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Acceptance of trial of labor after cesarean (Tolac) among obstetricians in the Western Region of Saudi Arabia: A cross-sectional study

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ABSTRACT

Background: Babies to women eligible for trial of labor after a cesarean (TOLAC) are sometimes delivered by cesarean section (CS). To obtain clinicians' attitudes and beliefs about TOLAC, this study was designed to investigate the views of clinicians when advising TOLAC-eligible pregnant women about TOLAC, and to explore their reasons in favor of or against TOLAC.

Methods: Interviews were carried out individually (face-to-face) with clinicians using a specially designed questionnaire to collect data from obstetricians in the Western Region of Saudi. Regression analysis was used as appropriate.

Results: Among the 183 obstetricians included in the current study, approximately 79.2% were against offering TOLAC. However, most of the physicians (89.1%) were in favor of offering TOLAC to patients who had had a successful vaginal birth after CS. Significant associations were found between physicians' opposition to TOLAC and medical and most non-medical factors.

Conclusion: Clinicians should recognize that the critical role they play in the delivery decision-making process and in boosting women's confidence in TOLAC may be key to increasing the rate of TOLAC.

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1. Introduction

Globally, Cesarean sections (CS) rank first in frequency among types of obstetric surgery. Although the incidence of CS varies widely from country to country (from as low as 0.4% to as high as 40%), over all the numbers continue to rise (Villar et al., 2006).

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The developed world is no exception to this trend, with CS rates of 23.3% in Australia, 33% in Italy, 23% in Northern Ireland, and 21.3% in the United Kingdom (Chaves et al., 2015; Dodd et al., 2007). This trend has also appeared in Saudi Arabia, where the prevalence of CS rose 196% (from 10.6% to 25%) from 1997 to 2014 (Ba'aqeel, 2009; Al Rowaily et al., 2014).

Research suggests that a higher proportion of the increase in CS is due to indications that are subjective in nature, including labor arrest disorders and non-reassuring fetal status, than those that are objective in nature (Nelson et al., 2020). It is undeniable that the principle factors for the steady increase in CS are non-clinical: the mistaken belief that CS prevents complications during delivery, physicians wanting to avoid malpractice litigation, and mothers wanting a conveniently scheduled delivery, free of labor pain (Gao et al., 2013).

However, contrary to the misconception of ensuring a risk-free delivery, CSs are linked to increased loss of blood, and a higher risk of injury to the urinary tract, pulmonary embolisms, postpartum

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infections, and neonatal respiratory complications (when surgery is done before the 39th week) (Silver et al., 2006). Adding to these adverse effects, women who deliver by CS tend to opt for the same procedure in subsequent deliveries, raising the rate of CS even more. This exposes women to the well-known risks related to recurrent CS, specifically a higher risk of maternal morbidity due to abnormal placental adherence and cesarean hysterectomy, a risk which grows with each CS (van den Akker et al., 2016). Being difficult to treat, such complications may cause significant adverse effects including maternal mortality (Chongsuvivatwong et al., 2010).

However, having a CS does not have to limit the mother to CS in subsequent pregnancies. The procedure known as vaginal birth after cesarean section (VBAC) is an option given to some women. Based on guidelines by the American College of Obstetricians and Gynecologists (ACOG), most women who have had one prior cesarean delivery and a low-transverse incision are eligible for the approach known as trial of labor after cesarean section (TOLAC) and should be offered this approach after receiving counseling about it (ACOG, 2010). The woman and her obstetrician should decide whether or not to pursue TOLAC during prenatal care or even before conception. TOLAC should be offered to the patient after an assessment of the best available clinical evidence and other factors: preparation of the delivery site; likelihood of VBAC; significance of and estimated complications with TOLAC; individual pregnancy factors; and the woman's values and preferences. Clearly, TOLAC has the potential to lower the high incidence of CS cases (Bangal et al., 2013). Research suggests that TOLAC is the optimal approach for women with a prior CS but no indications for CS in the present pregnancy (Bangal et al., 2013) since 60–80% of the women who attempt TOLAC have successful deliveries (Silver et al., 2006; Mazzoni et al., 2011). Although complications with uterine rupture arise in less than 1% of all TOLAC attempts, such a risk can be mitigated by close observation and adherence to set guidelines (Mazzoni et al., 2011). This suggests that the TOLAC approach should be promoted because vaginal birth has more benefits to both mothers and babies; namely, it is associated with faster recovery, is favored by many women (Kieser and Baskett, 2002; Landon, 2008), and is associated with fewer risks in subsequent pregnancies than CS (Mazzoni et al., 2011; Little et al., 2008). Additionally, disease and death rates due to TOLAC are lower than those of repeated cesarean sections.

