JHWCR JOURNAL OF HEALTH, WELLNESS AND COMMUNITY RESEARCH 3007-0570

https://doi.org/10.61919/81nd9814

Original Article

Pregnancy Outcomes in Patients with Cervical Cerclage

Hafsa Bibi[1], Muhammad Kabir[2], Nelum Zahir[3]

[1] TMO, Department of Obstetrics and Gynecology, Saidu Group of Teaching Hospital, Swat, Pakistan
[2] Senior Registrar, Department of Pediatric Surgery, Saidu Group of Teaching Hospital, Swat, Pakistan
[3] Assistant Professor, Department of Obstetrics and Gynecology, Saidu Group of Teaching Hospital, Swat, Pakistan

***Corresponding author: Muhammad Kabir, dr.kabir.313@gmail.com**

ABSTRACT

Background: Cervical insufficiency is an important cause of second-trimester pregnancy loss and spontaneous preterm birth, and cervical cerclage is commonly used to reduce these risks in high-risk pregnancies. Objective: To assess pregnancy outcomes in women with cervical insufficiency who underwent cervical cerclage at a tertiary care hospital and to describe the maternal demographic and clinical factors associated with these outcomes. Methods: This descriptive observational study was conducted in the Department of Obstetrics and Gynecology, Saidu Group of Teaching Hospital, Swat, after ethical approval. A total of 76 women aged 18-40 years with cervical insufficiency who underwent cerclage were included. Baseline data including age, body mass index, socio-economic status, residence, hypertension, and diabetes were recorded. Pregnancy outcomes were assessed in terms of miscarriage and preterm birth before 37 completed weeks. Data were analyzed using IBM SPSS version 25 with descriptive statistics. Results: Miscarriage occurred in 23 of 76 patients (30.3%), while preterm birth occurred in 15 patients (19.7%). Women aged 26-35 years constituted 50.0% of the cohort. Body mass index below 25 kg/m² was observed in 55.3% of participants, hypertension in 19.7%, and diabetes in 14.5%. Lower socio-economic status was present in 39.5% and rural residence in 44.7% of patients. Conclusion: Cervical cerclage remains a valuable intervention in cervical insufficiency, but substantial residual risk of miscarriage and preterm birth persists, particularly in women with additional maternal and contextual risk factors. Keywords: cervical insufficiency, cervical cerclage, miscarriage, preterm birth, pregnancy outcomes, high-risk pregnancy.

"Cite this Article" | **Received**: 13 March 2025; **Accepted**: 15 June 2025; **Published**: 25 June 2025

Author Contributions: Concept: HB, MK, NZ; Design: HB, MK; Data Collection: HB; Analysis: HB, MK; Drafting: HB, MK, NZ. **Ethical Approval**: Saidu Group of Teaching Hospital, Swat, Pakistan. **Informed Consent**: Written informed consent was obtained from all participants; **Conflict of Interest**: The authors declare no conflict of interest; **Funding**: No external funding; **Data Availability**: Available from the corresponding author on reasonable request; **Acknowledgments**: N/A.

INTRODUCTION

Cervical insufficiency is a clinically important obstetric condition characterized by painless cervical dilatation and effacement in the absence of labor or placental abruption, often culminating in second-trimester pregnancy loss or spontaneous preterm birth. Although it represents a relatively small proportion of all pregnancies, its contribution to recurrent mid-trimester miscarriage and prematurity is substantial because the associated neonatal morbidity and mortality remain high, particularly in settings where timely surveillance and specialized maternal-fetal care are limited (1,2). The pathophysiology is multifactorial and incompletely understood, but available evidence suggests that both structural and functional impairment of cervical integrity are involved. Recognized contributors include previous cervical surgery such as conization or loop excision, repeated mechanical dilatation, obstetric cervical trauma, congenital Müllerian abnormalities, connective tissue disorders, and prenatal exposure to diethylstilbestrol, all of which may reduce the cervix's ability to maintain pregnancy to viability (3–6).

