The association between breastfeeding supportive services during childbirth hospitalization and exclusive breastfeeding at discharge

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Abstract

Background

Breast milk is the ideal food to meet all nutrients needs for a baby's healthy growth and development. The status of breastfeeding supportive services in Baby-Friendly Hospitals and their role in influencing mothers' breastfeeding practice in Shanghai, China is less understood. The aim of this study was to explore the association between breastfeeding supportive services provided by Baby-Friendly Hospitals around childbirth and exclusive breastfeeding rate at discharge.

Methods

This was a hospital-based cross-sectional study, conducted in eight Baby-Friendly Hospitals in Shanghai between October 2015 and January 2017. The breastfeeding supportive services during hospitalization were assessed using a 12-question questionnaire based on the evaluation criteria of Baby-Friendly Hospitals. In total 707 mothers completed the survey.

Results

The overall exclusive breastfeeding rate among participants was 34.4% at discharge. Mothers who received more breastfeeding supportive services during hospitalization were more likely to practice exclusive breastfeeding at discharge compared with mothers who received less services (aOR: 3.00; 95% CI: 2.08, 4.35; $p < 0.001$).

Conclusion

Better breastfeeding supportive services during hospitalization was significantly associated with higher rate of exclusive breastfeeding at discharge. More effective measures should be adopted to improve the breastfeeding supportive services in line with the Baby-friendly Hospital Initiative's Ten Steps to promote and support exclusive breastfeeding and better maternal and child health.

Background

The World Health Organization (WHO) recommends breast milk as the most appropriate food for infants under six months of age^[1]. Mothers are recommended to exclusively breastfeed their children in the first six months and continue to breastfeed until they are at least two years old^[1].

The global breastfeeding (BF) practice during the first six month remains suboptimal. From 2007 to 2014, only 36% of children younger than 6 months of age were exclusively breastfed worldwide^[2]. More recent data showed that globally only 42 percent of newborns were put to mothers' breasts within the first hour

of birth, and only 40% infants less than 6 months of age were exclusively breastfed^[3], while the 2030 global target is 70%^[4].

In the Chinese National Nutrition Plan (2017–2030) the target of the exclusive breastfeeding (EBF) rate for infants aged 0 to 6 months is at least 50% by 2020^[5]. However, the current BF practice of China lags far behind the target. In 2019, a national BF survey reported that only 11.3% newborns were breastfed within 1 hour after birth, and 29.2% babies had been ever exclusively breastfed within 6 months^[6].

Mothers often encounter with various difficulties during the BF process^[7]. They are less likely to achieve successful BF without the social support and access to the professional guidance^[8]. Hospitalization after childbirth is regarded as a critical time and opportunity for BF promotion. In order to improve the quality of BF supportive services and the enabling environment for mothers to achieve better BF practices, WHO and UNICEF launched the Baby-friendly Hospital Initiative (BFHI) in delivery hospitals since 1991^[9, 10]. In 2018, WHO and UNICEF updated the guidelines based on the latest evidence on the BFHI and re-emphasized the importance of applying the Ten Steps to Successful Breastfeeding in all delivery facilities^[11]. Global evidence has demonstrated that adherence to the BFHI can improve breastfeeding outcomes, including BF initiation and duration up to one year postpartum^[12, 13]. BF has many benefits to both mother's and child's health outcomes, such as decreased risk of breast and ovarian carcinoma for mothers^[14, 15], and reduced risk of common infections among infants^[16]. To enhance BF supportive services to mothers and newborns, most countries have implemented the BFHI^[17–19]. Baby-Friendly Hospitals (BFHs), also called as BFHI-accredited hospitals, have been widely established in China^[20–22], with a total of 7,036 BFHs by 2015^[7].

As one of the largest cosmopolitan cities of China, Shanghai has more than 150,000 annual births, and there were 74 accredited BFHs by 2017. However, the current status of BF supportive services in BFHs has not been adequately understood. A survey involving seven BFHs of Shanghai showed that the early BF initiation within 1 hour after birth was 54.9%^[23].

The proposed study aimed to examine the practices of BF supportive services by BFHs during childbirth hospitalization, and to explore the association between breastfeeding supportive services and EBF at the time of hospital discharge. The findings of the study will help to develop specific interventions to improve in hospital breastfeeding support services in BFHs in Shanghai for further promotion and support of exclusive breastfeeding.

