

Modified Bishop Score, Does It Need Any Remodification

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Abstract

Objectives: To determine an association between modified bishop score and success of induction of labour in nulliparous women.

Methodology: A total of 97 nulliparous pregnant women at a gestation period of 37-42 weeks presented in Maternal and Child Health (MCH) center in outdoor antenatal clinic at Pakistan Institute of Medical sciences (PIMS) Islamabad were appraised for predicting successful labor induction. All five parameters of modified bishop score such as cervical length, dilation, cervical consistency, cervical position, station and overall score were evaluated for successful labour induction. Effect modifiers like Body mass index, age of the mother, gestational age were controlled by stratification. For estimation purpose, descriptive statistics and multiple regression approaches were used to determine the parameters in the prediction of successful vaginal delivery within 24 hours.

Results: Empirical findings based on logistic regression indicate that cervical consistency appears to be the important independent variable in predicting the successful labor induction (Confidence interval= 95%, P-value = 0.048;). Other independent variables such as, cervical dilation, cervical length, cervical position, have insignificant impact in determining successful labor induction. The CI and P-values are (CI= 95%, P-value = 0.116 CI=95%, P-value=0.908, CI= 95%, P-value = 0.381, respectively). Similarly overall bishop score(CI=95%,P-value=0.274) has weak association in success of labour induction.

Conclusions: In all nulliparous women with singleton pregnancies, cervical length, cervical dilation, cervical position, and Bishop score are weak indicators in predicting successful labor induction. However, cervical consistency is better conjecturers in determining the successful labor induction.

Keywords: Bishop Score, cervical length, labour induction.

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Introduction

Induction of labour is a process used to induce the contraction of the uterus by means of any mechanical process or pharmacological agents to avoid waiting for spontaneous delivery. Factors affecting the induction of labor have been the focus of many studies over the recent past in obstetric procedure.¹ The process of labour induction is performed generally in cases where the maternal or fetal health is in risk in waiting for natural onset of labour or there

is significant fetal indication. The frequent occurrences of cesarean deliveries show an increasing trend despite of the facts that there are many risk associated with it. Studies show that unlike spontaneous labor, there is more risk of cesarean delivery in the presence of induced labour.² Yet, over the past few years, the induction of labor has increased by 10 to 20 percent, whereas, this rate has soared to around 40 percent in some institutions.³

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There are different factors that affect the duration of labor such as demographic conditions, clinical & generic factors, however, the standard approach used by the practitioners is the Bishop score aimed to determine the cervical readiness.^{4,5}

The modified Bishop score is an index composed five parameters such as “cervical dilation, consistency of cervix, cervical position, cervical length and effacement and position of presenting⁶ as shown in table.

MODIFIED BISHOP'S SCORE

Ease of IOL = ripeness of the cervix

	SCORE			
	0	1	2	3
Cervical Dilation (cm)	0	1-2	3-4	5-6
Cervical length (cm)	>4	3-4	1-2	<1
Cervical consistency	Firm	medium	soft	
Cervical position	Posterior	central	Anterior	
Station (cm in relation to spine)	-3 above spines	-2 above spines	-1 to 0 above spines	Below spines
Total score 13 0-5	favorable	Score 6-13	Unfavorable	score

Substitute the length of labor for % of effacement

There are few studies which have shown a significant association between the individual parameters used in bishop score and successful labour induction. According to these studies cervical length and dilatation appears to have positive association with successful induction, thus there is need to find out an association if any, between other remaining factors and bishop score.

This study aims at determining an association between individual factors of bishop score and the success of induction of labour in order to have scientific evidence for using these factors in bishop score for successful labour induction.

Methodology

This is a retrospective study based on observations from women admitted to Gynecology department of Pakistan Institute of Medical Sciences (PIMS) Islamabad from July 2017 till Sep 2017. A total of 97 patients was calculated using WHO calculator setting 95% confidence interval and level of significance at 5%, 80% power of test.

