

DOI: <https://dx.doi.org/10.18203/2320-1770.ijrcog20213858>

Original Research Article

## Fetomaternal outcome in pregnancies with reproductive tract anomalies

Asit K. Jena, Trinity L. Meetei\*, Salma Begum, Rameswar M. Singh,  
Lipsa Priyadarshinee, Nasima Begum, Taneesha Subba, Snehangshu Das

Department of Obstetrics and Gynaecology, Regional Institute of Medical Sciences, Imphal, Manipur, India

**Received:** 04 August 2021

**Accepted:** 02 September 2021

**\*Correspondence:**

Dr. Trinity L. Meetei,

E-mail: [trinitymeetei@gmail.com](mailto:trinitymeetei@gmail.com)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

**Background:** Congenital reproductive tract anomalies result from abnormal formation, fusion or resorption of the mullerian ducts during fetal life. Pregnancies with reproductive tract anomalies are known to have higher incidence of spontaneous abortions, fetal malpresentations, preterm labour, preterm premature rupture of membranes and increased cesarean section rate. The present study was conducted to describe the fetal and maternal outcomes among pregnant women with uncorrected reproductive tract anomalies in a tertiary care centre, Manipur, India.

**Methods:** A hospital based cross sectional study was conducted among pregnant women with uncorrected reproductive tract anomalies in regional institute of medical sciences, Imphal, Manipur, India between September 2018 to August 2020.

**Results:** A total of 62 pregnant women with uterine anomalies were included in the study. Bicornuate uterus was the most common uterine anomaly (45.2%) followed by arcuate uterus (19.3%). Cesarean section was conducted in 72.6% of the pregnant women and its major indication was fetal malpresentation (breech). Maternal complications were present in 56.5% of the pregnancies and fetal complications in 27.4% of the newborns.

**Conclusions:** The current study has shown a significant association between uterine anomalies and maternal and fetal complications including premature rupture of membranes, fetal malpresentation and increased caesarean section rate. Further studies involving bigger sample size will help in understanding the problem more and hence in the prevention of the complications in future.

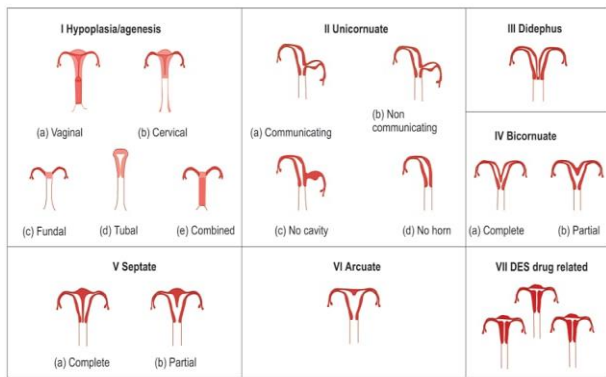
**Keywords:** Uterine anomalies, Malpresentation, Premature rupture of membranes

### INTRODUCTION

Normal development of the female reproductive tract involves a series of complex processes characterized by the differentiation, migration, fusion, and subsequent canalization of the mullerian system.<sup>1</sup> Congenital reproductive tract anomalies result from abnormal formation, fusion or resorption of the mullerian ducts during fetal life.<sup>2</sup> These abnormalities are often caused by errors in organogenesis, but other etiologies including deficiencies in steroidogenesis, receptor defects and genetic abnormalities are also involved.<sup>3</sup> The overall incidence of uterine or mullerian anomalies is estimated

to be 4% of all women, while in Indian population this incidence is around 0.36%.<sup>4,5</sup> In general fertile population, the frequency of mullerian anomalies is 5% and in infertile population it is 3%.<sup>4</sup> Recurrent miscarriages occur in 5-10% of cases.<sup>6</sup> Prevalence of congenital uterine malformations is approximately 5-25% in women with adverse pregnancy outcomes and up to 25% of women with late first or second-trimester pregnancy loss or preterm delivery.<sup>7,8</sup> The wide range of difference in the prevalence rate is presumably because of use of different classification systems and non-uniform diagnostic tests. Buttram and Gibbons proposed a classification system for congenital uterine anomalies in

1979 which was subsequently revised by the American society of reproductive medicine (ASRM) in 1988.<sup>9,10</sup>



