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Factors influencing the decision-making process regarding mode of delivery among women attending primary health care units in Ismailia district

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Abstract

Introduction: Women are responsible for taking a decision of choosing between vaginal and cesarean delivery method. There are various factors that play important roles in this selection. In this study, the Health Belief Model (HBM) is adopted to provide a clear theoretical basis for understanding the factors influencing women's delivery decisions.

Methods: A cross-section study was carried out in Ismailia district, Egypt among women aged 19 to 49 years, attending the primary health care units for infant vaccination and who had birth within the previous three months. 360 infants were selected randomly from those registered for vaccination in the district primary health care centers.

Results: Out of 360 recruited women, 36 (37.8%) preferred to have a cesarean section delivery (CD) and 224 (62.2%) preferred to deliver their babies by vaginal delivery. The results show that the two groups of women were concerned about being pregnant at an advanced age, were worried about the health of newborn, abdominal scar, labor pain, anal/urinary incontinence, and perineum tearing, and perceived that CD needs to have medical insurance coverage.

Conclusion: The data indicated that the constructs of the Health Belief Model: perceived susceptibility, benefits, perceived severity, and cues to action affect the decision that women make on their mode of delivery.

Keywords: mode of delivery decisions, cesarean section, vaginal birth, health belief model

Introduction

Pregnancy is a physiological phenomenon, that is associated with pain, fear, anxiety, and even fear of maternal death. Child delivery is the end of pregnancy, which is a multidimensional process that has physical, emotional, social, physiological, cultural, and psychological dimensions. Childbirth is a critical and sometimes painful experience for many women [1]. Delivery has two types: vaginal birth and cesarean section delivery. Historically, women delivered through the vagina, that is known as Vaginal Birth (VB) whereas Caesarean Section Delivery (CD), that involves an operative incision, has been perceived by many women as a risky procedure designed for women who have medical indications [2]. Historically, women delivered through the vagina, that is known as Vaginal Birth (VB) whereas Caesarean Section Delivery (CD), that involves an operative incision, has been perceived by many women as a risky procedure designed for women who have medical indications [3]. More than half of births in Egypt are delivered by cesarean section. Caesareans are very common at private health facilities (66%), also in urban areas (60%), and among women from the wealthiest households (67%). Cesarean deliveries have become more common, up from only 28% in 2008, 52% in 2014 [4]. Women are responsible for taking a decision of choosing between vaginal and cesarean delivery method. There are various factors that play important roles in this selection. Generally, decision-making and selection are subjective processes as all human beings deal with throughout their life. Decision-making process occurs with regards to the individual's culture, perceptions, beliefs, insights, and personality, and interaction of these factors. Therefore, shaping women's perceptions and preferences about cesarean is significant. Culture provides a frame to direct a person's behavior in special circumstances in which an individual's cultural basis affect the expression of the meaning and concept of delivery.

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So, culture plays a very important role in a person's attitude toward the mode of delivery, beliefs, and behaviors about delivery [5].

In this study, the Health Belief Model (HBM) is adopted as a conceptual framework, to provide a clear theoretical basis for understanding well the factors influencing women's delivery decisions. The HBM generally can specify the relationship between health-related beliefs/factors and individual behaviors, that can help in the prediction of the possibility of the individual choosing a special behavior. By using the HBM, mode of delivery and maternal choice and its influencing factors can be explored within the five domains of the HBM, which are: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action [6].

Perceived susceptibility was defined as a person's belief in her vulnerability to some medical condition. The more a woman believes she is at great risk, the more likely that women are to assume a special health-related behavior to minimize such risk. For example, negative experience in a previous birth could affect a woman's preference for a particular mode of birth in next births, due to her belief that the previous negative experience could occur again [7].

Perceived severity was defined as women's belief in the intensity of the medical condition and its unwanted outcomes. If women believed that they are in a very serious or in an intolerable complication associated with a specific mode of birth, women are more prone to express a preference for another alternative method of delivery, in order to reduce their risk. The most severe complications for both VB and CD, are neonatal and maternal mortality [8].

Perceived benefits were defined as women's belief that outcomes can be positively affected by charming in a particular health-related behavior [9]. The advantages of fetal and maternal health and also a sense of satisfaction of socio-cultural beliefs have been identified as an essential factor in the maternal decision-making process [10]. By taking in considerations the perceived benefits for the health of women in the childbearing period, it has been noted that in many countries women associate vaginal delivery with a greater benefit than cesarean delivery. This benefits such as that VB offers faster recovery, earlier discharge, and the absence of a cesarean-section abdominal scar [11]. By focusing on neonatal health, women believed that VB is safer for their babies [12].

