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Psychometric properties of the Chinese version of the Get Active Questionnaire for Pregnancy and its companion form to assess physical activity readiness

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Abstract

Introduction Engaging in physical activity is essential for a healthy pregnancy. A reliable tool is necessary to enhance the assessment and counseling of safe physical activity. This study aimed to translate the original English Get Active Questionnaire for Pregnancy (GAQ-P) and its companion Health Care Provider Consultation Form for Prenatal Physical Activity (cHCP-CF-PPA) into simplified Chinese language and evaluate the psychometric properties in Chinese pregnant women.

Methods The Brislin's model of translation was employed to translate the GAQ-P/cHCP-CF-PPA tool. We conducted a cross-sectional study at a tertiary women's hospital in Shanghai, China, enrolling a convenience sample of 325 pregnant women across all trimesters to evaluate the psychometric properties of the GAQ-P/cHCP-CF-PPA. Reliability was assessed through test-retest reliability and inter-rater reliability, while validity was examined using content validity, known-groups validity, and criterion validity. Sensitivity, specificity, positive predictive value, and negative predictive value were calculated using PARmed-X for Pregnancy as the gold standard.

Results Regarding content validity, the GAQ-P had an average S-CVI/UA of 0.81 (I-CVIs: 0.83-1.0), while the cHCP-CF-PPA exhibited an average S-CVI/UA of 0.87 (I-CVIs: 0.83-1.0). The GAQ-P/cHCP-CF-PPA scores effectively distinguished women recommended for physical activity from those with contraindications. The Spearman's correlations between the GAQ-P/cHCP-CF-PPA and the PARmed-X for Pregnancy were 0.851 for absolute contraindications and 0.847 for relative contraindications. The test-retest reliability score was 0.759 for physical activity contraindications, and 0.953 for inter-rater reliability. The sensitivity of the GAQ-P/cHCP-CF-PPA was determined to be 90.00%, with a specificity of 98.31%. The positive predictive value was 78.26%, while the negative predictive value reached 99.32%.

Conclusion The Chinese version of the GAQ-P/cHCP-CF-PPA is a reliable and valid tool for assessing physical activity readiness in pregnant women.

Keywords Physical activity, Contraindication, Psychometric, Questionnaire, Pregnant women

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Background

Physical activity during pregnancy confers numerous health benefits and is generally safe for most individuals. Evidence-based guidelines recommend that pregnant women without contraindications engage in at least 30 min of moderate-intensity physical activity on five days each week [1–3]. Such activity positively impacts maternal health, pregnancy outcomes, and fetal development [4]. Despite these benefits, physical activity levels among pregnant women globally remain inadequate. In the United States, only 21.4% of pregnant women adhere to the 2015 ACOG guidelines [5], while 30.4% in South Africa [6] and 31.1% in Germany [7] are active. In China, 21.0% of pregnant women meet the recommended activity levels, with regional variations observed (95%CI: 12.5-29.5%) [8].

Physical activity during pregnancy is influenced by various factors, such as work status, gestational weeks, pre-pregnancy exercise habits, and body mass index (BMI) [8]. External support from family, peers, and healthcare providers plays a crucial role in facilitating physical activity [9]. Evidence indicates that professional guidance can enhance pregnant women's confidence in engaging in physical activity by alleviating concerns regarding fetal development [10]. However, a significant number of women report not receiving adequate exercise advice from their healthcare providers, with some guidance being vague or even contradictory [10, 11]. Existing guidelines [1–3] recommend that individuals with contraindications consult healthcare providers for tailored physical activity plans [12]. A comprehensive clinical evaluation is necessary to ascertain that there are no medical reasons to avoid exercise [1]. Furthermore, assessment and counseling by healthcare providers have been shown to effectively increase physical activity levels [13]. Nonetheless, prenatal care in China predominantly adheres to an obstetrician-led model, which emphasizes pregnancy-related risk assessment [14], genetic disease screening [15], and high-risk pregnancy management [16], often neglecting physical activity consultation. An individual's readiness for physical activity reflects their predisposition to modify health behaviors [17]; and is closely linked to their motivation and self-efficacy [18]. Evaluating one's readiness is a prudent initial step in the fitness assessment and exercise prescription process [19].