**Figure 1: Classification of congenital uterine anomalies according to the American society of reproductive medicine (1988).<sup>10</sup>**

Uterine anomalies are associated with diminished cavity size, insufficient musculature, impaired ability to distend, abnormal myometrial and cervical function, inadequate vascularity and abnormal endometrial development.<sup>11</sup> In many patients, these reproductive tract anomalies have been related with primary or secondary infertility, spontaneous abortions, recurrent pregnancy loss, prematurity, ectopic pregnancies, malpresentations, intrauterine growth retardation, prematurity, intrapartum uterine rupture which increase the fetal morbidity and mortality. Authors who have found an association between uterine anomalies and preterm birth opine that diminished muscle mass, particularly in a unicornuate uterus plays an important role in the mechanism of preterm delivery.<sup>12</sup> A combination of two-dimensional (2D) ultrasound, hysteroscopy and/or laparoscopy is the most widely used method for the traditional diagnosis of müllerian anomalies.<sup>13</sup> Three-dimensional (3D) ultrasound has been recognized recently as another standard for the diagnosis of müllerian anomalies.<sup>14,15</sup> With the advent of better diagnostic and treatment modalities like transvaginal sonography, hysterosalpingography and laparoscopy, the reproductive outcomes have improved in cases of congenital uterine anomalies. However, müllerian anomalies remain an incidental diagnosis in majority of cases in India. This may be accounted to the limited resource setup in India and lack of health seeking attitude amongst infertile and reproductively challenged couples. Hence this study was undertaken to determine the perinatal outcomes in pregnant women with uncorrected reproductive tract anomalies in a tertiary care centre, Manipur.

## METHODS

### Study design, population and duration

A hospital based cross-sectional analytical study was conducted among the pregnant women with uncorrected reproductive tract anomalies in the Regional Institute of

Medical Sciences (RIMS), Imphal, Manipur. All the pregnant women with uncorrected uterine anomalies, diagnosed by transvaginal ultrasound and/or hysterosalpingography admitted through emergency or OPD basis. The study was conducted for a period of two years from September 2018 to August 2020.

### Inclusion criteria

Inclusion criterion for current study was pregnant women with uncorrected uterine anomalies with singleton pregnancies.

### Exclusion criteria

Inclusion criteria for current study were patients with previously corrected uterine anomalies, multiple pregnancies, known congenital and/or chromosomal fetal anomalies and those not willing to participate in the study.

### Study procedure

After obtaining permission from the institution ethics committee and informed consent from the participants, the patients were subjected to detailed history and clinical examination. Detailed history included age, menstrual history, parity, history of previous pregnancies (recurrent abortions, preterm delivery etc), family history, gestational age, uterine scar from caesarean section etc. Ultrasonography and/or hysterosalpingography findings were recorded (ectopic pregnancy, abnormal placentation, malpresentation etc). The patients were then followed up till delivery to know the final outcome- abortion, preterm delivery, PROM, obstructed labour, vaginal delivery or cesarean section, malpresentation, IUGR etc.

### Working definitions

Reproductive tract anomalies: Abnormal formation, fusion or resorption of the müllerian ducts during fetal life.<sup>2</sup> Abortion: termination of pregnancy before 20 weeks gestation or with a fetus weighing less than 500 g.<sup>16</sup> Recurrent abortions: occurrence of three or more consecutive spontaneous abortions before 28 weeks of gestation.<sup>16</sup> Preterm labour: onset of labour prior to the completion of 37 weeks of gestation and after the attainment of period of viability.<sup>17</sup> PROM (premature rupture of membranes): spontaneous rupture of membranes before the onset of regular uterine contractions at or after 37 weeks of gestation.<sup>17</sup> IUGR (intrauterine growth restriction): failure of a fetus to reach its genetic growth potential in utero putting it at risk of perinatal mortality and morbidity.<sup>17</sup>