Perceived Barriers were referred to the women's perception of the difficulties which could stop them from following a particular health-related behavior [13]. The desire for choosing VB is hindered by the presence of medical contraindications. The medical contraindications of VB for mothers are such as pelvic disproportion, pre-eclampsia, systemic diseases as (severe cardiovascular disease, diabetes mellitus), active genital herpes, HIV infection, and multiple pregnancies [14]. Also, fetal medical contraindications include fetal malpresentation, fetal malformation, macrosomia, and cord prolapse [15].

Cues to action were referred to the factors that help the women making a decision about a particular health-related behavior. Advice from family, relatives, friends, health care providers, as well as awareness about the rights of women, are critical factors that guiding the maternal decision on delivery mode. Women's beliefs and attitudes towards the different modes of delivery are strongly influenced by advice and stories that they heard from family, relatives, and

friends [16]. The issue of maternal preference for a particular mode of birth is a complicated process and there is a progressive increase in CD rate in Egypt with insufficient data regarding it. Therefore, this study will examine the factors that affect women in Ismailia district towards CD and VB as a mode of delivery, as well as their priorities when they are considering their mode of birth. With insight into women's preferences of a mode of delivery, midwives and obstetricians can better support women by providing proper information during pregnancy, helping them to make an informed choice and take an essential active part in the decision-making process.

Subjects and Methods

Cross-Sectional study design was used to determine the factors influencing the decision that women make regarding their mode of delivery.

This study was conducted in primary health care units (PHCUs) in Ismailia district. Ismailia district is bounded on the north by El-QantaraGharb, from the east by El-QantaraSharq, from the west by El-Tal El-Kebeer, and from the south by Fayed. According to the statistical data obtained from the Directorate of Health in Ismailia district, there are 15 primary health care units in Ismailia district. There are 7 urban and 8 rural primary health care units in Ismailia district. According to the statistical data of PHCUs' records obtained from the Directorate of Health, the total number of 2 months infants recorded for immunization in October 2016 was 1156 infants distributed between PHCUs' Study populations. This study was carried out on women attending primary health care units for infant EPI (Expanded Programme for Immunization). Participants will be recruited from the aforementioned setting for immunization.

Inclusion criteria: (1) Women aged 19-49 years. (2) Women had given birth within the previous three months.

Exclusion criteria: (1) Women who had medical indications for CD will be excluded. The number of participants was 360 participants. Sampling procedure In Ismailia district, there are 15 PHCUs distributed as (7 urban & 8 rural) with a total number of 1156 infant aged (2months) according to the statistical data obtained from the Directorate of Health in Ismailia district. All the women attending these units were eligible to participate in the study.

Data were collected by a structured interview with women using a translated pre-designed questionnaire. The questionnaire was made up of four parts. Part A for the socio-demographic data of the participants. Part B was designed to gather information about the preference of women to a different mode of birth and the factors influencing their preference. Parts C and D of the questionnaire contain different statements about the different perceptions relating to VB and CD correspondently based on the five constructs of HBM: perceived susceptibility, perceived benefits, perceived severity, perceived barriers, and cues to action. The women were asked to indicate their level of agreement towards the statements using a three-point Likert Scale (disagree, agree, and strongly agree). This scale requires the respondent to give either a negative or positive response, as there is no option for a neutral response is provided. There were 20 items in Part C, measuring the perceived susceptibility (2

items), perceived benefits (9 items), perceived severity (4 items), perceived barriers (1 item), and cues to action (4 items). There were 22 items in Part D, measuring the perceived susceptibility (2 items), perceived benefits (10 items), perceived severity (3 items), perceived barriers (2 items), and cues to action (5 items). For the calculation of mean scores of five constructs to two modes of delivery, —strongly agree was assigned a score of 2 and —agree was assigned a score of 1, whereas —disagree a score of 0. A higher score signifies a stronger perception of a specific construct.

Ethical considerations

-Official Approval of Ismailia administration of health and primary health care centers was sought. Written informed consent was obtained from the participants. Explanation of the research objectives and its relevance was conveyed before and at the time data collection. The participants had the right to refuse participation or withdraw from the study at any time during the study without stating any reason and no penalty. Confidentiality of the data was insured.

Statistical analysis

The questionnaire contains different statements about the different perceptions relating to VB and CD correspondently based on the five constructs of HBM: perceived susceptibility, perceived benefits, perceived severity, perceived barriers, and cues to action.

The women were asked to indicate their level of agreement towards the statements using a three-point Likert Scale (disagree, agree, and strongly agree). —strongly agree was assigned a score of 2 and —agree a score of 1, whereas —disagree a score of 0. A higher score signifies a stronger perception of a specific construct.

