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REVIEW

ELECTIVE CESAREAN SECTION ON MATERNAL REQUEST WITHOUT INDICATION: REASONS FOR IT, AND ITS ADVANTAGES AND DISADVANTAGES

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Abstract

Aim: The aim of this study was to analyze the available research evidence on the reasons for, and advantages and disadvantages of elective cesarean section on maternal request. *Design:* Literature review. *Methods:* The review was conducted using Web of Science, PubMed, Embase, Scopus, ProQuest, and Google Scholar from 2009 to 2020, based on PRISMA guidelines, and Mesh keywords. All types of studies reporting on the subject of the research were included, excepting case reports. STROBE and JBI checklists were used to assess the quality of studies. Sixteen studies were included in this literature review. *Results:* Fear of complications during vaginal delivery was the most frequent maternal reason for elective cesarean section. Fear of physical injury to the infant during vaginal delivery was the most frequent neonatal reason for elective cesarean section. Birth experiences of family, friends, or relatives was the most frequent social maternal reason given for elective cesarean section. The most common advantage of cesarean section was reduction in neonatal injuries. The incidence of maternal wound infection and risk of neonatal respiratory distress syndrome were the most common disadvantages of cesarean section. *Conclusion:* Identifying the reasons for cesarean section on maternal request can help create a more precise roadmap for increasing awareness in women of the advantages of vaginal delivery, preventing prenatal complications, and reducing costs in healthcare systems.

Keywords: advantages, cesarean section, disadvantages, maternal request, reasons, vaginal delivery.

Introduction

Vaginal delivery (VD) is a natural process and has traditionally been considered the primary mode of delivery worldwide (Carter, 2016). It is a spontaneous process that usually requires no medical intervention, and cesarean section (CS) is only performed if VD is contraindicated in order to maintain the health of the mother and newborn baby (Navaee & Abedian, 2015). The phenomenon of increasing CS rates has been registered in most countries worldwide (Câmara et al., 2016). Cesarean section on maternal request (CSMR) can be described as a CS requested by the mother, without obstetric or medical indications (Sharpe et al., 2015). CSMR is comparatively rare in the United Kingdom (1–2% of births) and the USA (3% of births), but in some middle income countries the rate is high and increasing (20% of births in southeastern China), making it a worldwide public health concern (Blustein & Liu, 2015). A maternal request for CS without maternal or fetal indication may increase risk-benefit considerations and ethical concerns for a healthcare provider (Alsayegh et al., 2018). Fear of VD is the most frequent reason given for CS, but generally, women giving birth by CSMR are older, more often use tobacco products, exhibit a lower educational level, have greater body mass index (BMI), are unemployed, and their parents were more often born outside of Scandinavia (Sydsjö et al., 2015). A study carried out in Norway also showed that anxiety, depression, low self-esteem, history of childhood sexual abuse, and low level of satisfaction in relationship with partner are associated with a preference for CS (Kringeland et al., 2009). Other reasons for maternal requests for CS are recommendations from healthcare professionals, experiences and recommendations from relatives and friends, negative accounts of a specific mode, which increases anxiety in mothers of having a similar experience during labor (Loke et al., 2015) poor mental health, and poor social support (Olieman et al., 2017).

Cesarean section is a surgical procedure that can lead to several complications in both the mother and the baby (Mylonas & Friese, 2015). Possible risks of CS

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by maternal request include longer duration of hospital stay, increased risk of respiratory problems in the baby, and increased risk of complications in subsequent pregnancies, such as uterine rupture, placental implantation problems, and need of hysterectomy (American College of Obstetricians and Gynecologists, 2013). The benefits of CS can include: 1) avoidance of prolonged labor; 2) avoidance of labor pain; 3) reduction in fear of overlong labor and fetal injuries; and 4) quicker and more convenient manner of delivery (Loke et al., 2015). Today, approximately 2.5% – 18% of CSs are performed without medical indication worldwide. It is estimated that 10% – 20% of all deliveries in northern Europe, the United States, Sweden, and Australia are CSs on maternal request (Gao et al., 2019). In Iran, 47% of deliveries are terminated by CS, of which 40% are performed at the mother's request (Zamani-Alavijeh et al., 2018).

Since VD is the best method of delivery for mothers who are healthy and without contraindications, and the number of CSMR without obstetrical or medical indications is increasing annually – despite the fact that CS has many risks for both mother and baby during and after delivery, the purpose of this study was to systematically review the literature regarding the reasons for elective CS on maternal request without indication, and its advantages and disadvantages.

