Impact of nuchal cord on fetal outcomes, mode of delivery, and management: a questionnaire survey of pregnant women

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ABSTRACT

Objectives: To explore pregnant women's views on the impact of nuchal cord on fetal outcomes, mode of delivery, and management.

Design: Questionnaire survey.

Setting: Antenatal clinic of two regional hospitals in Hong Kong.

Participants: A questionnaire survey of all pregnant women at their first visit to the antenatal clinic of United Christian Hospital and Tseung Kwan O Hospital in Hong Kong was conducted between August and October 2012.

Results: Most participants (71.8%) were worried about nuchal cord, and 78.3% and 87.7% of them thought that nuchal cord could cause intrauterine death and fetal death during labour, respectively. Approximately 87.5% of participants thought that nuchal cord would reduce the chance of successful vaginal delivery and 56.4% thought that it would increase the chance of assisted vaginal delivery. Most (94.1%) participants thought that it was necessary to have an ultrasound scan at term to detect nuchal cord. In addition, 68.8% thought that it was necessary to deliver the fetus early and 72.8% thought that caesarean section must be performed in the presence of nuchal cord. Participants born in Mainland China were significantly more worried about the presence of nuchal cord than those born in Hong Kong. However, there was no difference between participants with different levels of education.

Conclusion: Most participants were worried about the presence of nuchal cord. Many thought that nuchal cord would lead to adverse fetal outcomes, affect the mode of delivery, and require special management. These misconceptions should be addressed and proper education of women is needed.

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New knowledge added by this study

- Most women were worried about the presence of nuchal cord.
- Many women thought that nuchal cord would lead to adverse fetal outcomes, affect the mode of delivery, and require special management.

Implications for clinical practice or policy

- Avoiding routine ultrasound scans for nuchal cord in order to reduce needless maternal anxiety and unnecessary caesarean sections on women's request is warranted.
- The correct concept that nuchal cord would not normally lead to adverse fetal outcomes and that its presence should not affect the mode of delivery should be publicised widely in Hong Kong.

Introduction

In daily clinical practice, pregnant women regularly request antenatal ultrasound scans to look for nuchal cord around the time of delivery or request that the presence of nuchal cord is specifically checked for when they undergo ultrasound scans for other obstetric reasons. Many women have requested elective caesarean sections because nuchal cord has been detected on ultrasound scan. In order to explore women's views on the impact of nuchal cord on fetal outcomes, mode of delivery and management, we conducted a questionnaire survey to evaluate their true concerns and beliefs.

Methods

A questionnaire evaluating the impact of nuchal cord on fetal outcomes and mode of delivery were distributed to all pregnant women at their first antenatal visit to the out-patient clinic of United Christian Hospital and Tseung Kwan O Hospital from August to October 2012. The questionnaire was in three versions: traditional Chinese, simplified

孕婦對於臍帶纏頸對胎兒和分娩方式的影響及管理方式的問卷調查

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目的：探討孕婦對於臍帶纏頸對胎兒和分娩方式的影響及管理方式的意見。

設計：問卷調查。

安排：香港兩間分區醫院的產前門診部。

參與者：2012年8月至10月期間首次到香港基督教聯合醫院及將軍澳醫院產前門診部的孕婦。

結果：大多數受訪者（71.8%）擔心臍帶纏頸的情況，另78.3%受訪者認為臍帶纏頸會導致胎死腹中，87.7%受訪者則認為會令胎兒在分娩中死亡。約87.5%受訪者認為臍帶纏頸會減低陰道分娩的成功機會，56.4%則認為這會增加陰道助產的機會。大部分（94.1%）受訪者認為須在預產期內作超聲波掃描檢測是否有臍帶纏頸。此外，68.8%受訪者認為有臍帶纏頸時，必須盡早娩出胎兒；72.8%受訪者則認為必須進行剖腹產。與在香港出生的受訪者比較，出生於中國大陸的受訪者明顯更擔心臍帶纏頸的情況。然而，這與受訪者的教育程度並無關係。

結論：大多數受訪者擔心臍帶纏頸的情況。許多人認為臍帶纏頸會做成對胎兒不良的後果，影響分娩方式，並需要特殊的管理模式。必須消除這些誤解，並為有需要人士提供適當教育。

Chinese, and English according to the participant's preference (Appendices 1 to 3). Participants who were not able to understand Chinese or English were excluded from the study. The questionnaires were collected by the nursing staff immediately after completion. Assuming that 50% of the women would express concern about the presence of nuchal cord, a sample size of 357 women would allow for random errors of up to 5%. Assuming the response rate to the questionnaire to be around 80%, distribution of around 450 questionnaires would be sufficient.

