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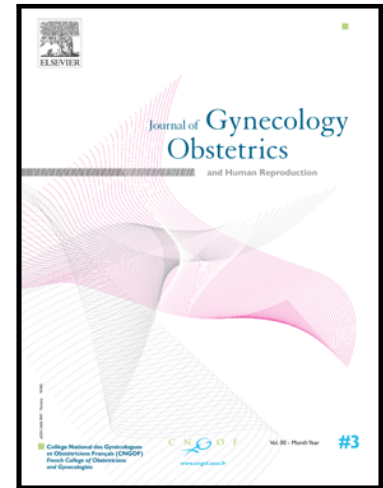
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Cross-Cultural Adaptation and Validation of the French Version of the Menstrual Distress Questionnaire (MEDI-Q)

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Abstract

Objective: To validate the French version of the Menstrual Distress Questionnaire (MEDI-Q) for use in French-speaking populations.

Methods: The study involved translation and cultural adaptation of the MEDI-Q from English to French, followed by a cross-sectional validation study. A sample of 266 French-speaking women aged 18-50 completed the French MEDI-Q, Brief Symptom Inventory (BSI), and Shortened Premenstrual Assessment Form (SPAF). Psychometric properties were assessed, including internal consistency, test-retest reliability, and convergent validity.

Results: The French MEDI-Q demonstrated good internal consistency (Cronbach's $\alpha = 0.84$, McDonald's $\omega = 0.86$) and excellent test-retest reliability (ICC = 0.94). Convergent validity was

confirmed through significant correlations with age, psychological distress, and premenstrual symptoms. The French-speaking sample showed higher average MEDI-Q scores compared to previous Italian and English validations, particularly in items related to menstrual bleeding distress and feelings of being dirty.

Conclusion: The French version of MEDI-Q exhibits robust psychometric properties, supporting its use in French-speaking populations. The observed differences in scores highlight potential cultural variations in menstrual experiences, warranting further investigation into cross-cultural perceptions of menstruation.

Keywords

Menstrual distress questionnaire; MEDI-Q; psychometrics; cultural adaptation; psychopathology; menstruation

1. Introduction

Menstruation is a highly complex psychophysiological phenomenon in women's lives [1]. It has a significant impact on the psychophysical health and quality of life of women, affecting their daily routines and activities [1–3]. The term menstrual distress is commonly used to refer to the negative symptoms associated with menstruation, both psychological and physical, ranging from negative affects (e.g. anxiety, irritability, low mood), to cognitive difficulties, impaired functioning, and pain [4].

Given the growing interest in measuring this construct, numerous tools have been developed. However, measuring menstrual distress in a stable, valid, and reliable manner is a significant challenge due to the complexity of the construct and the difficulty of isolating distress experienced during the menstrual phase from that typical of the intermenstrual and premenstrual phases [5]. Furthermore, many limitations have been highlighted in terms of psychometric properties of the existing questionnaires [6–9], with many instruments exhibiting limitations in terms of internal consistency, reliability and validity [7].

To address these issues and to obtain a reliable and comprehensive measure of menstrual distress in women, the Menstrual Distress Questionnaire (MEDI-Q) has been recently developed. It is a new multidimensional self-report questionnaire consisting of 25 items that investigate various specific areas such as pain, discomfort, psychological or cognitive changes, and gastrointestinal disorders over the past 12 months [10]. The questionnaire provides four general indices in addition to individual scores for each symptomatic area. The sum of all item scores yields a total index that measures the overall experienced distress (MEDI-Q Total). For this index a score of 20 or higher indicates a clinically significant level of distress. The three subscales are: (1) the Menstrual Symptoms (MS) which evaluates symptoms that cause greater distress during menstruation compared to intermenstrual days, (2) the Menstrual Symptoms Distress (MSD) which measures the average level of distress associated with menstrual symptoms, and (3) the Menstrual Specificity Index (MESI) which represents the proportion of symptoms for which the participant reported an increase in distress during the menstrual phase in comparison to intermenstrual and premenstrual days. The MEDI-Q is currently available in English and Italian [10,11]. Both versions of the questionnaire have demonstrated excellent validity and robust internal consistency, as indicated by Cronbach's alpha (English-version Cronbach's α : 0.84, 95% CI: 0.81–0.86; Italian-version Cronbach's α : 0.85, 95% CI: 0.90–0.98) and outstanding test-retest reliability, calculated as Intraclass Correlation Coefficient (ICC; English-version: 0.95; Italian-version: 0.95) [10,11]. Due to its excellent psychometric properties and its applicability in both clinical and non-clinical samples [10–14], it can be used in various settings. For example, it has been used in a clinical study to assess psychological distress in a sample of patients with uterine fibroids, revealing a correlation between menstrual distress and abnormal uterine bleeding [12]. It can also be used as an indicator of the effectiveness of medical or surgical treatments by comparing pre- and post-treatment scores [15]. The MEDI-Q can provide a comprehensive assessment of menstrual cycle-related symptoms, distinguishing between premenstrual and intermenstrual symptoms. Additionally, it evaluates the impact on the individual's overall functioning and quality of life. Another strength of the MEDI-Q is that it can be used independently of hormonal contraceptive therapy use [11]. In a recent systematic review comparing validated tools for assessing menstrual changes, the MEDI-Q was considered excellent in terms of measurement quality and clinical utility [16].

