

The Impact of Education on Patients' Understanding of the Implications of Nuchal Cord for Fetal Outcomes, Mode of Delivery, and Management

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Objective: To explore whether education can change a pregnant woman's understanding of the impact of nuchal cord on fetal outcomes, mode of delivery, and management.

Methods: A questionnaire survey was conducted between August and October 2012 among all pregnant women when they attended the antenatal clinic of two regional hospitals in Hong Kong for the first time. After completion of the questionnaire, the women were given an information pamphlet about the impact of nuchal cord. A second questionnaire asking the same questions about the impact of nuchal cord was mailed to these women at 36 weeks of gestation. Answers to the first and second questionnaires were compared.

Results: There were no statistically significant differences in the proportion of women who were worried about nuchal cord between the first and second questionnaires, i.e. before or after receipt of the information pamphlet. Results of the second questionnaire revealed that there were significantly fewer women continued to wrongly believe that nuchal cord would likely cause adverse fetal outcomes, or affect the mode of delivery and management.

Conclusion: Education can correct women's misconceptions about the impact of nuchal cord. More patient education about the impact of nuchal cord is suggested to reduce anxiety and misconceptions. This may involve organisation of specific antenatal health talks and promulgation of correct concepts through the media.

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Keywords: Health education; Nuchal cord; Pamphlets; Surveys and questionnaires

Introduction

The incidence of nuchal cord at delivery has been reported to be 14.7% to 33.7%¹⁻⁶. Most studies show that nuchal cord is not associated with lower Apgar score at 5 minutes or with an increase in Caesarean section rates, neonatal intensive care unit admissions, or perinatal mortality^{1,2,4,6-8}. Nonetheless in our daily practice, women often request an antenatal ultrasound scan to look out for nuchal cord, or ask the sonographer to specifically look for the presence of nuchal cord during ultrasound scans performed for other obstetric indications. In addition, many women request elective Caesarean sections when nuchal cord is suspected during an ultrasound scan near term. This study was conducted to explore whether simple patient education using an information pamphlet to explain evidence-based facts about 'cord around the neck' can alter their misconceptions.

Methods

In 2015, a study reported the results of a

questionnaire to evaluate women's understanding of the impact of nuchal cord on fetal outcome, mode of delivery, and management⁹. The questionnaire was distributed to all pregnant women at their first antenatal visit to the United Christian Hospital and Tseung Kwan O Hospital in Hong Kong from August to October 2012⁹. The questionnaire was available in traditional Chinese, simplified Chinese, and English (Appendix 1). All respondents were asked to choose the questionnaire in their preferred language. Those who were unable to understand Chinese or English were excluded from the study. The questionnaires were collected by nursing staff after completion. An information pamphlet (also available in three versions: traditional Chinese, simplified Chinese, and English; Appendix 2) about the true impact of nuchal cord was then distributed to respondents

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by the staff. The pamphlet included information that nuchal cord is not associated with adverse perinatal outcomes or an increase in the rate of Caesarean section or instrumental deliveries.

The respondents were then asked to complete a second questionnaire at 36 weeks of gestation. The questionnaire was mailed to the respondents' home address with a request to return it by fax or mail on completion. In addition to the questions included in the first questionnaire, the second questionnaire asked whether the respondent had undergone an ultrasound scan in the third trimester and whether nuchal cord was specifically looked for. The second questionnaire was also available in three languages as in the first questionnaire (Appendix 3). The two questionnaires were then compared to determine whether the women's understanding on the impact of nuchal cord had altered. Ethics approval was obtained from the Clinical Research Ethics Committee of the Hospital Authority. SPSS (Windows version 20.0; IBM Corp, Armonk [NY],

US) was used for statistical analysis. Chi-square test and Fisher's exact test were used when appropriate. McNemar's test was used to compare any change in respondents' views between the first antenatal visit and at 36 weeks of gestation. A p value of <0.05 was considered statistically significant.

