

RESEARCH ARTICLE OPEN ACCESS

Development and Validation of a Chinese Marital Intimacy Scale for Colorectal Cancer Survivors With an Ostomy (Ch-MIS-CRCO)

Xixi Du¹ | Suchira Chaiviboontham²  | Bualuang Sumdaengrit² | Sasivimol Rattanasiri³

¹School of Nursing, Shangqiu Medical College, Yingbin Road 66, Shangqiu, Henan, China | ²Ramathibodi School of Nursing, Faculty of Medicine Ramathibodi Hospital, Mahidol University, 270 Rama 6 Road, Ratchathewi, Bangkok 10400, Thailand | ³Department of Clinical Epidemiology and Biostatistics, Faculty of Medicine Ramathibodi Hospital, Mahidol University, 270 Rama 6 Road, Ratchathewi, Bangkok 10400, Thailand

Correspondence: Suchira Chaiviboontham (suchira.cha@mahidol.ac.th)

Received: 8 February 2025 | **Revised:** 1 March 2026 | **Accepted:** 11 March 2026

Academic Editor: Shashank Kaushik

Keywords: colorectal cancer | marital intimacy scale | ostomy | validation

ABSTRACT

Background: Marital intimacy plays a significant role in patients' quality of life. However, colorectal cancer (CRC) and ostomy surgery can disrupt this important aspect of life. Despite its significance, there is no specialized tool to assess marital intimacy in this population. Therefore, this study aims to develop and validate the Chinese Marital Intimacy Scale for CRC survivors with an ostomy (CRCO) (Ch-MIS-CRCO).

Methods: An observational cross-sectional study was conducted following the instrument development procedures outlined by DeVellis, which include instrument formation and psychometric testing phase. Content validity was evaluated by content validity index (CVI), while construct validity was examined by exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Convergent validity was assessed using correlations with the Lock and Wallace Marital Adjustment Test, Ostomy Adjustment Scale, and Stoma-QOL. Known-groups validity was evaluated across clinically relevant subgroups. Floor and ceiling effects were examined, and internal consistency reliability was assessed using Cronbach's alpha.

Results: The initial 52-item pool was refined through content validity assessment, pilot testing, item analysis, and EFA, resulting in a final 25-item scale across four dimensions, with eigenvalues ranging from 1.62 to 8.83, explaining 63.09% of the total variance. The scale demonstrated excellent model fit ($\chi^2/df = 1.61$; CFI = 0.95; TLI = 0.94; RMSEA = 0.05). Convergent validity was supported by significant correlations with the Lock and Wallace Marital Adjustment Test ($r = 0.49$), Ostomy Adjustment Scale ($r = 0.55$), and the Stoma-QOL ($r = 0.59$). Known-groups validity was confirmed, with higher scores observed among patients without ostomy complications, those with complete self-care ability, and those whose primary caregiver was their spouse (all $p < 0.05$). No floor or ceiling effects were detected. Internal consistency was high, with Cronbach's α of 0.93 for the total scale and 0.85–0.90 for the subscales.

Conclusion: The Ch-MIS-CRCO demonstrates strong psychometric properties and can be effectively used to evaluate marital intimacy among CRC survivors with an ostomy, further helping to predict and improve patients' quality of life.

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

Copyright © 2026 Xixi Du et al. *European Journal of Cancer Care* published by John Wiley & Sons Ltd.

1 | Introduction

Colorectal cancer (CRC) represents a significant global health challenge, ranking as the third most prevalent cancer worldwide [1]. In 2022, the World Health Organization (WHO) reported 1.93 million new CRC cases, accounting for 9.6% of all cancer diagnoses [1]. In China, CRC ranks second in incidence after lung cancer, with 517,100 new cases reported in 2022, representing 26.85% of the global total for new CRC diagnoses that year [1, 2]. Surgery is the primary treatment for CRC and may sometimes involve creation of an ostomy, a procedure in which a segment of bowel is exteriorized to the abdominal surface to form an opening, allowing for the diversion of fecal content [3]. It is estimated that 18%–35% of CRC patients require this intervention as part of their treatment [4].

The creation of an ostomy effectively alleviates obstruction symptoms and prolongs survival rate [5], but the altered bowel function and body image following this procedure have a significant impact on marital intimacy [6]. These effects are primarily reflected in the following three aspects: Firstly, multiple studies indicate that patients often experience a decline in sexual function and satisfaction following ostomy surgery, which can adversely affect their intimate relationships [7–9]. Secondly, the presence of an ostomy leads to various psychological issues, such as anxiety, depression, and feelings of stigma [10–12]. These emotional challenges may diminish the patient's ability to perceive and invest in intimate relationships. Additionally, the daily management of the ostomy imposes new demands on marital life, often necessitating a redistribution of household roles [13–15]. If an agreement cannot be reached, it may lead to conflicts that negatively impact marital intimacy.

Marital intimacy is crucial to helping patients cope with the cancer experience, reduce psychological distress, and improve their quality of life [16, 17]. This may be especially pertinent for middle-aged survivors, who are often at a pivotal life stage, balancing career demands, parenting responsibilities, and active social and sexual relationships. The creation of an ostomy during these years may therefore impose unique challenges to marital intimacy, distinct from those faced by older adults. Consequently, a focused investigation within this group is warranted. A systematic assessment of marital intimacy would help nurses identify couples at risk for intimacy deterioration postostomy, tailor spouse-involved interventions and monitor intervention effectiveness. Early detection through standardized measurement facilitates timely support, potentially mitigating psychological distress and improving dyadic coping outcomes.

However, existing marital intimacy instruments have limitations for Chinese CRCO patients. Widely used multidimensional scales, such as the Personal Assessment of Intimacy in Relationships (PAIR) and the Marital Intimacy Questionnaire (MIQ), were developed in Western contexts and may not capture culturally salient aspects of Chinese relationships, including familial interdependence [18, 19]. Critically, these tools are not designed for ostomy populations and thus lack sensitivity to condition-specific challenges, including altered body image, intimate caregiving demands of ostomy management, and associated stigma [6]. Even brief, general measures such as the Lock–Wallace Short Marital Adjustment Test (LWSMAT) show reduced reliability in Chinese cancer patients and are not specific to the ostomy experience [20]. Therefore, this study aimed to

develop and validate a culturally appropriate marital intimacy scale specific to this population, to better assess their needs and guide supportive interventions that can enhance recovery and overall well-being.

2 | Methods

2.1 | Research Design

This study followed the procedures outlined by DeVellis [21] to develop and validate the Ch-MIS-CRCO. The research process consisted of two phases, Phase I focused on scale construction, including item generation and preliminary testing, Phase II involved psychometric evaluation, including item analysis, construct validity, and reliability testing of the Ch-MIS-CRCO (Figure 1).

2.2 | Conceptual Framework

Marital intimacy is widely recognized as a complex, multidimensional concept, though consensus regarding its specific components remains limited. To clarify the construct of marital intimacy, a comprehensive scoping review was conducted across six databases, resulting in the inclusion of 11 relevant studies. Among these, seven adopted a systematic classification approach to intimacy, exemplified by Schaefer and Olson [18] and Mills and Turnbull [22], which posits multiple distinct domains. Through an iterative process of extraction and synthesis from the reviewed literature, 11 preliminary thematic dimensions were identified: Physical, Sexual, Psychological, Emotional, Social, Cultural, Recreational, Operational, Spiritual, Aesthetic, and Intellectual. Through iterative expert discussions, these themes were consolidated: Sexual was subsumed under Physical, Emotional under Psychological, and Recreational under Social. Themes deemed less pertinent in this clinical context (e.g., Aesthetic and Intellectual) were excluded. The final framework comprises five core dimensions of marital intimacy specific to Chinese CRCO patients: Physical (including Sexual), Psychological, Social, Spiritual, and Operational Intimacy. This framework directly served as the theoretical foundation for item generation (Figure 2).

2.3 | Samples and Settings

The targeted population is Chinese CRCO in Henan province, China. Inclusion criteria were as follows: aged 18–59 years, CRC diagnosis confirmed by biopsy, had ostomy creation over 3 months prior, no history of mental illness, married or living with a heterosexual partner for over a year, no history of sexual dysfunction before their cancer diagnosis and ostomy creation, clinical frailty score < 5, and Mini-Cognitive assessment score ≥ 3. The exclusion criteria included patients or partners with cognitive or hearing impairments, psychiatric disorders, and severe cardiopulmonary or liver diseases.