The development and validation of the MEDI-Q in Italian and English were carried out with high methodological rigor [10,11]. For the standardization of the tool in English, the use of dedicated focus groups contributed to developing a culturally adapted and appropriate instrument for the target population [11]. This resulted in an assessment tool with excellent psychometric properties,

particularly good test-retest reliability and internal consistency. In order to disseminate and increase the use of the MEDI-Q in other countries, the aim of this study was to validate the questionnaire in French for a French-speaking population.

2. Material and Methods

An observational cross-sectional study was conducted to validate the French version of the MEDI-Q. The study consisted of two phases: (a) the French translation and adaptation from the English version, informed by a focus group on Belgian French-native speaker women, and (b) subsequent data collection to validate the French version among a French-speaking population. The study steps are outlined in a flowchart in Figure 1. The research team included psychiatrists, gynaecologists, clinical psychologists, neuropsychologists, and experimental cognitive scientists with prior experience in the psychometric validation of questionnaires and translated scales in the domain of psychopathology and distress (including English to French adaptations).

2.1 Translation and cultural adaptation

Translation and cross-cultural adaptation were conducted according to the ISPOR Principles of Good Practice for the translation and cultural adaptation of patient-reported outcome measures, through forward translation, reconciliation, back translation, harmonization/expert review, cognitive debriefing, proofreading, and final reporting [17]. The English version of the MEDI-Q was translated to French by two independent bilingual (French/English) translators. Discrepancies between their translations were discussed and resolved. However, for one case, disagreement remained, concerning the term “*sluggish*”, translated as “*mou*” by one translator and “*faible*” by the other. Because these options conveyed partially different nuances in French, the issue was presented as an open discussion point in the subsequent focus group to ensure validity. Following previous validation procedures, the initial draft of the French version of the MEDI-Q was piloted using the focus group technique. Six women aged 23 to 33 years, who had experienced menstrual distress and reported at least six menstruations in the past 12 months, participated in the focus group. The focus group method is reported to foster a socially oriented environment where a sense of belonging encourages participants to share information and discuss personal experiences openly, leading to spontaneous responses [18]. The focus group participants were Belgian French-speaking women, including volunteering coworkers and researchers from the local university. They were unaware of the research aims and had no prior involvement in menstrual and sexual dysfunction research. The focus group was facilitated by two assigned researchers. Prior to the session, participants were sent the online version of the French MEDI-Q and were instructed to complete it independently. They were asked to review each item, noting any potential confusion or uncertainty. During the two-hour session, the group discussed the meaning and significance of each item, as well as any ambiguities they encountered. One researcher was present to ensure that cultural considerations were addressed, maximizing the questionnaire’s cross-cultural validity. Regarding the aforementioned disagreement, participants considered the accompanying wording “*avec peu d’énergie*” sufficient to express the intended meaning, and the terms “*mou/faible*” were therefore omitted from the final French version. A debriefing session was conducted at the end of the focus group. Notes from the discussion were compiled and used to refine the French translation. This revised version was then back-translated into English by a bilingual researcher, who was blinded to the original English version. A comparison of the original English version and the back-translated version revealed no significant

discrepancies. As a result of this process, the final French version of the MEDI-Q was developed and subsequently used for the quantitative validation described in Section 2.2.

