

The status quo and influencing factors of knowledge, attitude and practice of obstetric staff on the safe childbirth checklist

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Abstract

Practical Guidelines for Safe Childbirth Checklist has not been widely used in medical institutions at all levels in China. This study aims to understand the current status of knowledge, attitude and practice of obstetric medical staff toward the Safe Childbirth Checklist and analyze its influencing factors to provide a reference for establishing the promotion of the checklist. Convenience sampling was used in a cross-sectional survey of 685 obstetric medical staff in Chongqing using a self-designed questionnaire to analyze their knowledge, attitude and practice of the checklist. The scores of knowledge, attitude and practice of obstetric medical staff on the checklist were 29.96 ± 5.44 , 62.87 ± 9.11 , and 37.74 ± 6.82 , respectively. Occupation and hospital level were influencing factors of the knowledge and practice scores, while length of service was the only influencing factor of the knowledge score. Education was the influencing factor of attitude score. The total effects of the knowledge, facilitation and inhibition dimensions on practice were 0.671, 0.263 and -0.135, respectively. Mediating effects presented in the facilitation and inhibition of attitude in safe childbirth. Obstetrics medical staff know the checklist well, however, their attitudes and practices need to be improved. Managers should take targeted measures to strengthen the attitudes and practices of obstetric medical staff toward safe childbirth and promote the use of the checklist, thus providing a powerful safeguard for higher delivery quality and safer delivery.

Abbreviations: KAP = knowledge, attitude, practice model.

Keywords: attitude, knowledge, practice, safe childbirth, safe childbirth checklist

1. Introduction

Safe childbirth lays the foundation for maternal and child safety and the happiness of families. Obstetric quality is closely related to childbirth outcomes. According to statistics, the maternal mortality rate in China was 17.8/100,000 in 2019, with an infant mortality of 3.5%, which was mainly caused by nonstandard management, diagnostic procedures and techniques.^[1] Studies have shown that 85% of maternal and infant mortality can be avoided by improving the management efficiency of medical institutions and standardizing diagnostic procedures and techniques.^[1] In 2015, the World Health Organization issued the “Practical Guidelines for Safe Childbirth Checklist,” which aims to strengthen management and standardize operations to ensure the safety of mothers and infants and facilitate the mutual participation of pregnant women and their families. The table was registered by 34 teams from 234 different regions in 29 countries, verifying

that it can effectively improve the code of conduct and improve the quality of maternal delivery.^[2–4] Chinese scholars localized the World Health Organization Safe Childbirth Checklist and launched the “Checklist for Safe Childbirth in Delivery Room.”^[5] In July 2020, the National Health and Medical Commission proposed implementing and promoting the checklist in China. Research shows that the table has not been widely used in medical institutions at all levels in China. The use of safe childbirth checklist can reduce the incidence of maternal and infant delivery complications, but there are also medical staff who believe that it will increase the recording time of documents, affect work efficiency and low willingness to use them.^[6] This study aims to provide a reference for establishing clinical promotion paths and improving delivery quality and safety by investigating the status quo of the Knowledge, Attitude, Practice model (KAP) among obstetric medical staff regarding the checklist and analyzing its influencing factors.

XL and XY were contributed equally to this work.

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2. Objects and methods

2.1. Objects

The convenience sampling method included 685 obstetric medical staff in primary, secondary and tertiary hospitals in Chongqing. Inclusion criteria were doctors, nurses and midwives: practicing with qualification certificates; working in obstetrics for at least 1 year; volunteering to participate in this study. Exclusion criteria were medical staff in advanced studies, regular training and internships. This study was reviewed and approved by the Ethics Committee of the First Affiliated Hospital of Chongqing Medical University (2019-240). All participants signed informed consent forms.