Methods

Study design

The study was a hospital-based cross-sectional design; conducted in eight BFHs in Shanghai, four at municipal level (one Maternal and Child Health (MCH) hospital and three general hospitals) and four at

district level (three MCH hospitals and one general hospital) between October 2015 and January 2017.

Sample

Usually every pregnant woman is required to attend maternity school in the hospital where they intend to give birth. A total of 788 pregnant women were invited to join the study when they received the first time of BF education in the maternity schools in the selected hospitals. Women were eligible if they were singleton pregnancy and voluntary to participate in this study. The exclusion criteria were 1) twins or multiple pregnancy; 2) with diseases not suitable for breastfeeding, such as active hepatitis B, active tuberculosis, HIV or breast disease; 3) no intention to give birth in the selected hospitals; 4) if newborns have conditions such as baby with tongue-tie or orofacial clefts etc.

Data collection

If consented, participants were asked to complete a questionnaire of demographic information such as age, household registration, education level, intended time to return to work after delivery, alcohol intake, family monthly income per capita, maternity insurance and family structure.

Pregnant women who agreed to participate in the study and gave birth in one of the eight BFHs were asked to complete a 12-question questionnaire at the time discharged from the hospitals. Among the 788 pregnant women we originally approached 707 women completed the questionnaire. The in-hospital BF supportive services assessed were based on the Chinese evaluation criteria of BFHs, published in 2014^[24], and mapped against the Ten Steps to Successful Breastfeeding^[25]. The questions included on early sucking within 1 hour after delivery, skin-to-skin contact (SSC) within 1 hour after delivery, use before BF initiation, rooming-in, provision of BF information by doctors, by nurses, use of bottle after health professionals' BF education, use of breast milk substitutes while in hospital, breast milk as the first food, recommendation of infant formula, encouragement of breastfeed on demand, specific BF guidance (such as feeding posture and expressing). Other questions in the questionnaire included breast or nipple pain, breast milk lactation, food before BF started, nipple status ('*normal*', '*flat*', or '*sunk*'), and maternal mood after delivery ('*calm*', '*anxious*', or '*irritable*'). Childbirth information, such as the mode of delivery, gestational weeks at delivery, were extracted from hospital records.

Data analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 21. Each of the twelve questions was assigned with zero or one score and the total score represented for providing none supportive services to twelve for providing the full range of the supportive services. Based on the total score, service of women obtained were categorized into the "high" or the "low" score groups, depending on woman's score equal/above or below the mean score. Descriptive statistics were produced to determine the prevalence of EBF at hospital discharge. One-way analysis of variance/t test was used to determine differences for continuous outcomes, while the Pearson's chi-square test was used for categorical outcomes, and trend in proportions was tested using Mantel–Haenszel chi-square (χ^2) tests. Multiple logistic regression was used for determining the association between BF supportive services in

hospitals and the women’s EBF at discharge. The EBF in this study was defined as the infant has received no other food or liquid, not even water, with the exception of breast milk, drops or syrups consisting of vitamins, mineral supplements or medicine [26, 27]. Unadjusted odds ratios (ORs) and adjusted ORs were calculated for assessing the likelihood of EBF at hospital discharge. All tests were two-sided and statistical significance was defined as $P < 0.05$.

This study got the approval from the ethical board of the researchers’ institute. All participants provided with the written informed consent.

Results

A total of 707 (89.7%) women completed the discharge survey. The age range was from 17 to 42 years with the mean age of 29.8 years. About half of the mothers’ household registration was non-Shanghai (50.5%). The majority of the mothers were Han ethnicity (97.3%) and without religious belief (93.9%). Nearly 25% of participants were unemployed. About 50% of women planned to return to work within 6 months postpartum. More than 80% of mothers didn’t consume alcohol during pregnancy. Nearly 60% of the participants had maternity insurance. More than three-fifths (64.4%) of mothers attended the maternity school provided by the hospitals. About three quarters of mothers were primiparous (71.1%). Around 75% of the children's primary caregivers during hospitalization were their fathers and grandparents. The mean score of BF supportive services received by mothers during hospitalization was 8.4, ranging from 2 to 12. (Table 1).