Aim

The aim of this study was to analyze the available research evidence on the reasons for, and advantages and disadvantages of elective cesarean section on maternal request.

Methods

Design

Literature review.

This study was reported according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Rahnemaie et al., 2019).

Eligibility criteria

Inclusion criteria were: all studies in Persian and English published between 2009–2020, using the Medical Subject Headings (Mesh) terms including: "cesarean section" [tiab] OR "CS" OR "C-Section" [tiab] OR "elective cesarean section" [tiab] OR "elective CS" OR "cesarean delivery" [tiab] OR "elective cesarean delivery" [tiab] OR "abdominal delivery" [tiab] and "maternal request" [tiab] and "advantage" [tiab], OR "advantages" [tiab] OR "disadvantage" [tiab], OR "disadvantages" [tiab] and "reason" [tiab] OR "reasons" searched for in the databases. Studies examining healthy pregnant women requesting CS and women electing to have a caesarean section were included in the study.

Studies were excluded according to the following criteria:

- reviews, case reports, comments, and letters;
- studies focusing on babies in the breech position;
- studies investigating pregnant women with underlying diseases;
- studies examining emergency caesarean sections.

Search Strategy

The Web of Science, PubMed, Embase, Scopus, ProQuest, and Google Scholar databases were systematically searched for relevant studies published between 2009 and 2020. Quantitative and qualitative studies were included if they met certain inclusion criteria and did not match any of the exclusion criteria.

Study Selection inc. PRISMA flow diagram

The initial search yielded 2,170 results. All studies were independently assessed for eligibility by two authors and any disagreements were resolved by consensus. After initial screening, 1,085 irrelevant or duplicated studies were excluded. A further 951 papers were excluded after reviewing the titles and abstracts. Of the remaining 134 full-text articles, 118 were excluded due to ineligibility. Finally, a total of 16 eligible articles met our inclusion criteria and were included in the review (Figure 1).

Evaluation of quality of articles

The STROBE statement was applied to assess the quality of quantitative studies (Abdi et al., 2019). The checklist items focus on reporting how trials were designed, analyzed and interpreted. An authoritative tool, the STROBE Statement includes a checklist of 22 items. The checklist items focus on the reporting or assessment of different sections of observational studies. The Joanna Briggs Institute (JBI) checklist was used to evaluate qualitative studies. Both STROBE Statement and JBI checklists were used to assess the quality of mixed method studies.

Data extraction

Two investigators independently searched for relevant scientific publications, carried out validity assessments, and resolved any disagreements by consulting a third investigator. The methodological quality of the studies was assessed by author name, year of publication, study design, country, sample size, maternal age, data collection, advantages, disadvantages, social reasons, individual reasons, and quality score.