2.2. Survey tools

- (1) The general information questionnaire consisted of 7 items, including age, gender, education, hospital grade, professional title, and working duration of obstetrics.
- (2) The KAP Questionnaire of the Checklist Questionnaire was designed and revised multiple times based on the KAP, the literature, guidelines, and expert consensus.^[7-10] The questionnaire consists of 31 items, 6 in the knowledge dimension, 16 in the attitude dimension, further divided into promotion and inhibition dimensions, and 9 in the practice dimension. A 5-point Likert scoring method was used, with 1 point indicating totally unsatisfactory, 2 points indicating unsatisfactory, 3 points indicating generally satisfactory, 4 points indicating agree, and 5 points indicating totally agree. The attitude inhibition dimension was scored in reverse. The scores of knowledge, attitude, and practice were summed to form a total score, ranging from 31 to 155 points. The higher the score was, the higher the level of KAP. Six experts were invited to rate the validity of the questionnaire, and the content validity index was 0.85. A presurvey of 112 obstetric medical staff in a tertiary hospital in Chongqing was conducted. The Cronbach's alpha coefficients of the questionnaire's knowledge, promoting attitude, inhibiting attitude, and behavior dimensions were 0.97, 0.98, 0.90, and 0.96, respectively, indicating that the questionnaire had good consistency.
- (3) The evaluation criteria, the KAP of the checklist, was divided into 3 categories according to the score: <60% was poor, 60% to 85% moderate, and > 85% good.

2.3. Data collection

The questionnaire was uploaded into the Questionnaire Star Platform and then conducted via the WeChat app. We fully explained the purpose and significance of the survey to the nursing managers and asked for agreement to participate. Then, the questionnaire link was sent to the head nurse, who forwarded the link to the department's WeChat group. All obstetric medical staff completed the questionnaire independently. The respondents could only complete the questionnaire after they signed the informed consent form; otherwise, they had no access to the questionnaire. Questionnaire data were recorded and double-checked by 2 researchers to ensure accuracy.

A total of 692 questionnaires were distributed, and 692 were recovered. Seven questionnaires with obvious logical errors were excluded, leaving 685 valid questionnaires. The recovery rate was 99.0%.

2.4. Statistical method

SPSS 23.0 software (SPSS Inc., IL) was used for statistical analysis. Enumeration data were described by case number and rates.

Measurement data were described as the means \pm standard deviations. Two independent samples *t* tests and variance analysis were used to compare groups. The Student-Newman-Keuls method was used for pairwise comparison. Pearson correlation was used to analyze the correlation between variables. Factor analysis was used to judge the validity of the questionnaire, and Cronbach's alpha coefficient was used to evaluate the reliability of the questionnaire. The mediation effect model was established with Amos24.0 software (SPSS Inc., IL), the maximum likelihood estimation method was used to estimate the model parameters, and the nonparametric percentile bootstrap method of bias correction was used to calculate the confidence interval of the effect. The inspection level $\alpha = 0.05$.

3. Results

3.1. General information of the respondents

A total of 685 obstetric medical staff were investigated in this study, and the general data results are shown in Table 1.

3.2. KAP scores of obstetric medical staff on the checklist for safe delivery in delivery room

The total score of the obstetric medical staff's knowledge of the checklist was 29.96 ± 5.44 with a scoring rate of 85.6%; the total score of attitude was 62.87 ± 9.11 with a scoring rate of 78.6%, of which the score of promotion dimension was 45.53 ± 6.11 with a scoring rate of 91.1% and the inhibition dimension score was 17.34 ± 6.99 with a scoring rate of 57.8%; the total practice score was 37.74 ± 6.82 with a scoring rate of 83.9%. The results suggested that obstetric medical staff had mastered the checklist. However, their knowledge, attitude and practice were low, even resistant. See Table 2 for the top 3 and bottom 3 items in each dimension.

3.3. Univariate analysis of KAP scores of obstetric medical staff on the checklist

The results of the univariate analysis showed that occupation and hospital level had an impact on the knowledge and practice scores of obstetric medical staff ($P < .05$), working years had an impact on the knowledge score ($P < .05$), and educational background had an impact on the attitude score ($P < .05$); see Tables 3–6 for details.

