

Construction of a pregnancy exercise evaluation scale based on the modified Delphi method

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Abstract

Background: With in-depth research on physical exercise and health promotion during pregnancy, the scientific monitoring and evaluation of physical activity during pregnancy have gained increasing importance, with research in this area becoming more in-depth. **Objective:** This study aims to synthesize existing information to construct an evaluation index system for physical exercise behavior among pregnant women in China, and to develop a corresponding assessment scale. **Methods:** Based on literature review and preliminary clinical surveys, this study employed the modified Delphi method to conduct two rounds of questionnaire consultations with 20 experts in related fields. Data were analyzed to calculate the experts' positive coefficient, authority coefficient (Cr), coordination coefficient of variation (CV), and Kendall's coefficient of concordance. The weight of each indicator was determined using the product method. **Results:** The positive coefficient for both rounds of expert consultation was 100%. The first-round authority coefficients were Cs = 0.804, Ca = 0.953, and Cr = 0.878, while the second-round coefficients were Cs = 0.820, Ca = 0.966, and Cr = 0.893. The coordination degree W for the first round was 0.331 ($\chi^2 = 763.552, P < 0.001$), and for the second round, it was 0.437 ($\chi^2 = 1532.916, P < 0.001$). Ultimately, 4 first-level indicators (individual circumstances of pregnant women, health risk assessment, physical exercise behavior and dietary intake, and health outcomes of physical exercise during pregnancy) and 22 second-level indicators (e.g., psychological state, physiological condition, educational background, income, intrinsic motivation, family support, external social environment, built environment, self-efficacy evaluation, medical history, health status, exercise type, exercise duration, exercise frequency, exercise intensity, symptoms requiring cessation of exercise, safety precautions, healthy lifestyle behaviors, postpartum laboratory outcomes, neonatal laboratory outcomes, sleep quality, and anxiety levels) were selected. The scale demonstrated good reliability with a Cronbach's α of 0.955. **Conclusion:** The developed assessment scale includes 4 first-level and 22 second-level indicators, with statistical data conforming to a normal distribution. This scale provides practical guidance for evaluating physical exercise behavior during pregnancy and serves as a reference for developing a comprehensive, scientific, and operable assessment system for pregnant women's physical exercise behavior.

Keywords: Delphi method; pregnancy; physical exercise; integration of sports and medicine

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Introduction

The spirit of the *Healthy China 2030 Plan* issued by the Central Committee of the Communist Party of China and the State Council lies in "strengthening scientific guidance to promote active participation in national fitness by women, children, and other groups, and fostering self-disciplined health behaviors." In the face of China's declining birth rate, deepening the integration of sports and medicine and employing non-medical health interventions to encourage self-disciplined health behaviors among pregnant women are of great significance. Numerous studies have confirmed that scientific physical exercise during pregnancy can reduce complications, alleviate psychological discomfort, facilitate natural childbirth, and improve fetal outcomes (Zhu Li, Wang Zhengzhen, & Zhu Weimo. (2020).) However, due to traditional beliefs and social perceptions, many pregnant women in China still struggle to recognize and engage in physical exercise, leading to frequent issues such as obesity and depression, which severely impact their physical and mental health (Fu Hua. 2017) Therefore, under the policies promoting the integration of sports and medicine and encouraging childbirth, addressing health promotion for pregnant women is a crucial aspect of building a "Healthy China."

With the deepening of research on physical activity and health promotion during pregnancy, the scientific monitoring and evaluation of physical activity have become increasingly important. (Chen Changzhou, Wang Hongying, Xiang Xianlin, & Lin Shixing. (2021). Scholars have summarized existing international scales for assessing physical activity during pregnancy, such as the International Physical Activity Questionnaire (IPAQ), Pregnancy Physical Activity Questionnaire (PPAQ), Leisure-Time Exercise Questionnaire (GLETQ), Kaiser

Physical Activity Survey (KPA), and Global Physical Activity Questionnaire (GPAQ). These scales compare the advantages and disadvantages of assessing the type, duration, intensity, and timing of physical activity. However, most of these scales rely on self-reported questionnaires, which are highly subjective and unsuitable for large-scale surveys. Their accuracy and scientific validity remain questionable, and the quantified indicators often refer broadly to "physical activity" rather than specifically targeting "physical exercise (Zhu Xiaofeng, Jack Ma, & Lu Yue. (2017).

