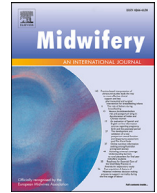




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The effects of not having continuous companion support during labour on pregnancy and neonatal outcomes during the COVID-19 pandemic

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ABSTRACT

Objective: With the surge of confirmed cases of coronavirus disease 2019 (COVID-19) and its associated morbidities and mortalities, continuous companion support during labour was halted in all public hospitals in Hong Kong to prevent the spread of the virus in hospitals. The purpose of this retrospective study was to evaluate the effect of not having continuous companion support during labour on pregnancy and neonatal outcomes during the COVID-19 pandemic period in a regional hospital.

Study design: We retrieved information on women without continuous companion support during the COVID-19 pandemic period from February 1, 2020 to May 15, 2020 and those with continuous companion support within the same period in 2019 in Queen Mary Hospital, Hong Kong. The pregnancy and neonatal outcomes were compared between the two groups.

Results: A total of 446 women with continuous companion support in 2019 and 340 women without continuous companion support in 2020 were included in the analysis. The rate of labour augmentation was significantly lower in women with continuous companion support than in those without continuous companion support (3.1% vs. 6.5%, respectively, $p = 0.027$). Babies born to women with continuous companion support were less likely to have Apgar scores <7 at 1 min than those born to women without continuous companion support (2.5% vs. 5.3%, respectively, $p = 0.036$). More women with continuous companion support had breastfeeding at the first hour of delivery than those without (86.3% vs. 80.6%, respectively, $p = 0.030$). There were no differences in other pregnancy and neonatal outcomes. The subgroup analysis with only Chinese women showed that the pregnancy and neonatal outcomes were not significantly different between the two groups.

Conclusion: Women without continuous companion support during labour had an increased chance of labour augmentation and babies with an Apgar score <7 at 1 min, and a reduced immediate breastfeeding rate when compared with those with continuous companion support.

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Introduction

The World Health Organization (WHO) recommends that a companion of choice should be available for all women throughout labour. This was based on the results of a Cochrane review that suggested that continuous companion support during labour reduced the rate of caesarean section, instrumental vaginal delivery, duration of labour, use of any type of intrapartum analgesia, low Apgar score at 5 min and negative feelings about childbirth experiences (WHO, 2018; Bohren et al., 2017). Nonetheless, limited data were available in the Chinese population. A retrospec-

tive study in China found that continuous companion support from family members or hospital professional staff during labour significantly reduced the labour duration and emergency caesarean section rates (Wang et al., 2018). Continuous companion support during labour has been advocated throughout the years in obstetric units of all public hospitals in Hong Kong.

Since December 2019, a cluster of cases of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) have emerged and subsequently led to significant morbidity and mortality worldwide (World Health Organization, 2020). A series of special measures were implemented in Hong Kong to reduce the spread of the virus, including suspension of hospital visits and continuous companion support during labour. Our recent paper on the effect of COVID-19 on delivery plans and postnatal depression scores found that pregnant women reported more depressive symptoms in the postpartum period (Hui et al.,

Abbreviations: COVID-19, Coronavirus Disease 2019; WHO, World Health Organization.

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2020). However, the impact of not having continuous companion support on pregnancy outcomes was not examined. The purpose of this study was to evaluate the effects of not having continuous companion support during labour on pregnancy and neonatal outcomes during the COVID-19 pandemic period.

Methods

We retrospectively retrieved information on women without continuous companion support during the COVID-19 pandemic period from February 1, 2020 to May 15, 2020 and those with continuous companion support within the same period in 2019 at Queen Mary Hospital, Hong Kong. The study was approved by the Institutional Review Board of the University of Hong Kong/Hospital Authority Hong Kong West Cluster.

In Queen Mary Hospital, a labouring woman has the option of having her husband to accompany her. If her husband is not available at the time of established labour, she can choose another companion instead. The husband is also allowed to accompany his wife during the caesarean delivery. Continuous companion support during labour was defined as intrapartum support given by either the husband, partner, friend, doula or other family members. The labour was managed and monitored by trained midwives, and obstetricians intervened if complications occurred. The information was retrieved from the obstetrics clinical information system (OBSCIS) of the Hospital Authority, which recorded the pregnancy events. All nulliparous women with a singleton delivery of ≥ 37 weeks of gestation were included in the study. Women who were not in labour (e.g. scheduled for elective caesarean section or emergency caesarean section without active labour) and those with foetal anomalies, stillbirths and incomplete data on pregnancy outcomes were excluded.