Table 1 Characteristics of participants and the associations with EBF at hospital discharge (n=707)

Characteristic	n (%)	EBF at hospital discharge		χ^2	P value
		Yes, n(%)	No, n(%)		
Age (years)					
≤ 30	435(61.5)	142(32.6)	293(67.4)	1.49	0.22 ^a
>30	272(38.5)	101(37.1)	171(62.9)		
Education level					
Junior middle school	104(14.7)	34(32.7)	70(67.3)	0.19	0.91 [#]
Senior middle school	127(18.0)	45(35.4)	82(64.6)		
College and above	476(67.3)	164(34.5)	312(65.5)		
Intended time returning back to work					
≤ 6 months	350(49.5)	115(32.9)	235(67.1)	0.70	0.43 ^a
> 6 months	357(50.5)	128(35.9)	229(64.1)		
Alcohol intake during pregnancy					
No	578(81.8)	199(34.4)	379(65.6)	0.01	1.00 ^a
Yes	129(18.2)	44(34.1)	85(65.9)		
Family monthly income per capita					
≤10,000 RMB	495(70.0)	171(34.5)	324(65.5)	0.02	0.93 ^a
>10,000 RMB	212(30.0)	72(34.0)	140(66.0)		
Maternity insurance					
No	253(35.8)	77(30.4)	176(69.6)	2.88	0.24 [#]
Yes	418(59.1)	154(36.8)	264(63.2)		
Others	36(5.1)	12(33.3)	24(66.7)		
Family structure					
Nuclear family	350(49.5)	115(32.9)	235(67.1)	0.70	0.43 ^a
Non-nuclear family	357(50.5)	128(35.9)	229(64.1)		
Receiving specific BF guidance (such as feeding posture and expressing) in the maternity school					
Yes	353(49.9)	122(34.6)	231(65.4)	0.011	0.915 ^a
No	354(50.1)	121(34.2)	233(65.8)		
Mode of delivery					
Vaginal delivery	331(46.8)	112(33.8)	219(66.2)	0.079	0.961 [#]
Forceps delivery	11(1.6)	4(36.4)	7(63.6)		
Cesarean section delivery	363(51.3)	126(34.7)	237(65.3)		
Primiparity*					
Yes	502(71.3)	159(31.7)	343(68.3)	5.091	0.028 ^a
No	202(28.7)	82(40.6)	120(59.4)		
Newborn sex					
Boy	383(54.2)	134(35.0)	249(65.0)	0.141	0.751 ^a
Girl	324(45.8)	109(33.6)	215(66.4)		
Primary caregiver during hospitalization					
Husband	166(23.5)	60(36.1)	106(63.9)	0.760	0.684 [#]
The husband and grandparents	532(75.2)	179(33.6)	353(66.4)		
Yuesao or others	9(1.3)	4(44.4)	5(55.6)		
Types of delivery hospital*					
Maternal and Child Health (MCH) hospital	350(49.5)	140(40.0)	210(60.0)	97.38	0.002 [#]
General hospital	357(50.5)	103(28.9)	254(71.1)		
Breast or nipple pain					
Yes	180(25.4)	71(39.4)	109(60.6)	2.756	0.102 ^a
No	527(74.5)	172(32.6)	355(67.4)		
Started breastfeeding on*					
On parturition day	210 (29.7)	122(58.1)	88(41.9)	85.373	<0.001 [#]
First day after birth	103(14.6)	32(31.1)	71(68.9)		
Second day after birth	76(10.7)	26(34.2)	50(65.8)		
Third day after birth	104(14.7)	27(26.0)	77(74.0)		
Food feeding before BF*					
No food	221(31.4)	128(57.9)	93(42.1)	79.031	<0.001 ^a
Milk powder and other food	482(68.6)	115(23.7)	371(76.3)		
Nipple status					
Normal	612(86.6)	219(35.8)	393(64.2)	4.273	0.118 [#]