Given these limitations, this study employed the modified Delphi method to conduct two rounds of expert consultations, aiming to comprehensively analyze existing factors and construct an evaluation index system for physical exercise behavior among pregnant women in China. The resulting assessment scale provides a reference for developing a multidimensional, scientific, comprehensive, and operable system for evaluating physical exercise behavior during pregnancy.

Objects and Methods

Objects

The expert panel was selected based on four criteria, all of which had to be met simultaneously: experts were required to hold a bachelor's degree or higher, possess an associate senior title or above, have over 10 years of experience in maternal medicine or sports health promotion, and voluntarily commit to participating in the study until its completion. These stringent criteria ensured the panel's professionalism and the study's reliability.

Ultimately, 10 maternal medicine experts were selected from public tertiary hospitals, and 10 sports and health experts were chosen from universities and research institutions, totaling 20 experts.

Research Methods

Using English keywords such as "Pregnancy," "Physical activity," and "Physical activity scale," and Chinese keywords like "pregnancy," "physical exercise," "physical activity," and "physical activity scale," databases such as PubMed, Web of Science, Cochrane Library, and CNKI were searched. A total of 11 guidelines on physical exercise during pregnancy from major countries were collected, including those issued by the American College of Obstetricians and Gynecologists (ACOG) (Committee on Obstetric Practice. (2002). the Australian Sports Medicine Association (SMA) (Brown, W. J., Finch, C., Robinson, D., Torode, M., & White, S. (2002)., the Society of Obstetricians and Gynaecologists of Canada (SOGC) Davies, G. A. L., Wolfe, L. A., Mottola, M. F., & MacKinnon, C. (2003). and the Danish government. Chinese scholars have also referenced foreign research to develop guidelines (Gao, H., Stiller, C. K., Scherbaum, V., Biesalski, H. K., Wang, Q., Hormann, E., & Bellows, A. C. (2013).. Additionally, 23 relevant journal articles were included (Dikötter, F. (1998).

These guidelines, assessed by the United Nations Development Programme as MEDC (Med-Design Company), cover various disciplines related to pregnant women and physical exercise, including obstetrics, exercise physiology, public health, and sports medicine. The issuing organizations are national public health authorities or authoritative medical organizations, and the target audiences include experts and physicians in maternal medicine and exercise physiology, as well as policymakers and practitioners in public health.

Based on these guidelines, the study identified preliminary evaluation indicators for physical exercise during pregnancy. Combined with preliminary clinical surveys, the first and second rounds of expert consultation questionnaires were developed and distributed via email from September to December 2022. After group discussions, the first-round screening criteria were established: mean score ≥ 4.00 , coefficient of variation ≤ 0.30 , and full score rate ≥ 0.10 . All three criteria had to be met simultaneously; otherwise, the indicator was excluded. The second-round screening criteria were: mean score ≥ 4.50 , coefficient of variation ≤ 0.20 , and full score rate ≥ 0.40 , with all three criteria required for retention.

First-Round Expert Consultation Questionnaire

The first-round consultation used a semi-open questionnaire covering four aspects: research background, basic expert information, importance ratings of evaluation indicators, and expert self-evaluation.

1. Research background included the study's purpose, significance, and instructions for completing the questionnaire.
2. Basic expert information included name, gender, age, institution, education level, professional title, expertise, years of experience, and overseas study experience.
3. Importance ratings of evaluation indicators for physical exercise behavior during pregnancy included first-level indicators (individual circumstances of pregnant women, health risk assessment, physical exercise behavior and dietary intake, health outcomes of physical exercise during pregnancy, and nutrition during pregnancy) and second-level indicators (e.g., psychological state, physiological condition, educational background, experience, income, intrinsic motivation, family support, external social environment, built environment, self-efficacy evaluation, medical history, health status, nutrition during pregnancy, pre-pregnancy exercise habits, exercise habits during different trimesters, exercise goals during pregnancy, personal information, absolute and relative contraindications, risk-benefit assessment, exercise type, duration, frequency, intensity, symptoms requiring cessation, safety precautions, healthy lifestyle behaviors, postpartum laboratory outcomes, sleep quality scales, and anxiety/depression scales). Experts were invited to supplement or modify the indicators in the

comments section.