Sample size was determined using methodological guidelines for scale development. Following Hair et al. [23], a ratio of 5 cases per item was employed for exploratory factor analysis (EFA), for the subsequent confirmatory factor analysis (CFA), which requires stringent testing of model fit, a more conservative ratio of 10 cases per item was used to ensure stable parameter estimation. The total sample size also adhered to the recommendation of

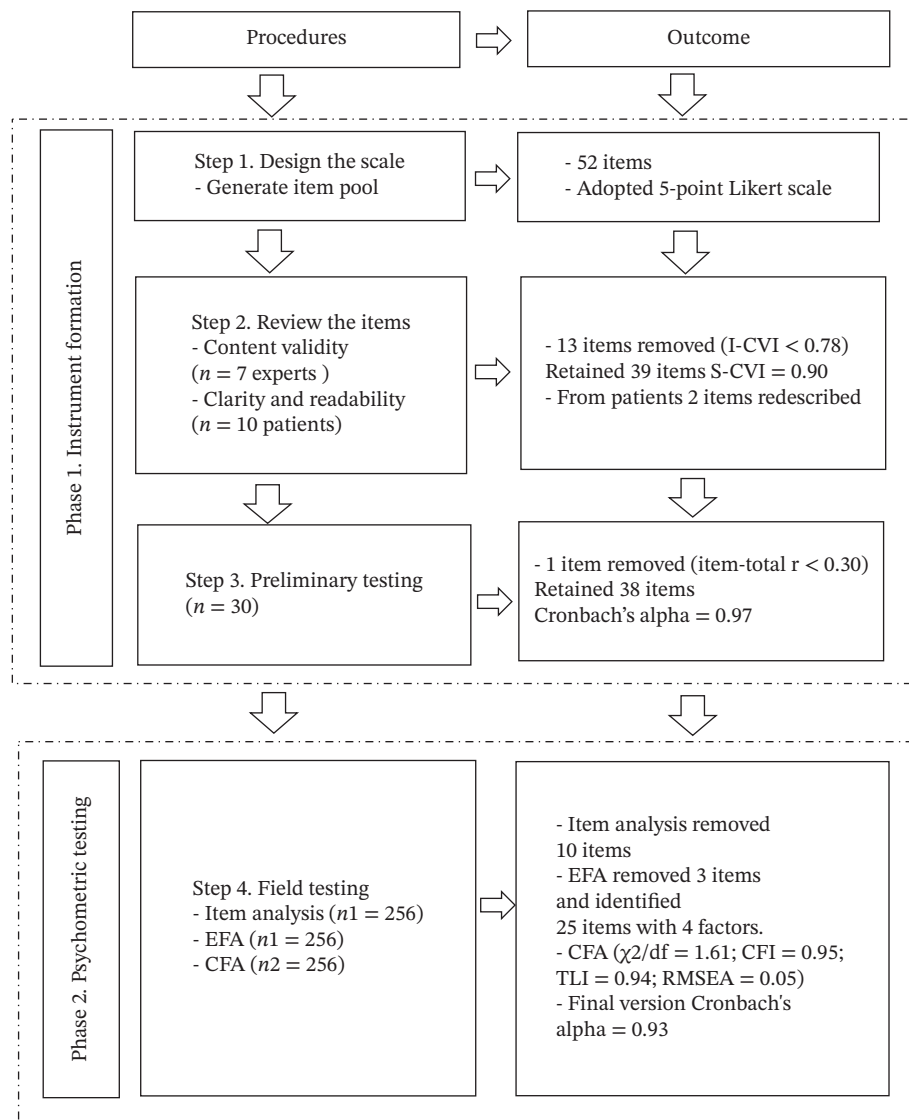


FIGURE 1 | The process of Ch-MIS-CRCO development.

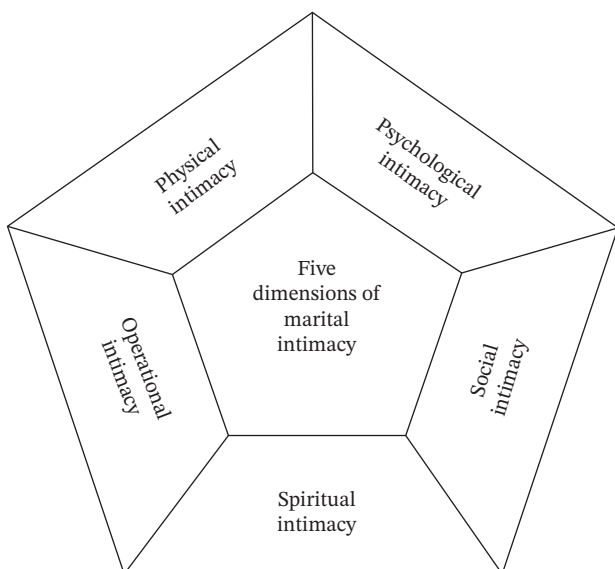


FIGURE 2 | Conceptual framework of marital intimacy for Chinese CRCO patients.

250–350 participants for instrument validation [24]. Consequently, 512 participants were recruited for psychometric testing, the first ($n1 = 256$) for item analysis and EFA, and the second ($n2 = 256$) for CFA.

2.4 | Research Procedure

2.4.1 | Instrument Formation Phase

The initial item pool was developed within the predefined conceptual framework through a dual approach: (1) adaptation of relevant items from existing intimacy instruments identified in the literature and (2) creation of new items derived directly from themes and narratives in our prior qualitative interviews [6]. Items were then screened and refined according to DeVellis's criteria [21], and a five-point Likert response scale was adopted to formulate the first draft (Ch-MIS-CRCO first).

This draft underwent formal content validity assessment by a panel of seven experts: two oncology clinical nurse specialists, two certified enterostomal therapists (ET), and three researchers specializing in couples' relationships and intimacy. Each expert independently rated each item's relevance on a four-point scale

(1 = *not relevant* and 4 = *highly relevant*). Inter-rater agreement was quantified using Kendall's coefficient of concordance (Kendall's W). The Item-Level Content Validity Index (I-CVI) was calculated as the proportion of experts assigning a rating of three or four, with an I-CVI ≥ 0.78 as the retention criterion [25]. The Scale-Level Content Validity Index (S-CVI/Ave) of ≥ 0.90 indicates excellent content relevance [25]. The retained items formed the second version (Ch-MIS-CRCO second).

Then, the cognitive interviews were conducted with 10 CRCO patients to assess clarity and comprehensibility. Participants paraphrased each item to identify ambiguous wording [21] and rated each item on four aspects (clarity of language, format, ease of understanding, and readability) using a four-point scale (1 = *poor* and 4 = *excellent*). They were also encouraged to provide additional comments. Items with a mean rating below 3.0 on any aspect were considered for revision. Their feedback led to rephrasing, resulting in the third version (Ch-MIS-CRCO third).

The third version was administered to 30 participants in a preliminary testing to confirm comprehensibility and applicability. Based on predefined psychometric criteria, the final fourth version (Ch-MIS-CRCO fourth) was prepared for subsequent field testing.

2.4.2 | Psychometric Testing Phase

In accordance with DeVellis's guidelines [21], psychometric testing was conducted to establish validity and reliability. This included the following: item analysis, construct validity assessment via EFA and CFA [25, 26], convergent validity testing using the LWSMAT, OAS-C-30, and Stoma-QOL, known-groups validity testing across clinical subgroups, floor and ceiling effects analysis, and internal consistency reliability assessment [25]. Detailed statistical procedures and criteria are described in Section 2.8.

2.5 | Measures

Personal data sheet: The personal data sheet consisted of general and disease-related information. The general information included age, gender, education, residence, primary caregiver, average family income, occupation, and time they had been married. The disease-related information included how long after ostomy creation, type of ostomy, ostomy self-care, and ostomy complications.

The LWSMAT consists of 15 items, with a total score ranging from 2 to 158 points, higher score indicating better marriage adjustment. This scale measures the agreement between spouses on various issues, including finances, recreation, affection, friends, sex, conventionality, philosophy, and in-laws, as well as how they resolve conflicts, the choice of shared activities, and their expectations about marriage. In the original population, the reliability coefficient was 0.90 [27].

Ostomy Adjustment Scale (OAS-C-30): Chinese version of the Ostomy Adjustment Scale (OAS-C-30) was developed by Zhang et al. [28] based on the original OAS [29]. This 30-item scale consists of four subscales: negative affect, normal functioning, therapy attitude, and life worry. Items are rated on a six-point Likert scale from 1 (*totally disagree*) to 6 (*totally agree*), higher

scores indicate better adjustment to living with an ostomy. Cronbach's α in this study was 0.94.