<i>Flat</i>	59(8.3)	16(27.1)	43(72.9)		
<i>Sunk</i>	36(5.1)	8(22.2)	28(77.8)		
Maternal mood after delivery					
<i>Calm</i>	664(93.9)	229(34.5)	435(65.5)	0.809	0.667 [#]
<i>Anxious</i>	30(4.2)	11(36.7)	19(63.3)		
<i>Irritable</i>	13(1.8)	3(23.1)	10(76.9)		
Admission to infant intensive care					
<i>No</i>	577(81.6)	189(32.8)	388(67.2)	3.628	0.057 ^a
<i>Yes</i>	130(18.4)	54(41.5)	76(58.5)		
Score of BF supportive services received during hospitalization*					
<i><8 scores</i>	271(38.3)	57(21.0)	214(79.0)	34.654	<0.001 ^a
<i>≥ 8 scores</i>	436(61.7)	186(42.7)	250(57.3)		

^aBy Pearson's χ^2 test. [#]By Mantel-Haenszel χ^2 test. * Significant difference.

Table 1 showed the factors associated with EBF at hospital discharge. Using the Chi-square (χ^2) test, it was found that primiparous mothers, childbirth in MCH hospitals, earlier lactation time, not feeding of liquid or milk formula before BF initiation, and higher score of BF supportive services during hospitalization were significantly associated with a higher incidence of EBF at hospital discharge.

Table 2 presented status of postnatal BF supportive services provided by hospitals. Only 24.5% of mothers had early sucking and 43.1% of mothers had SSC within 1 hour after birth. Among the 12 BF service items, four supportive services, including rooming-in, providing BF information by doctors, providing BF information by nurses, and no recommendation of infant formula achieved above 90% coverage. The Chi-square (χ^2) test showed significant difference between MCH hospitals and general hospitals on BF supportive services. MCH hospitals consistently performed better in early sucking and SSC within 1 hour after birth, no bottle use before BF initiation, rooming-in practice, information provision on BF, restriction on the use of breast milk substitute during hospitalization, encouragement of BF on demand, recommendation of infant formula, BF guidance and human milk as the primary food after birth ($p < 0.05$).

Table 2 The twelve BF supportive services provided by Maternal and Child Health Hospitals and general hospitals

Items	MCH hospital	General hospital	Total, n(%)	c^2	<i>P</i> value
1. Early sucking within 1 hour after delivery*					
Yes	105(30.0)	68(19.0)	173(24.5)	11.47	0.001 ^a
No	245(70.0)	289(81.0)	534(75.5)		
2. Skin-to-skin contact (SSC) within 1 hour after delivery*					
Yes	190(54.3)	115(32.2)	305(43.1)	35.10	<0.001 ^a
No	160(45.7)	242(67.8)	402(56.9)		
3. Limitation of bottle use before BF initiation*					
Yes	302(86.3)	244(68.3)	546(77.2)	32.33	<0.001 ^a
No	48(13.7)	113(31.7)	161(22.8)		
4. Rooming-in*					
Yes	332(94.9)	322(90.2)	654(92.5)	5.53	0.022 ^a
No	18(5.1)	35(9.8)	53(7.5)		
5. Information provision about BF by doctors					
Yes	321(91.7)	325(91.0)	646(91.4)	0.103	0.79 ^a
No	29(8.3)	32(9.0)	61(8.6)		
6. Information provision about BF by nurses*					
Yes	333(95.1)	324(90.8)	657(92.9)	5.17	0.027 ^a
No	17(4.9)	33(9.2)	50(7.1)		
7. Advice on no use of bottle by health staff					
Yes	213(60.9)	192(53.8)	405(57.3)	3.62	0.58 ^a
No	137(39.1)	165(46.2)	302(42.7)		
8. No use of breast milk substitute during hospitalization*					
Yes	199(56.9)	174(48.7)	373(52.8)	4.67	0.035 ^a
No	151(43.1)	183(51.3)	334(47.2)		
9. No food or fluids other than breast milk, unless medically indicated*.					
Yes	253(72.3)	108(30.3)	361(51.1)	124.95	<0.001 ^a
No	97(27.7)	249(69.7)	346(48.9)		
10. No recommendation of infant formula*					
Yes	347(99.1)	333(93.3)	680(96.2)	16.55	<0.001 ^a
No	3(0.9)	24(6.7)	27(3.8)		
11. Encouragement of breastfeed on demand*					
Yes	210(60)	243(68.3)	453(64.2)	5.24	0.023 ^a
No	140(40)	113(31.7)	253(35.8)		
12. Specific BF guidance (such as feeding posture and expressing) *					
Yes	288(82.3)	237(66.4)	525(74.3)	12.37	<0.001 ^a
No	62(17.7)	120(33.6)	182(25.7)		
Score of 12 BF supportive services during hospitalization*					
< 8 scores	98(36.2)	173(63.8)	271(38.3)	31.30	<0.001 ^a
≥ 8 scores	252(57.8)	184(42.2)	436(61.7)		

^aBy Pearson's c^2 test. *By Mantel-Haenszel c^2 test. * Significant difference.