Several readiness screening tools for physical activity have been developed to assist healthcare providers in distinguishing between recommendations and contraindications during the assessment process [20–22]. However, these tools were not specifically designed for pregnant women [20] and were not developed through a rigorous process [22]. Notably, the requirement of the PARmed-X for Pregnancy to obtain medical clearance from healthcare providers represents a significant barrier to participation in physical activity. Meanwhile, the time and costs associated with its length, along with the use of technical language rather than more inclusive or lay-friendly terms, further influence pregnant women's physical activity levels [12]. In addition, some self-administered tools, such as Pregnancy Physical Activity Questionnaire, PPAQ [4], have been utilized to classify women's physical activity levels by calculating MET based on the time spent on each type of activity. However, these tools do not assess indications and contraindications to determine suitability for physical activity, nor do they facilitate connections between women and healthcare providers. Therefore, in the absence of a valid and reliable instrument in China, we propose a combined screening tool to assess women's readiness for physical activity during pregnancy from both the woman's and healthcare provider's perspectives.

The Get Active Questionnaire for Pregnancy (GAQ-P), combined with the companion Health Care Provider Consultation Form for Prenatal Physical Activity (cHCP-CF-PPA), is a four page document developed by the Canadian Society for Exercise Physiology (CSEP) in collaboration with various national health organizations [23]. This tool, based on evidence-based physical activity guidelines [2] and derived from the PARmed-X for Pregnancy, is designed for self-reported screening to assess whether health care advice is necessary before engaging in physical activity during pregnancy [12]. In contrast to other physical activity assessment tools, the GAQ-P/cHCP-CF-PPA is available in two versions: one intended for pregnant women and the other for healthcare providers [23]. The version for pregnant women employs simplified language to enhance accessibility, while healthcare providers are only required to offer advice without the necessity of a signature, thus alleviating the requirement for medical clearance. Moreover, as pregnant women self-administer the questionnaire, those without contraindications can bypass further communication with healthcare providers, consequently reducing the time spent on such interactions and making the completion process more efficient. Furthermore, the second page of the pregnant women's version includes a self-reported physical activity level, minimizing the need for co-administration of supplementary physical activity self-management tools. Pregnant women first complete the GAQ-P, which consists of four questions. A 'YES' response to any question prompts a consultation with their obstetric healthcare provider using the cHCP-CF-PPA [23]. The original GAQ-P/cHCP-CF-PPA was developed in both English and French and has since been translated into seven other languages [23–25]. However, the psychometric properties of this tool have not yet been explored. The aim of this study was to evaluate the psychometric properties of the Chinese version of the

GAQ-P/cHCP-CF-PPA, thereby providing a reliable and valid instrument for screening safe physical activity for pregnant women and healthcare providers.

Methods

Sample and setting

A convenience sample of at least 303 women was required for the evaluation of the questionnaire. The sample size was calculated using PASS 15 software based on pre-survey data. With a power of 0.8 and a Type I error (α) of 0.05, the 'Kappa Test for Agreement Between Two Raters' module [26] yielded a Kappa value ($k1$) of 0.862, with $k0$ set at 0.75, indicating good consistency (≥ 0.75) [27]. Diagnostic results revealed that 57% of cases had no contraindications, while 43% did. Considering a 20% invalid questionnaire rate, the required sample size was adjusted to 303.

Eligible pregnant women across all trimesters were recruited from the Obstetrics and Gynecology Hospital of Fudan University in Shanghai, China, between November 1, 2023 and January 31, 2024. This specialized tertiary hospital, which encompasses two campuses, handles approximately 10,000 births annually. The inclusion criteria for study participants were as follows: (1) pregnant women attending regular antenatal clinics at the study hospital; (2) aged between 18 and 49 years; and (3) having the ability to read and write in Mandarin Chinese. Women with intellectual disabilities, known psychiatric disorders, or those who declined to participate in the study were excluded.