TOLAC could be an option for most women with a single previous low segment cesarian delivery (Metz et al., 2013), so clinical indications alone do not explain the high incidence of repeat CS. One of the main factors in determining a woman's choice of delivery method seems to be the advice and counseling given by maternity care providers, who are guided primarily by their beliefs about CS and TOLAC, as suggested by a systematic review and meta-synthesis (Panda et al., 2018). Globally, these provider beliefs and attitudes about TOLAC and planned repeat CS (PRCS) vary considerably (Panda et al., 2018; Lundgren et al., 2016).

Research on clinicians' attitudes and beliefs about TOLAC is limited. What has been found is that in countries where TOLAC is more common, clinicians point out that factors linked to how a country's maternity care system is structured, the collaboration between obstetricians and midwives, and the pre- and postnatal care provided are key to raising the rate of TOLAC (Lundgren et al., 2016). In this context of existing concern over the rising incidence of CS globally and the limited research on how clinicians feel about TOLAC, this study was designed to investigate the views of clinicians from two cities in the Western Region of Saudi Arabia when advising TOLAC-eligible pregnant women about TOLAC and PRCS, and to explore their reasons in favor of or against TOLAC.

2. Methods

In this cross-sectional study, a specially designed questionnaire was used to collect data from obstetricians in the Western Region (Makka, and Jeddah cities) of Saudi Arabia from November 2018–April 2019. Interviews were carried out individually (face-to-face) with clinicians who met the following inclusion criteria: (1) those who were board-certified specialists in obstetrics or who were in training for this specialty and (2) those with recent (in the past 3 years) experience in delivering babies. The questionnaire was piloted on 20 physicians of varying age, experience, and specialty to ensure its clarity and validity. The final analyses did not include the responses from the pilot study.

With information provided by the human resources department, our interviewer contacted obstetricians to determine eligibility. After we received informed consent from participants, appointments were made for interviews, which were carried out in a quiet place in hospitals, medical centers, and offices. The interviews all led off with this question: "Are you for or against VBAC?" and continued with questions like "Do you give your patients the option to have TOLAC?" and follow-up questions such as "Why is the rate of VBAC low?", "Why don't mothers select VBAC?", and "Why don't obstetricians welcome VBAC?" To ensure the validity of the results, all interviews were conducted by the same interviewer.

The study protocol was reviewed and approved by the Committee of Bio-medical Research and Ethics Unit at Umm Al-Qura University (HAPO-02-K-012-2018-10-267). All obstetricians gave written informed consent before participating in the study.

2.1. Statistical analysis

The Statistical Package for the Social Sciences (SPSS Inc., IBM, Armonk, New York, US) was used to enter and analyze the data. Multiple response dichotomy analysis was used to describe the physicians' responses to questions that required that they select several indications and criteria for offering TOLAC. Multivariate logistic regression analysis was performed to determine the association between professional and demographic characteristics and co-variables (perceived indication for TOLAC and medical and non-medical barriers to offering TOLAC) with their measured agreeability (i.e., attitude) toward offering TOLAC regardless of their hospital policies. The dependent outcome variable was dummy coded as 0 = TOLAC and 1 = against TOLAC). Results were considered significant if $P < 0.05$.

3. Results

One hundred eighty-three interviews were conducted in different maternity care settings and were included in the current study. Table 1 outlines the demographic and professional characteristics of the physicians. Most of the respondents were females (61.2%), and the sample was mostly composed of Saudis (68.9%). Physicians from the Saudi Ministry of Health were heavily represented in the sample (83.1%). Almost half of the respondents were residents and fellows (Table 1).