Descriptive statistics and a Chi-square test were used to identify and compare the demographic information, influencing factors, and the five constructs of the HBM between two preference groups. An unpaired t-test was used to determine whether there were any statistically significant differences regarding perceived benefits, severity barriers, and cues to action between women who prefer VB and CD. Finally, logistic regression was used to determine whether maternal characteristics and scores derived from constructs of HBM are predictors of maternal preference on the mode of delivery. The significance level (α) was set at 0.05.

Results

Table (1) shows the demographics of the study women. Their mean age was 27 ± 6 years old. Most women (75%) were from urban areas and most of them (75%) gave birth in governmental hospitals, while only 11.1% at home. 20% of the women were uneducated while 36% were highly educated. Most of the women (68%) were unemployed.

Women who preferred CD were more likely to be in the advanced maternal age as compared to those who preferred VB (29.2 ± 5.7 vs. 25.4 ± 5.3 years of age), and had delivery at private sector (15.4% vs. 13.8%), and less likely to be educated (9.6% vs. 27.7%) and also less likely to be housewives (55.1% vs. 75%). There were statistically significant differences between the two groups of women in terms of age ($p < 0.001$), place of last delivery ($p = 0.029$), level of education ($p < 0.001$), working status ($p < 0.001$), and monthly household income ($p = 0.029$).

Table (2) shows the factors that women would consider

when deciding the VB or CD. The most significant baby factors that the women considered when choosing the mode of delivery were Health of the newborn (VB 93.8% vs. CD 16.9%) ($p = 0.001$), Newborn's birth presentation (47.8% vs. 8.8%) ($p < 0.001$), and Large baby (46.9% vs. 24.3%) ($p < 0.001$). Also, the most significant maternal factors were Labor pain (97.8% vs. 14%) ($p < 0.001$), Unightly abdominal scars (0.4% vs. 90.4%) ($p < 0.001$), Worry about tearing of the perineum (98.7% vs. 6.6%) ($p = 0.007$), and Possible anal/urinary incontinence due to VB (99.6% vs. 5.9%) ($p = 0.002$).

Table (3) shows the women's perceptions of VB and CD using the five constructs of HBM. Most women perceived susceptibility for painful labor (77.5% strongly agree and 21.4% agree vs. 1.1% disagree) and for postpartum hemorrhage (53.3% and 39.7% vs. 6.9%).

Women who were more likely to perceive the benefits of VB, the top benefits of VB were deemed to bea normal or natural process (62.2 and 37.5 vs. 0.3%), allows early contact with newborn after delivery (74.2% and 24.9% vs. 0.8%), allows early breastfeeding (70.3% and 28.9% vs. 0.8%), shorter hospital stay (66.9% and 31.7% vs. 1.4%) and faster recovery (52.5% and 43.6% vs. 3.9%).

Women also were worried mainly about the perceived severity of perineal tears (67.5% and 22.8% vs. 9.7%) and urinary/anal incontinence after vaginal delivery (68.3% and 20% vs. 11.7%). As a perceived barrier for VB, most women did not possess insurance for VB in a private hospital (68% vs. 32%). More of them reported that heard negative stories from relatives/friends about their cesarean delivery (71.6%) and advice from relatives/friends (86%) were their cues for action.

Table (4) shows the women's perceptions of CD according to the five constructs of HBM. Women considered themselves prone to long recovery time (57.8% and 39.7% vs. 2.5%) and abdominal wound infections (59.2% and 28.6% vs. 12.2%) due to CD. The top perceived benefits of CD were avoiding labor pain (68.3% and 27.2% vs. 4.4%), avoiding labor induction (62.2% and 31.4% vs. 6.4%), avoiding pain due to repeated vaginal examination (66.9% and 26.4 vs. 6.7%), and being able to select date of delivery (62.5% and 29.2% vs. 8.3%).

The studied women have perceived the severity of using anesthesia during CD (66.1% and 23.1% vs. 10.8%) and the formation of scar adhesion (42.5% and 40.8% vs. 16.7%) but they were less worried about uterine scar ruptures (44.2% and 30% vs. 25.8%).

Women were more likely to consider the restrictions placed by public hospitals on CDMR to be a barrier to the use of CD (20.6% and 58.1% vs. 21.4%), and the extra cost of CD out of own pocket (64.2% and 30.3% vs. 5.6%).

Advice from friends/relatives (71.4%), advice from health care professionals (64.7%), have heard negative stories about VB (64.2%), and a family history of difficulty in childbirth (33.3%) were all cues to action for CD.