We compared the pregnancy and neonatal outcomes between the two periods. The pregnancy outcomes included mode of delivery, duration of labour, augmentation of labour, use of pain relief, breastfeeding and postpartum depression score by Stein's Daily Scoring System (SDSS) before discharge and Edinburgh Postnatal Depression Scale (EPDS) before discharge and upon phone follow-up 2 to 3 days after discharge. The women were referred for further counselling and management by dedicated midwives if the SDSS scored more than 8 or the EPDS scored more than 10, which indicated a higher chance of developing postpartum depression. Apgar scores at 1 min and 5 min and the admission rate to the neonatal intensive care unit (NICU) were recorded.

Statistical analysis

Data are presented as the number (percentage), mean \pm standard deviation (SD) and median (interquartile range) where appropriate. Student's *t*-test or the Mann-Whitney test was performed to compare the difference between two groups for continuous data based on the distribution of each factor. A chi-squared test was performed to examine the difference for categorical data. IBM SPSS Statistics version 26.0 (IBM Corporation, Armonk, NY, USA) was used to perform all statistical analyses. A *p* value of <0.05 was considered statistically significant.

Results

There were 522 and 366 nulliparous women with a singleton term delivery within the study period in 2019 and 2020, respectively. Amongst those included in 2019, more than 90% of them ($n = 488$) had continuous companion support during labour, while none was accompanied in 2020 due to suspension of continuous companion support. Amongst the 488 women in 2019, 28 women

underwent elective caesarean section and 14 of them had emergency caesarean section without going into labour. Of the 366 women who delivered in 2020, 15 had an elective caesarean section and 11 had an emergency caesarean section without being in labour. Therefore, a total of 446 women in 2019 and 340 women in 2020 were included in the analysis. The demographics were similar in the two groups except that more women with continuous companion support delivered in 2019 were non-Chinese (13.5% vs. 5.6%, $p < 0.001$) (Table 1).

The rate of labour augmentation was significantly lower in women with continuous companion support in 2019 than in those without continuous companion support in 2020 (3.1% vs. 6.5%, respectively, $p = 0.027$) (Table 2). The mode of delivery, labour duration, use of pain relief, number of women delivering with blood loss >500 ml, and SDSS and EDPS scores were similar between the two groups. The proportions of women with SDSS scores > 8 and EPDS scores > 10 were also not significantly different.

Regarding the neonatal outcomes, babies born from women with continuous companion support in 2019 were less likely to have an Apgar score <7 at 1 min than those born without continuous companion support in 2020 (2.5% vs. 5.3%, respectively, $p = 0.036$), but that at five minutes was not significantly different. More women with continuous companion support in 2019 had breastfeeding at the first hour of delivery than those without continuous companion support in 2020 (86.3% vs. 80.6%, respectively, $p = 0.030$). There was no difference in NICU admission (Table 2).

The subgroup analysis with only Chinese women showed that the pregnancy and neonatal outcomes were not significantly different between the two groups (Table 3).

Discussion

In view of the climbing number of COVID-19 cases in Hong Kong, continuous companion support was suspended in all public maternity units on February 1, 2020, and it has been resumed with episodic interruptions in response to COVID-19 surges in the territory. This retrospective study found that women without continuous companion support during labour had an increased chance of labour augmentation and babies with an Apgar score <7 at 1 min and a reduced immediate breastfeeding rate compared with those with continuous companion support. Other obstetric and neonatal outcomes were similar irrespective of the provision of continuous companion support.

The difference in ethnicity between the two periods could be attributed to the return of nonlocal women to their home countries for deliveries or the change to delivering in private hospitals, where continuous companion support was still available. Our results were different from those concluded by the Cochrane review (Bohren et al., 2017). We could not demonstrate the benefits of continuous companion support in terms of mode of delivery, duration of labour and the use of analgesics in labour. A subgroup analysis from the Cochrane review showed that the effect of continuous companion support might be more profound in certain settings, for example, in hospitals where epidural analgesia was not routinely available, or women were not permitted to have companions of their choices in labour, and in middle-income countries, where a more favourable impact on outcomes could be observed. Therefore, the results from the review might not be applicable to all populations and should be interpreted in the context of local logistics together with the actual service delivered to the birthing women. The subgroup analysis of Chinese women only further supported this view, as the pregnancy and neonatal outcomes were similar between the two groups.