Results

A total of 869 questionnaires were collected at the first antenatal visit⁹ and 510 (58.7%) respondents returned the second questionnaire at 36 weeks of gestation. The demographic data of the respondents who returned the second questionnaire (respondents) and those who did not (non-respondents) are shown in Table 1. The respondents had a significantly lower educational level than the non-respondents (P=0.001). There were, however, no significant difference in the understanding about the impact of nuchal cord on fetal outcome, mode of delivery, or management for the first questionnaire between the two groups (Table 2).

Table 1. Demographic data of respondents and non-respondents*

Demographics	No. (%) of patients [†]		p Value
	Respondents (n=510)	Non-respondents (n=359)	
Maternal age (years)			0.109
<35	394 (78.2)	260 (73.4)	
≥35	110 (21.8)	94 (26.6)	
Not indicated	6	5	
Parity			0.210
0	263 (53.6)	205 (57.9)	
≥1	228 (46.4)	149 (42.1)	
Not indicated	19	5	
Ethnicity			0.373
Chinese	485 (96.4)	337 (95.2)	
Non-Chinese	18 (3.6)	17 (4.8)	
Not indicated	7	5	
Marital status			0.426
Single	47 (9.4)	39 (11.1)	
Married	451 (90.6)	312 (88.9)	
Not indicated	12	8	
Educational level			0.001
Non-tertiary	345 (68.6)	205 (57.9)	
Tertiary or above	158 (31.4)	149 (42.1)	
Not indicated	7	5	

* Respondents were those who returned the completed second questionnaire at 36 weeks of gestation, and non-respondents were those who did not return the second questionnaire

† %s were calculated after exclusion of those with an incomplete questionnaire

Table 2. Comparison of understanding about nuchal cord between respondents and non-respondents at first visit, and between respondents at first visit and at 36 weeks of gestation*

	Non-respondents' view at first visit (n=359) [†]	Respondents' view at first visit (n=510) [†]	p Value [‡] (non-respondents vs. respondents at first visit)	Respondents' view at 36 weeks of gestation (n=510)	p Value [‡] (respondents' view at first visit vs. at 36 weeks of gestation)
	Answer yes	Answer yes		Answer yes	
Worrying about nuchal cord	260 (72.6)	360 (71.1)	0.634	363 (72.5)	0.611
Impact of nuchal cord on fetal outcomes					
Nuchal cord can cause intrauterine death	287 (80.2)	388 (77.0)	0.264	316 (62.8)	<0.001
Nuchal cord can cause fetal death during labour	312 (87.9)	432 (87.6)	0.909	343 (70.3)	<0.001
Effect of nuchal cord on mode of delivery					
Nuchal cord will reduce the chance of a successful normal vaginal delivery	306 (87.2)	441 (87.1)	0.830	363 (72.5)	<0.001
Nuchal cord will increase the chance of an assisted vaginal delivery such as vacuum extraction or forceps delivery	196 (56.0)	279 (56.7)	0.838	215 (44.1)	<0.001
Management of nuchal cord					
It is necessary to have an ultrasound to detect nuchal cord at term	337 (94.4)	471 (93.8)	0.726	395 (79.0)	<0.001
It is necessary to deliver the fetus earlier if there is nuchal cord	258 (72.5)	335 (66.2)	0.051	266 (52.7)	<0.001
Caesarean section must be performed for nuchal cord alone, without other medical indications	250 (71.6)	366 (73.6)	0.518	263 (53.5)	<0.001

* Respondents were those who returned the completed second questionnaire at 36 weeks of gestation, and non-respondents were those who did not return the second questionnaire

[†] Data are shown as No. (%) of subjects calculated after exclusion of those with an incomplete questionnaire