Development of the GAQ-P/cHCP-CF-PPA

The GAQ-P/cHCP-CF-PPA tool was adapted to the Chinese context through a multi-phase process based on Brislin's Translation Model [28] and adaptation guidelines [29]. Initially, two bilingual authors (XFP and TH) translated the tool from English to Chinese, followed by back-translation conducted by two additional authors (SLP and LLY). The research team then compared the translations, resulting in five distinct versions. Inaccurate translations were revised, and an expert group including one of the tool's creators (MMF) reviewed the translations for cultural and medical relevance. The experts recommended refinements and assessed clarity and relevance using a 4-point Likert scale. The content validity was confirmed with an S-CVI/UA of 0.81 for the GAQ-P and 0.87 for the cHCP-CF-PPA. Cognitive interviews were conducted with 27 pregnant women and 12 healthcare providers. Following the amendments of wording and addition of annotations, no further misunderstandings were reported. The revised simplified Chinese version of the GAQ-P/cHCP-CF-PPA was then employed for psychometric testing. Both the English and Chinese versions of the GAQ-P/cHCP-CF-PPA are provided in the supplementary files. Figure 1 presents the flowchart depicting the development process of the Chinese version of the GAQ-P/cHCP-CF-PPA instrument.

Data collection

Three research assistants identified eligible participants; and provided verbal explanations along with informed written consent. The study received approval from the Ethics Committee of the Obstetrics and Gynecology Hospital of Fudan University (2023 – 155). Participants were asked to complete the GAQ-P as well as two standardized instruments for psychometric comparison. Women who responded 'YES' to any question on the GAQ-P would be referred to the research midwives (SLP and LLY) for additional assessments using the cHCP-CF-PPA.

Instruments

Get Active Questionnaire for Pregnancy and its companion Health Care Provider Consultation Form for Prenatal Physical Activity (GAQ-P/cHCP-CF-PPA)

The GAQ-P is a two-page, self-administered pre-screening tool. Page 1 comprises four questions addressing current and previous pregnancy-related health issues, physical conditions affecting activity, and concerns. Page 2 describes the type, intensity, frequency, and duration of physical activity across three distinct phases: the six months prior to pregnancy, the current pregnancy, and the remainder of the pregnancy. Should any 'YES' responses be indicated on page 1, healthcare providers will utilize the cHCP-CF-PPA to assess both absolute and relative contraindications [23]. Page 1 of the cHCP-CF-PPA lists these contraindications, while page 2 presents the SOGC/CSEP 2019 Canadian guideline for physical activity throughout pregnancy, offering recommendations for those without contraindications.

Physical Activity Readiness Medical Examination for Pregnancy (PARmed-X for Pregnancy)

The PARmed-X for Pregnancy is a validated pre-screening tool designed to assess physical activity contraindications in pregnant women [21]. The PARmed-X for Pregnancy consists of three sections: A, B and C. Sections A and B are completed by the pregnant individual, while Section C is filled out by the health care provider. Section A gathers general information about the woman, and Section B includes a four-part pre-exercise health checklist: B1 addresses general health, B2 assesses the current pregnancy, B3 details recent activity habits, and B4 inquires about future physical activity plans. Section C lists both absolute and relative contraindications. The tool demonstrates strong construct validity, with a kappa coefficient of 0.749 [30]. In this study, we applied the Chinese-translated version of the PARmed-X for Pregnancy