On the other hand, our findings were consistent with several studies (Bruggemann et al., 2007; Gordon et al., 1999; Yuenyong et al., 2012). Similarly, Bruggemann et al. (2007) found

Table 1
Comparison of demographics of all women.

	Women with continuous labour support in year 2019 (N = 446)	Women without continuous labour support in year 2020 (N = 340)	P value
Age of women (year)	32.0 +/- 4.3	31.8 +/- 4.5	0.563
Height (cm)	159.6 +/- 6.3	159.6 +/- 6.0	0.997
Weight (kg)	56.8 +/- 39.9	56.2 +/- 11.4	0.773
Body mass index (kg/m ²)	22.4 +/- 17.4	22.1 +/- 4.0	0.794
Smoking			0.412
Smoker	1 (0.2%)	2 (0.6%)	
Non-smoker	445 (99.8%)	338 (99.4%)	
Educational level			0.768
Secondary or below	149 (33.4%)	117 (34.4%)	
Tertiary	297 (66.6%)	223 (65.6%)	
Gravidity			0.666
1	320 (71.7%)	251 (73.8%)	
2	87 (19.5%)	65 (19.1%)	
>=3	39 (8.7%)	24 (7.1%)	
Gestational diabetes mellitus			0.224
Yes	60 (13.5%)	36 (10.6%)	
No	386 (86.5%)	304 (89.4%)	
Birthweight (g)	3156 +/- 408	3149 +/- 381	0.816
Ethnicity			<0.001
Chinese	386 (86.5%)	321 (94.4%)	
Non-Chinese	60 (13.5%)	19 (5.6%)	
Onset of labour			0.242
Spontaneous onset	200 (44.8%)	149 (43.8%)	
Artificial rupture of membranes	6 (1.3%)	6 (1.8%)	
Medical induction*	150 (33.6%)	98 (28.8%)	
Combined induction†	90 (20.2%)	87 (25.6%)	

*combined induction consisted of artificial rupture of membranes with use of oxytocin.

†medical induction consisted of use of oxytocin only.

Continuous variables are expressed as mean +/- standard deviation and compared by student's *t*-test.

Categorical variables are expressed as number (percentage) and compared by chi square test.

Table 2
Comparison of pregnancy and neonatal outcomes of all women.

	Women with continuous labour support in year 2019 (N = 446)	Women without continuous labour support in year 2020 (N = 340)	P value
Mode of delivery			0.600
Normal vaginal delivery	272 (61%)	216 (63.5%)	
Assisted vaginal delivery	90 (20.2%)	59 (17.4%)	
Caesarean section	84 (18.8%)	65 (19.1%)	
Duration of first stage (min)*	105 (50–234)	115 (36–219)	0.849
Duration of second stage (min)*	22 (10–51)	235 (8–53)	0.700
Duration of third stage (min)*	6 (2–9)	6 (2–10)	0.989
Augmentation of labour	14 (3.1%)	22 (6.5%)	0.027
Pain relief	438 (98.2%)	337 (99.1%)	0.281
Epidural analgesics	108 (24.2%)	73 (21.5%)	
Entonox	400 (89.7%)	312 (91.8%)	
Pethidine	39 (8.7%)	32 (9.4%)	
Breathing exercise	427 (95.7%)	327 (96.2%)	
TENS	192 (43.0%)	150 (44.1%)	
Massage	124 (27.8%)	81 (23.8%)	
Birthball	101 (22.6%)	50 (14.7%)	
Aromatherapy	15 (3.4%)	26 (7.6%)	
Music	0 (0%)	247 (72.6%)	
Mobilization	0 (0%)	75 (22.1%)	
Total blood loss > 500 ml	22 (4.9%)	27 (8.1%)	0.076
SDSS > 8	19 (4.5%)	15 (4.6%)	0.986
Stage 1 EPDS > 10	44 (10.6%)	47 (14.3%)	0.118
Stage 2 EPDS > 10	9 (2.5%)	6 (2.1%)	0.773
NICU admission	8 (1.8%)	6 (1.8%)	0.976
Apgar score < 7 at 1 min	11 (2.5%)	18 (5.3%)	0.036
Apgar score < 7 at 5 min	2 (0.4%)	1 (0.3%)	0.730
Breastfeeding at first hour	385 (86.3%)	274 (80.6%)	0.030

*only cases who had vaginal delivery were included in the analysis.