[‡] Chi-square test

For the respondents, there were no statistically significant differences in their proportion who were worried about nuchal cord at the first antenatal visit and after education at 36 weeks of gestation ($p=0.611$). Nonetheless, significantly fewer women who, after reading the pamphlet, were concerned about possible adverse fetal outcomes related to nuchal cord including intrauterine death and intrapartum death (all $p<0.001$). There was also a significantly lower proportion of women who believed nuchal cord should affect mode of delivery, including decreasing the chance of normal vaginal delivery or increasing the instrumental delivery rate (all $p<0.001$) after reading the pamphlet. In addition, after education, fewer women thought that nuchal cord would affect antenatal management including the need to detect nuchal cord by ultrasound scan, the need to deliver the fetus earlier, and the need for Caesarean section (all $p<0.001$) [Table 2].

A total of 160 (31.4%) respondents had an ultrasound scan performed in the private sector during the third trimester. Of them, 81 (50.6%) respondents specifically searched for the presence of nuchal cord, and 26 (32.1%) were told they had nuchal cord. Two were offered Caesarean section.

Discussion

This study showed that education of women about nuchal cord can significantly alter their belief about the possible consequences. Although there were fewer misconceptions after receiving the information pamphlet, many women remained ill-informed. After reading the pamphlet, approximately 60% to 70% still believe that nuchal cord could lead to intrauterine death and intrapartum death, 73% thought that nuchal cord would decrease the chance of a successful normal vaginal delivery, 79%

thought that an ultrasound scan was required to detect nuchal cord at term, and 54% thought that Caesarean section should be arranged in the presence of nuchal cord. An information pamphlet might have helped in patient education but was insufficient to change the long-standing misconceptions held by some women. Further education should be provided such as organising specific antenatal talks about nuchal cord so that evidence-based facts can be elaborated in more detail and patient's concerns and questions about nuchal cord can be addressed directly.

This study showed that although significantly fewer women had misconceptions, their anxiety was not reduced after education. Approximately 73% of respondents still worried about nuchal cord. This anxiety in such a high proportion of women should be addressed by obstetricians. Apart from providing more patient education about the true impact of nuchal cord, the absence of adverse fetal outcomes as a result of nuchal cord should be publicised widely by media to the general population in order to alleviate women's anxiety due to the long-standing misconceptions.

Of the women who had an ultrasound scan performed by their private doctor during the third trimester, around half of them specifically searched for the presence of nuchal cord. This re-enforces the misconception that such practice is necessary. An earlier questionnaire survey of all Hong Kong obstetricians showed that none who practised in the public sector would search for nuchal cord while 35.7% of private obstetricians would¹⁰. Nonetheless only 1.6% of obstetricians from the public sector and 6.3% of private obstetricians would offer Caesarean section to women with nuchal cord¹⁰. The findings from our study were compatible. Of the 26 respondents who were found to have nuchal cord by their private doctor following an ultrasound scan, only two (7.7%) were offered Caesarean section. Searching specifically for the presence of nuchal cord during ultrasound scans performed near-term should be abandoned as this will not alter antenatal management. Various studies have revealed an incidence of nuchal cord as high as 33% so such practice will only heighten maternal

anxiety¹⁻⁶.

Limitations of the Study

This study had limitations. First, the response rate of the second questionnaire was only 58.7%, which can introduce bias into survey results. However, there was no statistically significant difference in the opinions about nuchal cord on the first antenatal visit between women who responded to the second questionnaire and those who did not. As such, we believe that our respondents at 36 weeks of gestation were not from a biased population and that the result from the second questionnaire should truly reflect the view of our patient population after education. Second, the respondents of the second questionnaire apparently had a lower educational level than the non-respondents. Whether a lower education background implies that such respondents were more amenable to health education, or whether non-respondents with a higher education background would show an even greater improvement in eradicating misconceptions after education requires further study.

Conclusion

Health education can reduce women's misconceptions about nuchal cord. More patient education in the form of antenatal talks about the true impact of nuchal cord is suggested. The absence of evidence of a direct adverse fetal outcome due to nuchal cord should be publicised widely by the media to the general population to reduce anxiety and misconceptions. Routine searching for the nuchal cord during ultrasound scan by obstetricians should be abandoned.