4. Expert self-evaluation included familiarity with the evaluation indicators and the basis for their judgments.

After the first-round consultation, the research team analyzed the experts' feedback, calculating their positivity, authority, importance ratings, coordination coefficient of variation (CV), and K value. Based on the first-round screening criteria and expert suggestions, the evaluation indicators were revised and refined to form the second-round questionnaire.

Second-Round Expert Consultation Questionnaire

The second-round questionnaire included feedback from the first round, basic expert information, importance ratings for the second round, and expert self-evaluation. After the second round, the research team analyzed the results and finalized the assessment scale for physical exercise behavior during pregnancy based on the screening criteria and expert suggestions.

Scoring Criteria

The first-round consultation used a Likert 5-point scale, with "very important," "important," "neutral," "unimportant," and "very unimportant" assigned 5, 4, 3, 2, and 1 point, respectively. Experts also rated their familiarity with the indicators, with "very familiar," "familiar," "neutral," "unfamiliar," and "very unfamiliar" assigned 1.0, 0.8, 0.6, 0.4, and 0.2 points, respectively. The basis for judgment (Cs) was scored as follows: practical experience (0.500, 0.400, 0.300), theoretical analysis (0.300, 0.200, 0.100), reference to domestic and international literature (0.100, 0.100, 0.050), and intuition (0.100, 0.100, 0.050). The results were compiled into a matrix for further analysis.

Weight calculation was incorporated into the evaluation indicators:

1. Determine the importance of each indicator and assign a weight value (typically ranging from 0 to 1).
2. Calculate the weighted score for each indicator by multiplying its weight by its score, then sum all weighted scores for a total weighted score. For example, if Indicator A has a weight of 0.6 and a score of 4, its weighted score is $0.6 \times 4 = 2.4$. If Indicator B has a weight of 0.4 and a score of 3, its weighted score is $0.4 \times 3 = 1.2$. The total weighted score is $2.4 + 1.2 = 3.6$. Weighting reflects the relative importance of each indicator, providing a more accurate overall evaluation.

Quality Control

The study participants were experts in maternal medicine and sports science who voluntarily participated. The first-round questionnaire was developed based on literature review and preliminary clinical surveys, with three formats offered: Word document, QR code for Wenjuanxing, and web link. To ensure quality, the research team sent polite reminders via WeChat after distributing the questionnaire. Data from the web version were directly imported into SPSS 25.0, while Word documents were double-entered and cross-checked. Disputed indicators were discussed by the team, with input from relevant experts for clarification.

Statistical Methods

Data were entered using Excel 2010 and analyzed with SPSS 25.0. The effective response rate reflected the experts' positive coefficient. The authority coefficient (Cr) was calculated as $Cr = (Cs + Ca) / 2$. The coefficient of variation ($CV = s/x$) and Kendall's coefficient of concordance indicated expert coordination. K represented the importance of influencing factors. The product method was used to calculate indicator weights, with first-level indicators summing to 100% and second-level indicators summing to their respective first-level weights.

Results

Expert Demographics

The 20 invited experts had a male-to-female ratio of 3:2, with an average age of 42.5 ± 5.7 years and an average work experience of 22.5 ± 7.7 years. In terms of professional titles, 16 were senior and 4 were associate senior. For education, 8 held doctoral degrees, 8 held master's degrees, and 4 held bachelor's degrees.

The positive coefficient was 100%, with all 20 questionnaires distributed and returned. The first-round authority coefficients were $Cs = 0.804$, $Ca = 0.953$, and $Cr = 0.878$, while the second-round coefficients were $Cs = 0.820$, $Ca = 0.966$, and $Cr = 0.893$. The coordination degree W for the first round was 0.331 ($\chi^2 = 763.552$, $P < 0.001$), and for the second round, it was 0.437 ($\chi^2 = 1532.916$, $P < 0.001$).

Indicator Screening Results

First-Round Screening

Based on literature review, the research team initially proposed 5 first-level and 37 second-level indicators. After the first-round consultation and group discussions, these were adjusted to 4 first-level and 23 second-level indicators, with 1 first-level and 16 second-level indicators deleted, and 1 first-level and 3 second-level indicators revised.

Second-Round Screening

The second-round consultation further refined the indicators, retaining 4 first-level and merging 2 second-level indicators, resulting in 4 first-level and 22 second-level indicators.