TENS = transcutaneous electrical nerve stimulation; SDSS = Stein's Daily Scoring System; EPDS = Edinburgh Postnatal Depression Scale; NICU = Neonatal intensive care unit.

Mean +/- standard deviation is calculated by student *t*-test.

Categorical variables are expressed as number (percentage) and compared by chi square test.

Continuous variables are expressed as median (25th–75th percentile) and compared by Mann-Whitney *U* test.

Table 3
Subgroup analysis: comparison of pregnancy and neonatal outcomes in Chinese women only.

	Chinese women with continuous labour support in year 2019 (N = 386)	Chinese women without continuous labour support in year 2020 (N = 321)	P value
Mode of delivery			0.662
Normal vaginal delivery	245 (63.5%)	207 (64.5%)	
Assisted vaginal delivery	72 (18.7%)	52 (16.2%)	
Caesarean section	69 (17.9%)	62 (19.3%)	
Duration of first stage (min)*	106 (52–226)	110 (36–211)	0.696
Duration of second stage (min)*	22 (10–49)	24 (8–51)	0.871
Duration of third stage (min)*	6 (3–9)	6 (2–10)	0.754
Augmentation of labour	13 (3.4%)	19 (5.9%)	0.104
Pain relief	378 (97.9%)	318 (99.1%)	0.224
Epidural analgesics	75 (19.4%)	62 (19.3%)	
Entonox	353 (91.5%)	294 (91.6%)	
Pethidine	34 (8.8%)	31 (9.7%)	
Breathing exercise	368 (95.3%)	310 (96.6%)	
TENS	162 (42%)	141 (43.9%)	
Massage	109 (28.2%)	74 (23.1%)	
Birthball	85 (22%)	49 (15.3%)	
Aromatherapy	15 (3.9%)	24 (7.5%)	
Music	0	232 (72.3%)	
Mobilization	0	71 (22.1%)	
Total blood loss > 500 ml	19 (4.9%)	25 (7.9%)	0.106
SDSS > 8	17 (4.7%)	15 (4.9%)	0.911
Stage 1 EPDS > 10	42 (11.6%)	46 (14.9%)	0.204
Stage 2 EPDS > 10	9 (2.8%)	6 (2.3%)	0.688
NICU admission	7 (1.8%)	6 (1.9%)	0.956
Apgar score < 7 at 1 min	8 (2.1%)	15 (4.7%)	0.051
Apgar score < 7 at 5 min	1 (0.3%)	1 (0.3%)	0.894
Breastfeeding at first hour	334 (86.5%)	261 (81.3%)	0.058

*only cases who had vaginal delivery were included in the analysis.

TENS = transcutaneous electrical nerve stimulation; SDSS = Stein's Daily Scoring System; EPDS = Edinburgh Postnatal Depression Scale; NICU = Neonatal intensive care unit.

Mean +/- standard deviation is calculated by student *t*-test.

Categorical variables are expressed as number (percentage) and compared by chi square test.

Continuous variables are expressed as median (25th–75th percentile) and compared by Mann-Whitney U test.

no difference in the mode of delivery, labour duration, use of analgesics, neonatal outcomes and breastfeeding rate with or without the presence of a companion of the woman's choice [Gordon et al. \(1999\)](#), and [Yuenyong et al. \(2012\)](#) also showed comparable findings. Although there were no differences in these outcomes, these studies revealed that women with continuous companion support were more satisfied with the labour experiences, however, this was not examined in our study.

We found that more women who did not have continuous companion support in 2020 required labour augmentation. However, this did not significantly affect the mode of delivery. We also found that babies born from women without continuous companion support in 2020 were more likely to have an Apgar score <7 at 1 min than those with continuous companion support in 2019. This was unlikely to be associated with adverse neonatal outcomes as the rate of babies having an Apgar score <7 at 5 min was similar. In contrast to previous studies, we demonstrated that continuous companion support during labour encouraged immediate breastfeeding ([Bohren et al., 2017](#)). Additional support should be provided to women without continuous companion support to facilitate breastfeeding right after delivery.