Appendix

Additional material related to this article can be found on the HKJGOM website. Please go to <<http://www.hkjgom.org/>>, search for the appropriate article, and click on Full Text (PDF) following the title.

Declaration

The authors have disclosed no conflicts of interest.

References

1. Sheiner E, Abramowicz JS, Levy A, Silberstein T, Mazor M, Hershkovitz R. Nuchal cord is not associated with adverse perinatal outcome. *Arch Gynecol Obstet* 2006; 274:81-3.
2. Shrestha NS, Singh N. Nuchal cord and perinatal outcome. *Kathmandu Univ Med J (KUMJ)* 2007; 5:360-3.
3. Lal N, Deka D, Mittal S. Does the nuchal cord persist? An ultrasound and color-Doppler-based prospective study. *J Obstet Gynaecol Res* 2008; 34:314-7.

4. Schäffer L, Burkhardt T, Zimmermann R, Kurmanavicius J. Nuchal Cords in term and postterm deliveries – do we need to know? *Obstet Gynecol* 2005; 106:23-8.
5. Spellacy WN, Gravem H, Fisch RO. The umbilical cord complications of true knots, nuchal coils, and cords around the body. Report from the collaborative study of cerebral palsy. *Am J Obstet Gynecol* 1996; 94:1136-42.
6. Kong CW, Chan LW, To WW. Neonatal outcome and mode of delivery in the presence of nuchal cord loops: implications on patient counselling and the mode of delivery. *Arch Gynecol Obstet* 2015; 292:283-9.
7. González-Quintero VH, Tolaymat L, Muller AC, Izquierdo L, O'Sullivan MJ, Martin D. Outcomes of pregnancies with sonographically detected nuchal cords remote from delivery. *J Ultrasound Med* 2004; 23:43-7.
8. Peregrine E, O'Brien P, Jauniaux E. Ultrasound detection of nuchal cord prior to labor induction and the risk of Cesarean section. *Ultrasound Obstet Gynecol* 2005; 25:160-4.
9. Kong CW, Lee DH, Chan LW, To WW. Impact of nuchal cord on fetal outcomes, mode of delivery, and management: a questionnaire survey of pregnant women. *Hong Kong Med J* 2015; 21:143-8.
10. Kong CW, Chan LW, To WW. The impact of nuchal cord on fetal outcomes, mode of delivery, and its management: a questionnaire survey on all Hong Kong Obstetricians and Gynaecologists. *Hong Kong J Gynaecol Obstet Midwifery* 2015; 15:131-7.

Appendix 1.

Hospital Authority Kowloon East Cluster:

Department of Obstetrics & Gynaecology of United Christian Hospital and Tseung Kwan O Hospital

Topic: **Understanding of pregnant women about cord around the fetal neck (First questionnaire)**

Objective: Many pregnant women are concerned if the cord is around the neck of the foetus. We would like to explore their understanding of the implications of the cord around the neck. We aim to distribute 450 questionnaires. We would like to first determine whether there will be any change in opinion among pregnant women in the third trimester about cord around the neck.

If you agree to participate in this study, please complete the questionnaire below today and return to us in the clinic. A second questionnaire will be mailed to you in the third trimester (around 36 weeks of gestation). Please complete it and return to us using the enclosed return envelope.

We would appreciate it if you take approximately 15 minutes to complete the following questionnaire. Please tick the appropriate box.

Section 1: View on cord round neck

A) Are you worried about the cord around the neck for your fetus?

Yes No

B) How many fetuses do you expect to have the cord around the neck at term (at or after 37 weeks of gestation)?

(Please mark on the line where you think is the % with an 'X')



C) Do you think that more turns of the cord around the neck is more dangerous? (For example, is two turns more dangerous than one turn?)

