

# Rates and Indicators for Amniotomy During Labor - a Descriptive Cross Sectional Study Between Primigravidas and Gravida 2 and Above

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## ABSTRACT

**Background:** Artificial rupture of membranes (Amniotomy) is a common obstetric intervention. Its rates and indications had been subjected to criticism in medical literature. The current practices recommend to reduce its rate and keep the birthing process as natural as possible. **Aim:** This observational study aimed to describe the rates and indicators for practice of artificial rupture of membranes (Amniotomy) during normal labor and to determine if any significant differences existed between women who have had one pregnancy (PG) and women who have already delivered two or more children (G2 and above) on this obstetric interventions: artificial rupture of membranes (ARM). **Results:** There were no PG participants with ruptured membranes whereas slightly more than half of the G2 and above participants ( $n = 88$ ) had ruptured membranes. The most frequent cause for ARM was active management of latent phase of labor (PG  $n = 20$  and G2 and above  $n = 9$ ). Furthermore, slow progress of labor (PG  $n = 17$  and G2 and above  $n = 7$ ) and concerns with fetal heart rate (PG  $n = 13$  and G2 and above  $n = 5$ ) had the next highest number of occurrences. Results from the proportions tests revealed that there was one significant difference between gravidity groups on the frequency of APH ( $p = 0.039$ ). That is, G2 and above participants had amniotomy done for APH (5 of 32 = 15.63%) significantly more often than PG participants (4 of 89 = 4.49%). And although not statistically significant ( $p = 0.084$ ), there were 21 cases within the PG group where ARM was performed for no specific reason (21 of 89 = 23.6%) compared to three cases within the G2 and above group (3 of 32 = 9.4%). **Conclusions:** Although ARM is a commonly performed procedure during labor, there is not much difference between its indications between PG and G2 and above. The only significantly different indication was antepartum hemorrhage which was higher in G2 and above. Amniotomy was also performed without any clear indication in 26.4% of PG and 9.4% of G2 and above. Considering ARM as obstetric intervention efforts should be done to reduce its rates. There is a need for arranging normal labor workshops to revise the indications and reviewing the rates after these workshops to reduce the rates of ARM.

**Keywords:** Artificial rupture of membranes, Primigravida, labor, Saudi Arabia.

## 1. INTRODUCTION

Amniotomy is a commonly used obstetric intervention; however preliminary data does not support its routine use in labor management (1). Its use in induction of labor in combination with oxytocin is well established when compared with other methods of induction (2). However its use in augmentation of labor is questionable. Literature review reveals that its use for augmentation of labor in combination with oxytocin result in a small reduction in cesarean section rate but it still does not justify its routine use as there is risk of uterine hyper stimulation and fetal heart rate abnormalities (3). Membranes are natural protective barriers against ascending infection as well as exert natural pressure on the cervix and perineum to dilate cervix and stretch the perineum (4). Based on the conflicting evidence amniotomies during the first stage of labor should be really performed with clear indications. There is less concern during second stage as delivery is

going to be imminent in a short time (4). Therefore amniotomy indications during the first stage of labor should be reviewed and there should not be unnecessary procedures performed so as to let the nature take its course with the intervention only if there is deviation from the normal.

## 2. PATIENTS AND METHODS

It was a descriptive cross sectional study. A self structured proforma was used to collect data. The study was conducted at Mother Child Hospital, Buraidah which is a major tertiary care facility in the region with annual delivery rate of 10,000. Seventy percent of them deliver normally however 30% undergo cesarean section. Women undergoing normal vaginal delivery were included in the study and amniotomy was considered as an obstetrical intervention. Sample size of 291 women had a 95% confidence level and a confidence interval of 5. All women suffering from any medical disorder or pregnancy relat-

ed complication (like preterm labor, postdate pregnancy, pregnancy induced hypertension (PIH), malpresentation were excluded). The study aimed to find out the rates of ARM, in the study population during labor, along with their indications. The intervention rates were compared between Primigravidas and Gravida two or above. Data was kept anonymous for privacy.

**Operational definitions**

**Amniotomy or ARM** is the rupture of amnion and chorion membranes that surround the fetus, encasing it in a sac of amniotic fluid. It's done by a special instrument called amniohook (4). **Latent Phase of labor** starts from the onset of mild uterine contractions till 3cm cervical dilatation and active phase of labor was defined as the interval after the latent phase to full cervical dilatation (5).

**3. STATISTICAL ANALYSIS**

The Statistical Package for the Social Sciences (SPSS) 22 was used to conduct proportion z-tests to determine if any significant differences existed between women who have had one pregnancy (PG) and women who have already delivered two or more children (G2 and above) as regards indications of artificial rupture of membranes (ARM). That is, for each intervention, several indicators were examined to determine if the frequency of occurrence was different between gravidity groups. Other factors examined included method of delivery (MOD) and integrity of membranes. P values less than 0.05 was considered as significant.

**4. RESULTS**

Most of the participants 140(48.1%) were between 20-35 years of age, One twenty three (42.2% had primary education and 142 (48.7% were Primigravidas (Table 1)

Variable	Level	Frequency	Percent
Age	Below 20	42	14.4
	20-35	140	48.1
	Above 35	109	37.45
		291	
Education	No formal education	76	26.11
	Primary education	123	42.26
	Secondary or above	92	31.6
		291	
Gravidity	Primiparous	142	48.79
	Multigravida	149	51.20
		291	

**Table 1.** Social and Demographic characteristics of the study population

**Indications of ARM**

Proportion z-tests were conducted to determine if any significant differences in the frequency of indications of artificial rupture membranes (ARM) existed between gravidity groups (PG and G2 and above). The indications of ARM included active management of latent phase of labor, concern with fetal heart rate, slow progress of labor, PIH, APH, reduced fetal movements, and no specific reason. Since this analysis examines indications of ARM, participants that reported having a spontaneous rupture

Variable	PG	G2 and above	Total
<b>Method of Delivery</b>			
SVD	102	98	200
LSCS	15	30	45
Forceps	13	4	17
Ventouse	11	14	25
Assisted breech	1	3	4
Total	142	149	291
<b>Integrity of Membranes</b>			
Intact	142	61	203
Ruptured	0	88	88
Total	142	149	291

**Table 2.** Cross Tabulation PG and G2 and Above Groups between Levels of MOD and Integrity of Membranes

prior to labor, direct emergency lower segment cesarean section (EMLSCS), or already ruptured membranes were removed from the analysis. Thus, there were a total of 89 PG participants and 32 G2 and above participants used in the analysis.