The comparison of the mean score of constructs of the perceptions of VB (table 5) showed that women who preferred VB had a significantly higher mean score on perceived benefits (14.5 vs. 13.5) than those who preferred CD ($P = 0.005$) and also a higher mean score on perceived barrier (1.8 vs. 1.2) than those who preferred CD ($P < 0.001$). Women who preferred CD had a significantly lower mean score on perceived susceptibility (2.9 vs. 3.1) than those who preferred VB ($P = 0.031$) and a lower mean score

on the perceived barrier (2.4 vs. 2.7) than those who preferred VB (P=0.016). Table (6) shows the logistic regression analysis that was conducted to assess whether maternal characteristics and the preference for VB as the mode of birth was set to be the dependent variable. A statistically significant link to a maternal preference for VB was found for age (OR = 0.916, P<0.001). These women perceived higher barriers (OR =

2.621, P<0.001), higher benefits (OR = 1.118, P=0.009), and also less susceptibility (OR = 0.711, P=0.038). Table (7) shows that the preference for CD as the mode of birth was set to be the dependent variable. A statistically significant link to a maternal preference for CD was found for age (OR = 1.11, P <0.001). These women perceived higher severity (OR = 1.212, P=0.038) and cues to action (OR =0.862, P=0.028).

Table 1: Demographics of women of childbearing age in Ismailia (N=360).

| Women characteristics | Preference | | Total | P value |
|----------------------------|-----------------------|---------------------------|-------------|---------|
| | Vaginal birth (n=224) | Cesarean delivery (n=136) | | |
| Age (years) Mean ± SD | 25.4±5.3 | 29.2±5.7 | 26.9±5.7 | <0.001* |
| | N (%) | N (%) | N (%) | |
| Site of residence | | | | |
| Rural | 91 (40.6%) | 0 (0.0%) | 91 (25.3) | <0.001* |
| Urban | 133 (59.4%) | 136 (100.0%) | 269 (74.7%) | |
| Place of last delivery | | | | |
| Private | 31 (13.8%) | 21 (15.4%) | 52 (14.4%) | 0.029* |
| Governmental hospital | 175 (78.1%) | 93 (68.4%) | 268 (74.4%) | |
| Doctor at home | 6 (2.7%) | 13 (9.6%) | 19 (5.3) | |
| Midwife at home | 12 (5.4%) | 9 (6.6%) | 21 (5.8%) | |
| Educational level | | | | |
| Uneducated | 62 (27.7%) | 13 (9.6%) | 75 (20.8%) | 0.001* |
| Primary school | 12 (5.4%) | 13 (9.6%) | 25 (6.9%) | |
| Preparatory school | 23 (10.3%) | 14 (10.3%) | 37 (10.3%) | |
| Secondary school | 57 (25.4%) | 37 (27.2%) | 94 (26.1%) | |
| College degree | 70 (31.3%) | 59 (43.4%) | 129 (35.8%) | |
| Working status | | | | |
| Not working (housewife) | 168 (75.0%) | 75 (55.1%) | 243 (67.5%) | <0.001* |
| Working for cash | 52 (23.2%) | 54 (39.7%) | 106 (29.4%) | |
| Other | 4 (1.8%) | 7 (5.1%) | 11 (3.1%) | |
| Monthly household income | | | | |
| <1000 pounds per month | 66 (29.5%) | 24 (17.6%) | 90 (25%) | 0.029* |
| 1000-2000 pounds per month | 123 (54.9%) | 82 (60.3%) | 205 (56.9%) | |
| >2000 pounds per month | 35 (15.6%) | 30 (22.1%) | 65 (18.1%) | |
| House | | | | |
| Owned | 111 (49.6%) | 53 (39.0%) | 164 (45.6%) | 0.051 |
| Rented | 113 (50.4%) | 83 (61.0%) | 196 (54.4%) | |
| Husband's occupation | | | | |
| Governmental occupation | 72 (32.1%) | 52 (38.2%) | 124 (34.4%) | 0.063 |
| Free occupation | 152 (67.9%) | 82 (60.3%) | 234 (65%) | |
| Dead | 0 (0.0%) | 2 (1.5%) | 2 (0.6%) | |

* Statistically significant at p<0.05

Table 2: Factors influencing decision making about mode of birth: Comparison between women who prefer a vaginal birth (VB) and a cesarean delivery (CD) (N=360).