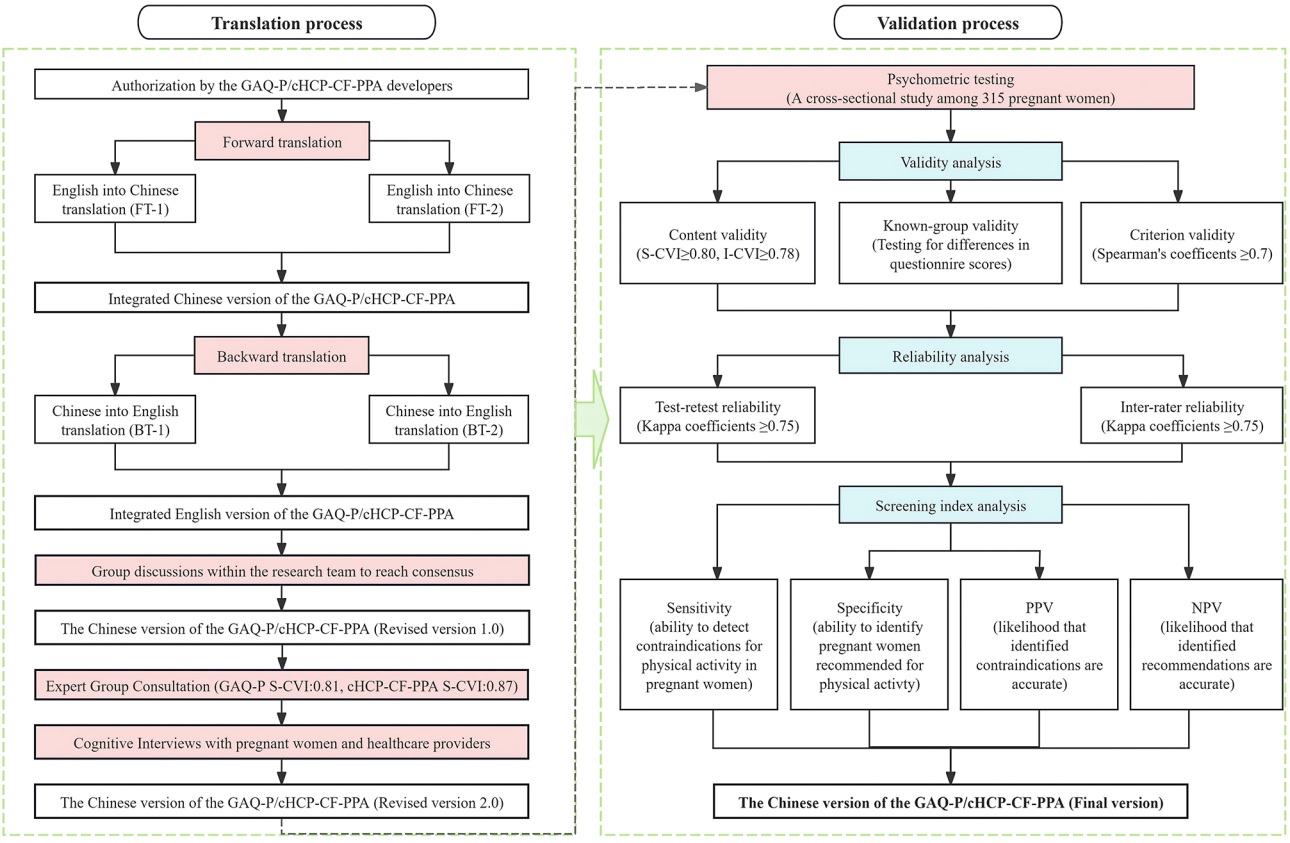

Fig. 1 Flowchart of the development process of the Chinese version of the GAQ-P/cHCP-CF-PPA. Note: FT-1 = Forward translation version-1; FT-2 = Forward translation version-2; BT-1 = Backward translation version-1; BT-2 = Backward translation version-2

to evaluate the criterion validity of the GAQ-P's contraindication scale [31].

International Physical Activity Questionnaire-short form (IPAQ-SF)

The IPAQ-SF is a semi-quantitative instrument that encompasses four domains of physical activity (PA): leisure, domestic, work-related, and transport. It assesses four types of PA, including sitting, walking, moderate-intensity, and vigorous-intensity activities [32]. The outcomes measured include MET-minutes per week and a physical activity category score [33]. The IPAQ-SF demonstrates good test-retest reliability, with Intraclass Correlation Coefficients (ICCs) ranging from 0.81 to 0.84 for moderate physical activity (MPA), moderate-to-vigorous physical activity (MVPA), and vigorous physical activity (VPA) among pregnant women [34]. We applied the IPAQ-SF to evaluate the criterion validity of the GAQ-P in assessing physical activity during pregnancy.

Design and procedures

This cross-sectional study used survey data collected via questionnaires. All eligible participants were required to complete the GAQ-P, PARmed-X for Pregnancy, and IPAQ-SF. After a two-week period, 35 pregnant women were randomly selected from the total sample to retake the GAQ-P. Two researchers, Evaluator A (WXJ) and Evaluator B (GCY), independently assessed inter-rater reliability at the same location and under identical conditions. Furthermore, six experts were invited to evaluate the clarity and relevance of the GAP-Q/cHCP-CF-PPA items using a 4-point Likert scale. The content validity index (CVI) was calculated based on the collected responses, which ranged from 1 (not clear or not relevant) to 4 (very clear or very relevant). Scores of 1 and 2 indicated that the item was deemed not relevant, while scores of 3 and 4 were classified as relevant and suitable for inclusion in the questionnaire. A score of 1 was assigned to items considered relevant and receiving universal agreement (UA). The content validity was determined through expert judgment, with an S-CVI of 0.80 or higher required for the instrument to be deemed valid [35].