## RESULTS

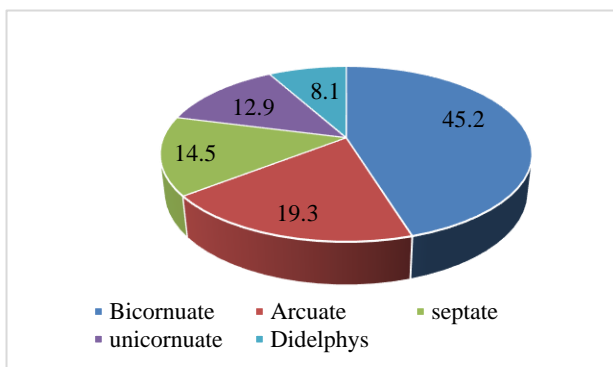
A total of 62 pregnant women with uterine anomalies were included in the study. The mean age of the participants was 27.2 (5.1) years with a minimum of 19

years and a maximum of 40 years. 38.7% of the pregnant women were primi and 9.7% were grand multipara (Table 1). Period of gestation was  $\leq 37$  weeks in 40.3% of the pregnant women. Recurrent abortions were noted in 9.7% of the study participants. Among the 62 pregnant women with uterine anomalies, there were 28 cases of bicornuate uterus (45.2%), 12 cases of arcuate uterus (19.3%), 9 septate uterus (14.5%) cases, 8 cases of unicornuate uterus (12.9%) and 5 uterus didelphys (8.1%) cases (Figure 2). 48.4% of the fetuses presented in breech while 38.7% were in cephalic presentation (Figure 3). Transverse lie was noted in 12.9% of the cases. Nearly 3/4<sup>th</sup> (72.6%) of the cases delivered by caesarean section (Figure 4).

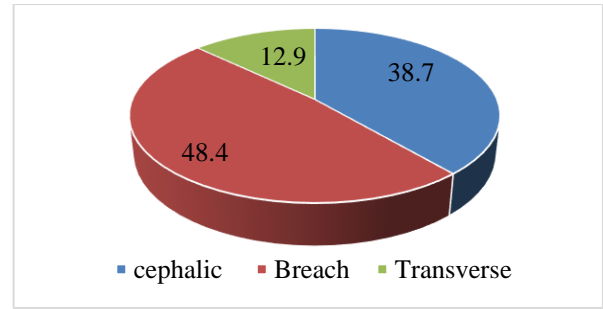
Maternal complications was present in 56.5% (95% CI: 43.3%-68.8%) of the pregnant women (Table 2). Fetal complications were present in 27.4% (17.2%-40.4%) of the newborns (Table 3). PROM was the most common maternal complication and it was noted in 22.6% of the participants followed by gestational hypertension, recurrent abortions and preterm labor which were found in 11.3%, 9.7% and 9.7% respectively. Among fetal complications, birth asphyxia and prematurity were present in 9.7%, each among the newborns. Neonatal sepsis and meconium aspiration was present in 4.8%, each. There was no maternal or neonatal death (Figure 5).

**Table 1: Obstetric characteristics of the study participants (n=62).**

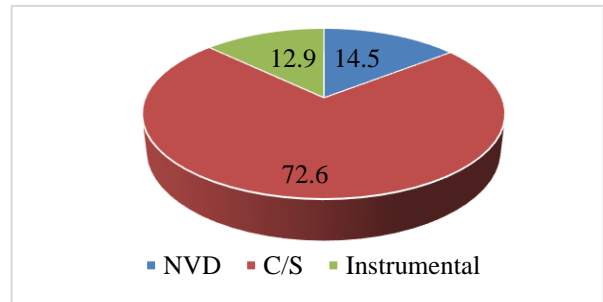
Obstetric characteristics	Frequency (%)
<b>Parity</b>	
Primi	24 (38.7)
Multi	32 (51.6)
Grand multi	6 (9.7)
<b>Period of gestation (weeks)</b>	
$\leq 37$	25 (40.3)
$> 37$	37 (59.7)
<b>Abortions</b>	
Nil	29 (46.8)
1-2	25 (40.3)
$\geq 3$	6 (9.7)



**Figure 2: Types of uterine anomaly among the study subjects (n=62).**



**Figure 3: Distribution by fetal presentation (n=62).**



**Figure 4: Distribution by mode of delivery (n=62).**

**Table 2: Maternal complications among the study participants (n=62).**

Maternal complications	N	% (95% CI)
<b>Yes</b>	35	56.5 (43.3-68.8)
<b>No</b>	27	43.5 (31.2-56.7)