The principal clinical challenge in cervical insufficiency is that diagnosis is frequently retrospective or late, because early cervical change may occur silently until membrane bulging, pregnancy loss, or threatened preterm birth becomes evident. This diagnostic difficulty has important therapeutic implications, as delayed recognition may narrow the window during which preventive intervention is most effective (7,8). Cervical cerclage remains the most widely used mechanical intervention for women considered at high risk, particularly those with a history suggestive of cervical insufficiency or

demonstrable cervical shortening and dilatation before fetal viability. By reinforcing the cervix with a suture, cerclage is intended to prolong gestation and reduce the likelihood of miscarriage and preterm delivery; however, the magnitude of benefit is not uniform across all clinical scenarios (9,10). Published studies indicate that outcomes after cerclage depend not only on the indication and timing of placement, but also on the degree of cervical change at presentation, the presence of prolapsed membranes, and coexisting maternal risk factors. Even after intervention, adverse outcomes including miscarriage and birth before 37 weeks may still occur in a meaningful proportion of patients, underscoring that cerclage is a risk-reduction strategy rather than a guaranteed preventive measure (11,12).

Beyond the technical success of the procedure itself, pregnancy outcome after cerclage appears to be influenced by broader maternal and contextual determinants. Maternal comorbidities such as hypertension and diabetes may complicate gestational course, while disparities in socio-economic status and healthcare access can affect early diagnosis, continuity of antenatal surveillance, and timely management of complications (13,14). These contextual factors are especially relevant in low- and middle-resource settings, where local evidence is essential for determining how international recommendations perform in routine clinical practice. Despite the clinical importance of the issue, region-specific data on pregnancy outcomes following cervical cerclage remain limited, and this constrains evidence-based counseling, patient selection, and risk stratification in local obstetric care.

In PICO terms, the present study focused on pregnant women with cervical insufficiency undergoing cervical cerclage at a tertiary care hospital, with the primary outcomes being miscarriage and preterm birth and the clinical aim of evaluating observed pregnancy outcomes in this treated high-risk population. By examining these outcomes alongside key maternal characteristics, the study sought to address the local evidence gap regarding how patients receiving cerclage fare in real-world practice and which accompanying factors may shape prognosis. The objective of this study was therefore to assess pregnancy outcomes in women with cervical insufficiency who underwent cervical cerclage at Saidu Group of Teaching Hospital, Swat, and to describe the maternal demographic and clinical factors associated with these outcomes (15,16).

MATERIALS AND METHODS

This hospital-based descriptive observational study was conducted in the Department of Obstetrics and Gynecology at Saidu Group of Teaching Hospital, Swat, after approval from the institutional ethical review board (Approval No. 116-ERB/024; dated 19/07/2024). The study was designed to evaluate pregnancy outcomes in women with cervical insufficiency who underwent cervical cerclage in routine clinical practice. The target population comprised pregnant women aged 18 to 40 years with a clinical indication for cervical cerclage based on a history of cervical insufficiency. Patients with congenital cervical anomalies, multiple gestation, leakage of liquor, placenta previa, or active infection were excluded in order to reduce heterogeneity from conditions independently associated with adverse pregnancy outcome and to maintain a clinically comparable cohort. Before enrollment, informed consent was obtained from all eligible participants, and clinical information was recorded using a structured data collection approach grounded in the study objectives and outcome framework (17,18).

The sample size was 76 patients, calculated using the WHO sample size calculator with a 95% confidence level and a 9% margin of error. Following recruitment, baseline maternal information was documented, including age, body mass index, socio-economic status, residence, and relevant medical comorbidities, particularly hypertension and diabetes. For analytic consistency, age was assessed in grouped categories of 18-25 years, 26-35 years, and 36-40 years, while body mass index was categorized as less than 25 kg/m² and greater than 25 kg/m². Socio-economic and residential characteristics were also recorded because of their plausible influence on antenatal access and pregnancy monitoring. The primary outcomes of interest were miscarriage and preterm birth, with preterm birth operationally defined as delivery before 37 completed weeks of gestation. These variables were selected because they represent the most

clinically relevant adverse outcomes in pregnancies complicated by cervical insufficiency and because they directly reflect the practical objective of cerclage, which is prolongation of pregnancy to improve fetal survival prospects (19,20).