3.4. The mediating effect of the promotion and inhibition dimensions on the attitude dimension of the safe childbirth checklist

The mediation effect evaluation index, $GFI = 0.999$, $CFI = 0.998$, $NFI = 0.991$, $IFI = 0.998$, the ratio of chi-square value to degrees of freedom = 1.126, $RMSEA = 0.020$, and the relevant indicators were all within the acceptable range, indicating that the model has a certain degree of compatibility with the actual data. The significance of direct, indirect, and total effects was estimated using the bias-corrected nonparametric percentile bootstrap method. A total of 5000 bootstrap samples were randomly selected from the original data, and 95% confidence intervals were calculated. The mediating effects of the facilitation and inhibition dimensions between knowledge and safe delivery verification behavior were 0.159 (95% confidence interval = 0.0078–0.211) and 0.016 (95% confidence interval = 0.005–0.034), respectively, and the mediating effect sizes were 23.39% and 2.39%, respectively. The total effects of the knowledge, facilitation and inhibition dimensions on practice were 0.671, 0.263 and -0.135 , respectively. These explained 51.3% of the variance in practice. It shows that knowledge of

Table 1**General information of study subjects (n = 685).**

Projects		
Gender (n, %)	Male	11 (1.6)
	Female	674 (98.4)
Age ()	32.59 ± 7.55	
Education (n, %)	Specialist	169 (24.7)
	Undergraduate	502 (73.3)
	Master degree and above	14 (2.04)
Title (n, %)	Junior	453 (66.1)
	Intermediate	172 (25.1)
	Senior	60 (8.8)
Occupation (n, %)	Nurse	192 (28.0)
	Doctor	119 (17.4)
	Midwife	374 (54.1)
Hospital grade (n, %)	Level 1	34 (5.0)
	Level 2	396 (57.8)
	Level 3	255 (37.2)
Length of service (n, %)	≤5 yrs	167 (24.4)
	6–10 yrs	273 (39.9)
	≥11 yrs	245 (35.8)
Access to knowledge of Checklist for Safe Delivery in Delivery Room (n, %)	Internet	410 (59.9)
	Newspaper and magazines	193 (28.2)
	Literature study	259 (37.8)
	Training session	575 (83.9)
	Superior help	258 (37.7)

Table 2**Knowledge, Attitude and Practice scores of obstetric medical staff on Checklist for Safe Delivery in Delivery Room Top 3 and bottom 3 items (n = 685).**

Items	Score
The top 3 knowledge dimension scores	
I am very aware of who is involved in the verification of the Safe Childbirth Checklist.	4.33 ± 0.83
I am very aware of where to use the Safe Childbirth Checklist.	4.37 ± 0.81
I am very aware of which kind of pregnancy women should be checked with the Safe Childbirth Checklist.	4.38 ± 0.79
The bottom 3 of the knowledge dimension score	
I am very aware of the background of the Checklist for Safe Delivery in Delivery Room.	4.13 ± 0.89
I am very aware of the items on the Checklist for Safe Delivery in Delivery Room.	4.21 ± 0.89
I am very aware of the operating specifications for each item of the Checklist for Safe Delivery in Delivery Room.	4.23 ± 0.89
The top 3 Attitude-inhibition dimension scores	
I think the Safe Childbirth Checklist is more suitable for beginners (junior midwives).	2.99 ± 1.49
I think I am experienced in midwifery and don't need the Safe Childbirth Checklist.	3.11 ± 1.56
I don't think the Safe Birth Checklist is applicable in China.	3.20 ± 1.48
The bottom 3 Attitude-inhibition dimension scores	
I think that my completion of the Safe Childbirth Checklist will be influenced by my colleagues.	2.62 ± 1.39
I think filling out the Checklist for Safe Delivery in Delivery Room will increase the workload.	2.64 ± 1.37
I think the contents and items of the Checklist for Safe Delivery in Delivery Room are cumbersome.	2.78 ± 1.36
The top 3 Attitude-facilitation dimension scores	
I think using the the Safe Childbirth Checklist can reduce maternal and newborn risk.	4.57 ± 0.66
I think the use of the Safe Birth Checklist can effectively reduce mistakes.	4.58 ± 0.64
I think the use of the Safe Childbirth Checklist can further regulate the practice of obstetric staff.	4.59 ± 0.63
The bottom 3 attitude-facilitation dimension scores	
I think it is necessary to establish a monitoring mechanism implementate the safe delivery verification system.	4.53 ± 0.67
I think the use of the Safe Birth Checklist facilitates effective communication between nurses, midwives and doctors.	4.53 ± 0.68
I think professional guidance can help me master the Safe Childbirth Checklist.	4.54 ± 0.66
The top 3 practice dimension scores	
I am always concerned about maternal and neonatal outcomes after using the Safe Childbirth Checklist.	4.24 ± 0.85
I always fill out the Safe Childbirth Checklist voluntarily.	4.25 ± 0.88
I always check that supplies are available for safe delivery.	4.35 ± 0.76
The bottom 3 of the practice dimension scores.	
I have never forgotten the key actions on Checklist for Safe Delivery in Delivery Room.	4.12 ± 0.91
I always check the Checklist for Safe Delivery in Delivery Room before (and after) the procedure.	4.12 ± 0.9
I rarely have a problem filling out the Checklist for Safe Delivery in Delivery Room.	4.13 ± 0.87