**Table 3: Fetal complications among the study participants (n=62).**

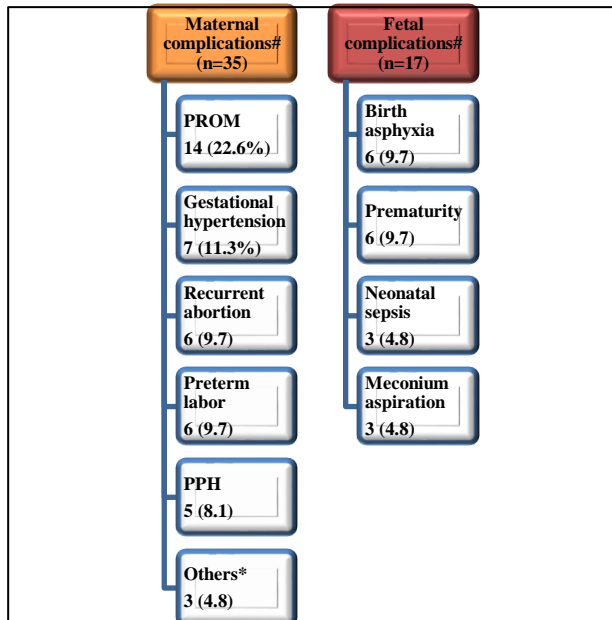
Fetal complications	N	% (95% CI)
<b>Yes</b>	17	27.4 (17.2-40.4)
<b>No</b>	45	72.6 (59.6-82.8)

## DISCUSSION

The mean age of the participants was 27.2 (5.1) years which is in line with the results of a study conducted by Vyas et al in which the maternal age was more in the age group of 21-25 years.<sup>18</sup> Various other studies across the globe also have reported similar results.<sup>19,20</sup> It could be due to the fact that the desire for pregnancy is higher during this age group and hence the attitude for seeking care for uterine anomalies.

About 38.7% of the fetus was in cephalic presentation and breech was noted in 48.4% while transverse lie was noted in 12.9% of the fetus. A study conducted by Hua et al and Vyas et al have shown that cephalic presentation was common and breech accounted for only around 1/4<sup>th</sup> of the participants.<sup>18,21</sup> This is contrary to our study findings where breech presentation accounted for nearly

half of the study participants. One main reason could be the less sample size owing to the lesser prevalence of the condition and hence because of time constraint could not cover a larger sample. Moreover, 40.3% of the pregnant women were preterm which can be a cause of fetal malpresentation.



\*others include anaemia and hypothyroidism #Multiple complications possible.

**Figure 5: Fetal and maternal complications among the study participants (n=62).**

Bicornuate uterus was the most common uterine anomaly (45.2%) followed by arcuate uterus (19.3%) while septate uterus was present in 14.5% of the pregnant women. Surprisingly, these results are in contrast to the available literature where septate uterus followed by bicornuate uterus was believed to be the common uterine anomaly.<sup>18,22-24</sup> In contrast, septate uterus is the most commonly associated with obstetrical complications.<sup>25</sup> Some other studies have reported bicornuate uterus followed by septate uterus to be the common uterine anomaly.<sup>26,27</sup> The reason behind this type of difference is debatable and poorly understood. One possible reason could be the small sample size in most of the studies.

Maternal complications was present in 56.5% (95% CI:43.3%-68.8%) of the pregnant women and fetal complications was present in 27.4% (17.2%-40.4%) of the newborns. PROM (22.6%) was the most common maternal complication of the participants followed by gestational hypertension, recurrent abortions and preterm labor. Studies conducted by Nagarathanamma et al, Rama et al and Hua et al have reported that preterm labour was the common type of maternal complication observed in their studies.<sup>21,26,27</sup> A study by Zhang et al have reported that malpresentations were the common complication to be observed in their study.<sup>24</sup> Similarly miscarriages were the common complication in a study conducted by Chan

et al.<sup>25</sup> A meta-analysis have documented that there was increased relative risk by 2.89 time of first trimester abortions in mullerian anomalies, which is in line with our study findings.<sup>25</sup> The current study reported a very high rate of caesarean section rate of 72.6% and is comparable to study by Raj et al where the caesarean rate was 63.3% as compared to 34.7% in Hua et al.<sup>21,28</sup> This high rate could be due to the reason that most of the anomalies are diagnosed incidentally during the pregnancy in most of the patients.