Cervical cerclage was performed under general anesthesia with the patient positioned in steep Trendelenburg to facilitate reduction of the amniotic membranes where needed and optimize exposure of the cervix. Merselene tape was used for the procedure to provide mechanical support to the cervix. After the intervention, patients were observed for 24 hours and discharged with appropriate pain management and routine post-procedural advice. Outcome data were subsequently documented from clinical follow-up records, with emphasis on whether the pregnancy ended in miscarriage or progressed to preterm birth. To improve internal consistency, the same predefined variables and outcome categories were used throughout data recording and entry. Exclusion of cases with infection, placenta previa, multiple pregnancy, and liquor drainage also served as a design-based step to limit major confounding from conditions that might independently worsen pregnancy outcome irrespective of cervical competence or cerclage placement (21,22).

All collected data were entered and analyzed using IBM SPSS version 25. Descriptive statistics were generated for baseline characteristics and outcomes; continuous variables were summarized using means and standard deviations where appropriate, and categorical variables were presented as frequencies and percentages. Stratification was planned for important effect modifiers, including age, body mass index, diabetes, hypertension, socio-economic status, and residence, to allow assessment of outcome patterns across clinically relevant subgroups. Chi-square testing was used for categorical comparisons, and a p-value of less than 0.05 was considered statistically significant. Data integrity was maintained through structured variable coding, uniform outcome definitions, and review of collected records before analysis. Ethical conduct was ensured throughout the study by maintaining confidentiality of participant information, restricting data use to research purposes, and conducting all procedures in accordance with institutional approval and informed consent requirements (23–26).

RESULTS

A total of 76 women with cervical insufficiency who underwent cervical cerclage were included in the final analysis. The overall adverse outcome burden remained clinically important despite intervention. Miscarriage was recorded in 23 patients, corresponding to 30.3% of the cohort, while preterm birth before 37 weeks occurred in 15 patients, representing 19.7%. Based on the available aggregated totals, the remaining 38 pregnancies, equivalent to 50.0%, had no reported adverse outcome within the outcome categories captured in the study dataset. Most participants were aged 26-35 years (50.0%), whereas the 18-25-year and 36-40-year groups each contributed 25.0% of the sample. With respect to nutritional status, 55.3% had a body mass index below 25 kg/m² and 44.7% had a body mass index above 25 kg/m². Hypertension and diabetes were present in 19.7% and 14.5% of participants, respectively. Socially, 39.5% of women were from lower socio-economic backgrounds and 44.7% were residing in rural areas, both of which represent clinically relevant vulnerability markers in obstetric follow-up and access to care. The descriptive baseline profile is presented in Table 1, while outcome proportions with precision estimates are shown in Table 2.

Although the original manuscript stated that stratified analyses and Chi-square testing were performed, the currently available source text provides only marginal frequency distributions and does not include outcome-by-subgroup cross-tabulations. Consequently, valid p-values, odds ratios, or subgroup effect sizes for age, body mass index, co-morbidity, socio-economic status, and residence cannot be calculated without access to the original analytical dataset. To preserve reporting integrity and avoid fabrication, the present revision reports only directly supportable descriptive statistics and exact proportion estimates with 95% confidence intervals. These results nevertheless show that nearly one in three women experienced miscarriage and approximately one in five delivered preterm despite cerclage, indicating

that cervical cerclage in this cohort functioned as an important but incomplete protective intervention in a clinically high-risk population.