Furthermore, the labouring experience may significantly affect women's mood in the puerperium. A systematic review found that negative birth experiences may contribute to postnatal depression and that these women may hold onto their negative birth experience memories longer than those with positive birth experience ([Bell and Andersson, 2016](#)) [Hodnett et al. \(2002\)](#), found that apparently fewer women in the continuous companion support group had evidence of postpartum depression compared with the usual

care group, i.e., without continuous companion support, but the difference was not statistically significant [Wolman et al. \(1993\)](#), also found that fewer women developed depressive symptoms if they had been supported during labour. We did not find any difference in postpartum depression scores. The negative psychological impact described by [Hui et al. \(2020\)](#) earlier could be possibly due to the fear about the COVID-19 pandemic rather than the unavailability of continuous companion support.

This is the first study to evaluate the impact of continuous companion support on pregnancy and neonatal outcomes during the COVID-19 pandemic. We have included a relatively large sample size compared with previous studies. The post-ad hoc calculation performed for labour augmentation, babies with an Apgar score <7 at 1 min and breastfeeding at the first hour of delivery showed that the power was greater than 90% with an alpha of 0.05.

There were several limitations in our study. First, this is a retrospective study comparing the pregnancy and neonatal outcomes between the two cohorts with and without continuous companion support from different time periods, which might have resulted in occult confounders, although there were no major changes in the intrapartum management or health care professionals taking care of the labouring women. This study was conducted during the COVID-19 pandemic, which itself may be a possible confounding factor affecting pregnancy outcomes. Ideally, the effect of continuous companion support should be evaluated in a randomised controlled trial. Moreover, we did not evaluate the pain score, which can be a more reliable indicator of intrapartum pain experienced by labouring women than the choice of intrapartum pain relief. However, a higher level of labour pain does not preclude an

overall satisfying experience, and it is a sense of personal control in association with participation in the informed decision-making processes in labour, which has been demonstrated to correlate with overall maternal satisfaction with childbirth (Goodman et al., 2004).

The WHO recommends continuation of continuous companion support during the COVID-19 pandemic (World Health Organization, 2004). Royal College of Obstetricians and Gynaecologists in the United Kingdom also published guidelines on COVID in pregnancy, stating that birth partners should be allowed to stay with the women throughout labour and birth unless the birth occurs under general anaesthesia (Royal College of Obstetricians and Gynaecologists, 2000). Due to the difference in the settings of labour wards and operation theatres and the disparity in the epidemics amongst the different countries, provision of continuous companion support may not be feasible in certain units.

We did not observe any significant adverse outcomes in women without continuous companion support compared with women with continuous companion support. Whether continuous companion support should be continued requires a balance between infection control and the perceived benefits of continuous companion support. Meanwhile, the public could be reassured that no significant adverse effects were found even if there was no continuous companion support during labour. With the advancement of telemedicine, one option to consider is using teleconference technology to provide a certain degree of companionship to the labouring women.

Conclusion

We found that women without continuous companion support during labour had an increased chance of labour augmentation and babies with an Apgar score <7 at 1 min and a reduced immediate breastfeeding rate when compared with those with continuous companion support. The mode of delivery, duration of labour, use of pain relief, postpartum haemorrhage and NICU admission rate were similar with and without continuous companion support.

Ethical approval

The study was approved by the Institutional Review Board of the University of Hong Kong/Hospital Authority Hong Kong West Cluster (IRB No.: UW20-471).

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Yin Kwan Mok: Methodology, Formal analysis, Investigation, Writing – original draft, Writing – review & editing. **Ka Wang Cheung:** Methodology, Writing – review & editing, Supervision. **Weilan Wang:** Formal analysis, Investigation. **Raymond Hang Wun Li:** Methodology, Writing – review & editing, Supervision. **Noel Wan Man Shek:** Methodology, Writing – review & editing, Supervision. **Ernest Hung Yu Ng:** Conceptualization, Methodology, Writing – review & editing, Supervision.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.midw.2022.103293.

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