the checklist directly affects practice and has an indirect effect on practice through attitude, which presents a partial mediating effect (see Fig. 1 for details).

4. Discussion

In this study, the overall awareness rate of obstetric medical staff about the checklist was reasonable (the score rate was

Table 3

Comparison of knowledge, attitude and behavior score results of safe childbirth checklist for different Length of service in obstetric medical staff.

General Info	≤5	6–10	≥11	t/F	P
Knowledge	29.04 ± 5.78	30.21 ± 5.07	30.29 ± 5.56	3.14	.044*
Attitude	59.04 ± 9.8	59.49 ± 9.74	58.96 ± 8.91	0.23	.794
Practice	37.29 ± 7.21	38.2 ± 6.38	38.36 ± 6.78	1.711	.163

*P < .05.

Table 4

Comparison of knowledge, attitude and behavior score results of safe childbirth checklist for different Education of obstetric medical staff.

General Info	Junior College	Undergraduate	Master	t/F	P
Knowledge	29.38 ± 5.83	30.19 ± 5.3	28.29 ± 5.21	2.073	.127
Attitude	59.75 ± 9.43	59.17 ± 9.44	53.29 ± 8.85	3.048	.048*
Practice	37.83 ± 6.95	37.76 ± 6.79	35.71 ± 6.83	0.635	.53

*P < .05.

Table 5

Comparison of knowledge, attitude and behavior score results of safe childbirth checklist for different Occupation of obstetric medical staff.

General Info	Nurse	Doctor	Midwife	t/F	P
Knowledge	29.42 ± 5.73	29.34 ± 5.78	30.43 ± 5.15	3.101	.046*
Attitude	59.15 ± 9.71	59.74 ± 8.12	59.04 ± 9.73	0.25	.779
Practice	37.44 ± 7.09	36.43 ± 7.09	38.31 ± 6.55	3.701	.025*

*P < .05.

Table 6

Comparison of knowledge, attitude and behavior score results of safe childbirth checklist for different Hospital Level of obstetric medical staff.

General Info	Level-1	Level-2	Level-3	t/F	P
Knowledge	27.53 ± 5.52	29.83 ± 5.61	30.47 ± 5.08	4.694	.009*
Attitude	58.56 ± 8.85	59.03 ± 9.59	59.52 ± 9.35	0.287	.751
Practice	34.59 ± 7.34	37.92 ± 7.05	37.87 ± 6.3	3.848	.022*

*P < .05.

85.6%), indicating that the obstetric medical staff had well mastered the checklist. The reason may be that the content of the checklist is mainly about the critical steps involved in the delivery process, and the respondents in this study have work experience in obstetrics and know the critical operations designed during delivery.^[3] Inconsistent with Ma Shuang's research,^[11] some medical staff are not very clear about the background and items of the checklist, which might be attributed to the short promotion time and lack of promotion.^[15] Some medical staff are unfamiliar with the checklist's operating specifications, which may be related to the complexity of some operations (such as neonatal resuscitation). Yu Youxia's research has shown that the training effect will be limited if there is no corresponding operation training after the theoretical training.^[12] Therefore, it is necessary to increase promotion efforts, hold training sessions, and conduct standardized operation training in the promotion process.

