetal heart is heard within 20-22 weeks. If the caretaker expects to hear fetal heart sounds sooner than expected due to incorrect gestational age, such an action might generate baseless anxiety [23]. It is also possible to measure ALF protein and two other pregnancy hormone in the mother during 16-18 weeks of pregnancy. If these tests are abnormal, amniocentesis is recommended due to suspected Down syndrome. If the gestational age is not properly estimated, there will be an unlikely event of errors in these tests and amniocentesis. The complications of elective cesarean delivery and induction of childbirth are the premature birth of a baby due to preterm labor resulting from incorrect determination of gestational age [24].

In cases where the gestational age is not clearly determined, ultrasound is significant. To determine the gestational age, based on ultrasound, measurement of embryonic parameters including Crown Roost Length (CRL), Biparietal Diameter (BDP), Fremor Length (FL), head circumference, abdominal circumference, and comparison with the norm of the device are used. EDC method is the most accurate when used with multiple parameters. It is worth noting that is used for determining the gestational age and estimating the delivery time in the first trimester; in the second and third trimester, FL and BPD are the most accurate [25].

Ultrasound and embryonic anomalies

In many ways, ultrasound in pregnancy and childbirth has a tremendous value, two of which are very important in this regard; i.e. determining the correct course of pregnancy and the discovery of fetal abnormalities. Studies have shown that ultrasound can reveal at least 35-50% of major embryonic anomalies with a specificity of 90- 100%. Also, the exact timing of pregnancy may affect the outcome of pregnancy [26].

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