Stoma-QOL Questionnaire: The Stoma-QOL questionnaire, originally developed by Prieto and Thorsen [30], was translated into Chinese and validated by Wu et al. [31]. This 20-item scale covers four domains: sleep, sexual activity, relations with family and close friends, and social relations with others. Items are rated on a four-point scale from 1 (*always*) to 4 (*not at all*), higher scores indicate better quality of life. Cronbach's α in this study was 0.90.

The Chinese Marital Intimacy Scale for Colorectal Cancer (CRC) Survivors with an Ostomy (Ch-MIS-CRCO): This scale was newly developed in this study and used to assess marital intimacy among CRC survivors with ostomy. The final draft had 25 items and covered four dimensions, which included sexual intimacy (SEI), psychological intimacy (PSI), mutual daily life (MDL), and spiritual intimacy (SPI). The total score ranges from 25 to 125, higher score referring to a higher degree of marital intimacy.

2.6 | Data Collection

Following approval from the institutional review board and the target hospitals, data were collected face-to-face at two tertiary hospitals between September 30 and December 30, 2023. Two trained research assistants, supervised by the principal investigator, identified eligible participants in ostomy clinics, relevant wards, and ostomy patient meetings. After explaining the study purpose and procedures, written informed consent was obtained from willing participants. The survey was self-administered by participants using paper questionnaires in a private setting. Only the patient participants completed the questionnaire, their spouses were not invited, research assistants were available to distribute and collect materials and to clarify procedural questions, but did not intervene in or influence the responses. To minimize cognitive burden, the questionnaire was designed to take approximately 15–20 min to complete. Assistants observed participants for signs of fatigue or distress and offered breaks if needed.

2.7 | Ethical Considerations

This study was performed according to the Declaration of Helsinki, approved by the Research Ethics Committee at the Faculty of Medicine of Ramathibodi Hospital (MURA-2023-600) and the Research Ethics Committee at Puyang People's Hospital (IEC-2023-EA-14). All participants were carefully informed about the aims of this study and their rights. They were voluntary participants and signed the consent form.

Given the sensitive nature of SEI items, precautions were taken. Participants were reminded that they could skip any question, and nonjudgmental language was used. Research assistants were trained to approach sensitive topics empathetically, explaining that these questions aimed to understand the full impact of ostomy on marital life, and that no pressure would be applied. Assistants maintained a respectful distance while remaining available for clarification. To address potential distress related to sensitive topics, the research team closely monitored participants' emotional state throughout data collection. Should any participant express or show signs of psychological discomfort, immediate referral to the hospital's psychological counseling service was available and would be facilitated. This support and

referral pathway remained available to participants who might express such needs after the completion of data collection.

2.8 | Statistical Analysis

Data were analyzed using SPSS 26.0 and Mplus 8.0. Descriptive statistics were utilized to describe the demographic characteristics of the sample. Item analysis assessed distribution by mean, SD, skewness, and kurtosis. Discriminatory power was examined by comparing the top and bottom 27% of scorers using independent-samples *t*-tests, with nonsignificant items ($p > 0.05$) to be removed. Corrected item-total correlations (Pearson *r*) were calculated, retaining items with $r \geq 0.30$, and interitem correlations within the same subscale between 0.30 and 0.70 to balance discrimination and redundancy [25].

The structure validity was evaluated by EFA and CFA. EFA was conducted on Sample 1 ($n = 256$). After confirming sampling adequacy ($KMO > 0.70$, Bartlett's test $p < 0.001$), factors were extracted using the principal components analysis method (eigenvalue > 1.0). Items with a primary factor loading ≥ 0.40 and no significant cross-loadings were retained [25]. CFA was performed on Sample 2 ($n = 256$) using maximum likelihood estimation in Mplus. Model fit was assessed using $\chi^2/df < 3$, CFI > 0.90 , TLI > 0.90 , RMSEA < 0.08 , and SRMR < 0.08 [26].

Hypothesis test convergent validity was examined by calculating Pearson correlations between the Ch-MIS-CRCO total score and the LWSMAT, OAS-C-30, and Stoma-QOL. Known-groups validity was assessed by comparing total scores across clinically relevant subgroups (ostomy complications, self-care ability, and primary caregiver) using independent-samples *t*-tests, with Cohen's *d* effect sizes calculated, $p < 0.05$ (two-tailed) as statistical significance.

Floor and ceiling effects were examined by calculating the percentage of participants achieving the minimum (25) or maximum (125) total score; effects were considered present if $> 15\%$ of respondents scored at either extreme [25]. Internal consistency reliability was estimated using Cronbach's alpha for the total scale and subscales.

There were no missing data in this study, as all questionnaires were reviewed for completeness at the time of collection.

3 | Results

3.1 | Instrument Formation Phase

Through an extensive literature review of 11 studies [18, 22], five core dimensions of marital intimacy were identified. Relevant items were adapted from existing intimacy instruments to ensure content coverage of each dimension, and 29 items were generated. Additionally, a qualitative study using in-depth interviews with 16 CRCO patients [6] was conducted. Key themes and verbatim expressions related to marital intimacy were extracted from patient narratives and transformed into candidate items, yielding an additional 48 items. This dual approach resulted in an initial pool of 77 items. According to DeVellis's [21] criteria, 25 items were eliminated for (a) poor cultural applicability ($n = 4$), (b) conceptual redundancy ($n = 8$), (c) ambiguous statements ($n = 4$), and (d) irrelevance to study objectives ($n = 9$). The remaining 52 items constituted the first version of the Ch-MIS-CRCO and rated on a five-point Likert scale.

Content validity assessment by seven experts led to the removal of 13 items with I-CVI below 0.78, leaving 39 items with I-CVI between 0.86 and 1.00, S-CVI/Ave of 0.90. The Kendall's *W* was 0.42, indicating a moderate level of interrater agreement. This moderate agreement is understandable and reflects the deliberately constituted multidisciplinary background of the panel and the complex and multidimensional nature of marital intimacy. Feedback from the 10 patient reviewers indicated that all 39 items received mean ratings above 3.0 across the four assessed aspects (clarity of language, format, ease of understanding, and readability), except for items Ph5 and Op4. Following further communication with participants, these two items were rephrased based on their comments and suggestions. For example, item Op4 was revised to better reflect patients' experiences with daily ostomy management.

Subsequent pilot testing with 30 participants confirmed that all 39 items were understandable, and all items that demonstrated the item-total correlation coefficients exceeding 0.3, except for #Ph4 ($r = 0.27$), were removed. The remaining 38 items demonstrating excellent internal consistency (Cronbach's $\alpha = 0.97$) and proceeding to psychometric field testing.

3.2 | Psychometric Testing Phase

3.2.1 | Sample Characteristics

A total of 545 CRCO patients were approached during the study period. Of these, 29 declined to participate due to lack of interest or time constraints, and 4 did not complete the questionnaires. Thus, 512 participants were recruited for psychometric testing. The first sample group ($n1 = 256$) was used for EFA, and the mean age was 48.52 years ($SD = 7.67$, range = 33–59 years). The second sample group ($n2 = 256$) was used for CFA, and the average age was 52.31 years ($SD = 5.33$, range = 34–59 years). There was a more significant percentage of males ($n1 = 60.5\%$, $n2 = 59.4\%$) than females, most participants resided in urban areas ($n1 = 55.1\%$, $n2 = 56.3\%$), and their spouses served as patients' primary caregivers ($n1 = 80.5\%$, $n2 = 60.9$). More details are presented in Table 1.

3.2.2 | Item Analysis

Item analysis was conducted on the 38-item version. The means of these items ranged from 2.86 to 3.96, with skewness (0.00–0.75) and kurtosis (0.00–1.67) values indicating an approximately normal distribution [32]. Using independent-samples' *t*-tests to compare the extreme groups (top vs. bottom 27%), all 38 items showed statistically significant differences (all $p < 0.001$), confirming adequate discriminatory power, and thus no items were removed on this basis.

All 38 items also demonstrated acceptable corrected item-total correlations, Pearson *r* value ranging from 0.31 to 0.67, with each exceeding the retention threshold of $r > 0.30$. Thus, all items met this criterion for retention. However, examination of interitem correlations within the same preliminary subdimensions identified issues with local consistency and redundancy. Ten items did not meet the recommended criteria: five items (#Ph10, #Ps1, #So5, #Sp7, and #Sp9) had correlations predominantly below 0.30, indicating poor coherence, and another five (#Ps3, #So8, #Sp3, #Op1, and #Op4) had correlations above 0.70, suggesting redundancy [21].

TABLE 1 | Demographic characteristics of participants ($n_1 = 256$ and $n_2 = 256$).