| | Vaginal delivery (n=224) N (%) | Caesarian delivery (n=136) N (%) | P value |
|--|--------------------------------|----------------------------------|---------|
| Baby's factors | | | |
| • Health of the newborn | 210 (93.8%) | 23 (16.9%) | 0.001* |
| • Birth trauma to the newborn | 212 (94.6%) | 10 (7.4%) | 0.443 |
| • Newborn's birth presentation | 107 (47.8%) | 12 (8.8%) | <0.001* |
| • Large baby | 105 (46.9%) | 33 (24.3%) | <0.001* |
| • Twins/triplets | 84 (37.5%) | 74 (54.4%) | 0.130 |
| Maternal factors | | | |
| • Maternal health | 213 (95.1%) | 13(9.6%) | 0.087 |
| • Advanced age for childbirth | 58 (25.9%) | 94(69.1%) | 0.305 |
| • Labor pain | 219 (97.8%) | 19 (14.0%) | <0.001* |
| • Unsightly abdominal scars | 1 (0.4%) | 123 (90.4%) | <0.001* |
| • Worry about tearing of the perineum | 221 (98.7%) | 9 (6.6%) | 0.007* |
| • Possible anal/urinary incontinence due to VD | 223 (99.6%) | 8 (5.9%) | 0.002* |
| • Possible sexual dissatisfaction | 216 (96.4%) | 9 (6.6%) | 0.186 |
| Social factors | | | |
| • Medical insurance coverage | 0 (0.0%) | 125 (91.9%) | <0.001* |
| • Choosing the suitable date for delivery | 9 (4.0%) | 127 (93.4%) | 0.273 |

* Statistically significant at p<0.05

Table 3: Constructs of HBM relating to women’s perceptions of vaginal birth.

| HBM constructs | Disagree N (%) | Agree N (%) | Strongly agree N (%) |
|--|----------------|-------------|----------------------|
| Perceived susceptibility | | | |
| • Severe labor pain | 4 (1.1%) | 77 (21.4%) | 279 (77.5%) |
| • Postpartum hemorrhage | 25 (6.9%) | 143 (39.7%) | 192 (53.3%) |
| Perceived benefits | | | |
| • VD is a normal/natural process | 1 (0.3%) | 135 (37.5%) | 224 (62.2%) |
| • Allows early contact with newborn after delivery | 3 (0.8%) | 90 (24.9%) | 267 (74.2%) |
| • Allows early breastfeeding | 3 (0.8%) | 104 (28.9%) | 253 (70.3%) |
| • Shorter hospital stay | 5 (1.4%) | 114 (31.7%) | 241 (66.9%) |
| • Faster recovery after delivery | 14 (3.9%) | 157 (43.6%) | 189 (52.5%) |
| • No unnecessary surgical wound pain | 52 (14.4%) | 129 (35.8%) | 179 (49.7%) |
| • No need for an operation and anesthesia | 17 (4.7%) | 132 (36.7%) | 211 (58.6%) |
| • Less costly | 27 (7.5%) | 162 (45.0%) | 171 (47.5%) |
| • Covered by insurance/hospital authority | 20 (5.6%) | 145 (40.3%) | 195 (54.2%) |
| Perceived severity | | | |
| • Risk of fetal injuries when the baby goes through the vaginal canal | 54 (15.0%) | 114 (31.7%) | 192 (53.3%) |
| • Risk of mother-to-child transmission of infectious Agent during vaginal VD | 67 (18.6%) | 151 (41.9%) | 142 (39.4%) |
| • Worry about perineal tears due to VD | 35 (9.7%) | 82 (22.8%) | 243 (67.5%) |
| • Concern over having urinary/anal incontinence After VD | 42 (11.7%) | 72 (20.0%) | 246 (68.3%) |
| Perceived barriers | | | |
| • Carry insurance coverage for VD in private hospitals | 115 (31.9%) | 111 (30.8%) | 134 (37.2%) |
| Cues to action | | | |
| • Healthcare professionals advise VD | 201 (55.8%) | 109 (30.3%) | 50 (13.9%) |
| • Relatives/friends advise VD | 115 (31.9%) | 111 (30.8%) | 134 (37.2%) |
| • Have heard negative stories from relatives/friends about their CD | 102 (28.3%) | 106 (29.4%) | 152 (42.2%) |
| • Media advice VD | 267 (74.2%) | 69 (19.2%) | 24 (6.7%) |

Table 4: Constructs of HBM relating to women’s perceptions of cesarean delivery.