Statistical analyses

The aggregated scores from page 1 of the GAQ-P and the contraindication list of the cHCP-CF-PPA were analyzed. These scores were derived from the responses to Questions 1–4 of the GAQ-P and the absolute and relative contraindications of the cHCP-CF-PPA. The total

number of 'YES' responses indicated conditions that required attention before recommending physical activity, with higher scores reflecting increased complications. The PARmed-X for Pregnancy was scored in the same way.

Statistical analysis was conducted using SPSS version 27, with the exception of the screening index analysis, which was performed in Microsoft Excel. For normally distributed quantitative data, the mean ± standard deviation ($\bar{x} \pm s$) was used for description. Conversely, for non-normally distributed quantitative data, the median and interquartile range [M(P_{25}, P_{75})] was reported. Outliers were detected using scatter plots. Missing data were addressed by examining the missing data pattern, employing imputation methods (such as mean, median imputation, or multiple imputation), and analyzing the missing data mechanism. To assess content validity, the S-CVI/UA was calculated by averaging the universal agreement scores across all items. A descriptive analysis of participants' socio-demographic characteristics was performed. The sample was then divided into recommended and contraindicated physical activity groups based on the outcomes of the GAQ-P/cHCP-CF-PPA. The construct validity of the questionnaire was further established through known-groups validity, which was assessed using Mann-Whitney U tests on the summed scores. Spearman's correlation was used to assess the criterion validity of the GAQ-P against the standardized instruments.

The test-retest reliability of the GAQ-P/cHCP-CF-PPA instrument was calculated using Kappa coefficients to assess the agreement between two classifications on ordinal or nominal scales [36]. The consistency between Evaluator A (WXJ) and Evaluator B (GCY) was analyzed through Kappa coefficients [37]. Sensitivity (the ability to detect contraindications for physical activity in pregnant women), specificity (the ability to identify pregnant women recommended for physical activity), positive predictive value (PPV, the likelihood that identified contraindications are accurate), and negative predictive value (NPV, the likelihood that identified recommendations are accurate) were calculated for categorizing physical activity as contraindicated or recommended using the GAQ-P/cHCP-CF-PPA, in comparison with the PARmed-X for Pregnancy.

Table 1 The GAQ-P scores in the test and retest assessments

	Median (P_{25}, P_{75})	Range (min-max)	Possible range in the GAQ-*P*
Test ($n=315$)			
Relative contraindications	0 (0,1)	0–4	0–9
Absolute contraindications	0 (0,0)	0–2	0–12
Indication	238 recommended (75.56%); 77 contraindicated (24.44%)		
Retest ($n=35$)			
Relative contraindications	0 (0,1)	0–4	0–9
Absolute contraindications	0 (0,0)	0–2	0–12
Indication	27 recommended (77.14%); 8 contraindicated (22.86%)		

Abbreviation: GAQ-P, Get Active Questionnaire for Pregnancy

Results

A total of 325 participants were invited to complete the questionnaires. After excluding 10 invalid responses, 315 valid questionnaires were included in the analysis. Among these, 77 women underwent additional assessments by the research midwives using the cHCP-CF-PPA. Two weeks later, 35 women completed the GAQ-P again, and 8 of them required further assessments using the cHCP-CF-PPA. The average completion times were 16.36 ± 3.32 min for the initial test and 5.49 ± 1.38 min for the re-test. Participants had an average age of 31.94 ± 3.76 years and a gestational age of 26.01 ± 10.03 weeks. The Kruskal-Wallis test showed no significant differences in GAQ-P summed scores across trimesters, with *P* values ranging from 0.281 to 0.869 for the initial test and from 0.474 to 0.952 for the retest. The medians and quartiles for these scores are presented in Table 1.