Characteristic	n (%)	
	n_1	n_2
Age		
N1: Min–Max = 33–59; Mean = 48.52; SD = 7.67		
N2: Min–Max = 34–59; Mean = 52.31; SD = 5.33		
Gender		
Male	155 (60.5%)	152 (59.4%)
Female	101 (39.5%)	104 (40.6%)
Education		
Elementary or below	46 (18%)	33 (12.9%)
Secondary school	94 (36.7%)	83 (32.4%)
High school	80 (31.3%)	102 (39.8%)
University or higher	36 (14.0%)	38 (14.9%)
Residence		
Urban	141 (55.1%)	144 (56.3%)
Rural	115 (44.9%)	112 (43.7%)
Main caregiver		
Spouse	206 (80.5%)	156 (60.9%)
Children	33 (12.9%)	68 (26.6%)
Others	17 (6.6%)	32 (12.5%)
Family average income (yuan/month)		
≤ 3000	96 (37.5%)	106 (41.4%)
3001–5000	109 (42.6%)	115 (44.9%)
> 5000	51 (19.9%)	35 (13.7%)
Occupation		
Farmer	60 (23.4%)	95 (37.1%)
Employee	118 (46.2%)	115 (44.9%)
Retire	40 (15.6%)	31 (12.1%)
Others	38 (14.8%)	15 (5.9%)
Marital time		
< 5 year	54 (21.1%)	14 (5.5%)
5–10 year	78 (30.5%)	84 (32.8%)
> 10 year	124 (48.4%)	158 (61.7%)
Ostomy time		
3–6 months	55 (21.5%)	71 (27.7%)
6–12 months	153 (59.8%)	74 (28.9%)
> 12 months	48 (18.7%)	111 (43.4%)
Ostomy location		
Ileostomy	176 (68.7%)	160 (62.5%)
Colostomy	80 (31.3%)	96 (37.5%)
Ostomy self-care		
Complete self-care	145 (56.6%)	120 (46.9%)
Partial self-care	95 (37.1%)	113 (44.1%)
Complete dependent	16 (6.3%)	23 (9%)
Ostomy complication		
No	87 (34%)	76 (29.7%)
Yes	169 (66%)	180 (70.3%)

The overall scale's Cronbach's α was 0.93 after the removal of these 10 items, supporting their deletion to refine the scale. Consequently, 28 items were retained for EFA.

3.2.3 | EFA

The Kaiser–Meyer–Olkin (KMO) value of the instrument was 0.93, surpassing the commonly accepted threshold of 0.70 [33]. Bartlett's test exhibited statistical significance ($p < 0.001$, $\chi^2 = 4042.79$, and $df = 378$). After the initial EFA test, Items Ph1 and Ps12 were removed due to cross-factor loading over 0.40, and Item So7 was removed for having factor loading below 0.40 [25]. Then, the EFA test was repeated with the remaining 25 items, and four factors emerged, with eigenvalues from 8.83 to 1.62, explaining 63.09% of the variance. Factor 1 (“SEI”) explained 16.67% with an eigenvalue of 8.83, Factor 2 (“PSI”) explained 15.83% with an eigenvalue of 3.41, Factor 3 (“MDL”) 15.38% with an eigenvalue of 1.91, and Factor 4 (“SPI”) 15.21% with an eigenvalue of 1.62. All items demonstrated factor loadings above 0.40 (see Table 2 for details). Information on the deleted items is provided in Supporting Table S1.

3.2.4 | CFA

Descriptive analysis results of the Ch-MIS-CRCO final version: The total Ch-MIS-CRCO (25 items) had a mean score of 81.05 (SD = 14.69). The SEI domain had a mean score of 19.07 (SD = 5.11), the PSI domain had a mean score of 20.07 (SD = 4.28), the MDL domain had a mean score of 23.20 (SD = 5.12), and the SPI domain had a mean score of 18.70 (SD = 4.48).

Model fit of the Ch-MIS-CRCO: The maximum likelihood method was used to estimate the model. The goodness of fit of the model was 1.61, with a χ^2 value and a ratio of degrees of freedom of less than 3. The CFI of 0.95 and TLI of 0.94 exceeded the standard value 0.90 [26]. The SRMR (0.04) and RMSEA (0.05) were below the criterion of 0.08 [26]. All the results indicated a good fit for the measurement model, as presented in Figure 3.

Convergent validity and discriminant validity: CFA results showed that the 25 items had factor loading ranges from 0.56 to 0.84. The AVE values for the four factors ranges from 0.46 to 0.61, with all but “MDL” (0.46) exceeding the recommended 0.50 threshold. However, all factors had CR values above 0.7 (ranging from 0.86 to 0.91), indicating good convergent validity (see Table 3). Additionally, all factors were significantly correlated, and the AVE square roots were greater than the corresponding correlation coefficients, confirming good discriminant validity.

3.2.5 | Hypothesis Test Convergent Validity and Known-Groups Validity

Pearson correlation analysis was used to examine the convergent validity of the Ch-MIS-CRCO. As hypothesized, the four dimensions of the Ch-MIS-CRCO were significantly positively correlated with the LWSMAT ($r = 0.34$ – 0.39 , $p < 0.01$), the OAS-C-30 ($r = 0.40$ – 0.47 , $p < 0.01$), and the Stoma-QOL ($r = 0.45$ – 0.48 , $p < 0.01$). The total score of the Ch-MIS-CRCO showed significant correlations with the LWSMAT ($r = 0.49$, $p < 0.01$), OAS-C-30 ($r = 0.55$, $p < 0.01$), and Stoma-QOL ($r = 0.59$, $p < 0.01$), all exceeding the recommended threshold of 0.40, supporting the convergent validity of the Ch-MIS-CRCO.

TABLE 2 | Item commonalities and factor loading on corresponding components.

Item	Description	Factor loading	Communalities (h2)
<i>Component 1: Sexual intimacy</i>			
Ph2	I feel ostomy didn't affect my sexual function.	0.820	0.780
Ph5	Despite the ostomy, he/she is still interested in having sex with me.	0.771	0.740
Ph6	I didn't suppress my sexual interest and reduced sexual activity because of the ostomy.	0.769	0.699
Ph9	We discuss the impact of the ostomy on our sexual intimacy.	0.724	0.609
Ph12	We adjusted our sexual behavior to adapt to the ostomy.	0.734	0.690
Ph13	Despite the ostomy, we are still satisfied with our sex life.	0.767	0.619
<i>Component 2: Psychological intimacy</i>			
Ps2	When I experience sadness or anxiety, I can seek comfort from him/her.	0.768	0.721
Ps4	I think he/she understands that I feel pain because of my ostomy.	0.669	0.585
Ps5	He/she listens to me carefully.	0.742	0.632
Ps6	I think he/she has accepted me with my ostomy.	0.778	0.722
Ps9	I can feel his/her love and affection for me, not diminished by the ostomy.	0.716	0.650
Ps10	When I need attention and affection, he/she can feel it.	0.780	0.676
<i>Component 3: Mutual daily life</i>			
So1	During our free time, we enjoy being together.	0.738	0.623
So6	Despite the ostomy, he/she is still willing to take me to participate in social activities with friends or colleagues.	0.638	0.519
So9	When we go out together, he/she often considers the cleaning needs of my ostomy.	0.709	0.565
So10	The ostomy did not affect our capacity to maintain intimacy in social situations.	0.557	0.522
Op2	He/she is willing to learn the knowledge and skills required for ostomy care.	0.580	0.396
Op6	We actively communicate and deal with the contradictions brought by the ostomy.	0.784	0.711
Op7	We can agree with each other on a lot of things.	0.650	0.537
<i>Component 4: Spiritual intimacy</i>			
Sp1	He/she helps me in accepting myself.	0.810	0.670
Sp2	After the ostomy, we have redefined our life goals.	0.790	0.629
Sp4	He helps me rediscover the meaning of life.	0.804	0.706
Sp5	We do unfinished things together to minimize life's regrets.	0.673	0.472
Sp6	Despite the ostomy, he/she has also helped me discover my self-worth.	0.725	0.564
Sp8	We often together do something which helps to keep the inner peace.	0.848	0.738

Known-groups validity was assessed by comparing total Ch-MIS-CRCO scores across clinically relevant subgroups. As hypothesized, participants without ostomy complications reported significantly higher marital intimacy than those with complications (mean $\pm$ SD: 88.22 ± 13.57 vs. 77.99 ± 14.11 ; $t = 5.359$, $p < 0.001$, Cohen's $d = 0.76$). Patients with complete self-care ability scored significantly higher than those requiring partial or complete assistance (84.53 ± 13.46 vs. 77.94 ± 15.09 ; $t = 3.669$, $p < 0.001$, $d = 0.46$). Furthermore, participants whose primary caregiver was their spouse reported higher marital intimacy than those cared for by others (82.66 ± 13.81 vs. 78.49 ± 15.71 ; $t = 2.233$, $p = 0.026$, and $d = 0.28$). These findings support the known-groups validity of the Ch-MIS-CRCO.

