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Alignment of Traditional Birth Attendant Practices with Safe Delivery Guidelines Insights from Rural Longsheng, China

Jianfu Xia[1], Junjie Wu[2], Victor Ei-Wen Lo[3], Erkhembayar Tseveen[4], Zhumagaliyeva Ardak Nazilovna[5]
[1] Department of General Surgery, The Dingli Clinical College of, Wenzhou Medical University, Zhejiang, China
[2] School of Public Health, Hangzhou Medical College, Zhejiang,China
[3] Department of Occupational Safety and Health, China Medical University, Taichung, Taiwan
[4] Department of Information Technology, Ikh Zasag International University, Ulaanbaatar, Mongolia
[5] Medical Studies Program, Semey State Medical University, Semey, Kazakhstan

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ABSTRACT

Purpose of the study: This research examined the competency profile of traditional birth attendants (TBAs) serving as frontline maternal care providers in a rural ethnic minority community in China. The study focused on evaluating their understanding of safe childbirth practices in relation to established maternal health standards.

Methodology: An analytical cross-sectional design was implemented, including all practicing TBAs in Longsheng Village (N = 32). Data were gathered through a structured assessment tool constructed from international safe motherhood and essential obstetric care frameworks. The questionnaire measured knowledge across four key areas: identification of obstetric danger signs, implementation of safe delivery techniques, infection control practices, and referral mechanisms for complications. Descriptive analyses were performed to determine overall knowledge distribution. Internal consistency testing demonstrated good reliability (Cronbach's $\alpha = 0.87$).

Main Findings: The assessment revealed that fewer than one-quarter of participants achieved the expected competency level in safe childbirth knowledge, while most demonstrated only partial or insufficient understanding of recommended practices. Statistical analysis confirmed that the average knowledge score was significantly below the predefined standard ($p < 0.001$). Performance was weakest in areas related to infection control and referral decision-making, suggesting limited preparedness in managing complications and ensuring timely transfer to higher-level care.

Novelty/Originality of this study: The findings indicate substantial competency gaps among community-based birth attendants in this rural setting. Strengthening structured training programs, enhancing referral coordination, and fostering collaboration between TBAs and formal healthcare systems are critical strategies to improve maternal and neonatal safety outcomes in underserved populations.

Corresponding Author:
Jianfu Xia,
Department of General Surgery, The Dingli Clinical College of, Wenzhou Medical University,
Chashan Higher Education Park Zone, Wenzhou, Zhejiang, China.
Email: jianfu.xia@gmail.com

1. INTRODUCTION

Safe childbirth remains a fundamental component of quality health systems and an essential determinant of maternal and neonatal survival. The presence of competent birth attendants during the birthing process and its management is widely recognized as a major factor in preventing avoidable complications [1]-

[3]. The presence of competent birth attendants during labor and delivery is widely recognized as a key factor in preventing avoidable complications [4], [5]. Beyond clinical skills, a safe general health process also requires timely decision-making, early identification of danger signs, awareness of infection control, and effective referral mechanisms [6]-[8]. However, in many underserved areas, these elements are not always available.

While improving maternal health during childbirth is important, preventable deaths during pregnancy and childbirth occur primarily in resource-limited settings [9]-[11]. Data from the world health organization states that there were approximately 287,000 maternal deaths worldwide in 2020, with the majority occurring in developing regions [12]. Limited access to skilled birth attendants and delays in responding to obstetric emergencies remain major contributing factors [13]-[15].

Inequalities in maternal care are particularly pronounced in rural areas and geographically remote communities [16]-[18]. Although antenatal care coverage has increased in many countries, the availability of trained health workers for birth attendance remains uneven in remote areas [19]-[21]. In such contexts, traditional birth attendants often serve as the primary providers of maternity care [22]-[24]. In addition to accessibility, it also leverages social trust, cultural continuity, affordability, and long-standing community ties.

China itself has achieved significant improvements in maternal health during childbirth [25]-[27]. However, disparities persist between urban centers and remote mountainous or ethnic minority areas [28], [29]. In geographically challenging provinces, access to institutionalized maternity care may be limited by transportation barriers, economic constraints, and cultural preferences [16], [30]. Consequently, traditional birth attendants continue to assist with deliveries in certain rural communities, serving as informal but influential providers of maternal care

Although traditional birth attendants generally possess extensive experiential knowledge and strong cultural legitimacy, concerns remain about the alignment of traditional childbirth practices with contemporary safety standards. Research from various regions in Asia and Africa has identified recurring gaps in infection prevention, recognition of obstetric emergencies, management of complications, and timely referral to higher-level facilities. These gaps can increase the risk of poor maternal and newborn health outcomes, particularly when referral systems are weak or delayed.