Various authors have put forward explanations for the mechanism of reproductive failure in infertility. Disorganization of uterine stroma along with high intrauterine pressure caused by an enlarging fetus could lead to cervical incompetence and insufficient uterine expansion. Additionally, poor vascular arrangement in the anomalous uterine fundus, will in turn fail to provide necessary support to the growing fetus. These conditions could lead to their loss in late first trimester and second trimester. Accordingly, recurrent abortions were noted in 9.7% of our study participants. Birth asphyxia and prematurity were present in 9.7%, each among the newborns and neonatal sepsis and meconium aspiration was present in 4.8%, each. 27.4% of the newborn babies were admitted in NICU, while there was no neonatal mortality. The mean age was found to be higher among those pregnant women with maternal complications when compared to those without maternal complications and it was found to be statistically significant (p=0.013). Pregnant women who were unbooked were found to have significantly higher chance of maternal as well as fetal complications (p=0.001). Preterm mothers were found to be associated with more maternal complications. Similarly, there was a significant association for low birth weight and low APGAR score with the fetal complications (p<0.005). However, there was no association for maternal age, parity and gestational age with fetal complications (p>0.05) in our study.

## CONCLUSION

A large number of uterine anomalies are detected routinely in reproductive medicine as practiced in current times. This increase is attributed more to availability of better imaging techniques for the uterus rather than increase in prevalence of such anomalies in the general female population. Reproductive tract anomalies remain an incidental diagnosis in majority of cases in India mainly due to lack of health-care seeking attitude of the females with infertility coupled with limited resource setting, which in turn has resulted in inadvertent outcomes both for the mother and the newborn baby. Subtle mullerian anomalies are difficult to diagnose. HSG gives a view of the endometrial cavity but does not visualize the fundus and the uterine contour and is invasive. 3D-ultrasonography gives a fair idea about the external contour of the uterus but might fail to visualize some lateral fusion defects. MRI is the gold standard diagnostic imaging modality, but it is not available in

resource constrained countries like India. One of the important limitations of our study is the small sample size owing to the time constraint and hence the results could only be generalizable to the similar setting. The cross-sectional nature of the study confers that the cause-effect relationship cannot be ascertained through our study. However considering the scarcity of evidences on the same subject in this part of the country, the present study is novel of its kind and hence it could serve as a base for further studies to come. Further studies on a multicentre level with a longitudinal component will help in understanding the problem more and hence in the prevention of the complications in future.

## ACKNOWLEDGEMENTS

Authors would like to thank Prof. L. Ranjit Singh and other staff in the department of obstetrics and gynaecology, RIMS, Imphal for their support during the study.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

