

An investigation into the effects of pregnancy duration on maternal and fetal outcomes in nulliparous mothers with a gestational age of between 38-40 weeks and over 40 weeks in Be'sat Hospital, Sanandaj

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Abstract: Many factors affect duration of pregnancy. And after the expected time labor is associated with complications for mothers and fetuses. World Health Organization (WHO) states that pregnancy duration is 280 days. Most studies have also defined pregnancy duration to be 281-283 days. Pregnancy duration can vary in different populations and according to a theory it depends on the cervical ripening time. According to the definition, pregnancy of 42 weeks or more (more than 294 days) is called post-term pregnancy whose incidence has been reported to be 3-12%. Various factors affect pregnancy duration. One of these factors is genetics which results in different pregnancy durations in different populations. Parity also affects pregnancy duration. According a study conducted in Swede, risk of post-term pregnancy is higher in nulliparous women. Other complications of prolonged pregnancy include Intra Uterine Growth Retardation (IUGR) and macrosomia. Intra Uterine Fetal Death (IUFD) is more common among fetuses with IUGR growth limitation that are born after 42nd week. In fact, in post dates there are growth limitations in IUFD cases [3]. Pregnancy continuation after 40 weeks is involved with a high risk of fetal mortality. Macrosomia and prolonged second phase of labor are among causes that result in atonic, need for transfusion, and an increase in infection rates. **Methods** ; In a historic-cohort study, 400 pregnant women (200 of 38 to 40 weeks and 200 of over 40 weeks) were studied. X² and Mann-Whitney tests were used for data analysis through SPSS. **Results** ; The mean age of mothers was 23.57±4.33, no significant difference was observed between the two groups (P>0.05). In terms of maternal hospitalization, induction, cesarean delivery, and fetal decelerations, the two groups were significantly different (P<0.01). **Conclusion** ; Based on our findings, more care is necessary for the fetal deceleration, induction, cesarean delivery, and fetal me conium.

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Introduction

World Health Organization (WHO) states that pregnancy duration is 280 days. Most studies have also defined pregnancy duration to be 281-283 days. Pregnancy duration can vary in different populations and according to a theory it depends on the cervical ripening time which follows the scheduled apoptosis time of cervical cells. This time can change depending to the individuals' genetics in different populations [1]. Different ways can be applied to estimate pregnancy duration. One of these ways is Naegele's rule provided that the last menstrual period (LMP) and regular cycles are kept in mind and recorded [2]. Another way which is currently the most important and common methods is sonography that is highly reliable if conducted in the first trimester of pregnancy [3]. According to the definition, pregnancy of 42 weeks or more (more than 294 days) is called post-term pregnancy whose incidence has been reported to be 3-12% [2].

Various factors affect pregnancy duration. One of these factors is genetics which results in different pregnancy durations in different populations [1]. Some studies concluded that fetus gender can also affect pregnancy duration; however, some have rejected this conclusion. According to these studies, owing to high levels of androgen in male fetuses, pregnancy duration is shorter [1]. Parity also affects pregnancy duration. According a study conducted in Swede, risk of post-term pregnancy is higher in nulliparous women [1]. Moreover, this risk is higher in old nulligravid mothers and teenager ones. There are few studies on the effects of profession, environment, and lifestyle on pregnancy duration. For example, exposure to ethylene oxide increases pregnancy duration. On the contrary, consuming fish in diet decreases the possibility of post-term delivery. Body Mass Index over 30 (BMI>30) is another cause of long duration of pregnancy. Smoking reduces pregnancy duration [4]. Maternal genes (not paternal ones) are effective in pregnancy duration. Other

factors affecting pregnancy duration to prolong are anencephaly, renal hypoplasia, and deficiency related to x sulfatase [5]. Among the abovementioned factors; however, only BMI \geq 25 and nulliparity have a significant relation with pregnancy duration increase [2]. After the expected time, labor will be associated with maternal and fetal complications. Fetal complications include fetal distress increase, dystocia and complications involved with it, an increase in NICU admissions, an increase in neonatal tension, and mortality increase [4]. Other complications of prolonged pregnancy include Intra Uterine Growth Retardation (IUGR) and macrosomia. Although fetal growth rate decreases in 37th week onward, in most fetuses weight continues increasing. For example, in 2006 a high percentage of fetuses that weighed over 4000 gr at birth aged 42 weeks or over it. Therefore, it seems that through timely induction of labor in order to prevent further growth of the fetus, supposedly fetal and maternal morbidity associated with macrosomia will decrease. However, American College of Gynecology (ACOG) does not support this supposition. An increase in fetal weight may increase the possibility of during-labor trauma, dystocia, and need for cesarean section [2]. Another complication of prolonged pregnancy is IUGR caused by the couple's efficiency reduction [5]. Intra Uterine Fetal Death (IUFD) is more common among fetuses with IUGR growth limitation that are born after 42nd week. In fact, in post dates there are growth limitations in IUFD cases [3]. Pregnancy continuation after 40 weeks is involved with a high risk of fetal mortality. About 60% of such deaths occur before labor. Moreover, due to distress and macrosomia, cesarean section imposed to mothers during prolonged pregnancy is high [1]. Macrosomia and prolonged second phase of labor are among causes that result in atonic, need for transfusion, and an increase in infection rates; therefore, the number of hospitalization days will increase for mothers [2]. In this regard and according to prolonged pregnancy complications, in order to prevent complications like meconium release and its subsequent aspiration meconium syndrome, macrosomia and its subsequent dystocia and birth trauma, the present study was aimed at investigating prevalence of these complications in terms of delivery time in Be'sat Hospital and making necessary predictions so as to prevent maternal and fetal complications.