Policy responses in many countries include expanding facility-based services, deploying trained midwives, and offering educational programs for traditional birth attendants. However, evidence suggests that improving maternal health outcomes depends not only on the availability of services but also on the actual competency level of community-based TBAs and their integration into the formal health system. In rural ethnic minority areas in China, empirical data examining TBAs' knowledge base in relation to established maternal health standards is limited. Longsheng Village represents a rural community where traditional birth practices continue to coexist with formal health services. Understanding whether TBAs in this community have adequate knowledge of safe birth principles is crucial for designing context-sensitive interventions.

1.2 Literature review

Their longstanding presence within communities often makes them trusted figures during pregnancy and childbirth [31]-[33]. Beyond assisting deliveries, they frequently provide emotional reassurance, social support, and culturally aligned care, which can enhance women’s comfort and confidence throughout the birthing process [34]-[36]. In settings where formal health infrastructure is limited, TBAs may represent the most accessible source of assistance.

Nevertheless, international evidence has consistently emphasized that reductions in maternal mortality are strongly linked to the availability of skilled birth attendants and access to emergency obstetric services [37]-[39]. The World Health Organization estimates that hundreds of thousands of women still die annually from preventable pregnancy-related causes, primarily in low-resource settings [40]-[42]. On the other hand, with the presence of trained general health professionals and consistent delivery, the morbidity and mortality rates for mothers and newborns will decrease [43], [44]. Research evaluating TBA-focused interventions indicates that training alone does not substantially improve maternal survival unless it is accompanied by functional referral pathways and accessible emergency care. This suggests that knowledge must be complemented by system-level support to translate into improved outcomes.

Studies conducted in parts of Asia and Africa demonstrate that TBAs’ knowledge of safe delivery standards varies widely [45]-[47]. While awareness of general pregnancy signs may be relatively adequate, deficiencies are frequently reported in infection prevention, management of obstetric complications, and timely referral practices [48]-[50]. These limitations are particularly concerning because delays in recognizing and responding to emergencies are key contributors to maternal and neonatal morbidity.

Utilization of TBAs is influenced not only by physical access to facilities, but also by socio-cultural factors such as trust, tradition, cost considerations, and perceptions of respectful care [51]-[53]. Even where health facilities are geographically available, women may continue to seek traditional attendants due to familiarity and shared cultural values. In China, maternal health indicators have improved substantially at the national level. however, disparities remain in remote and ethnic minority regions. Given this context, examining

the extent to which traditional birth attendants understand and apply established safety standards is critical. A focused evaluation of their knowledge provides deeper insight into potential risks, informs targeted training strategies, and supports better integration between community-based providers and formal health systems.

2. RESEARCH METHOD

2.1. Study Design

This investigation applied a quantitative observational framework aimed at describing the existing knowledge profile of community-based birth attendants. Rather than introducing training or experimental manipulation, the research captured conditions as they existed during the data collection period [54], [55]. The design enabled an objective assessment of competency levels at a single point in time, providing a snapshot of prevailing knowledge related to childbirth safety practices [56], [57].

Fieldwork took place in Longsheng Village, a highland community situated in Guangxi Province, China. The area is largely populated by ethnic minority families and is characterized by challenging terrain and limited accessibility to institutional maternity facilities. Due to transportation constraints and long-standing cultural practices, home-based delivery assistance by traditional birth attendants remains part of local maternal care patterns.

2.2. Study Population

The study focused on individuals who were actively providing childbirth assistance within the village at the time of the survey. Identification of eligible participants was conducted in collaboration with local administrative officials and community health representatives. This verification process confirmed the presence of 32 practicing traditional birth attendants. Given the manageable size of the population, all identified practitioners were invited to participate, ensuring full coverage of the available cohort rather than selecting a subset. This comprehensive inclusion reduced the possibility of selection imbalance and strengthened the representativeness of the findings within the community context [59]. Eligibility criteria included is Actively assisting childbirth within the previous two years, Community acknowledgment as a traditional birth attendant, Age 18 years or older and Willingness to provide informed consen. Individuals who were no longer practicing or declined participation were not included.