Approximately 79.2% of the physicians were against offering TOLAC, regardless of their hospital policies. Only a very small proportion (3.3%) of the physicians reported they had never offered TOLAC. However, most of the physicians (89.1%) were in favor of offering TOLAC to patients who had had a successful VBAC.

Descriptive analysis indicated that the most common indication for TOLAC was evidence of a previous cesarean section (91%). The most common criteria for offering TOLAC was the interval between the last cesarean section and the current pregnancy (71%), followed

Table 1
Demographic and professional characteristics of the physicians.

Variables	N (%)
Sex	
Female	112 (61.2)
Male	71 (38.8)
Nationality	
Non-Saudi	57 (31.1)
Saudi	126 (68.9)
Sector	
Private hospital	31 (16.9)
Government hospital	152 (83.1)
Experience/Training Level	
Resident/Fellow	84 (45.9)
Specialist	45 (24.6)
Consultant	54 (29.5)

by the uterine closure technique used during the previous delivery (46.1%). The least cited indication for TOLAC was the birth weight of the last baby before the current pregnancy (42.1%) (Table 2).

As shown in Table 2, the most common reason for not offering TOLAC was the indication for the previous cesarean section (73.4%), followed by maternal history of cephalopelvic disproportion dur-

Table 2
Physicians' attitudes and practices toward vaginal delivery after a cesarean section.

	N (%)
Are you for or against TOLAC regardless of your hospital policy	
Against TOLAC	145 (79.2)
For TOLAC	38 (20.7)
Do you give your patients the option to have TOLAC or not?	
No	6 (3.3)
Yes	177 (96.7)
Are you for TOLAC after a tested scar (patient had a CS followed by TOLAC)?	
No	163 (89.1)
Yes	20 (10.9)
Criteria/indications for offering TOLAC	
Indication for previous CS	162 (91)
Duration since last CS	127 (71)
Uterine closure technique (2 layers)	82 (46.1)
Birth weight of the last baby	75 (42.1)
The criteria that make you exclude TOLAC as an option	
Indication for previous CS	130 (73.4)
History of cephalopelvic disproportion in the last CS	116 (65.5)
Estimated fetal weight	112 (63.3)
Duration since last CS	96 (54.2)
Uterine closure technique (single layer)	36 (20.3)
Birth weight of the last baby	28 (15.8)
Inadequate facilities	65 (48.1)
Medico-legal reasons	59 (43.7)
Inadequate staff	58 (43)
Hospital policy	45 (33.3)
Other reasons (please explain)	17 (12.6)

Abbreviations: CS, cesarean section; TOLAC, trial of labor after cesarean delivery.

ing the last cesarean section (65.5%). The uterine closure technique (20.3%) and the birth weight of the last baby (15.8%) were among the least cited reasons that precluded physicians from offering TOLAC. An independent *t*-test showed that physicians working in private hospitals were significantly more likely to select more exclusion criteria (mean 3.32, standard deviation [SD] 1.7) than their peers working in government hospitals (mean 2.73, SD 1.4, *P* = 0.038).

Regarding the selection of non-medical barriers to offering TOLAC, multiple response dichotomy analysis showed that 1.33 ± 1.2 barriers were cited per physician. The most frequently reported non-medical barriers included the perceived inadequacy of facilities (48.1%), medical litigations (43.7%), inadequate staff (43.0%), and internal hospital policies and directives (33.3%). Only a relatively small proportion of the physicians indicated other non-medical reasons (Table 2).

A chi-squared test showed that there was no significant association between gender and physicians' attitudes toward TOLAC (*P* = 0.638). Additionally, no significant association was found between nationality and physicians' attitudes toward TOLAC (*P* = 0.647). Conversely, we found a significant association between the physicians' working place (hospital sector) and their attitudes toward TOLAC (*P* = 0.027), with physicians working in the private sector being more likely to oppose TOLAC than to agree with it compared to their colleagues working in government hospitals (Table 3).