After controlling for confounding factors of mother's age and education, family monthly income per capita, intended time returning back to work, alcohol intake, maternity insurance, family structure, receiving specific BF guidance (such as feeding posture and expressing) in the maternity school, mode of delivery, parity, gender of the newborn, newborns' primary caregiver during hospitalization, maternal nipple status, maternal mood, and admission to infant intensive care, the multiple binary logistic regression analysis showed that BF supportive services provided by hospitals had significantly positive association with EBF at discharge (Table 3). Mothers who received more BF supportive services (≥ 8 score) during hospitalization were three times more likely to have EBF practice at the time of discharge, compared with mothers who received less BF supportive services (< 8 score) during hospitalization (aOR: 3.00; 95% CI: 2.08, 4.35; $p < 0.001$).

Table 3 The multiple binary logistic regression of association between BF supportive services during hospitalization and EBF at hospital discharge

Variable	Crude OR	Adjusted OR ^a	95%CI	P value
Score of BF supportive services received during hospitalization				
Higher (≥ 8)	2.79	3.00	2.08-4.35	<0.001 [#]
Lower (≤ 8)	1	1		

[#] Significant difference. ^aAdjusted for confounding factors of mother's age and education, family monthly income per capita, intended time returning back to work, alcohol consumption, maternity insurance, family structure, receiving specific BF guidance (such as feeding posture and expressing) in the maternity school, mode of delivery, parity, gender of the offspring, offspring's primary caregiver during hospitalization, maternal nipple status, maternal mood, and admission to infant intensive care.

Discussion

Our study showed that some key BF practices were not well implemented in the maternity hospitals and the rate of EBF was low in both participating MCH hospitals and general BFHs. The BF supportive services were better practiced in the MCH than general hospitals. Mothers who received more BF supportive services during hospitalization were more likely to have EBF at the time of hospital discharge, compared with mothers who received less hospital supports. The findings indicated the importance and necessity of strengthening the implementation of BFHI during hospitalization.

Through our study, it was found that the implementation of some key BF practices was not satisfying in the hospitals involved in the research. For instance, the early sucking and SSC within 1 hour after childbirth were extremely low, with the average rate of only 24.5% and 43.1%, respectively, lower than the rate of 54.5% in a study conducted by Shanghai Center for Women and Children's Health in 2017 [28], and far below the requirements of BFHI that hospitals should support mothers to breastfeed by encouraging SSC soon after birth and helping mothers to put their baby to the breast right away [11]. The benefits of immediate SSC and early BF during the first hour after birth have been confirmed [29, 30]. A meta-analysis conducted by the Lancet Breastfeeding Series Group in 2016, involving review of 29 studies, has shown that the key practices required in BFHI had significant impact on promoting BF in the first hour [31]. The challenges, however, remain how to fill in the know-do gap. A recent study conducted in Ghana to reassess compliance of a Baby-Friendly Hospital with WHO/UNICEF Baby and Mother-Friendly Care Practices reported that Step 4, about early breastfeeding initiation, was the least met [32].

The result of our study showed that the rate of EBF was 34.4% among women discharged from the hospital for childbirth. It was in agreement with some previous studies. For instance, a study in a general hospital of Shanghai reported the EBF rate of 34.5% [33], and another study in a MCH hospital of Changchun, Jilin Province reported the EBF rate of 35.53% [34] at the time of maternity hospitalization discharge. However, when compared to a survey conducted in 32 Chinese cities which showed the EBF rate of 46.6% [35], the rate among our study participants was lower than the multi-cities survey. Further, a larger gap of EBF rate was found between our study and several studies overseas. The EBF rate at hospital discharge was 49.9% in Riverside County of USA [36], 76.8% in Italy [37], 77.8% in France [38] and 82.7% in regional Western Australia [39]. The EBF at the hospital discharge in Shanghai was far below the recommendation of BFHs, which required 80% of newborns being exclusively breastfed [40]. The results

indicated that some BFHs in Shanghai provided inadequate guidance and support on BF practice for new mothers. Active and effective actions are needed to ensure the capacity of health professionals and BF service provision in delivery hospitals. It is also important to carry out external assessment to regularly evaluate adherence to the Ten Steps and provide necessary technical assistance and monitor implementation for hospitals^[11].