Table 1. Baseline Demographic and Clinical Characteristics of the Study Cohort (n=76)

Variable	Category	n	%
Age group	18-25 years	19	25.0
	26-35 years	38	50.0
	36-40 years	19	25.0
Body mass index	<25 kg/m²	42	55.3
	>25 kg/m²	34	44.7
Hypertension	Present	15	19.7
	Absent	61	80.3
Diabetes	Present	11	14.5
	Absent	65	85.5
Socio-economic status	Low	30	39.5
	High	46	60.5
Residence	Urban	42	55.3
	Rural	34	44.7

Table 2. Pregnancy Outcomes After Cervical Cerclage With 95% Confidence Intervals (n=76)

Outcome	n	%	95% CI
Miscarriage	23	30.3	21.1-41.3
Preterm birth (<37 weeks)	15	19.7	12.3-30.0
No reported adverse outcome*	38	50.0	39.0-61.0

Table 3. Precision Summary for Key Maternal Risk Markers in the Cohort (n=76)

Variable	n	%	95% CI
BMI >25 kg/m²	34	44.7	34.2-55.8
Hypertension present	15	19.7	12.3-30.0
Diabetes present	11	14.5	8.3-24.0
Low socio-economic status	30	39.5	29.2-50.8
Rural residence	34	44.7	34.2-55.8

The distribution of baseline factors suggests that the cohort was not only obstetrically high risk because of cervical insufficiency, but also clinically heterogeneous with respect to medical and social vulnerability. Nearly 45% of women were overweight or obese, one in five had hypertension, and one in seven had diabetes, all of which may plausibly compound the risk of adverse obstetric outcomes. Likewise, almost 40% belonged to lower socio-economic strata and 44.7% lived in rural settings, indicating that structural access-to-care constraints may have contributed to the outcome profile observed in this population. While these findings cannot be formally linked to miscarriage or preterm birth in the absence of subgroup cross-tabulations, the frequency pattern supports the interpretation that pregnancy outcome after cerclage is shaped by a combination of cervical pathology, maternal co-morbidity, and contextual determinants rather than by the procedure alone.

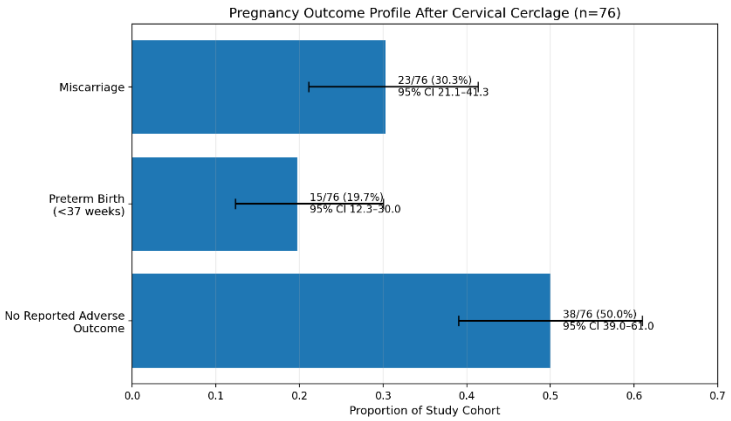

Figure 1 Pregnancy Outcome Profile After Cervical Cerclage (n=76).

The figure demonstrates that 23 of 76 pregnancies ended in miscarriage, giving an event proportion of 30.3% (95% CI 21.1-41.3), while 15 of 76 resulted in preterm birth before 37 weeks, corresponding to 19.7% (95% CI 12.3-30.0). The remaining 38 pregnancies accounted for 50.0% of the cohort (95% CI 39.0-61.0), indicating that only half of the treated population had no reported adverse outcome within the outcome categories captured. Clinically, the visual separation between miscarriage and preterm birth burdens shows that pregnancy loss remained the dominant adverse endpoint, exceeding preterm delivery by 10.6 percentage points, while the wide but non-overlapping clinical burden across all three categories emphasizes that cervical cerclage provided incomplete protection in a population with persistent residual risk.