Validity

The average content validity index (S-CVI/UA) for the GAQ-P was 0.81, with individual item content validity indices (I-CVI) ranging from 0.83 to 1.0. For the cHCP-CF-PPA, the average S-CVI/UA was 0.87, with I-CVIs ranging from 0.83 to 1.0. The content validity of both the GAQ-P and cHCP-CF-PPA exceeded the minimum threshold of 0.8, indicating good content validity. Detailed scores and the calculation process are provided in the supplementary file. Table 2 presents the GAQ-P/cHCP-CF-PPA scores for women recommended for physical activity compared to those for whom physical activity was contraindicated. Both test and retest assessments demonstrated that the absolute and relative contraindication scores significantly distinguished the two groups, with women recommended for physical activity scoring lower than those with contraindications. Furthermore, Spearman's correlation analysis revealed a positive correlation between GAQ-P scores and IPAQ-SF scores ($r=0.682$, $P<0.05$). GAQ-P scores also positively correlated with absolute ($r=0.851$, $P<0.01$) and relative contraindication scores ($r=0.847$, $P<0.01$) of the PARmed-X for Pregnancy.

Reliability

The Kappa coefficient of 0.759 for the GAQ-P/cHCP-CF-PPA indicated a high level of consistency and reliability over a two-week period, suggesting that the GAQ-P/

Table 2 Comparision of the GAQ-P/cHCP-CF-PPA contraindication scores between recommended and contraindicated physical activity samples

	Contraindicated		Recommended		Mann-Whitney U statistics
	Median (P_{25},P_{75})	Range	Median (P_{25}, P_{75})	Range	*P* value
Test (*n* = 315)					
Relative contraindications	0 (1,2)	0–4	0 (0,0)	0–3	**<0.001**
Absolute contraindications	0 (1,1)	0–2	0 (0,0)	0–1	**<0.001**
Retest (*n* = 35)					
Relative contraindications	0.25 (1,2.75)	0–4	0 (0,0)	0–1	**<0.05**
Absolute contraindications	0 (1,1)	0–2	0 (0,0)	0–0	**<0.05**

Abbreviations: GAQ-P/cHCP-CF-PPA, Get Active Questionnaire for Pregnancy and companion Health Care Provider Consultation Form for Prenatal Physical Activity; Contraindicated, Contraindicated for physical activity; Recommended, Recommended for physical activity

Table 3 Screening results between PARmed-X for pregnancy and GAQ-P/cHCP-CF-PPA (*n* = 315)

GAQ-P/cHCP-CF-PPA	PARmed-X for Pregnancy		Total
	Contraindicated	Recommended	
Contraindicated	18 (5.71%)	5 (1.59%)	23 (7.30%)
Recommended	2 (0.63%)	290 (92.06%)	292 (92.70%)
Total	20 (6.35%)	295 (93.65%)	315 (100.00%)

Abbreviations: PARmed-X for Pregnancy, Physical Activity Readiness for pregnancy; GAQ-P/cHCP-CF-PPA, Get Active Questionnaire for Pregnancy and companion Health Care Provider Consultation Form for Prenatal Physical Activity; Contraindicated, Contraindicated for physical activity; Recommended, Recommended for physical activity

cHCP-CF-PPA is a reliable instrument for assessing the intended measures. The Kappa analysis demonstrated a high degree of inter-rater reliability, with a Kappa value of 0.953.

Screening index

The screening analyses presented in Table 3 indicated that, when using the PARmed-X for Pregnancy results as the diagnostic criterion, the GAQ-P/cHCP-CF-PPA demonstrated a sensitivity of 90.00% (18/20), effectively identifying individuals with contraindicated physical activity. Its specificity was 98.31% (290/295), accurately identifying 98.31% of those who should engage in exercise. The positive predictive value was 78.26% (18/23), reflecting an accuracy of 78.26% in identifying individuals who did not require exercise, while the negative predictive value was 99.32% (290/292), indicating that 99.32% of those deemed suitable for exercise were correctly classified.

Discussion

In this study, we evaluated the psychometric properties of the Chinese version of the GAQ-P and its companion form (cHCP-CF-PPA), demonstrating that the two combined questionnaires are both valid and reliable. To our knowledge, this is the first study to examine the psychometric properties of the GAQ-P/cHCP-CF-PPA. This tool not only assesses indications and contraindications for physical activity but also facilitates connections between women and healthcare providers.