3.2.6 | Floor and Ceiling Effects

The total scores of the Ch-MIS-CRCO ranged from 25 to 125, no participants achieved the minimum possible score of 25 (0%), and only 2 participants (0.8%) achieved the maximum possible score of 125. Therefore, no floor or ceiling effects were detected.

3.2.7 | Reliability

In this study, the overall Cronbach's α coefficient of the Ch-MIS-CRCO was 0.93, and those of the four dimensions ranged from 0.85 to 0.90. The SEI domain's Cronbach's α was 0.90, the PSI domain was 0.87, the MDL domain was 0.85, and SPI domain was 0.86, respectively.

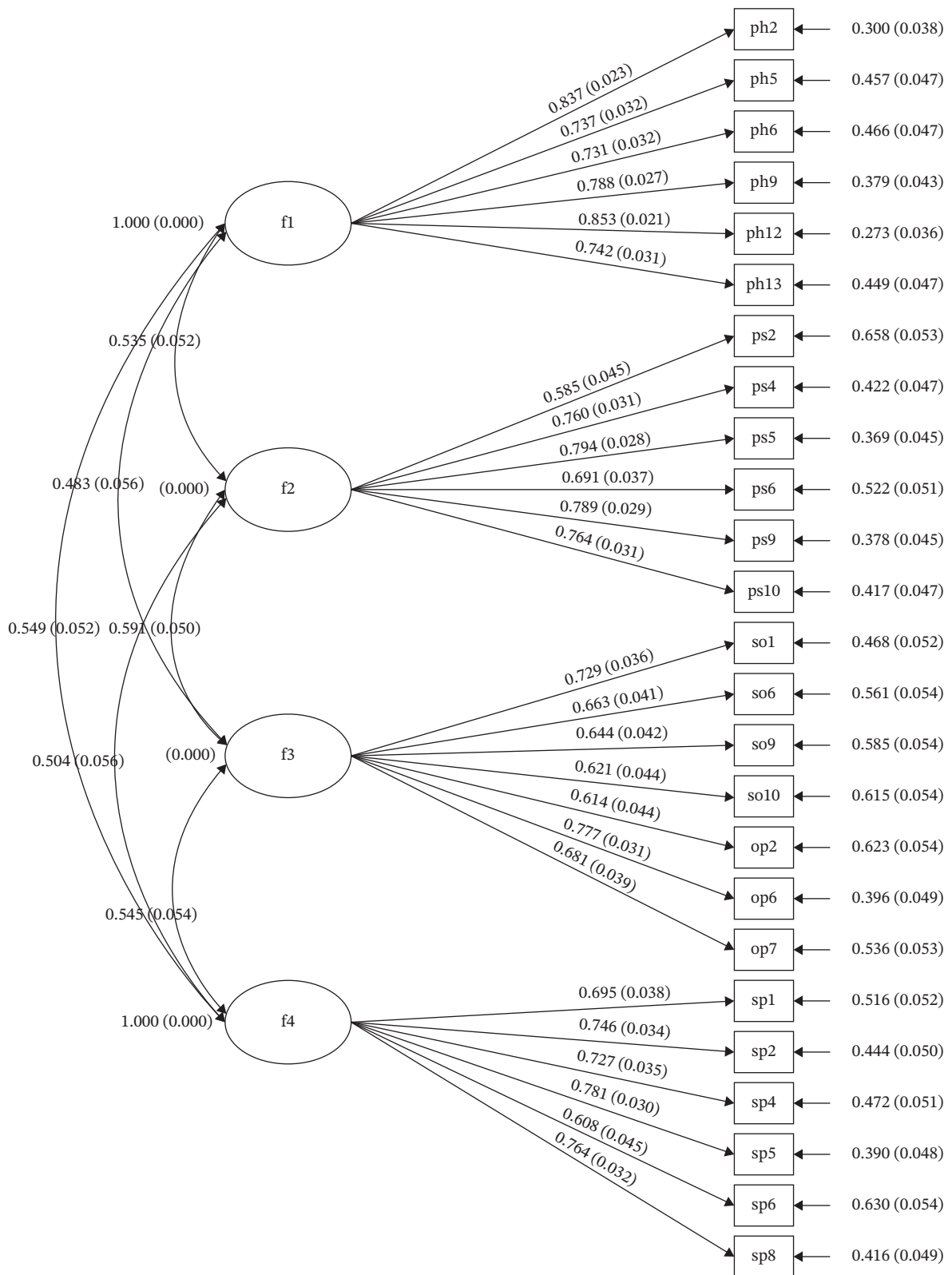


FIGURE 3 | Measurement model of Ch-MIS-CRCO.

TABLE 3 | Convergence validity results of CFA.

Domain	Item no.	Factor loading	SMC (R^2)	SE	t	p	CR	AVE
Sexual intimacy	Ph2	0.84	0.700	0.023	36.765	< 0.001	0.91	0.61
	Ph5	0.74	0.543	0.032	22.973	< 0.001		
	Ph6	0.73	0.534	0.032	22.504	< 0.001		
	Ph9	0.79	0.621	0.027	28.729	< 0.001		
	Ph12	0.85	0.727	0.021	39.973	< 0.001		
	Ph13	0.74	0.551	0.031	23.563	< 0.001		
Psychological intimacy	Ps2	0.56	0.342	0.045	12.956	< 0.001	0.87	0.54
	Ps4	0.76	0.578	0.031	24.465	< 0.001		
	Ps5	0.79	0.631	0.028	28.134	< 0.001		
	Ps6	0.69	0.478	0.037	18.623	< 0.001		
	Ps9	0.79	0.622	0.029	27.611	< 0.001		
	Ps10	0.76	0.583	0.031	24.752	< 0.001		
Shared daily life	So1	0.73	0.532	0.036	20.456	< 0.001	0.86	0.46
	So6	0.66	0.439	0.041	16.300	< 0.001		
	So9	0.64	0.415	0.042	15.388	< 0.001		
	So10	0.62	0.385	0.044	14.266	< 0.001		
	Op2	0.61	0.377	0.044	13.848	< 0.001		
	Op6	0.78	0.604	0.031	24.896	< 0.001		
Spiritual intimacy	Op7	0.68	0.464	0.039	17.375	< 0.001	0.88	0.52
	Sp1	0.70	0.484	0.038	18.445	< 0.001		
	Sp2	0.75	0.556	0.034	22.194	< 0.001		
	Sp4	0.73	0.528	0.035	20.702	< 0.001		
	Sp5	0.78	0.610	0.030	25.644	< 0.001		
	Sp6	0.61	0.370	0.045	13.662	< 0.001		
	Sp8	0.76	0.584	0.032	23.750	< 0.001		

4 | Discussion

4.1 | The Imperative for a Context-Specific Scale

Existing marital intimacy measures face conceptual, structural, and ecological limitations. Conceptually, tools such as the Experiences in Close Relationships Inventory (ECR) and LWSMAT [27, 34] assess related constructs (attachment and adjustment) rather than intimacy itself. Structurally, they are either unidimensional or have specific flaws, such as the PAIR's omission of spiritual [18] or the Waring Intimacy Questionnaire (WIQ)'s [35] impractical length (90 items). Ecologically, none are tailored to the Chinese cultural context or the specific experiences of CRCO.

The newly developed Ch-MIS-CRCO directly targets the core construct of marital intimacy using a standardized five-point Likert scale, enhancing conceptual clarity and measurement precision. Its structure is both comprehensive and concise, encompassing four key dimensions (Sexual, Psychological, Spiritual, and Shared Daily Life intimacy) within 25 items. Distinctively, the scale achieves high ecological validity by being simultaneously culturally embedded and clinically specific. Its items are derived directly from the lived experiences of Chinese CRCO patients, ensuring relevance to culturally important aspects of intimacy, such as familial harmony and nonreligious spirituality, as well as to disease-related challenges such as body image concerns, ostomy care, and role renegotiation. This results in a targeted, reliable, and contextually valid assessment tool for this population.

