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Essential competencies for three grades of midwives in China

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ABSTRACT

Objective: To identify the essential competencies for different grades of midwives in China.**Methods:** A nationwide modified Delphi process was implemented to amend and screen the indicators. Thirty expert panellists including practitioners (nurse-midwives), clinical managers, academic educators and obstetricians completed a two-round Delphi study through an electronic survey that was supplemented by an expert panel meeting for discussion of comments and suggestions.**Results:** All panellists completed two rounds of Delphi study and at least 75% of them achieved a consensus on 224 items ($W1 = 0.150$, $W2 = 0.173$). Seven domains were established, namely, 'Professional quality', 'Antenatal care', 'Intrapartum care', 'Postnatal care', 'Neonatal care', 'Gynaecological care', 'Public health care & Integrative competency'. Generalised maternal and neonatal knowledge and perinatal care skills were set for 'junior' midwives, pathological care for 'senior' ones and supervisory abilities and promotion of discipline for 'expert' ones.**Conclusions:** This research developed three grades of essential competencies for midwives in China. The next step will be assessment in clinical settings for further response. The set was in line with the concepts of International Confederation of Midwives under the domestic context. This set could be adopted as a reference in developing normalised midwifery practice, education and certification.© 2018 Chinese Nursing Association. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

The perinatal mortality has decreased continually in Mainland of China over the past two decades [1]. However, the caesarean section rate is the highest in the world (46.2%), especially for caesarean deliveries without indication [2]. This phenomenon is associated with great severe maternal and neonatal morbidity or mortality, long-term harmful outcomes and serious resource drain. The two-child policy can further aggregate this dilemma [3]. The problem may be caused by the deficiency in midwives' competencies and professional functions [4]. Midwives play a dominant role in reducing mortality and morbidity. Several evidence-based studies have shown that, compared with obstetrician-managed patients, nurse-midwife-managed patients have lower rates of caesarean section [5] and persistent maternal and newborn mortality [6,7]. The World Health Organisation, International Confederation of Midwives (ICM) and Federation of Gynaecology and Obstetrics made a joint statement, which highlights the crucial

function of skilled attendants in promoting maternal and newborn health and urges that all skilled attendants must have the core midwifery skills [8].

However, midwives in Mainland of China cannot shoulder the urgent mission to promote natural delivery and the health of women and newborn as far as the current practicing quality or quantity level. Firstly, the skills and abilities of these health professionals need to be ascertained and improved. According to the newest government report in 2014, 47% of avoidable maternal mortalities are caused by the lack of knowledge and skills of medical staff [9], particularly in identifying and preliminarily disposal of life-threatening diseases. Secondly, midwife manpower resources are severely short. As reported by *The State of the World's Midwifery 2014*, the number of midwives in China is 0.158 per 1000 people (217,670 nurse-midwives in total) [1], which is one-twentieth of that in Sweden and Britain and one-tenth of that in Malaysia [8]. For historical reasons, professional roles of midwives have been partly replaced by those of obstetricians and nurses for decades. Midwives are supervised separately with internal criteria in their own hospitals. The practice divisions of labour amongst midwives, doctors and nurses are confusing, and the performance of medical order occupies the majority of midwives' duties. Therefore, the competencies of midwives are degenerating

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gradually [10].

The underlying reasons are the absence of certification, management system, professional regulation and standardised education for midwives in Mainland China. Retrospective policy review has shown that midwifery education and management are gradually affiliated to nursing and clinical practice system. The education level falls far behind that of the two latter professions [11]. Midwives are constrained in a dilemma wherein professional title management belongs to nursing without specialised obstetrical standards and the practical management partly belongs to maternal clinical medicine without clear legal expression of 'midwife'. Although the employment of midwives is based on acquisition of 'Maternal and newborn care technical examination certificate' [12], routes to obtain the certificate varies between counties of provinces and are obscured and nonstandard.