Method

The present study is a historic-cohort one where nulliparous woman aged 38 and more weeks who referred to the labor ward of Be'sat Hospital were divided into two groups of those who aged 38-40 weeks and those who aged over 40 weeks (exposure

group). Inclusion criterion was: Nulliparous women aged 38 and more weeks who referred to the labor ward of Be'sat Hospital were selected. Regarding their pregnancy age, they were divided into two groups; one aged 38-40 weeks and one above 40 weeks. Sampling was in progress until the desired sample size was gained. Exclusion criterion: Mother's history of chronic disease, history of GDM due to probability of macrosomia and dystocia, neonate or fetus's proved maternal disease that would influence the outcome, indications of pregnancy termination through elective cesarean section, history of consuming tetracycline, and history of sensitivity to herbs and herbal medicines.

According to pregnancy consequences discussed in available references and midwifery reference (i.e., William's book) [1], in chapter 37 of this book these consequences are discussed in two groups based on pregnancy age and need for cesarean are mentioned to be 9 and 22 percent, respectively. With a reliability of 95% and test power of 80%, the minimum size of the sample was calculated through the following equation

$$\frac{z\left(1-\frac{\alpha}{2}\right)+z(1-\beta)}{(p_2-p_1)^2} \left(P_1(1-P_1) + p_2(1-p_2) \right) = 195$$

Finally, in each group 200 individuals (a total of 400 individuals) who had inclusion criterion were chosen for the study. According to their pregnancy age, nulliparous women were divided into two groups; one aged 38 to 40 weeks and the other one aged over 40 weeks. Information related to labor progress and whatever happened during it and variables related to mothers and neonates that were proved by a gynecologist were recorded in questionnaires.

Collected data were analyzed through SPSS. Descriptive statistics was applied to generate appropriate tables. Mann-Whitney and X² tests were utilized to compare qualitative and quantitative variables, respectively (K.S test proved abnormality of quantitative variables at P<0.05).

Results

The mean age of mothers was 23.57 \pm 4.33 ranged from 15 to 38 years old. There was no significant difference between the two groups in regard with their age (P>0.05). The two groups were not significantly different regarding the first and the second stages of labor and apgar scores at 1 and 5 minutes (P>0.05). There was a significant difference between the two groups in terms of mothers' number of hospitalization days (P<0.01), induction (P=0.028), delivery type (P=0.001), fetal deceleration (P=0.007), and fetal meconium (P=0.000) (See Tables 2-5). However, there was no significant

difference between them regarding vacuum, transfusion, atonic, and rupture ($P>0.05$). Moreover, other results indicated that none of the neonates had experienced trauma and that one case of fetal death was observed in the group aged over 40 weeks.

Neonate death did not occur and 3 cases of neonate hospitalization were observed; one in the group aged 38-40 weeks and two cases in the group aged over 40 weeks; however, the difference was not significant ($P>0.05$).

Table 1. Comparison of mothers' number of hospitalization days

Pregnancy Age	Rank Mean	Arithmetic Mean	Mann-Whiney U	Z	P
38-40 weeks	185.02	1.33	16904.0	-3.177	0.001
Over 40 weeks	215.98	1.49			

$P<0.05$)

Table 2. Comparison of induction status in the two groups

Pregnancy Age	Induction: Yes	Induction: No	Total
	Frequency (%)	Frequency (%)	Frequency (%)
38-40 Weeks	94 (47.0)	106 (53.0)	200 (100.0)
Over 40 Weeks	116 (58.0)	84 (42.0)	200 (100.0)
Total	210 (52.5)	190 (47.5)	400 (100.0)

$P<0.05$)