| HBM constructs | Disagree N (%) | Agree N (%) | Strongly agree N (%) |
|--|----------------|-------------|----------------------|
| Perceived susceptibility | | | |
| • Abdominal wound infection | 44 (12.2%) | 103 (28.6%) | 213 (59.2%) |
| • Long recovery time | 9 (2.5%) | 143 (39.7%) | 208 (57.8%) |
| Perceived benefits | | | |
| • A faster/more convenient method of delivery | 55 (15.3%) | 109 (30.3%) | 196 (54.4%) |
| • A trendy/modern method of delivery | 40 (11.1%) | 136 (37.8%) | 184 (51.1%) |
| • Less fear of fetal injuries | 49 (13.6%) | 116 (32.2%) | 195 (54.2%) |
| • Avoid pain induced by repetitive vaginal examination | 24 (6.7%) | 95 (26.4%) | 241 (66.9%) |
| • Avoid the necessity of inducing labor | 23 (6.4%) | 113 (31.4%) | 224 (62.2%) |
| • Prevent labor pain | 16 (4.4%) | 98 (27.2%) | 246 (68.3%) |
| • Preserve sexual function and genital appearance | 53 (14.7%) | 92 (25.6%) | 215 (59.7%) |
| • Minimize potential sexual dissatisfaction | 67 (18.6%) | 141 (39.2%) | 152 (42.2%) |
| • Allows tubal ligation after CD | 35 (9.7%) | 97 (26.9%) | 228 (63.3%) |
| • Can select an auspicious date to deliver my baby | 30 (8.3%) | 105 (29.2%) | 225 (62.5%) |
| Perceived severity | | | |
| • Concern over the anesthesia complications of CD | 39 (10.8%) | 83 (23.1%) | 238 (66.1%) |
| • Afraid of uterine scar ruptures if a cesarean delivery is performed | 93 (25.8%) | 108 (30.0%) | 159 (44.2%) |
| • Afraid of adhesion formation if a cesarean delivery is performed | 60 (16.7%) | 147(40.8%) | 153 (42.5%) |
| Perceived barriers | | | |
| • Extra cost of CD out of own pocket | 20 (5.6%) | 109 (30.3%) | 231 (64.2%) |
| • Cannot choose CD in a public hospital | 77 (21.4%) | 209 (58.1%) | 74 (20.6%) |
| Cues to action | | | |
| • Healthcare professionals advise CD | 127 (35.3%) | 77(21.4%) | 156 (43.3%) |
| • Relatives/friends advise CD | 103 (28.6%) | 116(32.2%) | 141 (39.2%) |
| • Have heard negative stories from relatives/friends about their cesarean delivery | 129 (35.8%) | 119(33.1%) | 112 (31.1%) |
| • Have a family history of difficult births | 240 (66.7%) | 79 (21.9%) | 41 (11.4%) |
| • Media advice VD | 270 (75.0%) | 54 (15.0%) | 36 (10.0%) |

Table 5: The constructs of HBM between the two groups of women who prefer a vaginal birth (VB) or a cesarean delivery (CD)

| HBM constructs | Preference | | P value |
|--------------------------|----------------------------|-----------------------------|---------|
| | Vaginal delivery Mean ± SD | Cesarean delivery Mean ± SD | |
| Vaginal Birth | | | |
| Perceived susceptibility | 3.2±0.8 | 3.3±0.9 | 0.055 |
| Perceived benefits | 14.5±3.0 | 13.5±0.2 | 0.005* |
| Perceived Severity | 5.9±2.2 | 6.0±0.1 | 0.833 |

| | | | |
|--------------------------|----------|----------|---------|
| Perceived barriers | 1.8±1.4 | 1.2±0.1 | <0.001* |
| Cues to action | 3.1±1.3 | 3.2±0.1 | 0.599 |
| Cesarean Delivery | | | |
| Perceived susceptibility | 3.1±1.0 | 2.9±1.2 | 0.031* |
| Perceived benefits | 15.1±3.7 | 14.2±4.5 | 0.069 |
| Perceived Severity | 4.0±1.6 | 4.0±1.9 | 0.747 |
| Perceived barriers | 2.7±0.9 | 2.4±1.1 | 0.016* |
| Cues to action | 4.1±1.8 | 3.7±1.8 | 0.073 |

* Statistically significant at p<0.05

Table 6: Logistic regression: predictive constructs for preferring vaginal birth

| | P value | OR | 95% C.I. for OR | |
|--------------------------|---------|-------|-----------------|-------|
| | | | Lower | Upper |
| Age | <0.001* | 0.916 | 0.874 | 0.96 |
| Education | 0.614 | 0.948 | 0.769 | 1.167 |
| Monthly income | 0.932 | 0.98 | 0.624 | 1.54 |
| Perceived susceptibility | 0.038* | 0.711 | 0.515 | 0.982 |
| Perceived benefits | 0.009* | 1.118 | 1.028 | 1.215 |
| Perceived Severity | 0.305 | 0.952 | 0.865 | 1.046 |
| Perceived barriers | <0.001* | 2.621 | 1.748 | 3.932 |
| Cues to action | 0.117 | 0.866 | 0.724 | 1.037 |

* Statistically significant at P<0.05

Table 7: Logistic regression: predictive constructs for preferring cesarean delivery

| | P value | OR | 95% C.I. for OR | |
|--------------------------|---------|-------|-----------------|-------|
| | | | Lower | Upper |
| Age | <0.001* | 1.11 | 1.061 | 1.161 |
| Education | 0.075 | 1.203 | 0.981 | 1.474 |
| Monthly income | 0.709 | 1.087 | 0.702 | 1.683 |
| Perceived susceptibility | 0.318 | 0.868 | 0.656 | 1.146 |
| Perceived benefits | 0.134 | 0.946 | 0.88 | 1.017 |
| Perceived Severity | 0.038* | 1.212 | 1.01 | 1.454 |
| Perceived barriers | 0.099 | 0.797 | 0.609 | 1.043 |
| Cues to action | 0.028* | 0.862 | 0.756 | 0.984 |