In this study, the obstetric medical staff scored moderate (78.6%), and the attitude promotion dimension scored well (91.1%). They agreed that the checklist could regulate their practice and thus reduce mistakes.^[3] Some health care workers do not believe that the checklist can promote communications between nurses, midwives and doctors. Albolino's study suggested that when using the checklist, doctors' compliance was very low, which may be related to the fact that midwives are mainly involved in key operations in the delivery process.^[13] Doctors rarely perform routine delivery operations, so they do not take the initiative to carry out the checklist. At the same time, the scoring rate of the attitude inhibition dimension was poor (57.8%), and many medical staff believed that this would increase the workload. They believe work in the delivery room is already busy and complicated, and unclear knowledge of checklist items and operation procedures will increase the time needed for verification.^[14] The delivery process cannot be completed by medical staff alone but requires cooperation so that they will be affected by each other. Skilled personnel should participate in continuous guidance during the process. When making changes to the items, items should not be too cumbersome, as Senanayake suggested.^[15]

In this study, the score of obstetric health care workers' practice on the Checklist for Safe Childbirth in Delivery Room was moderate (score rate was 83.9%). Some medical staff said they had forgotten key operations in the delivery process, and Yang Genmeng et al^[11] also indicated that forgetting steps or improper operations resulted in maternal or neonatal death. Although all medical staff confirm the effect of the checklist, they may not be able to apply it correctly. Thus, the practice of using the checklist needs to be improved. George's findings also show that providing forms without guidance does not lead to widespread and consistent use of the checklist, nor does it improve maternal quality of delivery.^[16] Therefore, continuous support is suggested in the process of usage. Continuous feedback can help solve problems so that the checklist can be used as a reminder to prevent forgetting key operations.

Length of service is the major factor affecting knowledge. The score of the checklist shows that fewer working years lower knowledge scores. This is consistent with Ding Zhaoxia's research, which revealed that relative lack of knowledge may be due to the short length of service and lack of clinical and professional knowledge.^[17] However, medical staff with longer work experience have more clinical working hours, richer clinical experience and greater professional knowledge; they also have more ways to receive training and better knowledge of the Safe Childbirth Checklist. It is suggested that during the promotion and use of the checklist, more support should be given to junior medical staff. Continuous training and practices can be used to enable them to master the relevant content and operating specifications of the checklist as soon as possible.

Education is the major factor affecting attitudes. This study shows that medical staff with a junior college degree have a better attitude score on the checklist than those with a master's degree. This is contrary to Zhang Dandan's research, and the reason may be attributed to the higher education level of obstetricians than that of nurses.^[18] However, midwives and nurses are the leading performers in delivery safety inspection, while doctors present less compliance and rarely conduct active checks. This study suggested that in the process of promoting and training staff in the Safe Childbirth Checklist, it is necessary to emphasize the importance of doctors' participation, increase the attention of doctors, and establish a supervisory mechanism to promote the effective conduct of the checklist.

Occupation has an influential impact on knowledge and practice. The research results show that midwives have higher scores on the knowledge and practice dimensions than doctors and nurses, which is consistent with Albolino's research.^[13] The reason may be that in childbirth, the main key operations are carried out by midwives, while nurses and doctors are less