Approval from hospital ethical committee was taken. Consecutive nulliparous women who underwent induction of labour for fetal or maternal reasons with

singleton pregnancy, the period of gestation (37-42 weeks), “fetal membranes intact and cephalic presentation were included in the study. While women with the gestation period <37 weeks, multiparous, multiple pregnancy, non-cephalic presentation, history of pervaginal bleed in later pregnancy, any surgery of uterus, placenta previa, placental abruption, onset of active labour and fetal macrosomia, were excluded”.

Data recorded for each women was modified Bishop score at the time of induction, duration of labor (intended as the time from cervical dilation of 4 cm through the delivery), mode of delivery, cesarean section indications. Effect modifiers like age of mother, parity and gestational age and BMI were also recorded. The method used for Induction of labor is with prostaglandin E2 (PGE2) vaginal tablets 3mg that were commenced at the time of admission. “The Bishop score was calculated at the start of labor initiation”. The patient was reassessed 6 hours after the initial PGE2 tablet insertion, and depending on the response of the cervix as indicated by the Bishop score, another dose of PGE2 was inserted. The procedure was repeated every 6 hours until regular contraction starts, or the cervix was favorable for amniotomy. The maximum dose of PGE2 allowed was 3 tablets in 24 hours.

Data was entered and analyzed by using SPSS version 20. Mean and SD were calculated for quantitative variables. Frequency and percentages were calculated for qualitative variables.

P≤0.05 was considered to be significant to determine the relationship between factors and cervical changes and response induction.

Results

For empirical analysis, data was collected from a total of 200 women. Out of these 200 women, however, 97 nulliparous women were selected, with singleton pregnancy. Mean age of the women was 24.31 ± 3.102 , mean gestational age was 39.38 ± 2.141 and the mean BMI was 26.34 ± 3.715 . Out of these 97 women, 72 women were those who have had a normal vaginal delivery within 24 hours, while there were only 25 women who have had experienced cesarean delivery. Data regarding the patients was collected against the variables such as dilation,

cervical length, cervical consistency, cervical position, and total Bishop Score.

Table I shows that the ratio of closed dilation was high i.e. 27 out of 72 (44%) in women that had successful labor induction compared to the ratio of 11 out of 25 (37%) in women who experienced unsuccessful labor induction. Similarly, the women who had dilation of 2-3 cm, 100% of the women ended up with successful induction and normal delivery. Thus, cervical dilation of 2-3 cm indicates a good predicting factor in success and failure of labor induction.

In case of cervical length of 3cm as shown in Table I, there was no significant difference both in case of successful labor induction and unsuccessful labour induction, however, in case of cervical length of 2-3 cm, there was a slight significant difference in the two groups; successful and unsuccessful labour induction which was 34 % and 36% in the former and latter respectively.

In case of cervical position Table I indicates when cervix is in central or in anterior position, the chances of successful labor induction are high, whereas, when the cervical position is posterior, there are more chances of failed labor induction.

Table I: Mode of Delivery					
Factors	Successful Labor Induction		Unsuccessful Labor Induction		
Dilation	Frequency	Percent	Frequency	Percent	Total
Closed	27	(37.50 %)	11	(44.00 %)	38
1-2 cm	34	(47.22 %)	14	(56.00 %)	48
2-3 cm	11	(15.28 %)	0	(0.00 %)	11
Total	72	(100.00 %)	25	(100.00 %)	97
Length					
3 cm	47	(65.28 %)	16	(64.00 %)	63
2-3 cm	25	(34.72 %)	9	(36.00 %)	34
Total	72	(100.00 %)	25	(100.00 %)	97
Consistency					
Firm	6	(8.33%)	5	(20.00 %)	11
Average	55	(76.39 %)	20	(80.00 %)	75