To achieve the 'Health China 2030' project target [13], National Health and Family Planning Commission of the People's Republic of China has planned to strengthen resources on training of midwives and medical health services during the perinatal period from beginning to end [3]. All the above-mentioned missions should be supported by competency standards for midwives. To date, many countries and Hong Kong districts are setting up competency standards as guidelines for educators and practitioners and especially constituting the basic requisites for graduates [14]. *The State of the World's Midwifery 2014* suggested that China should construct a clear description of competencies for midwives [1]. In addition, ICM determined that the competency statements should be updated continually and timely because the evidence concerning health and practices evolves and health care need changes [15]. At the same time, ICM standards in 2013 claimed that additional competencies are described for midwives who engage in a broad scope of practice to make a difference in maternal or neonatal outcome beyond 'basic' or 'core' [16].

However, no integrated and clear standard of midwifery practice competencies exists in Mainland of China. Exceptions are studies of a relative scale including 5 domains and 54 items from 2012 ICM standard and are formulated mainly on intrapartum care [17]; and a pilot province-level operating instruction for obstetric nurses [18], such as familiarity with check route of doctors' advices, which is different from competency standards abroad. Therefore, the set of essential competencies for midwives need to be established imperatively. The *Essential competencies for basic midwifery practice 2013* were established and recommended by ICM and can serve as a model to draft the competencies. Indigenisation for Mainland China is necessary as its health system and responsibilities of midwives are different from those of other countries. The unequal competency levels should be considered on the basis of the areas, provinces and grades of hospital. Considering the lack of regulations of practice scope, this research focused on future policy planning development.

2. Methods

2.1. Previous framework

We developed this survey on the basis of a previous work, a pilot qualitative study, to draft the original item list [19]. In this survey, literature review and interview were implemented using competency models for guidance from ICM and countries with superior midwifery system (Table 1). On this basis, seven domains and 186 items were formulated. Competencies were defined as knowledge, skills and codes within the seven domains of 'Antenatal care', 'Intrapartum care', 'Postnatal care', 'Feminine care', 'Public health care & Integrative competency' and 'Professional quality'. Three grades for midwives were set following a model from Britain [20] as

follows: junior (novice and advanced beginner), senior (competent and proficient) and expert without seniority setting. Thus, we hypothesise that midwives who meet the standard will be certified as the corresponding grade. The list needs to be testified and worded deliberately through quantitative method in follow-up study. The survey design was tested for clarity by five nursing specialists.

2.2. Modified Delphi procedure

A modified Delphi technique was used to obtain consensus on the essential competencies for different grades of midwives in Mainland China. The draft was distributed by e-mails to panellists for modification of items. All procedures met the anonymous distribution requirement. In the first round, the panellists were given one week to respond for their five levels of agreement (i.e. 'strongly agree', 'somewhat agree', 'unable to comment', 'somewhat disagree' and 'strongly disagree') on items and their grades for each round. Open text fields were given to panellists to suggest edits or additional items, and their grades were encouraged. Documents of participant inclusion criteria and informed consent were collected. The second draft was presented to panellists with the reasons why their suggestions were adopted or not. The second round was the same as the first round for consensus. Items of over 75% agreement were again fed back to respondents in the second round to avoid duplicated proposal and confusion in an integral and structured list as they might bias the range of opinions from successive rounds [21].

2.3. Consensus criteria

According to considerable published literature, consensus percentages range from 51% to over 90% [21,22]. In this study, iterations continued until a 75% degree of consensus was achieved [23]. Kendall's rank-order correlation coefficient (W) was used to test the consensus [24]. Items were included simultaneously on the basis of the following criteria [23,25]:

- Central tendencies (median > 3.5 and ratios of 'strongly agree' and 'somewhat agree' > 75%);
- Tendency of dispersion (coefficient of variation, $CV < 0.25$);
- The item content validity was revised as $Kappa > 0.78$. Items should be amended when $0.78 < Kappa < 0.5$ and deleted when $Kappa < 0.5$ [26].

We planned the iterations depending on the consensus level whereas strong disagreements remained on several fixed items in the first and second rounds. The preset consensus level was difficult to achieve. To avoid fatigue and thus spurious results in the subsequent round [24], we halted the iteration and launched an expert panel meeting to discuss the divergence and then validate the draft.