Yes No

D) Do you think that it is necessary to have an ultrasound scan to diagnose cord around the neck when the fetus is at term?

Yes No

E) What do you think is the accuracy of ultrasound in diagnosing cord around the neck?

(Please mark on the line where you think is the % with an 'X')



F) Do you think that it is necessary to deliver the fetus earlier if the cord is around the neck at term?

Yes No

G) Do you think that the cord around the neck can cause intrauterine death?

Yes No

H) Do you think that if the cord is around the neck your chance of a successful normal vaginal delivery is reduced?

Yes No

I) Do you think that if the cord is around the neck your chance of requiring an assisted vaginal delivery such as vacuum extraction or forceps delivery will increase?

Yes No

J) Do you think that Caesarean section must be performed if the cord is around the neck alone, without other medical indications?

Yes No

K) Do you think that if the cord is around the neck fetal death can occur during labour?

Yes No

Appendix 1. (cont'd)

Section 2: Demographic data

- 1) What is your age?
 20 or less 21-25 26-30 31-34 35-39 40 or above

- 2) Where were you born?
 Hong Kong Mainland China Other Asian country Non-Asian country

- 3) What is your status of residency in Hong Kong?
 Non-resident Less than 3 years 3-7 years More than 7 years

- 4) What is your marital status?
 Single Married Divorced

- 5) What is your education level?
 Primary or less Secondary Tertiary or above

- 6) What is your family income per month (in HK\$)?
 Less than \$10,000 \$10,000-\$30,000 \$30,000 or above

- 7) What is your gestation now?
 Less than 14 weeks 14 -28 weeks 28 weeks or above

- 8) How many babies have you delivered before?
 0 (→ please go to question 11)
 1 2 3 or above (→ please go to question 9)

- 9) Did any of your babies have the cord around the neck at delivery?
 Yes (→ please go to question 10)
 No (→ please go to question 11)
 I don't know (→ please go to question 11)

- 10) What was the mode of delivery for your baby with the cord around the neck?
 (You may tick more than one if you had more than one baby with the cord around the neck)
 Normal vaginal delivery
 → Is that baby overall healthy now? Yes No
 Instrumental delivery such as forceps or vacuum extraction
 → Is that baby overall healthy now? Yes No
 Caesarean section
 → Is that baby overall healthy now? Yes No

- 11) Did any of your friends or relatives have the cord around the neck of their baby at delivery?
 Yes (→ please go to question 12)
 No (→ end of questionnaire)
 I don't know (→ end of questionnaire)