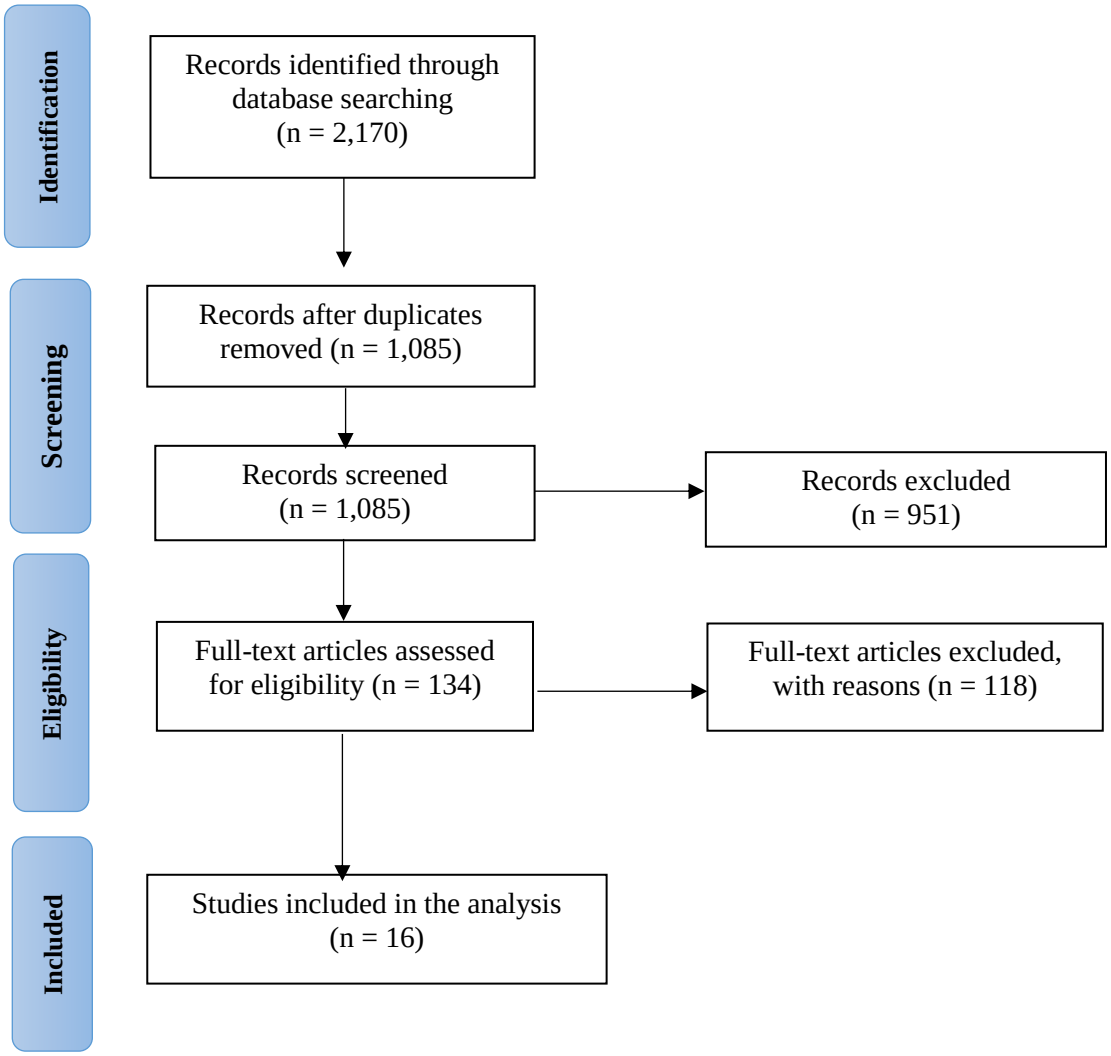

Figure 1 PRISMA Flow diagram

Results

After evaluation of the articles, only 16 were finally deemed eligible for inclusion in this systematic review, of which three were qualitative studies, 12 were quantitative studies, and one study was of mixed methodology. 16 studies were conducted in the following countries: China (3 studies), the United Kingdom (3 studies), Sweden (2 studies), Nigeria (2 studies), Iran (4 studies), Israel (1 study), Austria (1 study), Australia (1 study), Denmark (1 study), Canada (1 study), and Colombia (1 study) (Table 1).

Reasons for Elective CS

Reasons for elective CSMR can be divided into two categories: maternal indications, and fetal indications. A review of studies indicated that individual maternal factors behind elective CS included: fear of VD and its complications (8 studies), older maternal age (8 studies), attitudes toward cesarean birth on maternal request – i.e., the belief that it is safe and under control (4 studies), maternal education (4 studies), maternal obesity or BMI (3 studies), availability of options in childbirth (3 studies), maternal anxiety (2 studies), previous natural birth experience (2 studies), and having no intention of becoming pregnant again.

In addition, a single study examined the following factors: maternal self-confidence, women with larger fetuses, easier and faster labor, occupational status, all psychiatric disorders (except mental retardation), problems due to the use of psychoactive substances, fear of losing social position, type of health facility, more frequent use of tobacco products, previous pregnancy losses, a history of infertility, difficulties in conception, and women more likely to have been born outside of Sweden.