Evaluation Indicators for Physical Exercise During Pregnancy

Indicator Classification

The initial classification included 5 first-level indicators: individual circumstances of pregnant women (Questions 1–10), self-health assessment (Questions 11–12, 14–19), nutrition during pregnancy (Question 13), physical exercise behavior during pregnancy (Questions 20–26), and health outcomes of physical exercise during pregnancy (Questions 27–37). After the second-round consultation and discussions, the final classification included 4 first-level indicators: individual circumstances, health risk assessment, physical exercise behavior, and health outcomes. See Table 1.

Table 1. Classification of Evaluation Indicators for Physical Exercise During Pregnancy

First-Level Indicator	Mean	SD	CV	Full Score Rate	Screening Result
Individual Circumstances	4.67	0.55	0.12	0.70	Retained
Health Risk Assessment	4.57	0.63	0.14	0.63	Adjusted
Physical Exercise Behavior	4.43	0.68	0.15	0.53	Adjusted
Health Outcomes	4.57	0.63	0.14	0.63	Retained
Nutrition During Pregnancy	3.97	0.93	0.23	0.30	Deleted

Note: A radar chart was created based on the data in Table 1. The nutrition indicator was found to be less relevant and was thus removed. AVG = average; SD = standard deviation; CV = coefficient of variation; FM = full score rate; SO = screening outcome.

Indicator Scoring Results

Using "three or more passes" as the inclusion criterion and "three or more fails" as the initial exclusion criterion, the first-round results are shown in Tables 2 and 3. Pending items were carried into the second round, and after further discussions, the final evaluation scale was determined, as shown in Table 4. The final scale included 4 first-level and 22 second-level indicators, with a Cronbach's α of 0.955, indicating good reliability.

Table 2 Index coefficients of the first round of expert evaluation

Significance Items							Familiarity		Authority	
	MIN	MAX	AVG	SD	FM	CV	AVG	SD	R	CR
1 Mental	2.00	5.00	3.90	1.20	0.40	0.31	0.96	0.13	0.50	0.73
2 Physiology	1.00	4.00	2.90	0.88	0.00	0.30	0.92	0.14	0.50	0.71
3 Education Background	2.00	4.00	3.00	0.67	0.00	0.22	0.92	0.14	0.50	0.71
4 Experience	2.00	5.00	3.10	1.10	0.10	0.36	0.92	0.14	0.70	0.81
5 Income	3.00	5.00	4.20	0.79	0.40	0.19	0.98	0.06	0.60	0.79
6 Internal motivation	1.00	3.00	2.30	0.68	0.00	0.29	0.94	0.14	0.60	0.77
7 Family Member Support Level	1.00	4.00	2.30	0.95	0.00	0.41	0.94	0.14	0.60	0.77
8 Social Context	4.00	5.00	4.70	0.48	0.70	0.10	1.00	0.00	0.50	0.75
9 Residential Situation	2.00	5.00	3.90	0.99	0.30	0.25	0.98	0.06	0.50	0.74
10 Self-efficacy evaluation	4.00	5.00	4.50	0.53	0.50	0.12	1.00	0.00	0.50	0.75
11 Medical History	3.00	5.00	4.40	0.70	0.50	0.16	1.00	0.00	0.60	0.80
12 Health Status	4.00	5.00	4.80	0.42	0.80	0.09	1.00	0.00	0.50	0.75
13 Pregnancy Nutrition	1.00	4.00	2.20	1.03	0.00	0.47	0.90	0.11	0.70	0.80
14 Pre Pregnancy Exercise Habits	1.00	4.00	2.20	1.14	0.00	0.52	0.90	0.11	0.70	0.80
15 Pregnancy Cycle Exercise Habits	1.00	4.00	2.10	0.99	0.00	0.47	0.90	0.11	0.60	0.75
16 Goal of Pregnancy Exercise	1.00	4.00	2.20	1.03	0.00	0.47	0.90	0.11	0.60	0.75