2.3. Data Collection Instrument

Information was obtained through a purpose-built assessment tool developed to evaluate participants' understanding of essential childbirth safety principles. The content of the instrument was formulated based on established maternal and neonatal care frameworks, incorporating both international safety guidelines and nationally endorsed clinical protocols. The assessment explored four core areas of competency: early identification of pregnancy and labor-related warning signs, knowledge of appropriate intrapartum practices, application of infection control measures during delivery, and decision-making processes regarding referral and coordination with higher-level care providers.

The finalized questionnaire included 25 objective items with single best-answer options. Each accurate response contributed one point to the total score, whereas incorrect responses did not receive any points. Overall scores therefore ranged from 0 to 25, and were later transformed into percentage values to facilitate interpretation and comparison against predefined competency thresholds.

Table 1. Question instrument grid

Main Construct	Competency Domain	Specific Content Areas	Item Numbers
Traditional Birth Attendants' Competency in Safe Delivery Care	Identification of obstetric risk signs	Bleeding before delivery (antepartum hemorrhage)	1, 2
		Premature rupture of membranes	3
		Convulsions/eclamptic symptoms	4
		Prolonged labor exceeding 12 hours	5
	Understanding of standard labor management	Physiological stages of labor	6, 7
		Appropriate maternal birthing positions	8
		Avoidance of unsafe traditional practices	9
		Management of placental	10, 11

Main Construct	Competency Domain	Specific Content Areas	Item Numbers
		delivery(third stage)	
	Infection control and hygienic practice	Proper hand cleansing procedures	12
		Use of sterile or clean delivery instruments	13
		Prevention of cord-related infections	14
		Maintenance of a clean birth environment	15
	Recognition and initial response to complications	Detection of postpartum hemorrhage	16, 17
		Immediate steps prior to referral	18
	Referral readiness and coordination	Criteria requiring urgent referral	19, 20
		Timing of referral decisions	21
		Communication and collaboration with formal health providers	22
	Postnatal maternal and newborn care	Monitoring of mother after childbirth	23
		Essential newborn care	24
		Early initiation of breastfeeding	25

To facilitate interpretation, the total score was converted into proportional performance bands based on predefined competency thresholds. Knowledge levels were categorized as table 2:

Table 2. Classification framework for knowledge level

Proportion of Correct Responses	Competency Level
Below 0.60 of total score	Insufficient
0.60 – 0.79 of total score	Basic
0.80 and above	Proficient

With a pilot sample of 32 participants (df = 30) and a significance level of 0.05, the critical correlation coefficient required for item retention was 0.361. Items exceeding this threshold were considered to demonstrate adequate construct representation. All questionnaire items showed correlation values above the minimum requirement, indicating that each item contributed meaningfully to the overall scale.

Overall, the correlation coefficients ranged between 0.41 and 0.66, indicating moderate but acceptable item performance. None of the items fell below the minimum criterion; therefore, all items were maintained for use in the main study.

Table 3. Item total correlation results for the tbas knowledge questionnaire

Item	Content Area	Corrected Ite1m Total Correlation (r_{count})
1	Recognition of danger signs	0.582
2	Recognition of danger signs	0.558
3	Obstetric complications	0.614
4	Hypertensive disorders	0.496
5	Labor abnormalities	0.521
6	Labor stages	0.632
7	Labor stages	0.595
8	Safe delivery positioning	0.478
9	Avoidance of harmful practices	0.452
10	Management of third stage	0.661
11	Management of third stage	0.628
12	Hand hygiene principles	0.509
13	Sterile equipment use	0.576
14	Infection control	0.602
15	Clean birth environment	0.437
16	Postpartum bleeding	0.651
17	Postpartum bleeding	0.643

Item	Content Area	Corrected Ite1m Total Correlation (r_{count})
18	Initial emergency response	0.537
19	Referral criteria	0.563
20	Referral criteria	0.544
21	Referral timing	0.4825
22	Collaboration with facilities	0.461
23	Postnatal maternal care	0.590
24	Essential newborn care	0.616
25	Early breastfeeding support	0.558

All 25 items showed coefficients above the critical threshold (0.361), supporting acceptable construct validity for field implementation. To examine the stability of the questionnaire items, an internal coherence analysis was performed [60], [61]. The coefficient obtained indicated satisfactory consistency among the items measuring knowledge components.