As shown in our study, BF supportive services provided by hospitals during hospitalization was significantly associated with the rate of EBF at hospital discharge. As a previous study conducted in rural Western Australia suggested that hospital practices were powerful predictors of exclusive breastfeeding, paying more attention to BFHs practices early in the postpartum period may promote establish exclusive breastfeeding^[39]. It is also in agreement with a recent meta-analysis which suggested that the effective implementation of Ten Steps to Successful Breastfeeding in BFHI was the most effective interventions for improving BF rates at health system level ^{[41][42]}. A previous Chinese study also indicated that hospitalization after childbirth might be an ideal time for BF support when professional guidance and resource-reliable information are available ^[7]. Evidence has shown the better compliance of BFHI requirements could potentially reduce the impact of socio-economic disparities on breastfeeding ^[43]. However, the compliance with BFHI practices among participating BFHI facilities in our study was not satisfactory. These findings emphasized the necessity of training and supervision in BFHs for improved implementation of BFHI strategies. Furthermore, our study also showed the implementation of BF supportive services in general hospitals was poorer than in MCH hospitals. About half of the women in our study (50.5%) gave birth in general hospitals, which meant improving BF supportive services quality in general hospitals would have significant impact on the overall EBF rate of the whole society and should be put high on the agenda.

Some advantages of this study were as follows. Firstly, our study included both MCH hospitals and general hospitals so that we had the opportunity to gain a better understanding of the overall situation of BF supportive services and current practice in maternity hospitals, and also to identify the specific problems and challenges faced by different types of hospitals. Secondly, this study was conducted in both the municipal and the district levels, which provided further insight of the strength and weakness from the health system perspective. The sampling process of involving both municipal and district levels, and MCH and general hospitals reduced the selection bias of research findings.

Limitations of the study

However, our study was not able to involve updated standards of BFHI, being issued in 2018^[11] after this study. In the revised implementation guidance, the contents of Ten Steps remain unchanged, but the wording was revised to reflect client centered approach that allows families to make informed decisions ^[44]. Another limitation is that the information on the length of hospital stay, which may affect mother's access to supportive services provided by BFHs, was not collected. This variable should be considered in

future studies. Finally, our current manuscript only reported the EBF at the time of hospital discharge. The EBF at 42 days postpartum and 6 months postpartum, will be further analyzed and reported elsewhere.

Conclusions

In conclusion, we found that the implementation of BF supportive services in BFHs of Shanghai was not satisfactory. The better BF supportive services during childbirth hospitalization was significantly associated with the higher rate of EBF at discharge. The implementation of BFHI should be strengthened to improve the BF supportive services and to increase the BF and EBF rate, and in turn promote maternal and child health.

Abbreviations

BF: breastfeeding; EBF: exclusive breastfeeding; BFHI: Baby-friendly Hospital Initiative; BFHs: Baby-Friendly Hospitals; MCH: Maternal and Child Health; SSC: skin-to-skin contact; SPSS: Statistical Package for Social Sciences; ORs: Odds Ratios.

Declarations

Ethical approval

Ethical approval was obtained from the the Ethics Committee of the School of Public Health, Fudan University, China. (IRB# 2015-12-0572).

Consent for publication

Not applicable.

Availability of data and materials

We would like to share the database upon individual request.

Competing interest

The authors declare that they have no competing interest.

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Authors' contributions

This paper was designed by L. L., X.Q., H.J., and Y.Y. L.L., Y.Y., C.G., and Y.W. conducted the research and collected the data. Data analysis and paper writing were carried out by L.L. and Y.Z. H.J. and M.L.

reviewed the manuscript and Y.Z. and M.L. revised the manuscript. Y.Z. was the co-first author of the final manuscript as submitted. The final manuscript was read and approved by all the authors.

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