17	Information of Gravida	1.00	4.00	2.20	1.03	0.00	0.47	0.90	0.11	0.60	0.75
18	Absolute Taboos and Relative Taboos	1.00	4.00	2.10	0.99	0.00	0.47	0.90	0.11	0.60	0.75
19	Measuring Benefits and Risk	1.00	4.00	2.20	1.14	0.00	0.52	0.90	0.11	0.70	0.80
20	Exercise Program	1.00	5.00	3.20	1.03	0.10	0.32	0.96	0.08	0.50	0.73
21	Exercise Time	3.00	5.00	4.10	0.74	0.30	0.18	0.98	0.06	0.60	0.79
22	Exercise Frequency	1.00	4.00	2.90	0.88	0.00	0.30	0.92	0.14	0.50	0.71
23	Exercise Intensity	1.00	3.00	2.30	0.68	0.00	0.29	0.94	0.14	0.60	0.77
24	Symptoms of Stop Exercise	1.00	4.00	2.30	0.95	0.00	0.41	0.94	0.14	0.60	0.77
25	Safety Precaution	4.00	5.00	4.70	0.48	0.70	0.10	1.00	0.00	0.50	0.75
26	Healthy Lifestyle	2.00	5.00	3.90	0.99	0.30	0.25	0.98	0.06	0.50	0.74
27	Postpartum Check up	4.00	5.00	4.50	0.53	0.50	0.12	1.00	0.00	0.50	0.75
28	Newborn Check up	4.00	5.00	4.50	0.53	0.50	0.12	0.98	0.06	0.50	0.74
29	SF-3	1.00	4.00	2.20	1.14	0.00	0.52	0.90	0.11	0.70	0.80
30	PSQI	2.00	4.00	3.00	0.67	0.00	0.22	0.92	0.14	0.50	0.71
31	SCL-90	2.00	5.00	3.10	1.10	0.10	0.36	0.92	0.14	0.70	0.81
32	SDS	1.00	4.00	2.20	1.03	0.00	0.47	0.90	0.11	0.70	0.80
33	AS	1.00	4.00	2.20	1.14	0.00	0.52	0.90	0.11	0.70	0.80
34	STAI	1.00	4.00	2.10	0.99	0.00	0.47	0.90	0.11	0.60	0.75
35	ADS	1.00	3.00	2.30	0.68	0.00	0.29	0.94	0.14	0.60	0.77
36	MMPI	2.00	5.00	3.10	1.10	0.10	0.36	0.92	0.14	0.70	0.81
37	EPQ	1.00	4.00	2.20	1.03	0.00	0.47	0.90	0.11	0.70	0.80

Table 3 Score table of the first round of evaluation indicators expert consultation questionnaire

	MIN	MAX	AVG	SD	FM	CV
Items						
1 Mental	√	√	√	√	√	PASS
2 Physiology	√	√	√	√	√	PASS
3 Education Background	√	√	√	√	√	PASS
4 Experience	×	×	×	√	√	First round to be determined, deleted after discussion
5 Income	√	×	√	√	√	PASS
6 Internal motivation	√	√	√	√	√	PASS
7 Family Member Support Level	√	√	√	√	√	PASS
8 Social Context	√	√	√	√	√	PASS
9 Residential Situation	√	√	√	√	√	PASS
10 Self-efficacy evaluation	√	√	√	√	√	PASS
11 Medical History	√	√	√	√	√	PASS
12 Health Status	√	√	√	√	√	PASS
13 Pregnancy Nutrition	×	×	×	√	√	First round to be determined, deleted after discussion
14 Pre Pregnancy Exercise Habits	×	×	×	√	√	First round to be determined, deleted after discussion
15 Pregnancy Cycle Exercise Habits	×	×	×	√	√	First round to be determined, deleted after discussion
16 Goal of	×	×	×	√	√	First round to be

Pregnancy Exercise						determined, deleted after discussion
17 Information of Gravida	×	×	×	√	√	First round to be determined, deleted after discussion
18 Absolute Taboos and Relative Taboos	×	×	×	√	√	First round to be determined, deleted after discussion
19 Measuring Benefits and Risk	×	×	×	√	√	First round to be determined, deleted after discussion
20 Exercise Program	√	√	√	√	√	PASS
21 Exercise Time	√	√	√	√	√	PASS
22 Exercise Frequency	×	√	×	√	√	First round to be determined, then the second round
23 Exercise Intensity	√	√	√	√	√	PASS
24 Symptoms of Stop Exercise	√	√	√	√	√	PASS
25 Safety Precaution	√	√	√	√	√	PASS
26 Healthy Lifestyle	√	√	√	√	√	PASS
27 Postpartum Check up	×	√	√	√	√	PASS
28 Newborn Check up	×	√	√	√	√	PASS
29 SF-3	×	×	×	√	√	Delete after first round
30PSQI	×	√	×	√	√	First round to be determined, then the second round
31 SCL-90	×	×	×	√	√	First round to be determined, deleted after discussion
32 SDS	×	×	×	√	√	First round to be determined, deleted after discussion
33 AS	×	×	×	√	√	First round to be determined, deleted after discussion
34 STAI	×	×	×	√	√	First round to be determined, deleted after discussion
35 ADS	×	√	×	√	√	First round to be determined, then the second round
36 MMPI	×	×	×	√	√	First round to be determined, deleted after discussion
37 EPQ	×	×	×	√	√	First round to be determined, deleted after discussion