No significant association was found between physicians' training level and their attitudes toward TOLAC (*P* = 0.951). Further analysis showed that consultants were more likely to oppose TOLAC compared to their peers (OR = 1.13, *P* = 0.753). Similarly, no significant association was found between the physicians' attitudes toward TOLAC and their actual practice of giving the option for TOLAC or not (*P* = 0.199). However, we did find a significant association between physicians' opinions of TOLAC use in women with a cesarean section scar and their general attitude toward TOLAC (*P* < 0.001). Additionally, physicians who were averse to using TOLAC in women with a cesarean section scar were significantly more likely to be against TOLAC in general; however, the physicians who were in favor of offering TOLAC despite the presence of a cesarean scar were 0.074 times less likely to oppose this option.

Regarding the physicians' perceived indications of TOLAC and their attitudes toward TOLAC in general, we did not find a significant association between their perceptions and attitudes toward this procedure (Table 3). Furthermore, we did not find a significant association between the physicians' perceptions of a previous cesarean section as a barrier to using TOLAC and their overall attitude toward this procedure (*P* = 0.108). No statistically significant association was found between the physicians' attitudes toward TOLAC and their perception of a history of cephalopelvic disproportion during the last cesarean section as a contraindication to TOLAC (*P* = 0.430).

However, significant associations were found between physicians' opposition to TOLAC and several other indications. First, the estimated fetal weight was significantly associated with a higher opposition to TOLAC (*P* < 0.001). Physicians who agreed that fetal weight was a contraindication to TOLAC were 4.33 times more likely to oppose it (Table 3). Second, respondents who perceived the interval between the last cesarean section and the current pregnancy as a possible contraindication to TOLAC were 3.2 times more likely to have a negative attitude toward it (*P* = 0.003). Additionally, physicians who perceived the uterine closure technique as a possible contraindication to TOLAC were significantly more (4.6 times more) likely to oppose it (*P* < 0.001). We also found a significant association between physicians' opposition to TOLAC and the birth weight during the last delivery. Those who believed the birth

Table 3

Bivariate associations between the physicians' characteristics and their attitude toward the trial of labor after cesarean section.

Variables	Physicians' Attitude Toward TOLAC		Bivariate Odds Ratio (95% CI)	p-value
	For (n = 145)	Against (n = 38)		
Sex				
Female	90 (62.1%)	22 (57.9%)	1.20 (0.57–2.5)	0.638
Male	55 (37.9%)	16 (42.1%)		
Nationality				
Non-Saudi	44 (30.3%)	13 (34.2%)	0.84 (0.39–1.80)	0.647
Saudi	101 (69.7%)	25 (65.8%)		
Hospital type				
Private hospital	20 (13.8%)	11 (28.9%)	0.39 (0.17–0.91)	0.027
Government hospital	125 (86.2%)	27 (71.1%)		
Experience/Training Level				
Resident/Fellow	67 (46.2%)	17 (44.7%)	0.94 (0.46–1.93)	0.871
Specialist	36 (24.8%)	9 (23.7%)	0.94 (0.41–2.2)	0.884
Consultant	42 (29%)	12 (31.6%)	1.13 (0.52–2.50)	0.753
Do you give your patients the option for TOLAC or not?				
No	3 (2.1%)	3 (7.9%)	0.25 (0.05–1.30)	0.199
Yes	142 (97.9%)	35 (92.1%)	Yates	
Are you for TOLAC after a tested scar (patient had a CS followed by a TOLAC)?				
No	6 (4.1%)	14 (36.8%)	0.074 (0.03–0.211)	<0.001
Yes	139 (95.9%)	24 (63.2%)	Yates	
Criteria/Indications for using OLAC				
Indication for previous CS	129 (89%)	33 (86.8%)	0.82 (0.28–2.40)	0.936
Duration since last CS	103 (71%)	24 (63.2%)	0.70 (0.33–1.50)	0.348
Uterine closure technique (2 layers)	66 (45.5%)	16 (42.1%)	0.87 (0.42–1.80)	0.707
Birth weight of the last baby	58 (40%)	17 (44.7%)	1.21 (0.60–2.50)	0.731
The criteria that make you exclude TOLAC as an option				
Indication for previous CS	99 (31.7%)	31 (81.6%)	2.1 (0.84–5.02)	0.108
History of cephalopelvic disproportion in the last CS	94 (64.8%)	22 (57.9%)	0.75 (0.36–1.55)	0.430
Estimated fetal weight	80 (55.2%)	32 (84.2%)	4.33 (1.71–11.0)	0.001
Duration since last CS	68 (46.9%)	28 (73.7%)	3.20 (1.44–7.0)	0.003
Uterine closure technique (Single layer)	20 (13.8%)	16 (42.1%)	4.6 (2.1–10.1)	<0.001
Birth weight of the last baby	15 (10.3%)	13 (34.2%)	4.51 (1.91–10.6)	<0.001
Non-medical reasons that affect your decision to offer TOLAC to your patients				
Inadequate facilities	44 (30.3%)	21 (55.3%)	2.84 (1.40–5.6)	0.004
Medico-legal reasons	40 (27.6%)	19 (50%)	2.63 (1.30–5.5)	0.009
Inadequate staff	35 (24.1%)	23 (60.5%)	4.82 (2.30–10.30)	<0.001
Hospital policy	35 (24.1%)	10 (26.3%)	1.12 (0.50–2.54)	0.781
Other reasons (Please explain)	14 (9.7%)	3 (7.9%)	0.80 (0.22–2.95)	0.739