4.2 | Theoretical Rationale and Methodological Rigor in Scale Construction

The final four-dimensional structure of the Ch-MIS-CRCO (sexual, psychological, shared daily life, and SPI) represents a statistically and theoretically justified refinement of the initial five-dimensional framework. Empirically, EFA showed that items from "Social Intimacy" and "Operational Intimacy" loaded onto a single factor, indicating they share an underlying construct. This was confirmed by the excellent fit of the four-factor CFA model ($\chi^2/df = 1.61$, CFI = 0.95, and RMSEA = 0.05). Theoretically, this merger aligns with the dyadic coping framework [36], where practical and social coping are intertwined in daily life. For CRCO patients, the practical demands of ostomy care and shared social engagement are interwoven aspects of couplehood. Within the Chinese cultural context, marital intimacy is often expressed through shared daily activities, a concept captured by the "MDL" dimension. Thus, the four-factor structure is statistically robust, conceptually coherent, and culturally relevant. The composition and validation of each dimension are detailed below.

The "SEI" refers to sexual communication, satisfaction, interest, arousal, orgasm, or variety with the same partner [37, 38]. For CRCO, this construct focuses on sexual experience, function, and adaptive coping. Item Ph4, concerning "worry about the ostomy," was removed due to a low corrected item-total correlation. The final six items capture core themes of sexual function (Ph2), sexual experience (Ph5, Ph6), coping with sexual challenges (Ph9, Ph12), and sexual satisfaction (Ph13).

The “PSI” dimension reflects feelings of being understood, comforted, loved, and accepted, along with shared emotions and trust [39]. During item analysis, Ps1 (“shared feelings”) was removed due to unstable correlations across genders. Ps12 (“trust”) was omitted because of conceptual overlap with the SPI dimension, and Ps8 (“dependence”) was deleted due to low relevance. The retained items thus concentrate on measurable expressions of being comforted (Ps2), accepted (Ps6), understood (Ps4, Ps10), and loved (Ps5, Ps9).

The “MDL” integrates the original “Operational Intimacy” and “Social Intimacy” dimensions, reflecting how the practical and social aspects of managing an ostomy are interwoven in the daily experiences of couples, such as social activities, daily care, and household coordination [12, 13]. Item Op4, pertaining to “household responsibilities,” was eliminated due to redundancy with other items. The remaining items focus on “physical care” (So9, Op2), “managing conflict” (Op6, Op7), “shared socializing” (So6), and “daily intimacy” (So1, So10).

The “SPI” involves sharing beliefs, values, and spiritual experiences, including practices such as prayer or meditation [38, 39]. Within the Chinese cultural context, SPI often manifests in ways distinct from Western, religion relevant frameworks. It is less focused on organized religious doctrine and more on familial continuity, ancestral reverence, the search for life meaning, and the cultivation of inner harmony. Item Sp7, which pertained to “shared beliefs” and carried strong connotations of institutionalized religion, was removed as it did not resonate with a significant portion of our participants. The retained items reflect these culturally salient aspects: “inner peace” (Sp8), “making up for life’s regrets” (Sp5), “the meaning of life” (Sp2, Sp4), and “rediscovering self-value” (Sp1, Sp6). Figure 4 illustrates the final four-factor structure of the Ch-MIS-CRCO.

4.3 | Psychometric Properties

The Ch-MIS-CRCO demonstrates excellent psychometric properties. The four-factor model exhibited a stable and replicable structure, with the total variance explained (63.09%) exceeding the recommended threshold of 60% [21]. The subsequent CFA on an independent sample provided strong support for this four-factor model, with all fit indices meeting or exceeding established criteria for good model fit (e.g., CFI = 0.95 and RMSEA = 0.05) [26]. All items loaded significantly onto their intended factors (loadings > 0.40), further supporting the hypothesized structure [40].

Convergent and discriminant validity were further confirmed. In the CFA, all composite reliability (CR) values exceeded 0.70, and the average variance extracted (AVE) for each dimension surpassed 0.50, with the exception of the Shared Daily Life dimension (AVE = 0.46), which remained near the acceptable threshold [21]. Discriminant validity was supported as the square root of each dimension’s AVE was greater than its correlations with other dimensions, indicating that each dimension measures a distinct aspect of marital intimacy [41].

Hypothesis test convergent validity was evaluated by examining the correlation between the Ch-MIS-CRCO and the LWSMAT. According to Polit and Beck [25], convergent validity can be supported by a significant correlation with a measure of a related, though not identical, construct. The LWSMAT, a measure of

global marital satisfaction and adjustment, shares conceptual overlap with key domains of intimacy, such as agreement on sexual matters, shared recreation, and conflict resolution [42, 43]. As hypothesized, the total score of the Ch-MIS-CRCO showed a significant, moderate positive correlation with the LWSMAT total score ($r = 0.49$, $p < 0.01$). This correlation is theoretically appropriate: It is strong enough to confirm that the Ch-MIS-CRCO captures core aspects of relationship quality related to marital adjustment, yet not so high as to suggest redundancy, thereby supporting its validity as a distinct measure focused specifically on the multifaceted construct of marital intimacy within the unique context of living with an ostomy.

Further evidence of convergent validity was provided by correlations with condition-specific measures. Based on the intimate relationship model of couple adaptation to cancer [44] and Lazarus’s stress and coping theory [45], marital intimacy serves as both a primary mechanism for improving couples’ adaptation to cancer and a crucial resource for coping with stress associated with cancer diagnosis and ostomy surgery. The significant positive correlations between the Ch-MIS-CRCO and both the Ostomy Adjustment Scale (OAS-C-30) ($r = 0.55$, $p < 0.01$) and the Stoma-QOL ($r = 0.59$, $p < 0.01$) support these theoretical frameworks. These findings indicate that higher marital intimacy is associated with better psychological and functional adjustment to living with an ostomy and, ultimately, with better quality of life [6, 16, 17]. Thus, the Ch-MIS-CRCO demonstrates meaningful relationships with both ostomy-specific adjustment and broader quality of life outcomes, further confirming its convergent validity.

The scale demonstrated strong known-groups validity, with significantly higher scores among patients without ostomy complications ($d = 0.76$), those with complete self-care ability ($d = 0.46$), and those whose primary caregiver was their spouse ($d = 0.28$). The medium to large effect sizes for complication status and self-care ability suggest that these factors are particularly influential for marital intimacy in this population.

Internal consistency reliability was excellent. Cronbach’s alpha for the total scale was 0.93, and subscale alphas ranged from 0.85 to 0.90, all exceeding the acceptable threshold of 0.80 for a newly developed instrument [25]. This indicates that items within each dimension consistently measure the same underlying construct.

4.4 | Clinical and Research Implications

In nursing practice, nurses can administer this scale during follow-up visits to quickly identify couples struggling with intimacy postostomy. The four subscale scores can pinpoint whether difficulties are primarily sexual, emotional, spiritual or related to daily routines, guiding the focus of clinical inquiry. Assessment results can inform tailored, spouse-involved interventions. For example, low scores in MDL may indicate a need for couples’ counseling on role redistribution and communication around care tasks. Poor SEI scores can serve as an opening for healthcare providers to initiate sensitive conversations and refer patients to specialized sexual health resources. And, this scale can be used longitudinally to evaluate the effectiveness of psychosocial or nursing interventions aimed at improving marital intimacy and, by extension, overall quality of life.

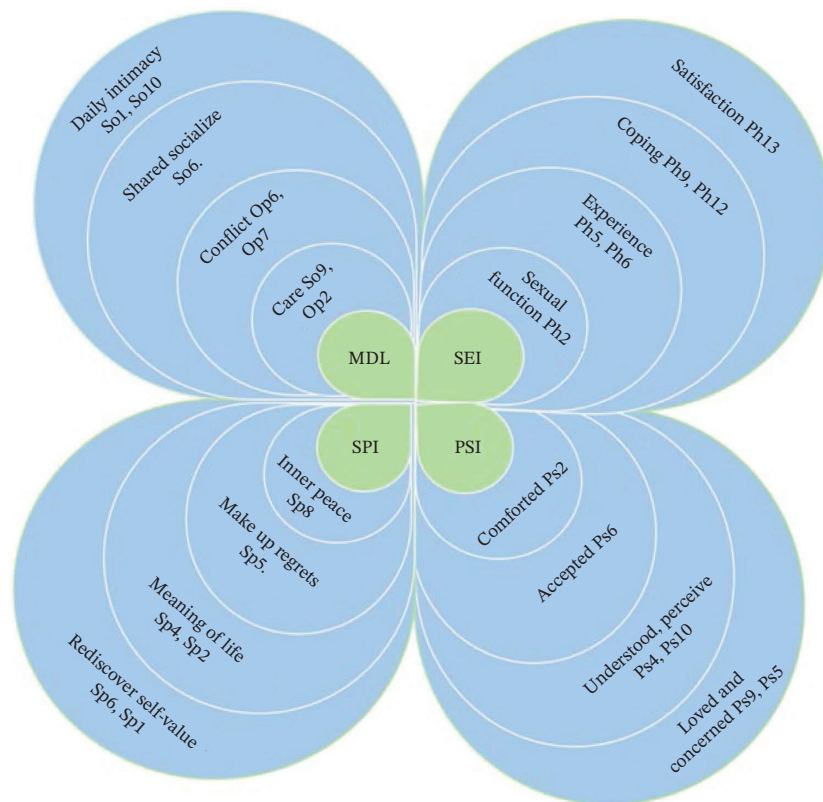


FIGURE 4 | Final four-factor structure of the Ch-MIS-CRCO.