2.4. Panel meeting

Controversial items after Delphi iterations were discussed in an analogue of expert panel (also known as the nominal group technique). Pre-existing group relationship was chosen depending on the population strata included and the scope of this research sampling [27,28]. We recruited 14 experts in the end [29]. The meeting was guided by a skilful facilitator. Spoken opinions and nonverbal behaviours of each participant were recorded. After group discussion and debating process, written opinions were gathered as the terminal decision. The study spanned from December 2013 to December 2014. The research had been rigorously reviewed in terms of ethics from the design stage to the end

Table 1
Competency models.

Standards of competencies	Institute(s)	Year of publication
Standards for Competence for Registered Midwives	Nursing and Midwifery Council (Britain)	2007
Core Competencies for Basic Midwifery Practice	American College of Nurse-Midwives	2012
Canadian Competencies for Midwives	Canadian Midwifery Regulators Consortium	2010
Competencies for Entry to the Register of Midwives	Midwifery Council of New Zealand	2004
Statement on Cultural Competence for Midwives	Midwifery Council of New Zealand	2012
National Competency Standards for the Midwife	Australian Nursing and Midwifery Council Incorporated	2004
Core Competencies of Midwives in Hong Kong	Midwives Council of Hong Kong	2010
Standards for the Preparation of Supervisors of Midwives	Nursing and Midwifery Council, (Britain)	2014
Clinical Nurse/Midwife Specialist Grade 1 & Grade 2 Classifications	Department of Health of New South Wales	2008
Standards for the Practice of Midwifery	American College of Nurse-Midwives	2009
Canadian Competencies for Midwives(appende)	Canadian Midwifery Regulators Consortium	2010
Midwifery Rules and Standards	Nursing and Midwifery Council, (Britain)	2012
Code of Ethics for Midwives in Australia	Nursing and Midwifery Board of Australia	2008
14.Construction Guideline of Core Competencies for Specialised Nurses	Department of Health of Guangdong Province (China)	2009

and approved by Peking University Institutional Review Board.

2.5. Participants

Thirty experts were sampled into Delphi survey panel purposefully. Participants were recruited through a list from 'Chinese Maternal and Child Health Association-midwifery committee of experts', which contains the most qualified elites and scholars with abundant experiences in midwifery practice, management or teaching in China, with general representation. The experts showed a persistent interest through the recruiting call and were knowledgeable about the competencies of midwives [21]. The minimum criteria were set as follows: bachelor's degree, 10 years of midwifery practicing experience and deputy-level professional title. The 30 experts came from 21 provinces, thereby covering 67.7% of Mainland of China and every stratum of perinatal care institutions defined by the government. Table 2 shows the professional role and education, affiliated institution, health service level and economic development level institutions of the chosen experts [30].

Table 2
Demographic characteristics of Delphi panel experts.

Indicator	n	Percentage(%)
Roles in midwifery (Multiple roles)		
Practitioner	17	57
Manager	18	60
Educator	15	50
Obstetrician	8	27
Credential earned by the program graduate		
Bachelor's degree	19	63
Master's degree	8	27
Doctorate degree	3	10
Hospitals/Colleges		
Categories of hospitals		
Maternal and Child Care	12	40
General	10	33
Grades of hospitals		
Secondary hospital	3	10
Tertiary hospital	19	63
Colleges	8	27
Health service level		
Top 10 in province ranking	15	50
Middle 10 in province ranking	8	27
Last 11 in province ranking	7	23
Economic development level		
High income	13	57
Medium income	12	23
Low income	5	20

2.6. Data analysis

Qualitative feedback was carefully analysed using a qualitative method, that is, categorisation. Repetitive items from different participants were classified. All new proposed items were listed in the second draft, but some were against the newest evidence from the literature review. Expression and grade adjustment proposals were adopted on the basis of the clarification and quantitative data. Selective criteria, including median, coefficient of variation, ratios of 'strongly agree' and kappa of each item were calculated. We counted the number of respondents who 'strongly agree' and 'somewhat agree' by the total number of respondents to determine the level of consensus for each item. Correlation coefficient (W) was validated by non-parametric test (K-related samples test, $\alpha = 0.01$) [31]. Missing data imputation was based on means of items.