Abbreviations: CI, confidence interval; CS, cesarean section; TOLAC, trial of labor after cesarean delivery.

weight of the last baby was a contraindication were 4.51 times more likely to oppose TOLAC ($P < 0.001$, Table 3).

Significant associations were also found between physicians' opposition to TOLAC and most non-medical factors. Physicians who perceived their facility as a barrier to offering TOLAC were 2.84 times more likely to have a negative attitude toward the procedure ($P = 0.004$). Those who perceived medico-legal issues as a non-medical obstacle were 2.63 times more likely to oppose TOLAC ($P = 0.009$). Likewise, physicians who perceived inadequate staffing as a non-medical barrier were 4.83 times more likely to oppose TOLAC ($P < 0.001$). However, we found no significant association between the physicians' attitudes toward TOLAC and their hospital policy (Table 3).

As shown in Table 4, the multivariate binary logistic regression analysis model was statistically significant ($P < 0.001$). The Hosmer-Lemeshow's chi-square goodness-of-fit test between the predicted and observed physicians' attitudes was not statistically significant ($P = 0.304$). Further testing showed that the area under the receiver operating curve (AUC) was statistically significant (AUC = 0.84, $P < 0.001$). Multivariate logistic regression suggested that gender, nationality, training level, or place of work (private or public sector) was not significantly associated with whether physicians agreed with or opposed TOLAC. However, physicians who believed in giving pregnant women an option to select TOLAC during the last trimester were significantly less likely to oppose it when other predictors in the model were considered ($P = 0.010$,

Table 4). Additionally, physicians who were in favor of using TOLAC after a successful VBAC were significantly less likely to oppose TOLAC after accounting for everything else in the model ($P < 0.001$).

Binary logistic regression analysis showed that the total number of perceived exclusion criteria for TOLAC converged significantly and positively with the physicians' negative attitudes toward TOLAC ($P < 0.001$) after controlling for other predictors in the model. The total number of perceived non-medical obstacles/barriers converged positively, but these were not significantly associated with their odds of opposing TOLAC (OR = 1.4, $P = 0.084$). The physicians' total number of perceived indications to use TOLAC converged slightly negatively with their odds of opposing TOLAC when analyzed simultaneously with the other predictors (OR = 0.66, $P = 0.128$).