Table 4. Internal consistency coefficient of the knowledge instrument

Total Items	Coefficient value	Reference Threshold	Interpretation
25	0.79	≥ 0.70	Acceptable reliability

The calculated coefficient (0.79) exceeded the commonly accepted minimum threshold of 0.70, suggesting that the instrument items functioned cohesively in measuring the intended construct. This suggests that the items consistently measure related dimensions of safe delivery knowledge without excessive redundancy.

2.4. Data processing and analysis

All collected questionnaires were reviewed to ensure completeness and consistency of responses before further processing. Each response was then assigned a numerical code according to a predetermined scoring scheme. The coded data was entered into statistical analysis software for systematic analysis. The analysis was conducted in two stages. By carrying out descriptive stages, namely explaining the characteristics of respondents and the distribution of knowledge scores. The measures used included the mean, standard deviation, and proportion distribution for each variable category.

The second stage aimed to test whether respondents' knowledge levels had met the previously established minimum competency standard of 80%. For this purpose, a one-sample mean comparison test was used. A probability value of <0.05 was set as the statistical significance limit..

2.5. Ethical considerations

Approval by respondents for this study was obtained from the relevant research committee [63]. This study was conducted after obtaining approval from the relevant research ethics committees. Prior to data collection, all potential participants were thoroughly explained the purpose of the study, the procedures to be conducted, and their right to refuse or discontinue participation at any time without consequence. To maintain privacy, no personally identifiable information was included in the research instruments or reports. All data was securely stored and used only for academic purposes in accordance with the principles of confidentiality and research ethics..

3. RESULTS AND DISCUSSION

During the data collection period, all active traditional birth attendants (TBAs) in the study villages were successfully recruited. Thirty-two participants met the criteria and completed the questionnaire. Most respondents were older, with more than half aged 45 and over. Their formal education levels were relatively low; the majority had only completed primary education or had never received formal education. Their length of practice was also relatively long, with most having assisted deliveries for more than a decade. Less than half of the respondents had received formal maternal health training facilitated by local health authorities.

These characteristics indicate that the role of TBAs in this region is still dominated by inherited experience rather than training based on modern clinical standards. This provides an important context for interpreting knowledge scores. The total knowledge scores obtained by respondents ranged from 10 to 23 out of a maximum score of 25. The overall mean score was 16.2 with a standard deviation of 3.1.

Table 5. Classification of knowledge levels

Category	Percentage Range	n	%
Limited	< 60%	9	28.1
Sufficient	60–79%	16	50.0
Adequate	≥ 80%	7	21.9
Total		32	100

More than three-quarters of respondents (78.1%) were in the limited to adequate category. Only a small proportion reached the adequate category according to the established competency threshold. A more detailed analysis shows the variation in achievement in each competency domain, which is presented in table 6.

Table 6. Average scores across knowledge domains

Domain	Maximum Score	Mean ± SD
Identification of maternal danger signs	5	2.9 ± 1.0
Standard delivery procedures	6	4.1 ± 1.1
Infection control measures	4	2.4 ± 0.8
Initial management of complications	5	2.8 ± 1.0
Referral coordination	5	2.0 ± 1.2

The lowest scores were seen in the referral system aspect, particularly regarding appropriate timing for referral and communication mechanisms with healthcare professionals. The score for infection prevention was also relatively low, indicating potential risks to maternal and infant safety. To assess the hypothesis of whether the average score has met the minimum competency standard (set at 80% of the maximum score or equivalent to a value of 20), a one-sample comparison test was carried out against the reference value.

Table 7. Comparison of mean knowledge score with competency standard

Reference Value	Observed Mean	t	df	Significance
20	16.2	−5.84	31	< 0.001

The average scores obtained by respondents were significantly below the established benchmark scores. This difference did not occur by chance, as indicated by the very small probability values. Therefore, it can be concluded that the level of knowledge possessed does not meet the previously determined competency threshold. The competency assessment revealed a significant gap between practical experience and mastery of health guideline-based delivery safety standards [64]. Although some respondents demonstrated a sufficient understanding of basic delivery procedures, their performance in crucial aspects such as detecting risky conditions and referral mechanisms remained inadequate. This imbalance indicates that long-standing traditional practices have not fully aligned with modern maternal safety approaches [34].