Social maternal factors behind elective CS included family, relatives, and friends or neighbors (4 studies), advice from healthcare professionals, friends,

Table 1 Characteristics of included studies

Author (Year)	Study design	Country	Para	Sample size	Maternal age (years)	Data collection	Quality score
Gao et al. (2019)	cross-sectional	China	primipara and multipara	564	23–48	Voluntary questionnaire	18[a]
Otkjaer et al. (2019)	cohort	Denmark	NR[c]	145,821	all age ranges	Danish coding system	21[a]
Zamani-Alavijeh et al. (2018)	cross-sectional	Iran	primipara and multipara	200	15–44	Interviews and eight-part questionnaire	19[a]
Liu et al. (2015)	cohort	China	NR	66,226	all age ranges	Hospital electronic medical record according to criteria set down on the standardized data collection form	21[a]
Loke et al. (2015)	cross-sectional	China	NR	319	18–45	Self-administered questionnaire	20[a]
Sharpe et al. (2015)	cross-sectional	United Kingdom	primipara and multipara	249	15–43	Pilot questionnaire	15[a]
Sydsjö et al. (2015)	cohort	Sweden	primipara and multipara	64,834	all age ranges	Swedish medical birth register	18[a]
Akintayo et al. (2014)	cross-sectional	Nigeria	NR	753	all age ranges	Self-administered semi-structured questionnaire	17[a]
Miller et al. (2013)	decision analytic model	California	primipara and multipara	1,000	NR	Two different approaches a nulliparous woman could use for her first delivery: trial of labor or elective CS	17[b]
Okonkwo et al. (2012)	cross-sectional	Nigeria	primipara and multipara	843	all age ranges	A 33-item questionnaire was generated from previous surveys, publications, and review articles on MDCS	17[a]
Handelzalts et al. (2011)	cross-sectional	Israel	primipara	59	22–39	Interview and questionnaire	18[a]
Bodner et al. (2011)	cross-sectional	Austria	primipara and multipara	178	19–45	Data recorded from Department of Obstetrics and Gynecology at the Rudolfstiftung Hospital	17[a]
Karlström et al. (2011)	cohort	Sweden	primipara and multipara	693	All age ranges	Questionnaire	14[a]
Fenwick et al. (2010)	qualitative	Australia	primipara	210	27–39	Interview	18[b]
Kingdon et al. (2009)	mixed methods	United Kingdom	primipara	454	< 45	Questionnaires and interviews	18[b]
Munro et al. (2009)	qualitative	United Kingdom, Colombia, Canada	primipara	17	NR	Interview	17[b]

[a]by STROBE; [b]by JBI; [c]not reported; CS – cesarean section; MDCS – maternal demand for cesarean section; NR – not reported

relatives (2 studies), others fueling mothers' doubts about type of delivery and fears regarding labor and VD, sense of trust in doctors, residential status, male obstetrician, role of mass media – including books, internet sources, and television programs about childbirth, fundamental issues with labor and delivery, absence of support during labor (2 studies), and absence of general and social support for women.

Neonatal reasons for CSMR were as follows: fear of physical injury to baby or otherwise endangering the health of the baby by VD (6 studies), secondhand accounts of VD from other women, and having control over the date of childbirth.

Advantages of elective CS

Maternal reasons for elective CS were as follows: reduced fear of childbirth and neonatal complications (3 studies), preservation of sexual function and genital appearance and minimization of potential sexual dissatisfaction (3 studies), safe procedure of delivery (2 studies), faster and easier method of delivery (1 study), avoidance of labor pain (1 study), avoidance of the necessity of induced labor, avoidance of pain from repetitive vaginal examinations, fashionable / modern manner of delivery, possibility of tubal ligation after CS, greater ability to plan maternity leave, possibility to select an auspicious date for delivery of the baby, avoidance of pelvic floor disorders, and a higher level of control over the birth.

Neonatal reasons for CSMR included decrease in morbidity rate and neonatal mortality caused by VD (2 studies), reduced likelihood of experiencing complications with mild primary pulmonary hypertension (PPH) and lower incidence of birth trauma (Table 2).

Disadvantages of elective CS

Maternal disincentives for elective CS were as follows: increased risk of wound infection (4 studies), prolonged hospital stay (2 studies), bleeding (2 studies), bladder injury, ureteral injury and intestinal injury, higher risks of maternal morbidity and mortality, significant increases in the use of iron supplementation due to medical analgesics and antibiotics, problems with breastfeeding, a considerably higher rate of puerperal febrile morbidity, a more negative birth experience, higher level of anesthetic blocks, epidural complications, severe vomiting, and sense of anticlimax, due to the brevity of labor (Table 3).

Neonatal disincentives for elective CS included: higher risk of respiratory distress syndrome (2 studies), low birth weight, temporary facial nerve injury, intraventricular hemorrhage, increased risk of neonatal intensive care unit (NICU) admission, neonatal infection, hypoxic ischemic encephalopathy, and meconium aspiration process (each of which were investigated in a single study) (Table 4).