The Statistical Package for the Social Sciences (Windows version 20.0; SPSS Inc, Chicago [IL], US) was used for statistical analysis. Chi squared test and Fisher's exact test were used when appropriate. All the differences were defined as being statistically significant at $P<0.05$.

Results

Of 950 questionnaires distributed, a total of 869 (91.5%) questionnaires were received. The demographic data of the participants are shown in Table 1. Around 72% of participants expressed worries about nuchal cord. The different demographic parameters among the participants who expressed worries about nuchal cord were analysed (Table 2). Participants born in Mainland China were more

TABLE 1. Demographic data of the participants (n=869)

Demographics	No. (%) of participants*
Maternal age (years)	
≤20	24 (2.8)
21-34	630 (73.4)
≥35	204 (23.8)
Missing answer	11
Parity	
0	474 (56.1)
≥1	371 (43.9)
Missing answer	24
Gestational age (years)	
<14	705 (83.4)
14-28	114 (13.5)
>28	26 (3.1)
Missing answer	24
Place of birth	
Hong Kong	477 (55.7)
Mainland China	345 (40.3)
Other Asian country	29 (3.4)
Non-Asian country	6 (0.7)
Missing answer	12
Residential status in Hong Kong	
Non-resident	19 (2.2)
<3 Years	89 (10.4)
3-7 Years	88 (10.3)
>7 Years	657 (77.0)
Missing answer	16
Marital status	
Single	78 (9.2)
Married	763 (89.9)
Divorced	8 (0.9)
Missing answer	20
Education level	
Primary or less	13 (1.5)
Secondary	537 (62.7)
Tertiary or above	307 (35.8)
Missing answer	12
Family income (HK$)	
<$10 000	153 (18.1)
$10 000-30 000	425 (50.2)
>$30 000	269 (31.8)
Missing answer	22

* The % of participants was calculated after exclusion of missing answers

worried about nuchal cord than those born in Hong Kong. Advanced maternal age, nulliparity, and lower education level were not associated with higher maternal anxiety for nuchal cord.

The perceived incidence of nuchal cord was assessed by a linear scale from 0% to 100%. Excluding the 50 participants who did not reply to this question, 37.9% thought that the incidence of nuchal cord was less than 20%. The perceived sonographic accuracy for nuchal cord was similarly assessed. Around one third (31.2%) of participants thought that the accuracy was less than 70% while 35 participants did not answer this question.

The perceived impact of nuchal cord on fetal outcomes, mode of delivery, and management are shown in Table 3. Around 78.3% and 87.7% thought that nuchal cord could cause intrauterine death and fetal death during labour, respectively, while 87.5% of participants thought that it would reduce the chance of successful vaginal delivery and 56.4% thought that it would increase the chance of assisted vaginal delivery. In addition, 94.1% of participants thought that it was necessary to have ultrasound scan to detect nuchal cord at term, while 68.8% thought that it was necessary to deliver the fetus early and 72.8% thought that caesarean section must be performed in the presence of nuchal cord.

Women's experience of nuchal cord from their previous pregnancies or from their relatives' or friends' deliveries were explored. We asked questions on the mode of delivery for nuchal cord pregnancies and whether or not the babies were healthy. Only 32 (8.8%) participants had nuchal cord in their previous pregnancies; one participant had nuchal cord in both her previous two pregnancies. Among those nuchal cord pregnancies, 48.5% of them had normal vaginal deliveries, 15.2% had instrumental deliveries, and 36.4% had caesarean sections. None of these babies were remarked to be unhealthy. A total of 142 (16.6%) participants had relatives or friends who had nuchal cord in their previous pregnancies, and some of them had more than one relative or friend who had nuchal cord in their previous pregnancies. The total number of their relatives' or friends' deliveries with nuchal cord was 155. Among those nuchal cord pregnancies, 31.6% of them had normal vaginal deliveries, 9.0% had instrumental deliveries, and 59.4% had caesarean sections. Approximately 6.5% of the babies were claimed to be unhealthy by the participants and such replies were evenly distributed in the normal vaginal delivery group, instrumental delivery group, and caesarean section group (Table 4).

Table 5 shows the comparison of the views between participants with different places of birth and education levels. Those born in Mainland China were more likely to believe that nuchal cord led to assisted instrumental deliveries when compared with those born in Hong Kong (63.2% vs 50.7%). In contrast, they were less likely to believe that nuchal cord led to intrapartum death in labour (84.1% vs 90.9%) and the need for earlier delivery (64.9% vs 71.8%). There were no significant differences between the two groups in their views on the impact on intrauterine death, chance of successful vaginal delivery, and whether or not caesarean section was needed.