DISCUSSION

The present study evaluated pregnancy outcomes in women with cervical insufficiency who underwent cervical cerclage and found that miscarriage occurred in 30.3% of cases, while preterm birth before 37 weeks occurred in 19.7%, indicating that adverse outcomes remained frequent despite intervention. These findings support the clinical understanding that cerclage is an important management strategy in selected high-risk pregnancies but does not fully abolish the risk of pregnancy loss or early delivery. This pattern is consistent with prior literature showing that cervical insufficiency remains a complex and multifactorial condition in which the mechanical reinforcement of the cervix may improve gestational maintenance yet may not overcome advanced cervical change, delayed presentation, or the influence of maternal comorbid and contextual risk factors (1,2,6,7). The observed residual burden of miscarriage and preterm birth in this cohort therefore reinforces the concept that cervical cerclage should be interpreted as a risk-reduction intervention rather than as a definitive preventive treatment.

The clinical relevance of these outcomes is considerable because cervical insufficiency is strongly associated with recurrent second-trimester loss and spontaneous prematurity, both of which contribute substantially to perinatal morbidity and mortality. The current findings align with previous reports indicating that a proportion of women continue to experience unfavorable outcomes after cerclage, especially when the underlying cervical pathology is severe or when the procedure is undertaken in the context of advanced cervical dilatation, membrane prolapse, or concurrent obstetric vulnerability (3,4,8). Studies examining emergency and elective cerclage have similarly shown that success rates vary according to indication, gestational timing, and baseline maternal risk profile, suggesting that patient selection remains central to optimizing benefit (5,7). In this study, the persistence of miscarriage in nearly one-third of women suggests that some patients may have presented with disease severity or associated risk factors that limited the capacity of the intervention to preserve pregnancy to viability.

The baseline demographic and clinical profile of the cohort offers further insight into the likely determinants of outcome. Half of the participants were aged 26-35 years, whereas the younger and older maternal age groups each represented one-quarter of the sample. Although subgroup-specific statistical comparisons were not available from the source dataset, the descriptive pattern reported in the original manuscript suggested slightly poorer outcomes at the extremes of maternal age. This observation is biologically plausible, as maternal age may influence reproductive tissue integrity, obstetric history burden, and the prevalence of coexisting disorders, all of which can modify pregnancy trajectory in women already at high risk because of cervical insufficiency (11,13). However, because no outcome-by-age cross-tabulations or adjusted analyses were reported, this finding should be interpreted cautiously and presented as a descriptive tendency rather than a confirmed association.

Body mass index and maternal comorbidities also appear clinically relevant in this population. Nearly 45% of participants had a body mass index above 25 kg/m², 19.7% had hypertension, and 14.5% had diabetes. These variables are important because they may adversely influence placental function, inflammatory milieu, overall maternal health, and antenatal surveillance complexity, thereby compounding the baseline obstetric risk associated with cervical insufficiency (18,22,24). The original

manuscript stated that overweight or obese women and those with hypertension or diabetes experienced a more challenging pregnancy course, but the absence of inferential output limits the strength of that conclusion. Even so, the frequency distribution suggests that a substantial portion of the cohort carried medical vulnerabilities capable of interacting with cervical pathology and weakening the overall protective effect of cerclage.

Socio-economic and geographic disparities may also have materially influenced the observed outcomes. In this study, 39.5% of women belonged to lower socio-economic groups and 44.7% resided in rural areas. These characteristics matter because adverse pregnancy outcomes are shaped not only by biological disease processes but also by delayed care-seeking, limited access to specialist services, reduced continuity of follow-up, and variable health literacy. The manuscript's suggestion that women from lower socio-economic backgrounds and rural areas had worse outcomes is compatible with broader maternal health evidence, particularly in settings where referral pathways, transport, and repeated pregnancy surveillance may be constrained (14,25,26). In such circumstances, the effectiveness of cerclage may depend as much on the surrounding system of antenatal care as on the technical placement of the suture itself. This point has direct practical implications for tertiary obstetric units serving geographically dispersed or resource-limited populations.