Table 2 Maternal reasons for choice of an elective CS without indication (Part 1)

Author (Year)	Individual reasons	p-value	Social reasons	p-value	Results
Gao et al. (2019)	advanced maternal age	0.080	residential status	0.009	The reasons given could affect the rate of CS on maternal request.
	attendance of a prenatal education course	0.045			
Otkjaer et al. (2019)	advanced maternal age more often overweight more often smokers	< 0.0001 < 0.0001 0.020	NR	NR	No increased risk of major maternal complications associated with PCD. All major complications occurred in women with PVD, but the occurrence was so infrequent that no significant difference was found.
Zamani-Alavijeh et al. (2018)	self-efficacy attitude	0.002 < 0.001	general social support	0.780	Attitude and self-efficacy had a greater predictive power for selection of delivery mode.
Liu et al. (2015)	advanced maternal age overweight or obese women women with larger fetuses assisted pregnancy	< 0.001 < 0.001 < 0.001 < 0.001	NR	NR	There is no significant difference between the CSMR and PVD groups in the frequencies of maternal intensive care unit admission, severe postpartum hemorrhage, maternal infection, organ injuries, thromboembolic disorders, perinatal mortality rate. The frequency of respiratory-distress syndrome was higher in the CSMR group.

Table 2 Maternal reasons for choice of an elective CS without indication (Part 2)

Author (Year)	Individual reasons	p-value	Social reasons	p-value	Results
Loke et al. (2015)	age	0.008	family history of difficulty in childbirth	0.001	Constructs of the Health Belief Model – perceived benefits, perceived severity, and cues to action – affect the decision that women make on their mode of delivery.
	level of education	0.016	advice from healthcare professionals	0.004	
	occupational status	0.016	advice from friends / relatives	< 0.001	
	maternal health	< 0.001	had heard negative stories about VD	0.006	
	safer mode of birth for the mother	NR			
	to avoid labor pain	< 0.001			
	certainty about the date of the birth	< 0.001			
	to avoid prolonged labor	< 0.001			
	fast and convenient delivery	< 0.001			
Sharpe et al. (2015)	fear of childbirth	NR	NR	NR	Healthcare professionals and pregnant women's views differ significantly.
	fear of injury to self	NR			
Sydsjö et al. (2015)	advanced maternal age	0.015	more often had parents born outside of Scandinavia	< 0.001	The burden of psychiatric illnesses was significantly higher in women giving birth by caesarean section on maternal request.
	more frequent use of tobacco products	< 0.001			
	lower educational level	< 0.001			
	more frequently unemployed	< 0.001			
	higher BMI	< 0.001			
	all psychiatric disorders except mental retardation	< 0.001			
	complications of using psychoactive substances, such as: neurotic disorders, stress	< 0.001			
	disorders of adult personality and behavior	< 0.001			
	neurotic disorders, stress-related disorders, and somatoform disorders	< 0.001			
Akintayo et al. (2014)	fear of losing the baby during labor	NR	previous experience of poor attitude from health workers during labor	NR	The most common motivations for the request were fear of losing the baby during labor, delay in conception, and fear of labor pains.
	delay in conception	NR			
	fear of labor pains	NR	lack of family support when in labor	NR	
	fear of incontinence	NR			
	unsatisfactory sexual intercourse	NR			
Miller et al. (2013)	NR	NR	NR	NR	Choosing an initial CS resulted in increased risk of a major adverse maternal outcome in the first pregnancy. The risk of an adverse neonatal outcome was higher among offspring of women who had chosen an initial elective CS.

Table 2 Maternal reasons for choice of an elective CS without indication (Part 3)