4. Discussion

There is widespread acceptance of vaginal delivery as the safer mode of delivery as it is linked to lower disease and death rates of the mother and baby. Likewise, VBAC is associated with higher rates of safe labor and delivery than repeat CS. In Saudi Arabia, the considerable increase in the CS rate for different indications has led to a rise in the number of women presenting with a history of prior CS (Ba'aqel, 2009; Al Rowaily et al., 2014). Recent research highlights differences in CS rates depending on country, region,

Table 4

Multivariate binary logistic regression analysis explaining the association between physicians' characteristics, practices, and perceptions of a trial of labor after cesarean delivery with their odds of opposing it.

Variables	Adjusted Odds Ratio	95% CI for Odds Ratio		p-value
		Lower	Upper	
Sex = Male	1.212	0.477	3.074	0.686
Nationality = Saudi Arabian	0.667	0.236	1.888	0.446
Physicians' training level	0.798	0.442	1.440	0.453
Prefers to give women an option to choose delivery type = Yes	0.048	0.005	0.489	0.010
Agrees with TOLAC in the presence of a tested scar = Yes	0.064	0.017	0.239	< 0.001
Hospital sector = Government	1.279	0.407	4.016	0.673
Total perceived indications/criteria for TOLAC	0.663	0.390	1.126	0.128
Total perceived exclusion criteria for TOLAC	2.274	1.528	3.384	0.000
Total perceived non-medical barriers to offer TOLAC	1.383	0.958	1.997	0.084

Abbreviations: CI, confidence interval, TOLAC, trial of labor after cesarean delivery.

financial status, physician preferences and the wishes of the expectant mother (Billard, 2011). The type of medical practice also impacts the CS incidence, with significantly higher rates seen in the private sector than in the public sector (Murray 2000).

Delivery by CS has been linked to increased complications for both mother and fetus (Silver et al., 2006; van den Akker et al., 2016). These include an increased incidence of infections, abdominal organ injuries, thromboembolic complications, placenta previa, placenta accreta, placenta increta, placenta percreta, and newborn respiratory problems and may lead to serious negative maternal and neonatal outcomes (Chongsuvivatwong et al., 2010). Even when most of these complications are avoided with the implementation of high-standard procedures, post-CS recovery is typically longer than that after a normal vaginal delivery.

To maintain positive outcomes for mother and baby, the World Health Organization recommends that the CS rate not exceed 10–15% of all deliveries. Like many countries, Saudi Arabia has a high CS rate, which does not appear to be diminishing. Elective repeat CS is one of the leading factors in the increased incidence of CS, so encouraging more TOLAC would seem to be key in lowering the CS rate. Because TOLAC is not widely attempted in Saudi Arabia, research in this area is limited, but to increase women's access to planned VBAC, it is important to explore obstetricians' perspectives toward TOLAC and VBAC and their reasons in favor of or against this approach. The current cross-sectional study investigated the acceptability of VBAC among obstetricians in the Western Region of Saudi Arabia and barriers associated with this approach.

Women are being given increasing autonomy in decisions about mode of delivery, and their wishes may be influenced by developments in obstetric management, but research has shown that they are significantly affected by the attitudes of their physicians (Gao et al., 2013). In the current study, obstetricians were in favor of CS. TOLAC was not their preferred mode of delivery, even for eligible women, which is in line with previous studies (Gao et al., 2013; D'Souza and Arulkumaran, 2013). When asked about personal preferences for themselves or partners in pregnancies without complications, a sizeable percentage of physicians practicing obstetrics in the United States (46%) (Gao et al., 2013) and female obstetricians in London (31%) (D'Souza and Arulkumaran, 2013) stated a preference for CS. Another study in Turkey found that two-thirds of obstetricians favored CS for themselves or partners in normal pregnancy (Arikan et al., 2011). The anxiety expressed by the expectant woman and her family pushing them to insist on CS as the mode of delivery was the most common explanation given by obstetricians for performing PRCS when not medically indicated (Arikan et al., 2011).

Despite their clear preference for CS, most of the participants in this study offered counseling on TOLAC. It is interesting to note that, many of our obstetricians placed conditions on women's 'choice' of TOLAC, including need for them to be well informed

and aware of the risks associated with TOLAC. However, these obstetricians did not consider the same condition necessary for expectant women to 'choose' PRCS. In fact, several obstetricians named PRCS as the default mode of delivery when expectant women were unaware of the risks involved in TOLAC. These findings are in accordance with prior research (Panda et al., 2018), reflecting a normalization of and preference for PRCS on the part of some physicians.