Soft	11	(15.28 %)	0	(0.00 %)	11
Total	72	(100.00 %)	25	(100.00 %)	97
Position					
Posterior	33	(45.83 %)	14	(56.00 %)	47
Central	39	(54.17 %)	11	(44.00 %)	50
Total	72	(100.00 %)	25	(100.00 %)	97
Bishop Score					
< 3	46	(63.89 %)	19	(76.00 %)	65
3 -5	20	(27.78 %)	6	(24.00 %)	26
> 5	6	(8.33%)	0	(0.00 %)	6
Total	72	(100.00 %)	25	(100.00 %)	97

Likewise, in case of cervical consistency. Table I shows 11% of the women with soft cervix ended with successful labour induction while none having failed induction. Thus 100% of the patients with soft cervix ended into the normal delivery, proving to be an important parameter in bishop score associated with successful labour induction in this study. Similarly, the ratio of women who had firm and rigid uterine cervix was much higher (20%) in case of failed labor induction while 0.08 % in case of successful labor inductions respectively.

Table I shows that with a total Bishop score of less than 3, 76 % of the women had cesarean deliveries whereas, 64 % of women had normal vaginal deliveries. However, with a Bishop score of more than 3, 27 % of the women had normal vaginal deliveries, whereas, this ratio reduces in case of cesarean deliveries to 24%. This indicates that the Bishop score is a good scoring index in predicting the successful labour induction.

Table II presents empirical estimates of logistic regression that shows the impact of a different factor that contribute to the success of labor induction. In this empirical analysis, factors such as cervical dilation, cervical length, cervical consistency, cervical position, and overall Bishop score included. P values are given in correspondence to the factors which are independent variables. $P < 0.05$, and $P < 0.10$ indicate the significance at 5 and 10%. In this study, the

variable of our interest is cervical consistency. The probability value against the consistency variables is 0.048 indicating that it is significant at 5% level. Similarly, the p-value for effect modifiers like, age of the mother and gestational age are significant indicating that these are the good indicators in predicting the success of labor induction

Other factors such as cervical dilation, cervical length, cervical position, and overall Bishop score show that these factors do not have any significant impact on the prediction of successful labor induction.

Table II: Predicting factors of Successful Labour Induction	
Factor	P-Value
Dilation	0.116
Length	0.908
Consistency	0.048
Position	0.381
Bishop Score	0.274
Age of the mother	0.046
Gestational Age	0.053

Discussion

In this study, the impact of different factors on successful labour induction has been investigated. The dependent variable in this study is the normal vaginal delivery which is the primary outcome as it has been used by many obstetric experts while the secondary outcomes were induction to labour and induction to delivery intervals. Unlike other studies that have evaluated multiparous pregnant women, only nulliparous women were included in this study.

Regarding this study, in case of cervical dilation, there are mixed findings in term of prediction of successful labor induction. As in cases, where the cervical dilation is in the range of 2-3 cm, it clearly predicts that all such cases end up with successful labor induction and there was no cesarean delivery.⁷

However, in case of closed cervical dilation, though it results in unuseful labor induction with a ratio of 44%, yet a large portion of women concluded with a successful labor induction with a ratio of 37%. Hence, these mixed findings have been reflected in the regression results where the P-value is 0.116 which indicates that cervical dilation has no significant effect on successful labor induction. However, results in this study are in line with the findings of other studies.⁶ Diny G. E. Kolkman, Corine J. M. Verhoeven, Sophie J. Brinkhorst,

The Bishop Score as a Predictor of Labor Induction Success: A Systematic Review, Amer J Perinatol 2013; 30(08): 625-630 studied the case of 156 pregnant women where the impact of cervical dilation on Bishop score was examined. The study shows that cervical dilation does not have any significant impact on successful labor induction.

Alpaslan.et.al⁸ also report a weak association between cervical dilation and successful vaginal delivery besides other variables that too had a weak relationship with successful labor induction.