Author (Year)	Individual reasons	p-value	Social reasons	p-value	Results
Okonkwo et al. (2012)	type of health facility	NR	mentioned their husband's, friends', parents', family members', and doctor's opinion	NR	Common reasons reported for MDCS were fear of labor pains (68.9%), and fear of poor labor outcome (60.1%), and fear of fecal (20.2%) and urinary incontinence (16.8%).
	educational status	NR			
	fear of labor pains	NR			
	fear of problems arising in labor	NR			
	advanced maternal age	NR	lack of support in labor		
	previous pregnancy losses	NR		NR	Willingness to request MDCS was low.
	previous infertility	NR			
	pregnancy achieved assisted reproduction	NR			
	fear of urinary or fecal incontinence	NR			
	fear of episiotomy	NR			
	belief that CS is now safer than before	NR			
Handelzalts et al. (2011)	advanced maternal age	< 0.001	NR	NR	No difference was found in any demographic or psychological variables except age, method of conceiving, and level of fear of childbirth.
	fear of delivery	NR			
	anxiety sensitivity	NR			
Bodner et al. (2011)	NR	NR	NR	NR	The increased maternal morbidity in elective CS included puerperal febrile morbidity, wound infections, as well as breastfeeding problems in the postpartum period.
Karlström et al. (2011)	women more likely born outside of sweden	0.000	NR	NR	Women who preferred and had CS experienced fear of childbirth to a higher degree compared to women with VD.
	low level of education	0.038			
	greater fear of childbirth	NR			
	birth experience made them consider not having more children	NR			A fulfilled request on mode of birth does not guarantee a positive birth experience.
Fenwick et al. (2010)	fear of VD	NR	birth experiences of friends and family (especially mother)	NR	Childbirth fear, issues of control and safety, and a devaluing of the female body and birth process were the main themes underpinning women's requests for a non-medically-indicated caesarean section.
	fear of physical injury to mothers	NR	mother's doubts	NR	
			mother's fears about labor	NR	
			VD fueled by doctor	NR	
	fear of losing dignity	NR	chance of adverse incident remote	NR	
	greater control over the birth	NR	sense of trust and faith in their doctor	NR	
			belief that safety is guaranteed by payment of fee for service	NR	
Kingdon et al. (2009)	older age of women	NR	fundamental problems with the notion of expressed preference	NR	All women felt that concerns about their baby's or their own health should take precedence over personal preference. Choice may not be the best concept through which to approach the current arrangements for birth.
	to avoid perineal trauma during VD	NR			
	women's autonomy and modern birth method	NR			

Table 2 Maternal reasons for choice of an elective CS without indication (Part 4)

Author (Year)	Individual reasons	p-value	Social reasons	p-value	Results
Munro et al. (2009)	previous stressful, traumatic, or unsatisfactory	NR	heard stories of VD from other women	NR	Social and cultural knowledge formed their decision to give birth by patient-initiated elective CS. However, numbers of women who request a cesarean delivery for social reasons is still small.
	birth experiences in multipara	NR	heard stories about the length of labor	NR	
	to avoid labor pain	NR	hinged on qualities associated with organization and control	NR	
	to reduce anxiety during labor				
	self-perception	NR	accounts of birth in books and internet	NR	
			fear of VD due to negative television portrayal	NR	
			husband's level of discomfort with television images of VD or animals in labor	NR	
			social, physiological, historical, and practical influences	NR	

BMI – Body Mass Index; CS – cesarean section; CSMR – cesarean section on maternal request; MDSCS – maternal demand for cesarean; NR– not reported; PCP – planned cesarean delivery; PFD – pelvic floor disorders; PVD – planned vaginal delivery; QALYs – quality adjusted life-years; VD – vaginal delivery

Table 3 Advantages and disadvantages of CSMR (Part 1)

Author (Year)	Advantages	p-value	Disadvantages	p-value
Otkjaer et al. (2019)	safe procedure of childbirth for healthy primiparous women with an uncomplicated pregnancy	NR	slightly increased risk of wound infection	0.010
Liu et al. (2015)	lower birth injuries	< 0.001	prolonged time of mother's stay in hospital	< 0.001
	lower incidence of birth trauma	< 0.001	bladder injury, ureteral injury, and intestinal injury	0.294
Loke et al. (2015)	faster and easier method of delivery	< 0.001	abdominal wound infection	0.329
	fashionable / modern manner of delivery	< 0.001	prolonged time of recovery	0.140
	less fear of prolonged labor and fetal injuries	< 0.001		
	avoidance of pain induced by repetitive vaginal examinations	< 0.001		
	avoidance of the necessity of inducing labor	< 0.001		
	avoidance of labor pains	< 0.001		
	preservation of sexual function and genital appearance	0.002		
	minimization of potential sexual dissatisfaction	< 0.001		
	allows tubal ligation after CS	0.388		
	allows better planning of maternity leave	0.065		
	selection of auspicious date to deliver baby	0.840		
	year, date, time, and weekday of birth affect one's fate	0.004		
Miller et al. (2013)	avoidance of pelvic floor disorders	NR	greater risks of maternal morbidity and mortality	NR
Bodner et al. (2011)	NR	NR	significantly higher rate of puerperal febrile morbidity	0.0001
			wound infection	0.0001
			significant blood loss	0.030
			significant increases in the use of iron supplementation due to medical analgesics and antibiotics	0.002
			problems with breastfeeding	0.002
			prolonged hospital admission	NR