- Amesse LS, Pfaff-Amesse T. Congenital anomalies of the reproductive tract. In: Falcone T, Hurd WW eds. *Clinical reproductive medicine and surgery*. 1st ed. New York: Mosby; 2007:171-90.
- Moore KL, Persaud TVN, Torchia MG. The urogenital system. In: *before we are born: essentials of embryology and birth defects*. 7th ed. Philadelphia: Saunders/Elsevier; 2008:162-89.
- Strissel PL, Oppelt P, Cupisti S, Stiegler E, Beckman MW, Strike R. Assessment of pituitary and steroid hormones and member of the TGF-beta superfamily for ovarian function in patient with congenital uterus and vaginal aplasia (MRKH syndrome). *Horm Res*. 2009;41(5):408-13.
- Golan A, Langer R, Wexler S, Segev E, Niv D, David MP. Cervical cerclage-its role in the pregnant anomalous uterus. *Int J Fertil*. 1990;35(3):164-70.
- Rama Ch, Esanakula J, Lepakshi G. Role of Congenital uterine anomalies in adverse pregnancy outcome. *IOSR-JDMS*. 2018;17(1):60-4.
- Airoldi J, Berghella V, Sehdev H, Ludmir J. Transvaginal ultrasonography of the cervix to predict preterm birth in women with uterine anomalies. *Obstet Gynecol*. 2005;106(3):553-6.
- Acien P. Incidence of mullerian defects in fertile and infertile women. *Human Reproduction*. 1997;12(7):1372-6.
- Simon C, Martinez L, Pardo F, Tortajada M, Pellicer A. Müllerian defects in women with normal reproductive outcome. *Fertil Steril*. 1991;56(6):1192-3.
- Buttram VC, Gibbons WE. Mullerian anomalies: A proposed classification (an analysis of 144 cases). *Fertil Steril*. 1979;32(2):40-8.
- American Fertility Society. The american fertility society classification of adnexal adhesions, distal tubal occlusion, tubal occlusion secondary to tubal ligation, tubal pregnancies, mullerian anomalies and intrauterine adhesions. *Fertil Steril*. 1988;49(6):944-55.
- Rock JA, Schlaff D. The obstetric consequences of uterovaginal anomalies. *Fertil Steril*. 1985;43(5):681-92.
- Airoldi J, Berghella V, Sehdev H, Ludmir J. Transvaginal ultrasonography of the cervix to predict preterm birth in women with uterine anomalies. *Obstet Gynecol* 2005;106(3):553-6.
- Rackow BW, Arici A. Reproductive performance of women with mullerian anomalies. *Curr Opin Obstet Gynecol*. 2007;19:229-37.
- Salim R, Woelfer B, Backos M, Regan L, Jurkovic D. Reproducibility of three-dimensional ultrasound diagnosis of congenital uterine anomalies. *Ultrasound obstet Gynecol*. 2003;21:578-82.
- Ghi T, Casadio P, Kuleva M, Perrone AM, Savelli L, Giunchi S, et al. Accuracy of three-dimensional ultrasound in diagnosis and classification of congenital uterine anomalies. *Fertil Steril*. 2009;92:808-13.
- Sharma JB. Early pregnancy haemorrhage. In: Sharma JB, eds. *Textbook of obstetrics*. 2nd ed. New Delhi: Avichal publishing company; 2020:113-24.
- Sharma JB. Preterm labor, fetal (intrauterine) growth restriction, intrauterine death and postmaturity. In: Sharma JB, eds. *Textbook of obstetrics*. 2nd ed. New Delhi: Avichal publishing company; 2020:480-505.
- Vyas RC, Moghariya AM, Shah SR, Parikh PM, Shelat PM. Mullerian ductal anomalies and its outcome. *Int J Reprod Contracept Obstet Gynecol*. 2019;8:440-4.
- Chasen ST, Havryliuk Y, Troiano R. Uterine duplication anomalies and obstetric outcomes. *AJOG*. 2008;199(6):S102.
- Butt F. Reproductive outcome in women with congenital uterine anomalies. *Ann King Edw Med Univ*. 2011;17(2):171.
- Hua M, Odibo AO, Longman RE, Macones GA, Roehl KA, Cahill AG. Congenital uterine anomalies and adverse pregnancy outcomes. *Am J Obstet Gynecol*. 2011; 205(6):558.
- Grimbizis GF, Camus M, Tarlatzis BC, Bontis JN, Devroey P. Clinical implications of uterine malformations and hysteroscopic treatment results. *Hum Reprod Update*. 2001;7:161-74.
- Raga F, Bauset C, Remohi J, Bonilla-Musoles F, Simon C, Pellicer A. Reproductive impact of congenital mullerian anomalies. *Hum Reprod*. 1997; 12(10):2277-81.
- Zhang Y, Zhao YY, Qiao J. Obstetric outcome of women with uterine anomalies in China. *Chin Med J*. 2010;123(4):418-22.

25. Chan YY, Jayaprakasan K, Tan A, Thornton JG, Coomarasamy A, Raine-Fenning NJ. Reproductive outcomes in women with congenital uterine anomalies: a systematic review. *Ultrasound Obstet Gynecol.* 2011;38(2):371-82.
26. Nagarathnamma R, James T, Prasad N. Pregnancy outcome in uterine anomalies. *J Med Sci.* 2017;3(1): 31-3.
27. Rama CH, Esanakula J, Lepakshi G. Role of congenital uterine anomalies in adverse pregnancy outcome. *IOSR-JDMS.* 2018;17(1):60-4.
28. Raj N, Chavan NN. An observational study of effect of mullerian anomalies on pregnancy. *Int J Reprod Contracept Obstet Gynecol.* 2019;8:1155-61.

**Cite this article as:** Jena AK, Meetei TL, Begum S, Singh RM, Priyadarshinee L, Begum N, et al. Fetomaternal outcome in pregnancies with reproductive tract anomalies. *Int J Reprod Contracept Obstet Gynecol* 2021;10:3895-900.