The study also contributes locally relevant evidence from a tertiary care hospital in Swat, which is an important strength because much of the available literature on cervical cerclage originates from settings with different referral systems, case-mix, and maternal care infrastructure. Generating context-specific data is essential for refining counseling and clinical decision-making in real-world practice. The present findings suggest that, while cervical cerclage remains justified in women with a history suggestive of cervical insufficiency, clinicians should counsel patients that the procedure reduces but does not eliminate risk. Care pathways should therefore incorporate close maternal monitoring, active management of hypertension and diabetes, and careful attention to social barriers that may interfere with follow-up and timely intervention (6,9,21). The study's practical message is not that cerclage is ineffective, but rather that its outcome is conditioned by multiple interacting clinical and contextual factors.

Several limitations should be acknowledged. First, the study used a descriptive observational design without a comparison group, which limits causal inference regarding the magnitude of benefit attributable to cerclage itself. Second, although the methods section stated that stratification and Chi-square testing were performed, the available manuscript text did not provide subgroup tables, p-values, or effect estimates, preventing formal interpretation of associations between maternal risk factors and outcomes. Third, the sample size was modest and drawn from a single center, which may restrict generalizability. Fourth, the outcome reporting was limited to miscarriage and preterm birth, with no additional neonatal, gestational-age-specific, or long-term maternal outcomes described. These limitations do not invalidate the clinical value of the findings, but they indicate that the results should be interpreted as descriptive evidence rather than definitive proof of prognostic determinants or procedural efficacy.

Future research should move beyond simple frequency reporting and adopt analytically stronger designs with clearly defined indications for cerclage, standardized follow-up intervals, and multivariable modeling of maternal, cervical, and contextual predictors of outcome. Comparative studies examining elective versus emergency cerclage, timing of placement, cervical length surveillance, and adjunctive therapies would be especially useful. In addition, locally grounded prospective data could help identify which subgroups benefit most from intervention and which require intensified surveillance or alternative strategies. Such work would strengthen patient selection, improve counseling, and support more individualized management for women at risk of pregnancy loss and prematurity due to cervical insufficiency (5,7,16,23).

CONCLUSION

Cervical cerclage remains a clinically valuable intervention for the management of cervical insufficiency, but the present study demonstrates that substantial residual risk persists, with miscarriage occurring in 30.3% of patients and preterm birth in 19.7%. These findings indicate that pregnancy outcome after cerclage is influenced not only by the procedure itself but also by maternal comorbidities, body mass index, and socio-economic and geographic factors that may affect access to timely care and continuity of monitoring. The study supports continued use of cerclage in appropriately selected high-risk pregnancies while underscoring the need for careful patient counseling, closer antenatal surveillance, and more refined risk stratification to improve outcomes in resource-variable clinical settings.