Table 3 Advantages and disadvantages of CSMR (Part 2)

Author (Year)	Advantages	p-value	Disadvantages	p-value
Karlstörm et al. (2011)	NR	NR	a more negative birth experience	NR
Fenwick et al. (2010)	guaranteed safety of CS	NR	higher level of anesthetic blocks	NR
	higher level of "control" over the birth	NR	epidural complications	NR
			wound infection	NR
	alleviation of fear	NR	severe vomiting	NR
			sense of anticlimax was unexpected and a little disconcerting	NR
			bleeding	NR

CS – cesarean section; NR – not reported

Table 4 Neonatal reasons for choice of elective CSMR without indication

Author (Year)	Reasons	Advantages	Disadvantages
Otkjaer et al. (2019)	NR	NR	low birthweight
Liu et al. (2015)	birth injury	lower incidence of birth injury	increased risks of NICU admission
		lower incidence of infant infection	higher risk of respiratory distress syndrome
		less likely to experience complications with mild PPH	frequency of NICU admission with neonatal infection hypoxic ischemic encephalopathy and meconium aspiration syndrome
		lower incidence of birth trauma	temporary facial nerve injury associated with the use of short-arm Simpson forceps and intraventricular hemorrhage
Loke et al. (2015)	health of the baby safer mode of birth for the neonate concern for the health of the newborn worry about potential birth trauma and respiratory trauma to avoid fetal injuries	NR	NR
Sharpe et al. (2015)	concern for the baby's safety welfare of the child	NR	NR
Miller et al. (2013)	NR	lower incidence of common cerebral palsy and brachial plexus palsy and neonatal morbidity to avoid infrequent intrapartum neonatal events due to long term neurodevelopmental impairment	NR
Okonkwo et al. (2012)	ear of losing the baby during labor	NR	NR
Karlström et al. (2011)	great anxiety about threat to the baby's life	NR	NR
Fenwick et al. (2010)	children of family or friends that suffered some physical trauma as a result of VD fear of physical injury to baby	NR	fetal respiratory distress
Kingdon et al. (2009)	allows choice of date of childbirth	NR	NR

NICU – neonatal intensive care unit; NR – not reported; PPH – primary pulmonary hypertension; VD – vaginal delivery

Discussion

There has been a global rise in CS over recent decades, with CSMR as the most important determinant of this increase in many countries. A cesarean section is a surgical procedure which can lead to several complications in both the mother and the baby, and accordingly, the World Health Organization emphasizes that CS should be carried out only when it is clearly advantageous (Otkjær et al., 2019). The risks of CSMR are higher than its benefits, but some obstetricians and gynecologists still perform elective CS on maternal request, which is of a great concern. The different attitudes to CSMR in gynecologists can be partly explained by the various cultural and social differences existing within countries (Sun et al., 2020). In the present systematic review, 16 studies examining the reasons for CS on maternal request, and the advantages and disadvantages of CSMR were analyzed. Fear of childbirth and its associated complications was the most common reason for CSMR. In line with our current findings, fear of VD was the most frequently cited psychological factor for CSMR (Alimohammadzade et al., 2013). Advanced maternal age, investigated in eight studies, was the second most frequent reason for CSMR. Today, in many developed countries, women give birth during their fourth decade of life due to social, economic, and educational factors; therefore, the rate of infertility, the use of assisted reproductive technologies, and the incidence of chronic diseases such as hypertension and diabetes are increasing in these women. Women aged 35 years or older are more likely to have delivery by CS (Benli et al., 2015). It is not increasing maternal age alone that is affecting the rate of CS, but the birth complications associated with advancing maternal age (Mylonas & Friese, 2015).