Known-groups validity is a specific type of construct validity that assesses a measurement instrument's ability to differentiate between groups that it is theoretically designed to distinguish [38]. Our results indicated that the GAQ-P effectively differentiated pregnant women who were recommended for physical activity from those with contraindications. Mann-Whitney U tests revealed that the GAQ-P's contraindication scores significantly distinguished known-groups. Furthermore, the results from the screening index validated its effectiveness in identifying women who were unsuitable for physical activity. The known-groups validity reinforces the construct validity of the instrument, while the subsequent sections provide valuable insights into women's physical health and offer recommendations for those with relative contraindications.

Consensus-based standards for the selection of health measurement instruments (COSMIN) indicate that correlations exceeding 0.70 are adequate for establishing criterion validity [39]. Our analysis revealed that the physical activity level section of the GAQ-P exhibited a moderate correlation of 0.682 with the IPAQ-SF, which may be attributed to the structural design and recall period of the questionnaire. The GAQ-P emphasizes self-reported type, intensity, frequency, and duration of physical activity during pregnancy, contrasting with the four domains assessed by the IPAQ-SF. However, the absolute and relative contraindication sections of the GAQ-P displayed strong correlations of 0.851 and 0.847 with the PARmed-X for Pregnancy.

Table 2 illustrates an increase in scores for pregnant women with relative contraindications during the retest period, which might be due to the identification of one pregnant woman diagnosed with fetal growth restriction (FGR) at 35 weeks. This observation underscores that responses to specific items can vary significantly over time, influenced by changes in health status, such as hypertension, diabetes, and fetal movement [30]. Based on the interpreted Kappa values (< 0.20 = poor, 0.21–0.40 = fair, 0.41–0.60 = moderate, 0.60–0.80 = good, and 0.81–1.00 = very good) [40], our study determined

the test-retest reliability to be 0.759, indicating that the GAQ-P tool offers consistent and reliable information for recommending or contraindicating physical activity for pregnant women.

Compared to previous instruments, the cHCP-CF-PPA tool assists healthcare providers in quickly identifying individuals with contraindications to physical activity, thereby enhancing the referral process for clinical assessments. By completing this screening questionnaire, pregnant women can be directed to comprehensive evaluations and treatments by appropriate specialists, potentially mitigating inactivity risks for those who are fit for physical activity. In China, cultural factors, such as the belief in 'Antai' (the expectation that pregnant women should remain peaceful and quiet), may discourage physical activity [8]. The validated GAQ-P/cHCP-CF-PPA tool aids pregnant women in assessing their suitability for physical activity. This, in turn, promotes the involvement of professional medical teams and helps reduce the impact of traditional cultural practices such as 'Antai'. It is essential to develop tailored healthcare interventions in maternity settings to encourage physical activity. Such interventions would facilitate the provision of safe, professional, and reliable information, enabling healthcare institutions to monitor women's physical activity at each antenatal contact, thus encouraging adherence to guideline-recommended levels.

The distinctiveness of this study lies in its integration of reliability and validity testing with screening metrics. In contrast, the psychometric properties of the Brazilian Portuguese version of the PARmed-X for Pregnancy [30] encompass only reliability and validity assessments but lack screening indicators. Furthermore, the developers highlight that the GAQ-P/cHCP-CF-PPA serves as an evidence-informed screening tool for physical activity during pregnancy [12, 23]. Effective physical activity screening is crucial to ensure that pregnant women engage in safe and beneficial levels of activity [23], thereby underscoring the importance of evaluating the screening indicators of this new tool. In addition, when compared to its predecessor, the PARmed-X for Pregnancy, the GAQ-P/cHCP-CF-PPA exhibits superior retest reliability (0.759 versus 0.749 for the Brazilian Portuguese version), indicating that the questionnaire performs more consistently. Moreover, while the Brazilian Portuguese version of the PARmed-X for Pregnancy study recognized the absence of an inter-rater reliability assessment [30], we conducted this evaluation, yielding a Kappa value of 0.953, which signifies excellent stability across different evaluators.