2.2 Validation

2.2.1 Sample

Recruitment was conducted through spontaneous participation, with no rewards provided. The enrollment process took place between July 2024 and January 2025 and involved ****BLINDED****, as well as outreach to the general population via social media, word-of-mouth, and flyers. In accordance with the research objectives and previous validation studies in other languages, the following inclusion criteria were established: (1) being of female sex and aged 18 to 50 years, (2) being a native French speaker, and (3) having experienced at least three menstruations in the past 12 months. Exclusion criteria included (1) the presence of a known mental disorder, (2) the presence of a known uterine disorder, and (3) an inability to provide informed consent.

All participants provided written informed consent. All procedures were performed in compliance with relevant laws and institutional guidelines. The study protocol was approved by the Ethics Committee of the leading institution (****BLINDED****). To assess test-retest reliability, a subgroup of participants ($n_{\text{test-retest}} = 50$) completed the questionnaire again two weeks after the initial administration. Repeated measures were paired using a unique code generated and entered by the participants, ensuring complete anonymity.

2.2.2 Measures

Sociodemographic and medical history data were gathered, including age, menstrual characteristics over the past year (e.g., interval and duration in days), age at menarche, current use of hormonal contraceptive, and any gynecological or psychiatric conditions diagnosed by a healthcare professional. Consistent with previous validation studies [10,11], the validation of the French MEDI-Q included an assessment of convergent validity by examining its associations with psychopathological and premenstrual symptomatology. Participants who met the inclusion criteria and provided consent were asked to complete the French version of the following self-administered questionnaires:

French-MEDI-Q: This newly translated questionnaire was designed to measure overall distress experienced by women during menstruation. It comprises 25 items, each describing one or more symptoms. For each item, respondents indicate whether the symptom is absent (“No.”) or present, selecting one of two frequency options (“Yes, more than half of the times I’ve had my period.” and “Yes, less than half the times I’ve had my period.”). If a symptom is reported, participants then rate the degree to which it interferes with the quality of life, including recreational, work, and social domains, on a 4-point scale ranging from “Not at all.” to “Very much.” These ratings are provided separately for three periods: menstruation days, the premenstrual phase, and the other days (intermenstrual phase). The premenstrual phase was defined as “the 7 days before the start of menstruation” in line with established operationalized criteria in the context of premenstrual disorders [19]. For the premenstrual and intermenstrual phases, respondents can additionally indicate if the symptom did not occur. Item 25 specifically assesses sexual interactions involving vaginal penetration and the related menstrual distress; this item is structured differently from the others, and includes 4 sub-items that allow the participant to skip the item if there were no sexual interactions involving vaginal penetration for reasons other than menstrual distress (for example, in the case of a sexually inactive woman or avoidance of sexual activity during menstrual flow by personal choice). The scoring procedure yields four scores: the *MEDI-Q Total Score*, which reflects

overall menstruation-related distress; *Menstrual Symptoms* (MS), which indicates the number of symptoms causing greater distress during menstruation compared to intermenstrual days; *Menstrual Symptoms Distress* (MSD) which measures the average distress associated with menstrual symptoms; and the *Menstrual Specificity Index* (MESI), calculated as the proportion of symptoms reported as causing heightened distress during the menstrual phase relative to those reported during intermenstrual and premenstrual phases. A complete version of the French-MEDI-Q, along with detailed scoring and administration instructions, is available in the Supplementary Material.

Brief Symptom Inventory (BSI): a questionnaire designed to assess psychological distress and psychopathology [20,21]. It is widely used in both healthcare and research settings to evaluate general psychological functioning and mental health. The BSI comprises 53 items that assess 9 dimensions: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. The Global Severity Index (GSI) is a summary score providing an overall measure of psychological distress, and a previous study identified a cut-off score of 1.2 for clinically-relevant distress [22]. The reliability in the present sample was excellent (Cronbach's α : 0.97).

Shortened Premenstrual Assessment Form (SPAF) is a 10-item self-report questionnaire designed to measure the severity of premenstrual symptoms [6]. It evaluates both psychological and physiological aspects of premenstrual symptomatology. In previous community-based studies, mean SPAF total scores were approximately 27–28 out of a maximum of 60 [6,23]. A French-translated version of the SPAF was employed in this study (Cronbach's α : 0.87).

All data (i.e., sociodemographic and anamnestic, MEDI-Q, BSI, and SPAF) were gathered exclusively in digital format, via Google Form.

2.3 Statistics

Descriptive statistics for the collected data were reported using frequencies and percentages for dichotomous categorical variables or means and standard deviations for continuous variables.