In this study, birth experiences of family members, relatives, or friends were the most common social maternal reasons for elective CS. In a study conducted by Stoll et al. (2017), fear of childbirth can lead to CSMR. Consultation with experts, and the dissemination of positive accounts of women's experiences of childbirth can increase maternal awareness and reduce the rate of CS (Stoll et al., 2017). Some pregnant women choose CS due to concerns about risks for the infant. Evidence from the present study suggested that women were more likely to choose CS due to fear of physical injury to the baby during VD; yet several studies have shown that CS is associated with greater neonatal risks. Vidic et al. (2016) have demonstrated that Infants born at a lower gestational age exhibit a greater rate of Apgar scores, hypoglycemia, hyperbilirubinemia, respiratory distress syndrome, and neonatal intensive care admissions (Vidic et al., 2016). A review study has also shown elective CS to be associated with higher neonatal risks, such as respiratory morbidity, brachial plexus injury, sepsis, intracranial hemorrhage, asphyxia, encephalopathy, and death (Signore & Klebanoff, 2008). In the present study, avoidance of labor pain, and a faster and easier method of delivery were the most common reasons for CSMR. The results of the current study are consistent with those of the study by Ecker and Frigolleto (2007) regarding the benefits associated with CS: greater degree of convenience for patient and obstetrician; decrease in complications, such as uterine rupture, reduced adverse perinatal outcomes e.g., hypoxic ischemic encephalopathy; and a reduction in complications associated with the use of vacuum and forceps, such as severe perineal laceration, urinary incontinence, and neonatal injuries (Ecker & Frigoletto, 2007). In the present review, four studies indicated that wound infection was the most common maternal complication following CS, and two studies found that respiratory distress syndrome was the most common neonatal complication. Wound infection and hematoma occurred in 3% of women following cesarean delivery, and this rate increased as the prevalence of maternal obesity or diabetes increased (Ecker & Frigoletto, 2007). A review examining the maternal and fetal complications of emergency cesarean sections and elective CS reported that there was a higher risk of maternal complications, such as wound infection following emergency CS (Yang & Sun, 2017). Prevalence of these complications is aggravated by maternal conditions before or during pregnancy, meaning that older mothers, obese mothers, or those with chronic diseases are at increased risk of complications following CS (Leonard et al., 2019). A study comparing the maternal and neonatal consequences of elective CS with those of planned vaginal delivery (PVD) found that a considerably higher rate of puerperal febrile morbidity, wound infection, and significant blood loss were observed in the elective CS group, as well as problems with breastfeeding in the postpartum period, while neonatal outcomes were low in both groups, with no significant differences detected (Bodner et al., 2011). Currently, there are various health programs and approaches around the world which can increase mothers' awareness and change their attitudes towards VD. Knowledge of the benefits and disadvantages of CS and vaginal delivery should allow mothers to freely decide on the most suitable delivery method. Nevertheless, in spite of all these efforts, the prevalence of CS continues to increase worldwide.

Conclusion

Fear of childbirth can be caused by ignorance or negative accounts of VD from other women, friends, relatives, family members, or mass media, and is the most frequent reason for CSMR. It should be understood that childbirth is a frightening event for the pregnant mother. Approaches that build confidence in mothers will help them overcome their fears. A comprehensive multilateral health plan put forward in collaboration with influential organs of society (such as the mass media) that increases positive cultural norms, changes women's opinions and attitudes towards VD, and increases their awareness and confidence so that they can dismiss negative accounts of VD from other women, friends, relatives, or family members can play a positive role in promoting VD and reducing maternal and neonatal mortality and morbidity. Clearly, if women have no indications for CS, VD is the best mode of delivery. In choosing the method of delivery, the advantages and disadvantages of each method should always be considered. In addition, the development of ways to reduce the pain of VD such as use of aromatherapy, water birth, and physiological delivery, and their promotion in women of reproductive age can help reduce the number of CSMRs without indication.

Limitation of study

The limitations of this review were as follows: limited access to information on maternal and neonatal mortality and morbidity in most hospital-based studies, the difficulty in predicting outcomes – especially in women who experienced VD and were discharged from hospital sooner than those with CS, and women who had scheduled CS for breech birth (the rates of all neonatal complications in breech presentation were higher than in those in cephalic presentation), and, finally, the small number of certain articles, which made generalization difficult.

Ethical aspects and conflict of interest

This study has the code of ethics number IR.ABZUMS.REC.1398.193 from Alborz University of Medical Sciences. The authors declare no potential conflicts of interest.

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Author contributions

FA and NSH fulfilled an advisory role. The remaining authors each contributed equally.

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