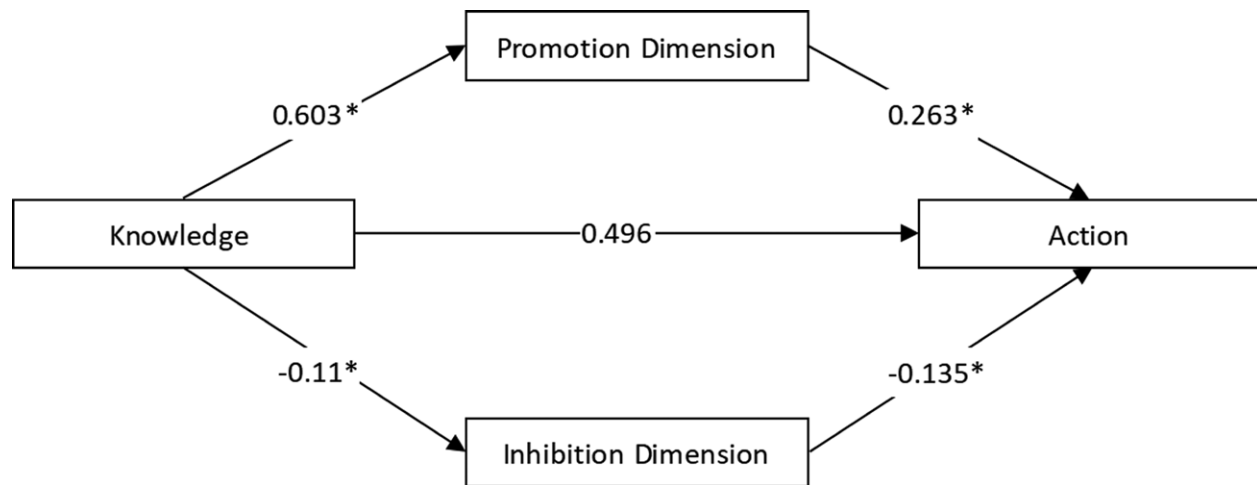


Figure 1. The path diagram of the mediating effect of safe delivery verification and its standardized coefficient, * $P < .001$.

involved, so they have a relatively low understanding of the knowledge and practice of relevant checklists. However, the delivery process is complex and changes very fast. When an abnormal situation occurs, doctors are needed to guide and deal with it. Therefore, when promoting knowledge of the checklist, not only the midwives but also the doctors and nurses should be trained and evaluated for their mastery.

Hospital level affects knowledge and practice. Research shows that in first-grade hospitals, the knowledge and practice of the checklist are worse than those in second- and third-grade hospitals. Tang Rong and Kumar's studies also show that maternal and neonatal deaths are more likely to occur in primary hospitals.^[19,20] Primary hospitals may have a larger gap in health care facilities, training capabilities, and learning capabilities than tertiary hospitals. The materials in the checklist are the basic instructional materials for childbirth safety. This reminds us that before the promotion of the checklist, we need to review the materials in the primary hospitals for timely replenishment in case of deficiencies and hold training based on the checklist to achieve the expected effect.

The results of the mediation effect analysis further showed that knowledge has a direct impact on practice and has an introduction effect on the practice functioning through attitude, which is consistent with Wang Fengwei's research.^[21] During the implementation of the safety protocol, in addition to improving the knowledge of the checklist, it is also necessary to comprehensively consider the content of the promotion of the training and the attitude of obstetrics medical staff toward the training to cultivate a positive experience that will promote the protocol.

Some limitations remain in this study. First, all participants in this study were from the same region (Chongqing, China); second, the number of participants were relatively small. Therefore, A larger number of participants from more geographies will be needed in the further study.

5. Conclusion

The application of the checklist can largely reduce adverse events and ensure the safety of delivery. However, the medical staff's current knowledge, attitudes, and practices regarding the checklist are not promising, especially in the dimensions of attitude and practice, which are closely related to the length of service, education, occupation, and hospital level. This study suggested that it is necessary to promote and standardize the application of the checklist and increase the compliance of obstetric medical staff, thereby reducing safety risks, improving delivery quality, and ensuring the safety of mothers and infants.