For nursing research, Ch-MIS-CRCO provides a valid, reliable, and culturally appropriate instrument for the measurement of marital intimacy in Chinese CRCO, thereby enhancing methodological rigor and reducing measurement bias in studies concerning this population. Researchers can employ this scale to explore marital intimacy, identify influencing factors, develop risk prediction models, and develop health education and intervention programs. Furthermore, it facilitates research into how marital intimacy influences broader patient-reported outcomes, such as quality of life, psychological adjustment, and dyadic coping.

4.5 | Limitations and Recommendations

The cross-sectional design of this study limits the ability to assess dynamic changes of marital intimacy within the target population over time. Consequently, test-retest reliability, which evaluates the stability of the scale across time points, was not assessed in this initial psychometric evaluation. Future research should focus on enhancing the reliability and validity of the Ch-MIS-CRCO through longitudinal studies. Specifically, it is recommended to conduct repeated measurements at different postoperative recovery stages (e.g., 3, 6, and 12 months after surgery) to evaluate the trajectory of intimacy changes and the stability of the scale over time. Test-retest reliability assessments using intraclass correlation coefficients (ICC) should be included to establish measurement consistency across time points.

In addition, all participants were recruited from Henan Province, with the majority aged 33–59 years. Rural residents accounted for only about 45% of the sample. These geographic and demographic limitations may affect the generalizability of the findings to other regions, socioeconomic settings, or cultural contexts within China. It

is recommended that subsequent studies validate the scale in multicenter populations that include older adults, more rural residents, and individuals from diverse regions and ethnic backgrounds to evaluate its applicability across broader groups.

Furthermore, the exclusion of older adults (aged ≥ 60 years) limits the applicability of the Ch-MIS-CRCO to the broader CRCO population. This decision was made to enhance sample homogeneity, as middle-aged survivors face distinct challenges related to career, parenting, and active sexual relationships that may differ from those of older adults. Consequently, some items assessing SEI may not be entirely appropriate for elderly patients. Future research should validate the scale in older populations, potentially developing a modified version that omits or adapts the SEI dimension.

5 | Conclusion

This study developed and validated the Ch-MIS-CRCO; the final 25-item instrument demonstrates strong psychometric properties and a culturally relevant four-factor structure. As the first condition-specific tool of its kind for this population, the Ch-MIS-CRCO provides a valid and reliable means to assess a critical aspect of survivorship. Its use can facilitate targeted clinical assessment and inform the development of interventions to support marital intimacy and improve overall quality of life in patients and their partners.

Author Contributions

Conceptualization: Xixi Du, Suchira Chaiviboontham, Bualuang Sumdaengrit, and Sasivimol Rattanasiri.

Data curation: Xixi Du and Suchira Chaiviboontham.

Formal analysis: Xixi Du, Suchira Chaiviboontham, Bualuang Sumdaengrit, and Sasivimol Rattanasiri.

Funding acquisition: Xixi Du.

Methodology: Xixi Du, Suchira Chaiviboontham, Bualuang Sumdaengrit, and Sasivimol Rattanasiri.

Writing—original draft: Xixi Du.

Writing—review and editing: Suchira Chaiviboontham, Bualuang Sumdaengrit, and Sasivimol Rattanasiri.

Acknowledgments

The authors extend gratitude and thank all participants for their invaluable cooperation in this study. They thank the Ramathibodi School of Nursing for supporting this research. Additionally, they thank the Health Commission in Henan Province for providing funding support.

Funding

This research was supported by the Health Commission of Henan Provincial, China (Grant no. LHGJ20210931).

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

References

1. F. Bray, M. Laversanne, H. Sung, et al., “Global Cancer Statistics 2022: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries,” *CA: A Cancer Journal for Clinicians* 74, no. 3 (2024): 229–263, <https://doi.org/10.3322/caac.21834>.
2. R. S. Zheng, R. Chen, B. F. Han, et al., “Cancer Incidence and Mortality in China, 2022,” *Zhonghua Zhongliu Zazhi* 46, no. 3 (2024): 221–231, <https://doi.org/10.3760/cma.j.cn112152-20240119-00035>.
3. American Cancer Society, “The American Cancer Society Medical and Editorial Content Team,” (2024), <https://www.cancer.org/cancer/acs-medical-content-and-news-staff.html>.
4. Colorectal Cancer Alliance, “Living Well With Colorectal Cancer: Ostomy,” <https://colorectalcancer.org/resources-support/resources/living-well-colorectal-cancer/ostomy>.
5. N. Hoshino, K. Hida, Y. Fukui, Y. Takahashi, T. Nakayama, and K. Obama, “Impact of Diverting Ostomy on Long-Term Survival in Patients With Rectal Cancer: A Nationwide Study Based on Health Insurance Claims Data,” *Clinical Surgical Oncology* 2, no. 4 (2023): 100030, <https://doi.org/10.1016/j.cson.2023.100030>.
6. X. Du, S. Chaiviboontham, and B. Sumdaengrit, “The Experiences of Chinese Colorectal Cancer Survivors in Marital Intimacy After Ostomy Creation: A Qualitative Study,” *Belitung Nursing Journal* 10, no. 2 (2024): 222–230, <https://doi.org/10.33546/bnj.3212>.
7. C. Petersén and E. Carlsson, “Life With a Ostomy-Coping With Daily Life: Experiences From Focus Group Interviews,” *Journal of Clinical Nursing* 30, no. 15-16 (2021): 2309–2319, <https://doi.org/10.1111/jocn.15769>.
8. W. C. Zewude, T. Derese, Y. Suga, and B. Teklewold, “Quality of Life in Patients Living With Ostomy,” *Ethiopian Journal of Health Sciences* 31, no. 5 (2021): 993–1000, <https://doi.org/10.4314/ejhs.v31i5.11>.
9. I. F. A. Meira, F. R. D. Silva, A. R. Sousa, E. S. S. Carvalho, D. O. S. Rosa, and Á Pereira, “Repercussions of Intestinal Ostomy on Male Sexuality: An Integrative Review,” *Revista Brasileira de*

Enfermagem 73, no. 6 (2020): e20190245, <https://doi.org/10.1590/0034-7167-2019-0245>.