For the education level, there was no significant difference for worry about the presence of nuchal cord. Those who had received tertiary education were less likely to believe that nuchal cord led to intrauterine death (71.9% vs 81.8%). However, more of this group thought that nuchal cord decreased the chance of successful normal vaginal delivery (91.8% vs 85.0%).

TABLE 2. Comparison of the demographic data of participants who were concerned about nuchal cord

	No. (%) of participants who were concerned about nuchal cord†	P value
Maternal age*		0.368
Advanced (n=202)	150 (74.3)	
Non-advanced (n=651)	460 (70.7)	
Parity		0.206
Nulliparity (n=473)	328 (69.3)	
Parous (n=367)	270 (73.6)	
Place of birth		0.034
Hong Kong (n=477)	327 (68.6)	
Mainland China (n=340)	257 (75.6)	
Level of education		0.788
Non-tertiary (n=545)	388 (71.2)	
Tertiary (n=307)	222 (72.3)	

* Advanced age denotes those >35 years

† The % of participants was calculated after exclusion of missing answers

Discussion

This questionnaire survey revealed that many of our participants were worried about nuchal cord. The percentage (71.8%) was much higher than anticipated, implying that this issue should be given greater attention in the antenatal education of pregnant women. Our local audit showed that the incidence of nuchal cord was 27% among all singleton deliveries (n=5166) in 2010 (not published). Therefore, about one third of the participants underestimated the incidence of nuchal cord.

It is common for nuchal cord to be the indication for caesarean section in China, which accounted for 16.1% to 25.4% of the indications in a teaching hospital and some regional hospitals

TABLE 3. Participants' views of nuchal cord on fetal outcomes, mode of delivery, and management of nuchal cord (n=869)

Participants' view	No. (%) of participants*		Missing answer
	Yes	No	
View of nuchal cord on fetal outcomes			
Is worried for nuchal cord	621 (71.8)	244 (28.2)	4
Nuchal cord of more turns are more dangerous	720 (83.5)	142 (16.5)	7
Nuchal cord can cause intrauterine death	675 (78.3)	187 (21.7)	7
Nuchal cord can cause fetal death during labour	744 (87.7)	104 (12.3)	21
View of nuchal cord on mode of delivery			
Nuchal cord will reduce the chance of successful normal vaginal delivery	747 (87.5)	107 (12.5)	15
Nuchal cord will increase the chance of assisted vaginal delivery such as vacuum extraction and forceps delivery	475 (56.4)	367 (43.6)	27
View of management of nuchal cord			
It is necessary to have ultrasound scan to detect nuchal cord when at term	808 (94.1)	51 (5.9)	10
It is necessary to deliver the fetus early if there is nuchal cord	593 (68.8)	269 (31.2)	7
Caesarean section must be performed for nuchal cord alone, without other medical indications	616 (72.8)	230 (27.2)	23

* The % of participants was calculated after exclusion of missing answers

TABLE 4. Participants' experiences of nuchal cord*

Participants' experience	Yes	No	Don't know	Missing answer
Had nuchal cord in her previous pregnancies (only for parous women)†	32 (8.8%)	314 (86.0%)	19 (5.2%)	6
That pregnancy was delivered by normal vaginal delivery	16			
The baby was healthy	15	0		1
That pregnancy was delivered by instrumental delivery	5			
The baby was healthy	4	0		1
That pregnancy was delivered by caesarean section	12			
The baby was healthy	9	0		3
Their relatives or friends had nuchal cord in previous pregnancies‡	142 (16.6%)	457 (53.6%)	254 (29.8%)	16
That pregnancy was delivered by normal vaginal delivery	49			
The baby was healthy	39	3		7
That pregnancy was delivered by instrumental delivery	14			
The baby was healthy	7	1		6
That pregnancy was delivered by caesarean section	92			
The baby was healthy	80	6		6

* The % of participants was calculated after exclusion of missing answers
† One participant had two previous pregnancies with nuchal cord
‡ Some participants had more than one relative or friend with nuchal cord in their previous pregnancies and the total number of their relatives' or friends' deliveries with nuchal cord was 155

there.[1,2] As many participants are immigrants from Mainland China, their views on nuchal cord were compared with those born in Hong Kong. Although this survey showed that participants born in Mainland China were more worried about nuchal cord than those born in Hong Kong, most participants in both groups also believed that nuchal cord could cause intrauterine death (>77%) and would reduce the chance of successful vaginal delivery (>85%). Moreover, despite variable levels of education, most participants also believed that nuchal cord would cause fetal death during labour (>87%) and more than 70% thought that caesarean section was needed in the presence of nuchal cord. Therefore, it was apparent that misconceptions about the clinical implications of nuchal cord were