Table 4 Score table of the second round of undetermined items expert consultation questionnaire

Significance	AVG	SD	FM	CV	Screening result
4 Experience	2.1	0.74	0.00	0.35	Second round of deletion
13 Pregnancy Nutrition	2.7	0.48	0.00	0.18	Second round of deletion
14 Pre Pregnancy Exercise Habits	2.7	0.68	0.00	0.25	Second round of deletion
15 Pregnancy Cycle Exercise Habits	2.8	0.79	0.00	0.28	Second round of deletion
16 Goal of Pregnancy Exercise	3.4	1.08	0.00	0.32	Second round of deletion
17 Information of Gravida	2.3	0.82	0.00	0.36	Second round of deletion
18 Absolute Taboos and Relative Taboos	2.2	0.63	0.00	0.29	Second round of deletion
19 Measuring Benefits and Risk	2.6	1.08	0.00	0.41	Second round of deletion
22 Exercise Frequency	3.9	0.74	0.20	0.19	Second pass
29 SF-36	2.6	1.08	0.00	0.41	Second round of

30 PSQI	3.9	0.74	0.20	0.19	deletion
31 SCL-90	2.6	1.08	0.00	0.41	pass
32 SDS	2.3	0.95	0.00	0.41	Second round of deletion
33 SAS	2.1	0.74	0.00	0.35	Second round of deletion
34 STAI	2.7	0.48	0.00	0.18	Second round of deletion
35 HADS	4.0	0.47	0.10	0.12	Second round of deletion
36 MMPI	2.7	0.68	0.00	0.25	Second round of deletion
37 EPQ	2.8	0.79	0.00	0.28	Second round of deletion

Discussion

Rationality of the Evaluation Scale

This study improved the traditional Delphi method by predefining questions based on extensive literature review, forming a structured consultation questionnaire. The modified method offers three advantages:

1. Facilitates quicker logical thinking and judgment by experts.
2. Enhances accuracy and timeliness through timely feedback and communication.
3. Promotes interaction and consensus among experts.

The expert panel was selected for its rigor, authority, and diversity. Given the complexity of factors influencing physical exercise during pregnancy, the panel included equal numbers of experts in sports science and maternal medicine, ensuring a balanced perspective and fostering the integration of sports and medicine.

Analysis of the Scale Construction

Based on cognitive-behavioral theory and health promotion theory, the scale confirmed the theoretical relationship between physical exercise and health promotion during pregnancy. It provides a foundation for developing guidelines and evaluation systems for physical exercise during pregnancy.

The scale distinguishes physical exercise from general physical activity, addressing the unique needs of pregnant women. It includes four first-level and 22 second-level indicators, covering individual circumstances, health risks, exercise behavior, and health outcomes. The scale also introduces new evaluation metrics like PSQI and HADS, paving the way for exploring optimal exercise effects.

Conclusion

This study developed a pregnancy physical exercise evaluation scale through two rounds of expert consultation, comprising 4 first-level and 22 second-level indicators. The scale offers practical guidance for clinical practice and serves as a reference for multidimensional health promotion models. Future research will expand data collection to further validate and refine the scale. This study confirmed that in the current assessment of physical exercise during pregnancy, the scale still needs to be supplemented and improved by adding assessment indicators such as sleep quality and mental health, which were not included before, to form a more scientific and systematic research assessment tool. A more scientific pregnancy assessment tool system can help women and doctors evaluate their fertility potential and formulate more reasonable fertility plans. This has a certain positive effect on curbing the current global trend of continuously declining fertility rates.

About AI: This article did not use any AI technology.

Conflict of Interest: The authors declare no conflicts of interest.

Limitations: Despite its strengths, the study acknowledges limitations. The modified Delphi method lacks standardized procedures for expert selection, questionnaire design, and data processing. Some indicators, like nutrition and healthy lifestyle behaviors, were overly broad. Future research should validate the scale's feasibility and applicability.

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