Author contributions

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References

- [1] Yang G, Hong S, He Y, et al. Analysis of 151 cases of medical disputes about maternal and newborn deaths. *J Kunming Med Univ.* 2018;39:118–23.
- [2] Xiao M, Qi H. WHO safe childbirth checklist implementation guide: improving the quality of facility-based delivery for mothers and newborns. People's Med Publish House. 2018.
- [3] Tolu LB, Jeldu WG, Feyissa GT. Effectiveness of utilizing the WHO safe childbirth checklist on improving essential childbirth practices and maternal and perinatal outcome: A systematic review and meta-analysis. *PLoS One.* 2020;15:e0234320e234320.
- [4] Semrau KE, Hirschohorn LR, Kodkany B, et al. Effectiveness of the WHO Safe Childbirth Checklist program in reducing severe maternal, fetal, and newborn harm in Uttar Pradesh, India: study protocol for a matched-pair, cluster-randomized controlled trial. *Trials.* 2016;17:576.
- [5] Zhao Y, Chen L. The practice and efficiency of WHO safe childbirth checklist. *Chin J Pract Gynecol Obstet.* 2019;35:966–8.
- [6] Mudhune S, Phiri SC, Prescott MR, et al. Improving the quality of childbirth services in Zambia through introduction of the Safe Childbirth Checklist and systems-focused mentorship. *PLoS One.* 2020;15:e0244310e244310.
- [7] Hirschohorn LR, Krasne M, Maisonneuve J, et al. Integration of the opportunity-ability-motivation behavior change framework into a coaching-based WHO Safe Childbirth Checklist program in India. *Internat J Gynecol Obstet.* 2018;142:321–8.
- [8] Epiu I, Wabule A, Kambugu A, et al. Key bottlenecks to the provision of safe obstetric anaesthesia in low-income countries; a cross-sectional survey of 64 hospitals in Uganda. *BMC Pregnancy Childbirth.* 2017;17:387.
- [9] Senanayake HM, Patabendige M, Ramachandran R. Experience with a context-specific modified WHO safe childbirth checklist at two tertiary care settings in Sri Lanka. *BMC Pregnancy Childbirth.* 2018;18:411.
- [10] Li S, Ke H, Zhang X. Nurses' knowledge, attitude, and practice of nutritional support. *J Nurs Sci.* 2017;32:85–8.
- [11] Shuang MA, Bing Z, Yuguang H. Investigation and analysis of the surgical checklist implementation in the hospital. *Chinese Hospital Manag.* 2013;33:43–4.

- [12] Yu Y, Wei L, Zhou J. Questionnaire survey analysis on effect of neonatal resuscitation training in Chongqing. *Laboratory Med Clin*. 2014;11:3527–8.
- [13] Albolino S, Dagliana G, Illiano D, et al. Safety and quality in maternal and neonatal care: the introduction of the modified WHO Safe Childbirth Checklist. *Ergonomics*. 2018;61:185–93.
- [14] Sun Y. Improve peripartum management and promote safe delivery. *Chin J Obstet Emerg (Electronic Edition)*. 2017;6:1–3.
- [15] Senanayake HM, Patabendige M, Ramachandran R. Piloting of WHO safe childbirth checklist using a modified version in Sri Lanka. *BMC Res Notes*. 2018;11:896.
- [16] George ER, Hawrusik R, Marx DM, et al. Who's your coach? The relationship between coach characteristics and birth attendants' adherence to the WHO Safe Childbirth Checklist. *Gates Open Res*. 2020;4:111.
- [17] Ding Z, Chen X. Knowledge, attitude and practice investigation on protection of fever with thrombocytopenia syndrome among medical staff. *J Nurs Sci*. 2018;33:18–21.
- [18] Zhang D, Hong L, Zhao F, et al. Attitudes and practice of advance care planning in community medical staff. *J Nurs Sci*. 2019;34:77–9.
- [19] Tang R, Liang R, Feng T, et al. Analysis of the trends and influencing factors of maternal mortality from 2005 to 2014. *Chin Health Serv Manag*. 2018;35:710–2.
- [20] Kumar S, Yadav V, Balasubramaniam S, et al. Effectiveness of the WHO SCC on improving adherence to essential practices during childbirth, in resource constrained settings. *BMC Pregnancy Childbirth*. 2016;16:345.
- [21] Wang F, Shen Q, Bacangla La, et al. Analysis on the prevention of osteoporosis in middle-aged and elderly residents of Shanghai community. *J Shanghai Jiao Tong Univ (Medical Science)*. 2020;40:525–9.