Regarding the psychometric validation procedure, as performed for the Italian and English versions of MEDI-Q [10,11], analyses were conducted to assess reliability and criterion validity. Parameters for internal consistency, Cronbach's α and McDonald's ω , were calculated, both considered indicative of good reliability when exceeding 0.80. Although Cronbach's α is the most widely used and reported parameter in the literature, McDonald's ω is regarded as more reliable and robust, as it does not rely on the assumption of equal contributions from all items to the underlying construct (absence of tau-equivalence) and is less sensitive to inflation as the number of items increases [24,25]. Therefore, given the complex and multidimensional structure of MEDI-Q, McDonald's ω was considered more appropriate. Following recommendations [25], 95% confidence intervals (CIs) for both parameters were calculated and reported; specifically, McDonald's ω CI was obtained using the percentile bootstrap procedure with 1000 resamples. Additionally, the intraclass correlation coefficient (ICC) was computed on a subsample ($n = 50$), using a single-measurement two-way mixed-effects model to evaluate the degree of agreement among measurements taken two weeks apart.

Finally, for the assessment of convergent validity, correlates of MEDI-Q scores with age, general psychopathology, and menstrual symptomatology were calculated using linear regression models adjusted for age (MEDI-Q indices as dependent variables). Specifically, a negative relationship was expected between MEDI-Q Total Score and age, and a positive relationship with BSI global distress indices and SPAF score. Additionally, a negative association between SPAF and MEDI-Q MESI

was hypothesized, since as the prevalence of premenstrual symptoms increases, so does their overlap with menstrual period symptoms (and consequently, the specificity of symptoms for the menstrual phase, measured by MESI, decreases). This statistical plan mirrored the methodology used for the psychometric validation of the Italian and English versions of MEDI-Q, and in particular the correlations expected for convergent validity were the same as those verified for the other versions. Similarly to previous MEDI-Q validations, no exploratory or confirmatory factor analysis was performed in the present study. This choice was made a priori because the MEDI-Q was not conceptualized as a strictly unidimensional reflective scale, but rather as a questionnaire assessing a broad set of menstrual-related symptoms and associated distress, some of which may cluster only partially while others may occur relatively independently. In this context, the four MEDI-Q indices are derived from the original scoring algorithm and were retained unchanged to preserve comparability with the Italian and English versions. Accordingly, internal consistency coefficients were reported as indices of score coherence and for continuity with previous validation studies, not as evidence that the questionnaire reflects a single latent dimension. A dedicated structural study based on a larger sample would be more appropriate to investigate the dimensional architecture of the instrument.

The a priori power analysis required a sample of at least 136 individuals to detect a Cronbach's alpha of at least 0.80 (against a null hypothesis of 0.70) with 90% power [26]. Statistical analyses were performed using R Statistical Software v.4.4.1, and the following libraries: dplyr, MBESS, psych [27–30].

3. Results

3.1 Characteristics of the sample

The sample consisted of 266 French-speaking women, of whom 114 were under 25 years old, 101 were between 25 and 35 years old, and 51 were over 35 years old. Regarding nationality, 47 were French, 2 were Canadian, 1 was Luxembourgish, and the remaining ($n = 216$) were Belgian. The descriptive statistics for the entire sample, concerning general and psychometric characteristics, are presented in Table 1, while Table 2 displays those related to distress scores for each MEDI-Q item. The items with higher reported scores (i.e., average item distress score ≥ 1.00) were related to lower abdominal pain, discomfort associated with menstrual bleeding, the feeling of being dirty, fatigue, and psychological discomfort (particularly sadness, emotional lability, and irritability) (Table 2). In Figure 2, a heatmap is shown depicting the distress scores of individual MEDI-Q items, divided by age groups.

3.2 Psychometric validation

Considering reliability, the French version of MEDI-Q demonstrated good internal consistency, as shown by a Cronbach's $\alpha = 0.84$ (95% CI: 0.82–0.87) and a McDonald's $\omega = 0.86$ (95% CI: 0.83–0.88). Furthermore, the test-retest reliability after two weeks was excellent (ICC = 0.94).

Regarding convergent validity, Table 3 reports the psychopathological correlates of MEDI-Q scores. All MEDI-Q indices showed a statistically significant inverse association with age, indicating a higher prevalence and intensity of menstrual distress in younger age groups, and a lower overlap between menstrual and premenstrual symptoms (Table 3). MEDI-Q Total Score and MS were positively correlated with all global indices of psychological distress on the BSI scale, as well as

with almost all subscales related to psychopathological domains (Table 3). The MEDI-Q MSD index was positively correlated with the equivalent index of psychopathological distress, BSI PSDI (Table 3). Lastly, a significant positive association was observed between premenstrual symptoms, as measured by the SPAF score, and MEDI-Q Total Score, MS, and MSD indices, while the association with MESI was negative (Table 3).