Although less important than other factors, clinicians' characteristics do seem to play a role in the decision to perform CS. Previous research on the impact of gender found more willingness to perform CS on the part of male obstetricians than on the part of their female colleagues (Monari et al., 2008). Another study found that male obstetricians recommended CS at a rate three times higher than that of their female colleagues (Danishevski et al., 2008). Our findings were in line with this prior research as male obstetricians in our study were twice as likely to perform CS compared to their female counterparts.

Professional status could also play a role in the decision regarding TOLAC. Two studies found that as obstetricians increased in rank and experience, they were more inclined to approve of or perform CS (Kwee et al., 2004; Appleton et al., 2000). Findings from a Dutch study indicated that consultants and experienced physicians performed CS more frequently than did registrars and doctors with less experience (Kwee et al., 2004). This mirrors results from research in Australia where consultants or senior colleagues were less likely to push for TOLAC than obstetric residents/registrar (60% vs. 83%) (Appleton et al., 2000). Similarly, our findings indicate that consultants in our study were more opposed to TOLAC than the fellow and residents. This could be related to the perception that experienced obstetricians (consultants) perform CS more frequently than less experienced ones (Kwee et al., 2004; Appleton et al., 2000).

Being able to predict the likelihood of VBAC success is crucial to providers when counseling women on mode of delivery. Obstetricians in the current study considered factors that are generally linked to successful TOLAC, such as prior vaginal delivery, and duration since last CS. They also considered factors linked to lower TOLAC success rates, such as history of obstructed labor, and birth weight of the last baby. Recent studies examining factors like no previous vaginal delivery, failure to progress in labor, and prior CS for arrest of descent, which are widely associated with lower TOLAC success rates, have found unexpectedly high VBAC success levels ranging from 49 to 73% (Fox et al., 2019; Cox 2014; Murphy and Fahey 2013).

Previous research found significant variation in CS rates between private and public clinical settings. In private maternity clinics, CS was more associated with non-medical factors than biological or clinical factors related to pregnancy. Researchers found that irrespective of their TOLAC eligibility, women in the private sector were more likely to have a CS than those in public institu-

tions (Cox 2014). The main factor for this difference in CS rates may be that in general, the private sector is profit driven and thus motivated by financial incentives that take into consideration patients' preferences more than evidence-based medicine (Murphy and Fahey 2013). In the current study, this private–public difference was not observed, which may be due to the small number of private hospitals included in our study.

The present study is the first investigation of the views and experiences of obstetricians related to VBAC and its obstacles in the Saudi health care system. The qualitative methodology and the participation of clinicians in different positions are strengths of this study. However, this study was limited by the lack of data from pregnant mothers with a prior CS. Based on the findings of this study, further research is needed to establish suitable ways to remove these obstacles and raise the rate of VBAC in the region. Additional research of the views of obstetricians and midwives related to VBAC in different regions of Saudi Arabia is warranted.

5. Conclusion

Obstetricians are the final ones making decisions for or against CS and as such, are contributors to the overall CS incidence in any country. However, multiple complex factors go into their decision to perform CS, including personal, cultural, institutional, legal, and financial considerations. In the current study, one of the major factors impacting decision-making for CS was clinicians' beliefs. For the most part, this was connected to clinicians' personal preferences, perception of the amount of risk associated with vaginal birth or VBAC, and view of CS as a safe and convenient choice. As concern mounts over increasing global rates of CS, clearer evidence related to the factors that influence decision-making is needed. Clinicians should recognize that the critical role they play in the delivery decision-making process and in boosting women's confidence in TOLAC may be fundamental to increasing the rate of TOLAC.

Author contributions

All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Concept or design of the study: All authors.

Acquisition of data: Katib H.

Analysis or interpretation of data: All authors.

Drafting of the article: All authors.

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