As displayed in Table 3, the most frequent cause for ARM was active management of latent phase of labor (PG *n* = 20 and G2 and above *n* = 9). Furthermore, slow progress of labor (PG *n* = 17 and G2 and above *n* = 7) and concerns with fetal heart rate (PG *n* = 13 and G2 and above *n* = 5) had the next highest number of occurrences. The indication reduced fetal movements had the fewest occurrences where PG participants had five incidents and only one for G2 and above participants.

Indications of ARM	PG	G2 and above	Total
Active management of latent phase of labor	20	9	29
Concern with fetal heart rate	13	5	18
Slow progress of labor	17	7	24
PIH*	9	2	11
APH**	4	5	9
Reduced fetal movements	5	1	6
No specific reason	21	3	24
Total	89	32	121

**Table 3.** Cross Tabulation and of Gravidity Groups and Indications of ARM. PIH\*=Pregnancy induced hypertension APH\*\*=Antepartum hemorrhage

Results from the proportions tests revealed that there was one significant difference between gravidity groups on the frequency of APH (*p* = .039). That is, G2 and above participants experienced APH (5 of 32 = 15.63%) significantly more often than PG participants (4 of 89 = 4.49%). And although not statistically significant (*p* = .084), there were 21 cases within the PG group where ARM was performed for no specific reason (21 of 89 = 23.6%) compared to three cases within the G2 and above group (3 of 32 = 9.4%). A summary of the proportions z-tests is displayed in Table 4.

**5. DISCUSSION**

The use of amniotomy for induction of labor has previously been reported as a commonly used method; how-

ever in this case even it is not free of risks and it slightly increases the need for oxytocin (6). The common indications include medical disorders like PIH and obstetrical conditions like post term pregnancy (7). The indications for amniotomy during labor needs to be carefully evaluated as the procedure is not free from side effects like ascending infection , fetal distress and cord prolapse (8). Secondly there is a growing demand from females towards less and less intervention during labor (9). This study tried to explore the indications of amniotomy during labor. It was noticed that frequent cause for ARM was active management of latent phase of labor (PG  $n = 20$  and G2 and above  $n = 9$ ). Furthermore, slow progress of labor (PG  $n = 17$  and G2 and above  $n = 7$ ) and concerns with fetal heart rate (PG  $n = 13$  and G2 and above  $n = 5$ ) had the next highest number of occurrences. Fredric et al had reported that amniotomy as a part of active management of labor failed to reduce the incidence of cesarean section in low risk women (10). Fraser at al reached at the conclusion that although amniotomy reduces the prevalence of dystocia in nulliparous women but it failed to reduce the incidence of cesarean section (11). Results from the proportions tests revealed that there was one significant difference between gravidity groups on the frequency of induction of labor for APH ( $p = .039$ ). That is, G2 and above participants experienced APH (5 of 32 = 15.63%) significantly more often than PG participants (4 of 89 = 4.49%). Although amniotomy is performed in cases of antepartum hemorrhage yet in some situations of vasaprevia it can lead to disastrous fetal exsanguation and as the condition is rarely diagnosed in the antenatal period, a high index of suspicion should be kept in mind (12). Amniotomy may hasten the delivery in case of abruption placenta when the fetus is mature however keeping the bag of membranes intact may be more beneficial in a small fetus in promoting cervical dilatation (13). This again questions the need of amniotomy in cases of antepartum hemorrhage.

Although not statistically significant ( $p = .084$ ), there were 21 cases within the PG group where ARM was performed for no specific reason (21 of 89 = 23.6%) compared to three cases within the G2 and above group (3 of 32 = 9.4%). Considering the fact that ARM for different indications has no definite benefit yet established and at the same time is not free from side effects the essence of normal labor should be to keep the membranes intact as long as possible.

There is a need for arranging normal labor workshops, repeating audit at fixed intervals after these workshops to reduce the rates of ARM. Intermittent auscultation policy for fetal heart rate should be stresses and this information should be displaced at the labor ward boards. Random labor ward audit of staff and delivery notes is recommended in order to reduce the rate of unnecessary amniotomy.

Indications of ARM	Proportions (%)		Difference (I-J)	Z	Probability (2-tailed)
	PG (I)	G2 and above (J)			
Active management of latent phase of labour	22.47	28.13	-5.65	-0.642	0.521
Concern with fetal heart rate	14.61	15.63	-1.02	-0.139	0.890
Slow progress of labour	19.10	21.88	-2.77	-0.337	0.736
PIH*	10.11	6.25	3.86	0.652	0.516
APH**	4.49	15.63	-11.13	-2.058	0.039
Reduced fetal movements	5.62	3.13	2.49	0.557	0.575
No specific reason	23.60	9.38	14.22	1.730	0.084

**Table 4.** Summary of Proportion z-Tests on Indications of ARM by Gravidity Groups. PIH\*=Pregnancy induced hypertension APH\*\*=Antepartum hemorrhage

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**CONFLICT OF INTEREST: NONE DECLARED**

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