10. S. Shrestha, S. Siwakoti, U. Shakya, R. Shakya, and S. Khadka, “Quality of Life, Anxiety and Depression among Clients with Ostomy Attending Selected ostomy Clinics,” *Journal of Nepal Health Research Council* 20, no. 2 (2022): 383–391, <https://doi.org/10.33314/jnhrc.v20i02.3978>.
11. J. G. Kooor, J. H. W. Jacobsen, B. Stretton, et al., “Depression After Ostomy Surgery: A Systematic Review and Meta-Analysis,” *BMC Psychiatry* 23, no. 1 (2023): 352, <https://doi.org/10.1186/s12888-023-04871-0>.
12. J. H. Shin and J. Y. Choi, “Development and Evaluation of Resilience Enhancement Program Applying Mindfulness Meditation in Patients With Ileostomy,” *Journal of Korean Academy of Nursing* 51, no. 3 (2021): 334, <https://doi.org/10.4040/jkan.21019>.
13. M. Krogsgaard, H. Ø Kristensen, E. J. B. Furnée, et al., “Life With a Ostomy Across Five European Countries: A Cross-Sectional Study on Long-Term Rectal Cancer Survivors,” *Supportive Care in Cancer* 30, no. 11 (2022): 8969–8979, <https://doi.org/10.1007/s00520-022-07293-y>.
14. B. Cengiz and Z. Bahar, “Perceived Barriers and Home Care Needs When Adapting to a Fecal Ostomy: A Phenomenological Study,” *Journal of Wound, Ostomy and Continence Nursing* 44, no. 1 (2017): 63–68, <https://doi.org/10.1097/WON.0000000000000271>.
15. S. M. Wang, J. L. Jiang, R. Li, et al., “Qualitative Exploration of Home Life Experiences and Care Needs Among Elderly Patients With Temporary Intestinal Ostomys,” *World Journal of Gastroenterology* 30, no. 22 (2024): 2893–2901, <https://doi.org/10.3748/wjg.v30.i22.2893>.
16. C. M. Ruiz-Marin, R. Molina-Barea, M. Slim, and E. P. Calandre, “Marital Adjustment in Patients With Cancer: Association With Psychological Distress, Quality of Life, and Sleep Problems,” *International Journal of Environmental Research and Public Health* 18, no. 13 (2021): 7089, <https://doi.org/10.3390/ijerph18137089>.
17. S. Moon, J. Jin, S. H. Cheon, S. Park, and S. H. Kim, “The Influence of Marital Intimacy on Urinary and Sexual Symptom Experience Among Patients With Prostate Cancer: A Cross-Sectional Study,” *Contemporary Nurse* 54, no. 2 (2018): 171–181, <https://doi.org/10.1080/10376178.2018.1462092>.
18. M. T. Schaefer and D. H. Olson, “Assessing Intimacy: The Pair Inventory,” *Journal of Marital and Family Therapy* 7, no. 1 (1981): 47–60, <https://doi.org/10.1111/j.1752-0606.1981.tb01351.x>.
19. S. Van den Broucke, H. Vertommen, and W. Vandereycken, “Construction and Validation of a Marital Intimacy Questionnaire,” *Family Relations* 44, no. 3 (1995): 285–290, <https://doi.org/10.2307/585527>.
20. X. Du, D. Wang, H. Du, Q. Zou, and Y. Jin, “The Correlation Between Intimate Relationship, Self-Disclosure, and Adaptability Among Colorectal Cancer Enterostomy Patients,” *Medicine* 100, no. 19 (2021): e25904, <https://doi.org/10.1097/MD.00000000000025904>.
21. R. F. DeVellis and C. T. Thrope, *Scale Development: Theory and Application*, 5th ed. (Sage, 2021).
22. B. Mills and G. Turnbull, “After Trauma: Why Assessment of Intimacy Should Be an Integral Part of Medico-Legal Reports,” *Journal of Sex and Marital Therapy* 16, no. 3 (2001): 299–308, <https://doi.org/10.1080/14681990120064531>.
23. J. F. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, *Multivariate Data Analysis: A Global Perspective*, 8th ed. (Cengage Learning, 2018).
24. M. White, “Sample Size in Quantitative Instrument Validation Studies: A Systematic Review of Articles Published in Scopus, 2021,” *Heliyon* 8, no. 12 (2022): e12223, <https://doi.org/10.1016/j.heliyon.2022.e12223>.
25. D. F. Polit and C. T. Beck, *Nursing Research: Generating and Assessing Evidence for Nursing Practice*, 11th ed. (Wolters Kluwer Health, 2021).
26. D. Goretzko, K. Siemund, and P. Sterner, “Evaluating Model Fit of Measurement Models in Confirmatory Factor Analysis,” *Educational and*

Psychological Measurement 84, no. 1 (2024): 123–144, <https://doi.org/10.1177/00131644231163813>.

27. H. J. Locke and K. M. Wallace, “Short Marital-Adjustment and Prediction Tests: Their Reliability and Validity,” *Marriage and Family Living* 21, no. 3 (1959): 251–255, <https://doi.org/10.2307/348022>.

28. J. E. Zhang, F. K. Wong, M. C. Zheng, A. L. Hu, and H. Q. Zhang, “Psychometric Evaluation of the Ostomy Adjustment Scale in Chinese Cancer Patients With Colostomies,” *Cancer Nursing* 38, no. 5 (2015): 395–405, <https://doi.org/10.1097/NCC.0000000000000213>.

29. M. Olbrisch, “Development and Validation of the Ostomy Adjustment Scale,” *Rehabilitation Psychology* 28, no. 1 (1983): 3–12, <https://doi.org/10.1037/h0090996>.

30. L. Prieto, H. Thorsen, and K. Juul, “Development and Validation of a Quality of Life Questionnaire for Patients With Colostomy or Ileostomy,” *Health and Quality of Life Outcomes* 3, no. 1 (2005): 62, <https://doi.org/10.1186/1477-7525-3-62>.

31. X. Wu, X. Y. Jin, S. M. Shang, T. Y. Liang, and Y. Yang, “Colostomy Patients’ Quality of Life Scale for Chinese Version of the Reliability and Validity Analysis,” *Chinese Nursing Management* 11, no. 7 (2011): 23–25, <https://doi.org/10.3969/j.issn.1672-1756.2011.07.008>.

32. F. Orcan, “Parametric or Non-Parametric: Skewness to Test Normality for Mean Comparison,” *International Journal of Assessment Tools in Education* 7, no. 2 (2020): 255–265, <https://doi.org/10.21449/ijate.656077>.

33. S. Lloret, A. Ferreres, A. Hernandez, and I. Tomas, “The Exploratory Factor Analysis of Items: Guided Analysis Based on Empirical Data and Software,” *Anales de Psicología* 33, no. 2 (2017): 417–432, <https://doi.org/10.6018/analesps.33.2.270211>.

34. T. G. Li and K. Z. Kato, “The Relationship Experience Scale (ECR): Chinese Version,” *Acta Psychologica Sinica* 38, no. 3 (2006): 399–406.

35. E. M. Waring and J. R. Reddon, “The Measurement of Intimacy in Marriage: The Waring Intimacy Questionnaire,” *Journal of Clinical Psychology* 39, no. 1 (1983): 53–57, [https://doi.org/10.1002/1097-4679\(198301\)39:1%3C53::aid-jclp2270390110%3E3.0.co;2-0](https://doi.org/10.1002/1097-4679(198301)39:1%3C53::aid-jclp2270390110%3E3.0.co;2-0).

36. G. Bodenmann, S. Pihet, and K. Kayser, “The Relationship Between Dyadic Coping and Marital Quality: A 2-Year Longitudinal Study,” *Journal of Family Psychology* 20, no. 3 (2006): 485–493, <https://doi.org/10.1037/0893-3200.20.3.485>.

37. S. B. Levine, “Psychological Intimacy,” *Journal of Sex & Marital Therapy* 17, no. 4 (1991): 259–267, <https://doi.org/10.1080/00926239108404350>.

38. K. J. Holland, in *The Effects of Spiritual Intimacy on Relational Intimacy and Well-Being Doctoral Dissertation*, Order No. 3726454 (ProQuest Dissertations & Theses Global, 2015).

39. K. J. Holland, J. W. Lee, H. H. Marshak, and L. R. Martin, “Spiritual Intimacy, Marital Intimacy, and Physical/Psychological Well-Being: Spiritual Meaning as a Mediator,” *Psychology of Religion and Spirituality* 8, no. 3 (2016): 218–227, <https://doi.org/10.1037/rel0000062>.

40. D. L. Bandalos and J. J. Gerstner, “Using Factor Analysis in Test Construction,” in *Principles and Methods of Test Construction: Standards and Recent Advances*, ed. K. Schweizer and C. DiStefano (Boston, MA: Hogrefe, 2016), 26–51.

41. T. A. Brown, *Confirmatory Factor Analysis for Applied Research*, 2nd ed. (Guilford Press, 2015).

42. R. Aydin, S. Aktaş, and D. Kaloğlu Binici, “Examination of the Effect of the Perceived Stress in the Coronavirus-19 Pandemic on Marital Adjustment, Sexual Life and Intimate Partner Violence,” *Journal of Advanced Nursing* 79, no. 4 (2023): 1513–1524, <https://doi.org/10.1111/jan.15368>.

43. G. Shi, T. Shi, Y. Liu, and Y. Cai, “Relationships Between Dyadic Coping, Intimate Relationship and Post-Traumatic Growth in Patients

With Breast Cancer: A Cross-Sectional Study,” *Journal of Advanced Nursing* 77, no. 12 (2022): 4733–4742, <https://doi.org/10.1111/jan.14946>.

44. S. Manne and H. Badr, “Intimacy and Relationship Processes in Couples’ Psychosocial Adaptation to Cancer,” *Cancer* 112, no. 11 Suppl (2008): 2541–2555, <https://doi.org/10.1002/cncr.23450>.

45. R. S. Lazarus and S. Folkman, *Stress, Appraisal, and Coping Model* (Springer, 1984).

Supporting Information

Additional supporting information can be found online in the Supporting Information section. (*Supporting Information*)

Supporting Table S1 demonstrates details of the deleted items that did not meet the theoretical framework, validity, and reliability criteria.