Table 3. Comparison of delivery type in the two groups

Delivery Type Pregnancy Age	Cesarean	Natural	Total
	Frequency (%)	Frequency (%)	Frequency (%)
38-40 Weeks	54 (27.0)	146 (73.0)	200 (100.0)
Over 40 Weeks	86 (43.0)	114 (57.0)	200 (100.0)
Total	140 (35.0)	260 (65.0)	400 (100.0)

$P<0.05$

Table 4. Comparison of fetal deceleration in the two groups

Deceleration Pregnancy Age	Yes	No	Total
	Frequency (%)	Frequency (%)	Frequency (%)
38-40 Weeks	20 (10.0)	180 (90.0)	200 (100.0)
Over 40 Weeks	39 (19.5)	161 (80.5)	200 (100.0)
Total	59 (14.8)	341 (85.2)	400 (100.0)

$P<0.05$

Table 5. Comparison of meconium status in the two groups

Meconium Pregnancy Age	Yes	No	Total
	Frequency (%)	Frequency (%)	Frequency (%)
38-40 Weeks	25 (12.5)	175 (87.5)	200 (100.0)
Over 40 Weeks	57 (28.5)	143 (71.5)	200 (100.0)
Total	82 (20.5)	318 (79.5)	400 (100.0)

$P<0.05$

Discussion

Many factors affect pregnancy duration. After the expected time, delivery will be associated with maternal and fetal complications. Fetal complications include fetal distress, dystocia and its complications, an increase in the number of hospitalization in NICU, an increase in fetal seizures, and morality increase [4]. The results of the present study indicated that there was no difference between the two groups one aged under 40 weeks the other over 40 weeks regarding the first and the second labors, significance

value for each one was respectively 0.73 and 0.23. However, the results of the studies conducted by Song et al [7] and Gary C. et al [9] showed that in the second labor there was a significant difference between the two groups ($P<0.05$). In the present study the two groups were more different in the second labor compared to the first one; however, this difference was not significant. Macrosomia and prolonged pregnancy duration in the second stage of labor are among factors resulting in atonic, need for

transfusion, and an increase in the number of hospitalization days [1].

In regard with apgar of 1 and 5 minutes, there was no significant difference between the group aged under 40 weeks ($P=0.78$) and the one over 40 weeks ($P=0.41$). This finding is not in agreement with that of Ajori et al [12] which indicated that there was a significant difference between the two groups regarding their apgar of under 6 and aspiration. In addition, the results of the study conducted by Song et al [7] indicated that apgar under 7 in pregnancy of less than 40 weeks was 1% and in over 40 weeks was 2.3%, which was not significant. The reason for such difference in the results of different studies can be related to differences in health care during pregnancy, services provided to the patients, and racial characteristics. Other results of the study indicated that there was a significant difference between the two groups in regard with their number of hospitalization days ($P=0.001$), mothers' induction ($P=0.028$), and delivery type and cesarean ($P=0.00$). This finding is in complete agreement with most studies conducted all over the world such as studies conducted on causes and complications of prolonged pregnancy in Swede, Denmark, and Norway by a group of researchers supervised by Song [7]. The results of the present study indicated that fetal macrosomia was significantly more than natural term pregnancies and that number of cesarean deliveries was more due to fetal distress and arrest in labor process in prolonged pregnancy. They also showed that level of induction was significantly higher. These findings are completely in line with those of Trondheim J et al [2] that showed that cesarean number is higher due to distress and macrosomia in 40 weeks and over it. In another study conducted on 17794 individuals by Okeke et al [8] in the U.S. number of hospitalization days in NICU for pregnancies of 37-40 weeks on average was 4.5 ± 1.8 , which is not in line with the results of the present study that indicated there was only one neonate that needed hospitalization in the group aged 37-40 weeks. This discrepancy may be due to higher sensitivity of the U.S. healthcare system and hospitalization standards for neonates. Moreover, the results of the study conducted by Ajori et al [12] indicated that the two groups were significantly different regarding cesarean and fetal meconium but there was no significant difference regarding trauma and hospitalization in NICU. These findings are in line with those of the present study. Moreover, in the present study there was no significant difference between the two groups in regard with their vacuum, transfusion, atonic, rupture, and fetus hospitalization ($P>0.05$). However, there was a significant difference regarding meconium ($P<0.001$). Like the study

conducted by Ajori et al, in the present study no case of trauma was observed. There were three cases of hospitalization; one in the group aged less than 40 weeks and two in the group aged over 40 weeks.

Other results of the study indicated that there was no difference between the two groups regarding neonates' weight ($P>0.05$). This finding is in line with that of Ajori [12]. Pregnancy age has no effect of neonate's weight.

Conclusion

According to the results of the present study, it is to provide more care for deliveries of over 40 weeks in terms of deceleration and meconium. Moreover, these individuals need induction labor more.

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