The distribution of knowledge categories showed that only 7 of 32 participants (21.9%) achieved the 80% competency threshold, while the majority were at a moderate or limited level. The overall mean score (16.2 out of 25), which was statistically lower than the standard, reinforces the finding that cognitive capacity to support safe deliveries still needs systematic improvement. Domain analysis revealed that the most prominent weaknesses were in referral coordination and infection prevention. Low scores in the referral system indicate potential delays in decision-making when complications arise. In the context of maternal safety, delays in referral are often a determining factor in clinical outcomes [65], [66]. Similarly, limited understanding of infection control has the potential to increase the risk of postpartum complications, including maternal and neonatal infections.

The findings align with earlier investigations carried out in several South Asian and sub-Saharan African settings, where traditional birth attendants were reported to demonstrate satisfactory awareness of maternal risk indicators, basic infection control principles, and initial responses to obstetric emergencies [67]. However, mastery of basic procedures without the support of risk identification and collaborative action skills is insufficient to ensure comprehensive maternal and newborn safety [68]. This confirms that empirical experience alone does not always equate to standards-based competency.

These findings also reflect the structural challenges in integrating traditional service providers into the formal health system [69]. When training is not continuous or accompanied by clear oversight and referral mechanisms, knowledge gains tend to be inconsistent [70]. Therefore, capacity-building approaches need to be contextually designed, taking cultural factors into account while ensuring alignment with clinical safety guidelines.

This study provides novelty insights into the most vulnerable areas that could potentially impact maternal and newborn safety. Furthermore, the focus on rural communities with ethnic minority characteristics provides empirical evidence from a relatively under-documented region in the maternal health literature in

China. Thus, this study enriches the global discourse on how traditional service providers can be positioned within community-based maternal health strategies.

The practical implications of these findings emphasize the need for more targeted and competency-based interventions. Capacity building programs should prioritize is early recognition of obstetric danger signs, infection prevention standards in delivery practices, clear and collaborative referral mechanisms with health professionals. A partnership approach that respects the social legitimacy of traditional birth attendants while upholding evidence-based safety standards has the potential to be a more effective strategy than substitutional or exclusionary approaches.

Several limitations need to be considered when interpreting the results of this study. First, the number of participants was relatively limited and they came from a single community, so generalization to other areas should be approached with caution. Second, the questionnaire-based measurement assessed dimensions of knowledge, not direct observation of actual practice, so there may be discrepancies between what is known and what is done. Third, the cross-sectional study design does not allow for analysis of causal relationships or changes in competency over time. Nevertheless, this study provides relevant empirical insights for developing maternal health policies that are responsive to cultural and geographic contexts.

4. CONCLUSION

The findings of this investigation indicate that the capacity of traditional midwives in the area remains below the expected level to support safe births. Although they remain trusted figures in the community, gaps in key areas, particularly infection prevention practices and referral decision-making, are clearly identified. The difference between the average knowledge score and the required competency threshold is statistically significant, suggesting structural limitations rather than incidental variation. These results suggest that long-standing practical experience, without systematic reinforcement through formal standards and supervision, may not be sufficient to ensure maternal and newborn health. These findings underscore the necessity of strengthening competency development initiatives tailored to rural and culturally distinct communities. Future interventions should move beyond short-term informational sessions and instead adopt structured, continuous capacity-building models that include practical simulations, periodic evaluation, and supportive supervision. Establishing clear referral pathways and communication channels between traditional birth attendants and formal healthcare facilities is equally critical to minimize delays in managing obstetric emergencies. From a policy perspective, integrating traditional birth attendants into community-based maternal health strategies while clearly defining their supportive rather than independent clinical role may enhance collaboration without undermining cultural trust. Further research incorporating observational assessments of clinical practice and multi-site comparisons is recommended to better understand how knowledge translates into real-world delivery outcomes. Strengthening both competency and system-level coordination will be essential to improving childbirth safety in underserved rural populations.

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USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors confirm that no artificial intelligence (AI)-assisted technologies were utilized in the preparation, analysis, or writing of this manuscript. All stages of the research process, including data collection, data interpretation, and the development of the manuscript, were conducted solely by the authors without any support from AI-based tools.

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