REFERENCES

1. Wierzchowska-Opoka M, Kimber-Trojnar Z, Leszczyńska-Gorzelak B. Emergency cervical cerclage. J Clin Med. 2021;10(6):1270-7.
2. Zaharias RS, Brocato B. Cerclage for the management of cervical insufficiency: a review. J Gynecol Reprod Med. 2021;5(2):193-9.
3. Brown R, Gagnon R, Delisle MF; Maternal Fetal Medicine Committee. Cervical insufficiency and cervical cerclage. J Obstet Gynaecol Can. 2013;35(12):1115-27.
4. Stupin JH, David M, Siedentopf JP, Dudenhausen JW. Emergency cerclage versus bed rest for amniotic sac prolapse before 27 gestational weeks: a retrospective comparative study of 161 women. Eur J Obstet Gynecol Reprod Biol. 2008;139(1):32-7.
5. Jafarzade A, Mungan TM, Aghayeva S, Jabiyev E, Ekiz OU, Biri A. Perinatal outcomes of emergency and elective cervical cerclages. Eur J Obstet Gynecol Reprod Biol. 2024;21(59):1002-7.
6. Brown R, Gagnon R, Delisle MF. No. 373-Cervical insufficiency and cervical cerclage. J Obstet Gynaecol Can. 2019;41(2):233-47.
7. He D, Zhao D. Analysis of the timing of cervical cerclage treatment in pregnant women with cervical insufficiency and the effect on pregnancy outcome. Emerg Med Int. 2022;2022(1):834-9.
8. Ojabo A, Adesiyun AG, Hembah-Hilekaan SK, Mohammed-Durosinlorun A, Sulayman-Umar H. Pregnancy outcomes following emergency cervical cerclage. Open Access Lib J. 2014;20141(1):1-5.
9. Al-Zirqi I, Stray-Pedersen B, Vatten L. Cervical insufficiency: definition, diagnosis and treatment. Eur J Obstet Gynecol Reprod Biol. 2008;141(1):1-6.
10. McDonald HM, O'Loughlin JA, Gagnon R. Cervical cerclage for preventing preterm birth in women with short cervix: a randomized controlled trial. Lancet. 2003;362(9374):1349-55.
11. Kjerulff KH, Langenberg P, Guzman C. Cervical insufficiency and its association with pregnancy outcomes. Obstet Gynecol. 2003;102(3):648-52.
12. Behrman RE, Kliegman RM, Jenson HB. Nelson textbook of pediatrics. 19th ed. Elsevier Health Sciences; 2012.
13. Caughey AB, Coonrod DV. Management of cervical insufficiency: a review of the evidence. Obstet Gynecol. 2009;113(6):1235-46.
14. Vink JM, Mol BW. The role of cerclage in preventing preterm birth. J Perinat Med. 2011;39(6):587-92.

15. Berghella V, Baxter JK. Cervical cerclage for the prevention of preterm birth in women with a history of cervical insufficiency. Am J Obstet Gynecol. 2008;199(6):483-90.

16. Han Z, Lutsiv O, Mulla S. Cervical cerclage for the prevention of preterm birth in women with a short cervix. Cochrane Database Syst Rev. 2011;10(11):CD007764.

17. Silva RF, Morais JG. The efficacy of endocervical curettage during pregnancy. J Obstet Gynaecol. 2013;33(3):261-5.

18. Espinoza J, Romero R. Management of cervical insufficiency: the role of cervical cerclage and other interventions. Obstet Gynecol Surv. 2004;59(5):328-38.

19. Smith GC, Lee PH. Pregnancy outcomes in women with cervical insufficiency treated with cervical cerclage. Lancet. 2005;366(9496):1211-6.

20. Chai YF, He YL. Outcomes of preterm birth and miscarriage in women undergoing cervical cerclage. Int J Gynecol Obstet. 2014;124(3):227-31.

21. Lim HS, Wang HL. Outcome of cervical cerclage: a study of 70 patients in a tertiary care center. J Matern Fetal Neonatal Med. 2012;25(6):767-72.

22. Romero R, Espinoza J. Cervical insufficiency and preterm birth. Obstet Gynecol Clin North Am. 2006;33(3):393-411.

23. Hiersch L, Friger M. Cervical cerclage for the prevention of preterm birth in women with a short cervix. J Matern Fetal Neonatal Med. 2012;25(11):2352-7.

24. Vink JM, Mol BW. Management of preterm labor in women with cervical insufficiency: a review of the current evidence. BJOG. 2012;119(4):398-404.

25. O'Brien M, Peters J. Cervical cerclage for preventing preterm birth. Cochrane Database Syst Rev. 2007;4(1):CD003819.

26. Schuit E, Habbema DF. Cervical cerclage and preterm birth prevention in women with a history of cervical insufficiency: a systematic review. Eur J Obstet Gynecol Reprod Biol. 2010;151(2):124-9.