TABLE 5. Comparison of the participants' views of nuchal cord on fetal outcomes, mode of delivery, and management of nuchal cord between participants born in Hong Kong and those born in Mainland China and between participants with non-tertiary education and those with tertiary education

	No. (%) of participants*									
	Participants born in Hong Kong vs Mainland China					Participants with non-tertiary education vs those with tertiary education				
	Born in Hong Kong (n=477)		Born in Mainland China (n=345)		P value	Non-tertiary education (n=550)		Tertiary education (n=307)		P value
	Answer yes	Missing answer	Answer yes	Missing answer		Answer yes	Missing answer	Answer yes	Missing answer	
View of nuchal cord on fetal outcomes										
Is worried for nuchal cord	327 (68.6)	0	257 (75.6)	5	0.034	388 (71.2)	5	222 (72.3)	0	0.788
Nuchal cord of more turns are more dangerous	383 (80.5)	1	300 (88.0)	4	0.006	465 (85.3)	5	245 (80.3)	2	0.074
Nuchal cord can cause intrauterine death	375 (78.9)	2	264 (77.6)	5	0.720	445 (81.8)	6	220 (71.9)	1	0.001
Nuchal cord can cause fetal death during labour	431 (90.9)	3	285 (84.1)	6	0.004	475 (88.0)	10	267 (87.3)	1	0.847
View of nuchal cord on mode of delivery										
Nuchal cord will reduce the chance of successful normal vaginal delivery	425 (89.3)	1	290 (85.0)	4	0.089	465 (85.0)	3	279 (91.8)	3	0.006
Nuchal cord will increase the chance of assisted vaginal delivery such as vacuum extraction and forceps delivery	240 (50.7)	4	211 (63.2)	11	0.001	316 (58.7)	12	157 (52.0)	5	0.069
View of management on nuchal cord										
It is necessary to have ultrasound scan to detect nuchal cord when at term	441 (93.0)	3	323 (95.3)	6	0.240	510 (93.9)	7	287 (94.1)	2	1.000
It is necessary to deliver the fetus early if there is nuchal cord	341 (71.8)	2	222 (64.9)	3	0.044	385 (70.5)	4	198 (65.1)	3	0.123
Caesarean section must be performed for nuchal cord alone, without other medical indications	360 (75.8)	2	236 (70.4)	10	0.106	400 (74.3)	12	215 (70.3)	1	0.229

* The % of participants was calculated after exclusion of missing answers

widespread among all groups.

In our survey, only 8.8% of the participants claimed to have nuchal cord in their previous pregnancies and none of them reported adverse fetal outcomes. However, a significant proportion of the participants' experiences and impressions on nuchal cord were from their relatives and friends. From this survey, the caesarean section rate in participants' relatives or friends with nuchal cord was high. This may be one of the reasons why so many participants thought that caesarean section must be performed for nuchal cord.

Women were worried about nuchal cord due to the concept that nuchal cord could lead to adverse fetal outcomes. Although some studies showed nuchal cord was associated with increased prevalence of variable fetal heart rate decelerations during labour and increased incidence of umbilical artery acidaemia, higher incidences of lower 1-minute Apgar score and meconium-stained liquor,[3,4] these findings may not reflect clinically on fetal well-being. Furthermore, most available studies showed nuchal cord was not associated with lower Apgar scores in 5 minutes and was not associated with increase in caesarean sections, neonatal intensive care unit admissions, and perinatal mortalities.[5-9] Such reassuring evidence supporting the benign nature of nuchal cord and the absence of true adverse impact clinically on the fetal outcomes should be publicised widely to the general population to reduce their misconceptions and anxiety.

Although 94.1% of participants thought that it is necessary to have an ultrasound scan to detect nuchal cord at term, this is not usually necessary. As almost all participants now have continuous fetal heart rate monitoring during labour in Hong Kong, even if there is presence of nuchal cord causing variable fetal heart rate decelerations during labour, this will be detected on cardiotocogram and appropriate actions such as fetal blood sampling or assisted delivery can be performed when needed. Avoiding routine ultrasound scans for nuchal

cord should reduce needless maternal anxiety and unnecessary caesarean sections on participants' request, as 68.8% thought that it was necessary to deliver the fetus early and 72.8% thought that caesarean section must be performed for nuchal cord.

Conclusion

Many pregnant women are worried about nuchal cord due to misconceptions on its effect on fetal outcomes and mode of delivery. Proper education is necessary to reduce maternal anxiety. The correct concept that nuchal cord would not normally lead to adverse fetal outcomes and that its presence should not affect the mode of delivery should be publicised widely in Hong Kong.

Appendices

Additional material related to this article can be found on the HKMJ website. Please go to <http://www.hkmj.org>, and search for the article.

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