As far the impact of cervical length is concerned, In general, the shorter cervical length is associated with successful labor induction.⁹ However, in this study, the cervical length does not seem to be a good predicting indicator for successful labor induction. As with cervical length of 3 cm, there is no statistical difference on impact of both successful and cesarean section, even, with the cervical length of 2-3 cm, 35 % of the cases had normal vaginal delivery and 36% of the cases had experienced unsuccessful labor induction that indicates that cervical length is not a good predicting factor.

Interestingly, in this study the findings of descriptive statistics have been confirmed further with regression approach. As the P-value of 0.98 indicates that cervical length is no a good indicator for predicting successful labor induction. Our empirical results support the findings of other studies such as Hüseyin Cengiz.et.al¹⁰ show that there was no significant impact of cervical length in terms of transvaginal measurement of cervical length “(area under the curve (AUC) 0.583; 95% confidence interval (CI) 0.452 - 0.714)”.

The results in this study also support the findings of Çalışkan et al.¹¹ Roman.et.al studied 106 women patients for analyzing the impact of cervical length on successful labor induction. The results showed that the cervical length measured by transvaginal ultrasonography has not proved to be a good predicting factor in successful labor induction.^{12,13} Similar, insignificant association between cervical length and successful labor induction was reported by Çalışkan et al. and Gonen.et.al.¹¹

In the sub weighted factors that contribute to Bishop score, one important factor is the position of cervix. In literature, the anterior position of the cervix is

considered crucial in predicting successful labour induction. However, in this study, the cervical position does not seem to present a decisive picture as 45% of the women reported to have had a posterior cervical position yet, they all ended up with a successful labor induction. Similarly, 44% of the women were, with the cervix in central position, yet all those women ended up with unsuccessful delivery.

This pattern indicates that cervical position does not seem to be a good indicator in this study. The same findings were verified when the significance of cervical position by regression approach was being checked. The p-value of 0.384 indicates that it has no significant impact on successful labor induction. However, this study supports other studies that too came up with the insignificant impact of cervical position on successful labor induction.

determine the predicting power of various factors such as multiparity, Bishop score and cervical position in successful vaginal delivery. The multiparity and Bishop score were reported to have a prediction performance, however, cervical position was not significant.¹⁴

Along with other factors, the impact of Bishop score on successful labor induction is studied. The findings indicate that a Bishop score of < 3 has mixed predictive power in determining a successful labor induction as with Bishop score of < 3, 64% of cases ended up with normal vaginal delivery while 76% ended up with unsuccessful labor induction.

The Bishop score with >5 is a good predicting indicator in predicting successful labor induction. However, the overall impact of Bishop score is not significant as the P-value of 0.274 indicates the insignificant role of Bishop score in predicting the successful labor induction. However, there are many studies that have reported a weak or insignificant prediction performance of Bishop score which validate the findings in this study.¹⁵ Finally, the indicator that proved to be important in successful induction in this study was cervical consistency. Cervical firmness and softness tend to be good predicting factors in successful labor induction. In this study, cervical consistency has been identified as a good predicting factor in determining successful labour induction. The results show that

when cervix tissue was firm, in majority of the cases, it resulted in unsuccessful labor induction. On the other hand, when consistency of cervix was identified as soft, in majority of the cases it ended up with a successful labor induction.¹⁶ The same results were again reinforced as the regression results show that P-value is 0.048 which indicates that cervical consistency serves as a good predicting factor. The findings of this study are in line with the study of Alpaslan.et.al¹

Finally, the studied effect modifiers like maternal age and gestational age are insignificant predicting factors in successful labour induction which are in line with study done by Emilio.et.al.¹⁷

Conclusion

Thus, it is concluded that in all nulliparous women with singleton pregnancies, cervical length, cervical dilation, cervical position, and Bishop score are weak indicators in predicting successful labor induction. However, cervical consistency is better conjecturers in determining the successful labor induction.

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