- 12) What was their mode of delivery?
 (You may tick more than one if they have had more than one baby with the cord around the neck)
 Normal vaginal delivery
 → Is that baby overall healthy now? Yes No
 Instrumental delivery such as forceps or vacuum extraction
 → Is that baby overall healthy now? Yes No
 Caesarean section
 → Is that baby overall healthy now? Yes No

~~~~~ End ~~~~~

Thank you for completing this questionnaire!

## Appendix 2.

Hospital Authority Kowloon East Cluster:  
Department of Obstetrics & Gynaecology of United Christian Hospital and Tseung Kwan O Hospital

### Information about cord around the neck

Many pregnant patients express worries and have misconceptions about the implications if the cord is around the neck. We would like to conduct a survey of the understanding of pregnant women about cord around the neck and would like to provide the correct evidence and information regarding cord around the neck.

#### Incidence of cord around neck

Different studies have shown that 14 - 35 % of fetuses will have the cord around the neck at term.

#### Perinatal outcome

Evidence has shown that the presence of the cord around the neck is not associated with adverse perinatal outcome such as lower Apgar score or admission to a neonatal intensive care unit. It is therefore unnecessary to have an ultrasound scan to diagnose cord around the neck before delivery. It is also unnecessary to have earlier delivery or induction of labour even when the cord around the neck is incidentally suspected by ultrasound scan.

#### Mode of delivery

Evidence has shown that when the cord is around the neck, there is no increase in the rate of Caesarean section or instrumental delivery.

During labour, all patients (whether or not the fetus has the cord around the neck) will have fetal heart rate monitoring to detect any features of fetal hypoxia throughout labour. After delivery of the fetal head vaginally, it is routine practice to look for the cord around the neck. If present, the cord will either be loosened or cut before delivery of the body. Therefore vaginal delivery is safe. There is no need for Caesarean section without other indications.

For further enquires, you can contact Dr Kong Choi Wah (contact number: 31536121) or ask your doctor in our antenatal clinic.

Thank you very much for your participation.

## Appendix 3.

Hospital Authority Kowloon East Cluster:  
Department of Obstetrics & Gynaecology of United Christian Hospital and Tseung Kwan O Hospital

Topic: Understanding among pregnant women of the implications of cord around the neck (Follow-up questionnaire)

Objective: Many pregnant women are concerned if the cord is around the fetal neck. We would like to explore their understanding of the implications of the cord around the neck and determine whether this will change in the third trimester.

You have completed a similar questionnaire before in our clinic. Please complete the following questionnaire and return to us using the enclosed return envelope or by fax (fax: 3513 5535).

We would appreciate it if you could spend 15 minutes to complete the following questionnaire. Please tick the appropriate box.

1) Are you worried about cord around the neck for your fetus?

Yes       No

2) How many fetuses do you expect to have the cord around the neck at term (at or after 37 weeks of gestation)?

(Please mark on the line where you think is the % with an 'X')



Appendix 3. (cont'd)

3) Do you think that more turns of the cord around the neck is more dangerous? (For example, is two turns of the cord more dangerous than one?)  
 Yes       No

4) Do you think that it is necessary to have an ultrasound scan to diagnose cord around the neck when the fetus is at term?  
 Yes       No

5) What do you think is the accuracy of ultrasound in diagnosing cord around the neck?  
 (Please mark on the line where you think is the % with an 'X')

6) Do you think that it is necessary to deliver the fetus earlier if the cord is around the neck at term?  
 Yes       No

7) Do you think that cord around the neck can cause intrauterine death?  
 Yes       No

8) Do you think that cord around the neck will reduce the chance of a successful normal vaginal delivery?  
 Yes       No

9) Do you think that cord around the neck will increase the chance of requiring an assisted vaginal delivery such as vacuum extraction or forceps delivery?  
 Yes       No

10) Do you think that Caesarean section must be performed for cord around the neck alone, without other medical indications?  
 Yes       No

11) Do you think that cord around the neck can cause fetal death during labour?  
 Yes       No

12) Did you have an ultrasound scan by a private doctor in Hong Kong or in another country in the past two weeks?  
 Yes, by Hong Kong private doctor      (→ please go to question 13)  
 Yes, in Mainland China      (→ please go to question 13)  
 Yes, in another country      (→ please go to question 13)  
 No, I didn't      (→ end of questionnaire)

13) Did that doctor spontaneously tell you that your fetus had the cord around the neck?  
 Yes, he spontaneously told me that my fetus had the cord around the neck (→ please go to question 15)  
 Yes, he spontaneously told me that my fetus did not have the cord around the neck (→ end of questionnaire)  
 No, he did not spontaneously tell me this (→ please go to question 14)

14) Did you actively ask that doctor to look for cord around the neck during ultrasound scan?  
 Yes, I asked and he told me that my fetus had the cord around the neck (→ please go to question 15)  
 Yes, I asked and he told me that my fetus did not have the cord around the neck (→ end of questionnaire)  
 No, I did not ask (→ end of questionnaire)

15) Did that doctor tell you that you needed a Caesarean section for delivery due to cord around the neck?  
 Yes      (→ end of questionnaire)  
 No      (→ end of questionnaire)

~~~~~ End ~~~~~

Thank you for completing this questionnaire!
 Please return to us using the attached return envelope or by fax