* Statistically significant at p<0.05

Discussion

In this study, most women indicated their preference for vaginal delivery (62.2%) over cesarean delivery (37.8%). According to EDHS 2014, the cesarean delivery rates 1995 was (6.6%). It raised to (10.3%) in 2000, (19.9%) in 2005, (27.6%) in 2008 and reached to (51.8%) in 2014 [4]. It is clear that there is a progressive increase in cesarean delivery rates and it exceeds the rate of 10–15% for CDs considered optimal by the World Health Organization.

This proportion of preference of VD is similar to that found in other countries of Asia, as in South Korea (96.9%), Singapore (95.1%) [11], and Turkey (84.1%) [18], where VB was preferred as a mode of birth. A high preference for VB, at 89%, was also reported in a study conducted in North Carolina, USA [19]. Another study in Iran showed that the majority of the subjects preferred to have NVD (20). On the other hand, the percentage of CD preference in our study is lower than in the urban regions of China (54.1%) [21]. However, the preference rate for CDs expressed by the women in this study is higher than the rate for elective CDs for non-medical indications in Hong Kong in 2004, at 16.7% [22].

In this study, the mean age of women of childbearing was 26.9±5.7 years of age. According to EDHS 2014, the majority of births occur among women in the age group of 20–29 years [4]. In our study, the preference for CD is associated with advanced maternal age which is similar to EDHS statistics in which women who were less than 20 years at the time of the delivery were a little less likely than

older women to deliver by cesarean section [4]. Other studies in Hong Kong which study the attitude of women toward CD have found an association between advanced age and higher request for C-section [23, 24]. Another descriptive study in Taiwan revealed that older women were more worried about their baby to pass safely throughout the vaginal canal [18]. Women of advanced age might think that they and their babies are more vulnerable to risks during delivery, due to the physiological factors that are related to aging. This concern has led them to select CD as a safer mode of delivery for them and their babies.

Working women (44.8%) with higher level of education (43.4%) are more likely to choose CD as their preferred mode of birth, which is similarly as reported by EDHS 2014 that the preference of a cesarean delivery increased with the mother's educational status and was also greater among women working for cash than among other women [4]. A descriptive study that was conducted in South China to detect the prevalence of CD on maternal request which showed that more educated women would choose CD as the mode of delivery [25]. Another study in Turkey was conducted on female healthcare providers and highly educated women from the general public on attitude toward route of delivery found that 48.1% of healthcare providers prefer VD and 69.6% of the public group prefer VD (P = 0.001) [26]. That may indicate that highly educated women may feel that cesarean delivery becomes safer with advanced reproductive technology which plays a great role in the reduction of risks or complications that may

accompany CD.

In this study, most women prefer VD delivered were at a governmental hospital (78.1%) and most women who delivered at private sectors prefer CD (15.4%). In EDHS 2014, Women delivering in a private health facility were more likely than women delivering in a government facility to have a cesarean delivery (66 percent and 45 percent) [4]. All the studied women from rural areas prefer VB (n=91) as a mode of delivery and in contrary, all women who preferred CD (n=136) were from urban areas. According to EDHS 2014, Six in ten of urban births were CD compared to 48 % of rural births [4]. Another study in China that describe patterns of delivery showed that living in urban areas could be a reason for preference of CD [27]. Monthly income was found to be higher with women who prefer the CD. According to EDHS 2014 Two-thirds of births among women in the highest wealth quintile were cesarean deliveries in comparison to 38 % among women in the lowest quintile. This result reflects that place of residence and standard of living have strong influences on women preference of mode of delivery.

Women in this study who preferred VB are mostly concerned with maternal health (95.1%) and the health of the baby (93.8%). These women are also worried about labor pain (97.8%), urinary or anal incontinence (99.6%), and tearing of perineum (98.7%). Nearly half of them prefer VB also in a medical situation such as with large baby (46.9%) and other newborn's birth presentation (47.8%). They also reported that there is no medical insurance coverage for vaginal delivery. This finding is similar to a descriptive study that was conducted in turkey consisted of 840 women to determine Turkish women's attitudes and basal knowledge regarding vaginal delivery and cesarean-section, as well as factors causing women to prefer CD even when there is no medical indication, this study have reported that the majority of women considered vaginal delivery to be the safest mode of birth for the mother (81.7%) and for the neonate (72.8%) [12]. That implies the worry of women about their babies and also reflect their knowledge about the most common complication related to vaginal delivery which has an influence on their decision.