3. Results

Thirty panellists completed all iterations without attrition and offered their qualitative and quantitative judgment on items. 229 items were contained in draft 1 based on 186 items mentioned previously and experts' suggestions after the first round. 227 items were contained in draft 2 based on draft 1 and experts' suggestions after the second round. Finally, 15 controversial items in draft 2 and 1 new proposed item were left to be discussed in subsequent panel meeting. A total of 224 items in the final draft were identified on the basis of careful review by the Task Force. According to the non-parametric test of W , consensus was increased ($W1 = 0.150$, $W2 = 0.173$), and both showed statistical significance ($P < .01$). 170 of 186 items in the first round and 219 of 229 in the second achieved consensus greater than 75%.

3.1. First round

In the first round, 169 items were suggested to be edited. A total of 229 items were contained in draft 1, amongst which 51 items were reworded, 1 item was dropped, 46 new items were added and 3 items were merged with another. No item met the removal criteria. Accordingly, we amended items on the basis of CV, kappa, ratios of agreement and qualitative opinions as follows: $CV > 0.25$ ($n = 13$), ratios of agreement $< 75\%$ ($n = 16$) and $0.5 < Kappa < 0.78$ ($n = 2$). The qualitative edits comprised three main aspects. Firstly, competences were adapted to domestic clinical characters. Added items such as 'regard pregnancy as normal physical process and advocate support natural birth' and 'expectant or active management of the third stage of labour as appropriate' were modified to 'identify the signs of placenta removal and provide assistance' in

the junior grade. Secondly, expressions were changed to be more accurate than before; for example, 'propagandise and educate ...' was edited to 'educate ...'. Lastly, the sequence of items was adjusted through physical development process; for example, 'teach and demonstrate measures to decrease common discomforts of pregnancy' was moved before 'four-step palpate abdominal assessment'.

3.2. Second round

In the second round, 50 items were suggested to be edited. A total of 227 items were contained in draft 2, amongst which 11 items were reworded, 2 items were dropped (one met the removal criteria and another was a duplicate, i.e. 'physiological characters of newborn'), 15 items were controversial and 1 new proposed item was left to be discussed in the subsequent panel meeting. All items obtained median > 3.5, Kappa > 0.78. Three items met the removal criteria with $CV \geq 0.25$. In particular, items 'repair third and fourth degree perineal or vaginal lacerations ($CV = 0.25$)', 'perform low forceps delivery ($CV = 0.26$)' and 'management and nursing for newborn with complicated diseases ($CV = 0.27$)' were left to be discussed in the panel meeting. We reworded other items on the basis of the rates of agreement and qualitative opinions as follows: rates of agreement < 75% ($n = 10$). Qualitative opinions focused on expression; for example, item 'principles of aspiration of the uterine cavity to remove retained products of conception, such as membrane' was modified to 'principles to remove retained products of conception in uterine cavity'. Ten items failed to achieve consensus, amongst which one was dropped directly, that is, 'repair third and fourth degree of perineal or vaginal lacerations (rates of agreement = 70%)', which was an intrapartum care skill for expert grade. Nine items were subject to review and rewording in the panel meeting.

3.3. Panel meeting

A total of 16 items were left to be confirmed in the panel meeting; for example, 'diagnostic method of cephalo-pelvic relative location' for the expert grade was transferred to the senior grade. Through enthusiastic debate, panellists reached a consensus that moderate expression could be adopted for controversial items; for example, item 'perform low forceps delivery' was changed to 'cooperate with doctors in low forceps delivery' with $CV = 0.29$ and rates of agreement = 70%. Panellists from Beijing suggested that 'obstetricians should be employed apart from training midwives'. At the same time, panellists from inferior developed cities and Level 2 (inferior) hospitals suggested that 'if occipito-transverse or posterior position and shoulder dystocia are mishandled, then the foetus will die'. One item was merged with another, and two items were dropped because of duplication. As a result, 224 items were settled in the final set.

3.4. Final set

The final set and the corresponding consensus are presented in the [Appendix](#).

4. Discussion

4.1. Reflection without limitation to the midwifery practice scope

To widen the applicability of the set, moderate expressions were adopted on some controversial items; for example, 'institute resuscitation of neonatal asphyxia, including tracheal intubation' was simplified to 'institute resuscitation of neonatal asphyxia'. The

controversies resulted from unbalanced allocation of medical service resources. Midwives in fourth-tier cities, villages and towns (with workforce shortage) undertake vacuum extraction, assist breech delivery alone and use ultrasound in umbilical blood flow detection [32]. However, midwives' authority in first-tier cities, which are equipped with intensive medical technology and abundant obstetricians, is limited. Perspectiveness and current applicability were considered, and current practice scope served as basis and was expanded moderately on the basis of future demands and international model. Therefore, this set needs to be revised with the professional development.