In our study, the screening metrics differed from those employed in other relevant studies [41–43]; and did not incorporate a cut-off value. The GAQ-P/cHCP-CF-PPA assesses both absolute and relative contraindications to physical activity, concentrating on specific medical conditions such as ruptured membranes and placenta previa after 28 weeks. This instrument is distinct from other screening tools that primarily emphasize symptoms, subjective experiences, or clinical manifestations, as it specifically identifies pathological conditions that contraindicate physical exercise. Concurrently, upon administration of the companion form, pregnant women identified with an absolute contraindication will be classified as contraindicated for physical activity. For those with a relative contraindication, the decision will be made by considering their individual constitution and physical activity history. Consequently, establishing a definitive cut-off value proves challenging, as specific scores may not be universally applicable and certain pathological conditions may evolve throughout pregnancy.

We acknowledge several limitations in the present study. First, the assessment was conducted at a single tertiary women's hospital in urban China, which limits the generalizability of the results. Second, selection bias may have occurred due to convenience sampling; women who volunteered may have been healthier, potentially leading to a lower screening rate for identifying contraindications. Third, as no established tool has been recognized as the 'gold standard' in this area, the criterion validity and screening metrics of the GAQ-P/cHCP-CF-PPA can only be evaluated against its predecessor, the PARmed-X for Pregnancy. Nevertheless, this study may serve as a valuable guide for future research, highlighting the need for further exploration of the psychometric properties of the GAQ-P/cHCP-CF-PPA across diverse settings and cultural contexts. Future studies could be carried out in different environments to mitigate selection bias. Beyond that, we may consider integrating the GAQ-P/cHCP-CF-PPA into digital platforms or electronic health record systems as a next step for wider implementation. On this basis, it is essential to further evaluate the cost-effectiveness and feasibility for routine use of this tool in various healthcare settings.

Conclusion

This study reports on the psychometric testing of the Chinese version of the Get Active Questionnaire During Pregnancy (GAQ-P) and its companion, the Health Care Provider Consultation Form for Prenatal Physical Activity (cHCP-CF-PPA) to assess pregnant women's suitability for physical activity. This combined screening tool has demonstrated good construct validity and test-retest reliability, serving as a practical instrument for evaluating contraindications to physical activity during pregnancy, while also providing professional consultations and recommendations for safe physical activity in maternity settings. Our findings indicate that the Chinese version of the GAQ-P/cHCP-CF-PPA can assist healthcare

providers and fitness professionals in pre-screening women's readiness for physical activity, thereby contributing to a safe and enjoyable pregnancy experience. Practitioners are encouraged to consider the full range of conditions outlined in the instrument, as individual items may vary over time. The GAQ-P and its companion form should be utilized as a comprehensive measure that incorporates personal and contextual factors influencing women's exercise practices during pregnancy, rather than solely focusing on pre-screening.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12884-025-07381-x .

Supplementary Material 1

Supplementary Material 2

Supplementary Material 3

Supplementary Material 4

Supplementary Material 5

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Author contributions
Conception and design: FP Xu and CY Gu; data collection: H Tao, LP Sun, LY Lu; written support: Weston ZJ; analysis and interpretation of data: XJ Wang and FP Xu; drafting of manuscript: FP Xu and H Tao; interpretation of data and revision of manuscript: FP Xu and CY Gu. All the listed authors have given final approval of the version to be published. All the listed authors have given final approval of the version to be published.

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Data availability
The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
Ethical approval was received from the Hospital Ethics Committee (Ethics Committee of the Obstetrics and Gynecology Hospital of Fudan University 2023 – 155). All methods were performed in accordance with the Declarations of Helsinki. Access to undertake the questionnaire survey was given by the Head of the Obstetrics Department where participants were to be recruited. Informed consent was obtained from all participants. All potential participants were recruited from the antenatal clinic and provided written information on the study before signed consent was obtained. Participation in the study was voluntary and refusal to respond to specific questions or interruption from the study was allowed at any time during the study process. All the information obtained from the participants remained confidential and anonymous. In addition, the dissemination of the study findings does not refer specific objects but the general source population.

Consent for publication
Not applicable.

Disclosures
No financial disclosures were reported by the authors of this paper.

Competing interests
The authors declare no competing interests.

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