On the other hand, the women who preferred CD express low incidence of labor pain (14%), possible anal/urinary incontinence after delivery (5.9%) and worry about tearing of the perineum (6.6%) as advantages for CD. They report a high incidence of unsightly abdominal scars (90.4%). Medical insurance coverage is an important factor that affects their decision (91.9%). A study in Ghana about the preference of birth delivery modes among women attending antenatal and postnatal clinics in the Tamale Metropolis of Ghana showed that women who preferred delivery by cesarean-section thought that CD enabled them to avoid the stress and the pain associated with vaginal delivery (Williams Walana *et al.*, 2017). Another study in Turkey about fears associated with childbirth among nulliparous found that fear of labor pain direct women decision to select CD (Serçekuş P and Okumuş H, 2009). Therefore, fear of labor pain and complications associated with vaginal delivery are likely to determine women's decision about the mode of delivery in favor of CD.

Women who preferred VB perceived the benefits of VB more than the other group with a mean (14.5±3.0 over 13.5±2.0) (p=0.005). They agree on the benefits of VD as being that it is a normal and natural process (99.7%), early

contact (99.1%) and breastfeeding for the newborn (99.2%), recovery is faster after delivery (96.1%), no unnecessary surgery (85.5%) and anesthesia is involved in the process (95.3%), less cost (92.5%) and covered by governmental hospitals (94.5%). These women also perceived more barriers as having insurance coverage for VB in private hospitals (68%). This is consistent with the study in Ghana that showed that the most cited reasons given for their preference of vaginal delivery were rapid post-delivery recovery (11.6%), natural and safe (34.7%), simple and easy method (22.9%) [29].

Women who preferred CD believed that by preferring cesarean delivery, they would perceive less susceptibility to abdominal wound infection (87.8%) and long recovery time (97.5%). They also perceived fewer barriers for CD as extra cost (94.6%) and delivery in public hospitals (78.7%). Another cross-sectional study in Hong Kong to identify the factors influencing the decision that women make on their mode of delivery, showed that women who preferred cesarean delivery believed that by delivery by cesarean-section, they would be able to avoid prolonged labor (100%), labor pain (97.2%), and fetal injuries, as well as have a fast and convenient delivery [30].

Women who preferred CD had a significantly lower mean score on the perceived susceptibility (2.9±1.2 vs. 3.1±1.0) (p=0.031) and barriers (2.4±1.1 vs. 2.7±0.9) (p=0.016) of CD than those who preferred VB. With the advance in medicine, women perceive less susceptibility to wound infection or need to long recovery time with the cesarean delivery mode. As most of the women who prefer CD are with high monthly income, delivery in a private hospital and the extra cost of CD make them perceive fewer barriers to CD.

The logistic regression analysis of the demographics of women shows that the age of women is a predictor for both modes of delivery. This is consistent with other studies mentioned before that showed that the age of women is as an important factor that can direct her perception toward a particular mode of delivery.

The analysis of HBM demonstrates that the constructs of perceived benefits, perceived susceptibility, and perceived barriers are predictors for the vaginal delivery preference as a mode of birth. These results are consistent with those of other studies that have confirmed that perceived benefits are a predictive factor of delivery preference [31-33]. These means benefits that mentioned before from vaginal delivery have a strong effect on women perception. Also, women are less worried about labor pain and postpartum hemorrhage which make them prefer vaginal delivery. Low socio-economic state of most women makes them perceive more barriers to deliver in private hospital and as well as vaginal delivery does not need a private hospital, this directs their perception also to prefer vaginal delivery.

This regression also clarifies the predictors for cesarean delivery as perceived severity and cues to action. Women who prefer CD are less worried about the severity and the complications that may result from CD. As most of them are highly educated and working so, they have knowledge about the advance in technology and also, they can deliver in private hospitals so, they perceive less severity. Cues to an action show that advice from professionals plays an essential role in the maternal decision on mode of delivery, especially for CD. This is similar to a study about "Caesarean section on request: a comparison of

obstetricians' attitudes in eight European countries" which has been reported that advice from physicians was considered as an important influence on women in their choice of mode of delivery ^[34]. Another study has shown that only 5 percent of women continued to trial the vaginal delivery when they perceived that their obstetricians held an unfavorable attitude towards vaginal delivery ^[35].

Conclusion

The results of this study provide a better understanding of the prevalence and the factors influencing the choice of mode of delivery among childbearing women in Ismailia. Although more women in this study preferred VB, there is evidence of a growing preference for CD. While age, the level of education, and involvement in a health-related profession influenced the decision made by the women in this study, the perceptions of the benefits and susceptibility and barriers of the different modes of delivery were the most important considerations. There is also evidence that advice from health professionals plays an important role in the maternal decision on mode of birth.

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