4.2. Comparison of essential competencies for midwives in China and other countries, regions and associations

The competencies adopted the philosophy of ICM competencies that 'a delineation of the construct of midwifery practice from the basic list of knowledge and skills' [33]. The structure was in accordance with the standards in Britain, America, Canada and Hong Kong of China. These standards were crafted with practical delineation, differed from those in Australia and New Zealand, from pre-conception up to postnatal periods and newborn care, and were supplemented with professional and ethical practice and professional responsibilities (i.e. management issues and professional development). Compared with those of the ICM standard, the current items were modified to adapt to the midwifery practice scope that has expanded lately. The majority of the antenatal, intrapartum, postpartum and neonatal care competencies followed the ICM standard, without enlarging practice scope, but removing some items of the community and gynaecological care.

4.2.1. Competency 1: professional quality

Ethical and professional behaviours or hallmark competencies were extracted from the Competency 1 of ICM standard, 'Social, epidemiologic and cultural context of maternal-newborn care', to be a separate domain 'Professional quality' as the basis of other domains. Item 'be honest and self-restrain in privacy' was in accordance with Hong Kong standards [34]. Item 'regard pregnancy as normal physical process and advocate and support natural birth' was proposed by panellists in Delphi in accordance with analogous expressions, such as 'facilitate the normal physiological process of childbirth' [35] and 'facilitate the woman's ability to achieve her natural potential throughout her childbirth' [36]. This proposal verified an updated philosophy against previous abuse of artificial treatment or medicine in China.

4.2.2. Competencies 2 and 3: antenatal and postpartum care

The current antenatal care domain was enriched compared with that in the former scale study [17] because antenatal clinics and propaganda classes operated by midwives are springing up lately. The newly included 'concept and categories of high-risk pregnancy' represented indigenisation of most items, an expression change in the native custom of diagnosis and management. For the postpartum care domain, the instruction of 'exercises and pelvic floor rehabilitation' was included following the extensive practices in China. We emphasised postpartum depression and attached it to the expert grade owing to its trans-disciplinary characteristics.

4.2.3. Competency 4: intrapartum care

Controversial items such as 'conduct shoulder dystocia' and 'implement artificial rupture of membranes in low location' were attached to the senior grade, indicating that Chinese midwifery practitioners were required to handle these abnormal labours. Otherwise, neonatal death would occur in areas with shortage in workforce. However, management of severe complications (e.g.

'repair third and fourth degree lacerations') was removed from midwives' competencies and transferred to that of obstetricians' scope because of the clear division of work between obstetricians and midwives in China. For experts, high competencies were required, such as 'foresee possible complications of mother and foetus and institute precautions', which was exactly in accordance with the evidence 'accept and deal with uncertainties and rapid changes in labour and possess anticipatory and preventative competence' [37].

Amongst all items, instrumental assisted birth techniques, such as 'perform vacuum extraction', were the most controversial items. They were retained to expert grade as competencies despite recent conditions (it was objected by interviewees in the original draft formulation because of its rare utilisation in the current domestic practice to avoid staff–patient conflicts caused by haemorrhages). Previous evidence has shown that vacuum extraction generally has low risks [38]. Thus, we retained forceps delivery but made a compromise, that is, 'cooperate with doctors in low forceps delivery' was added to increase vaginal deliveries [39]. The reason was that assisted vaginal delivery rates are usually high in other countries (e.g. 10%–15% of vaginal birth in United States [40] and 9% in all deliveries in Sweden, 2011 [38]).

4.2.4. Competency 5: newborn care

Items in this domain differed from those in the ICM standard in time range. An overwhelming majority of caregivers in China are responsible for instant care after birth and during the mother's hospitalisation, mostly within 7 days after birth. Thus, most junior grade competencies were in accordance with the ICM standard. Instant and daily care of normal or full-term newborn and abnormal features were attached to the junior grade. Identification of abnormality was attached to the senior grade, whilst infants of very low birth weight or rare illness were attached to the expert grade because of the existence of extremely specific hospital systems.

4.2.5. Competency 6: gynaecological care

This domain was derived from two original domains, namely, 'pre-pregnancy care and family planning' and 'facilitation of abortion-related care' but without family planning and and community care owing to the separate family planning care systems in China. According to *The State of the World's Midwifery 2014*, China is one of the two countries with midwives that are unauthorised to prescribe contraceptives [38], insert intrauterine devices and perform induced and manual vacuum aspiration abortion.

4.2.6. Competency 7: public health care & integrative competency

For public health care, items related to religious, conventional and community care were removed. However, practical preventions of infection or emergency management, as well as other comprehensive public health items, were retained to protect client and care provider. For integrative competency, rigid evidence-based care was attached to the expert grade considering the inferior midwifery education level in China (i.e. most midwives have a three-year associated degree of nursing or midwifery, graduate from technical secondary schools, or obtain bachelors' degrees from nursing continuing education programmes) [41]. Competencies of assessment and formulation and training the novices were emphasised and should be taken as core requirements [37].

4.3. Approach for developing the competency set

We incorporated validity, reliability and consensus, which are important aspects of the modified Delphi approach, into the discussion. The questionnaires were designed to be humanised and

concise. The objectives and significance of this study were explained elaborately. We rigorous matched all items, and considerable feedback was summarised and then analysed. Given that similar edits were emphatically considered, concurrent validity might be increased [21]. The modification was not affected by bias of personal perspectives through careful and evidence-based review by the Task Force, which was constituted by three tutors and one graduate student who are engaged in maternal care.

The reasons why experts' opinion was adopted or not were claimed separately in detail along with draft 1 to every Delphi expert to preserve reliability and consensus. However, the senior and expert grades showed slightly decreased consensus in *W*. The practicing background gap between panellists might be responsible for the controversy, which we failed to overcome and was within our anticipation. The Task Force set the following stopping criteria: when consensus was reached, consensus did not progress from the previous round and returned rates decreased. The number of edits decreased tremendously in the second round, and arguments concentrated on certain items repeatedly. Scholars have deemed that consensus is not the major aim and stopping criterion of a Delphi round [23] and universally agreed that proportion does not exist for the Delphi and that consensus should be equated with 51% or higher agreement amongst respondents [21]. Moreover, the statistical significance of *W* was an insufficient criterion to halt the survey because panels of more than 10 experts and with very small values of *W* could be significant of consensus [24]. Additional pieces of evidence have demonstrated that either two or three rounds are preferred and extra round may cause sample fatigue and tax resources [21]. Therefore, we ceased the survey and discussed the debatable items in the expert panel meeting.

4.4. Limitations

Owing to the limited time and fund cost, the set was not objectively tested in clinical context for its real validity and discrimination on practical competencies. Fatigue would likely exist with more than two rounds [42], especially when a large number of tedious sentences were introduced to panellists in our survey despite of elaborate explanations. Consumers' demands of these competencies were not explored in this study. We offset this with the literature review and found that the puerperas had high expectations on 'control and participation of the delivery setting' and 'supportive system (e.g. family member and medical care giver)' [43]. Therefore, related competencies, such as 'provide physical and psychological support for woman and family and promote normal birth', were included. This inclusion was exactly in accordance with the adopted theory of 'birth territory', which emphasises the empowerment of puerperas [44].

5. Conclusions

This study was launched to describe three grades of competencies for midwives in China. The list of 7 domains and 224 items with knowledge, skills and codes was formulated, and they were expected to be acquired by midwives. The set was testified to be credible and valid in each stratum of Chinese situations despite the argument of midwifery practicing experts. The next step will be competency assessment in hierarchical clinical settings for further response and application to the educational programs.

Conflict of interest

The authors declare no competing interests.

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Appendices. Supplementary data

Appendix A: Final set of essential competencies for three grades of midwives in China (in English); Appendix B: Essential competencies for three grades of midwives in China (in Chinese). Supplementary data related to this article can be found at <https://doi.org/10.1016/j.ijnss.2017.12.010>.

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