4. Discussion

The present study confirms the validity of the French version of MEDI-Q, both regarding cross-cultural adaptation and psychometric properties, which were found to be similar to those demonstrated for versions in other languages [10,11]. In particular, good reliability and internal consistency emerged, and convergent validity tests confirmed the expected associations between greater menstrual distress and younger age, general psychological distress, and premenstrual symptomatology. The considered sample showed average general characteristics in line with expectations and previous studies, and in particular, the percentage of women using contraception was consistent with available population data (updated to 2021) [31].

However, it is important to highlight that the average MEDI-Q scores obtained in the French-speaking population of this study ($\text{MEDI-Q Total Score}_{\text{French}} = 17.63 \pm 13.99$) appear to be higher than those of the samples in previous validation studies ($\text{MEDI-Q Total Score}_{\text{Italian}} = 14.94 \pm 12.73$; $\text{MEDI-Q Total Score}_{\text{English}} = 12.43 \pm 11.27$) [10,11], although they did not reach those observed in clinical populations such as patients with Eating Disorders ($\text{MEDI-Q Total Score}_{\text{Eating Disorders}} = 20.16 \pm 13.76$) [14]. An initial hypothesis to explain this difference was to attribute it to a selection bias in the sample, drawn in part from university settings (for further discussion on this point, the study's limitations are described later). However, it is important to note that the same recruitment method was also used for the English validation [11], and while this does not allow a selection bias to be completely ruled out, it may suggest differences between the populations studied.

It could be hypothesized that this finding simply reflects a higher prevalence of psychopathological distress in the Belgian population (which represented 81.20% of the sample) compared to other populations. This hypothesis could be indirectly supported by available international data on suicide, which show rates in Belgium among the highest in Europe and in particular about 3 times those in Italy (data updated to 2021) [32]. However, data from the same sources regarding the prevalence of anxiety or depressive conditions are inconsistent [33], and indeed the mean scores of the general psychopathology scale BSI GSI highlighted in the present study do not seem to differ from those of the other populations examined [10,11].

Item-level data (Table 2) indicate that the aforementioned score differences appear to be particularly marked in two items, specifically those related to distress resulting from menstrual bleeding ($\text{MEDI-Q Bleeding}_{\text{Italian}} = 0.98 \pm 1.46$; $\text{MEDI-Q Bleeding}_{\text{English}} = 1.01 \pm 1.46$; $\text{MEDI-Q Bleeding}_{\text{French}} = 1.85 \pm 1.91$) and the feeling of being dirty ($\text{MEDI-Q Dirty}_{\text{Italian}} = 0.12 \pm 0.58$; $\text{MEDI-Q Dirty}_{\text{English}} = 0.25 \pm 0.81$; $\text{MEDI-Q Dirty}_{\text{French}} = 1.13 \pm 1.58$) [10,11]. For the latter item, scores in the French-speaking sample were markedly higher than those reported in previous validations. These observations were subsequently discussed with the development team responsible for the French adaptation of MEDI-Q, to assess whether they could reflect translation errors or validity issues; this possibility was excluded in this context.

These results highlight the need for caution when comparing absolute scores across language versions for two reasons. First, given the scarcity of comparative data across cultural contexts, it is not currently possible to draw firm conclusions regarding the origin of these differences, which will need to be clarified in future studies. Second, measurement invariance between the Italian and French versions of MEDI-Q has not been established, and observed differences may therefore reflect differences in item functioning or interpretation rather than true differences in the underlying construct. A potential interpretation is that the item referring to ‘feeling dirty’ may carry different semantic or experiential connotations across cultural contexts. This expression may capture a range of meanings or experiences (e.g., notions of cleanliness, bodily awareness). Consistent with this interpretation, the item shows greater variability, suggesting heterogeneity in responses. This pattern may indicate that respondents differ in how they interpret or relate to the item. Alternative explanations could also be considered. The observed difference could reflect greater sensitivity to the subjective experience of feeling dirty among Belgian women. However, available evidence does not clearly support a broader difference in contamination-related disgust. While previous studies using the Three-Domain Disgust Scale (TDDS) highlighted a possible greater propensity for sexual disgust in Belgian women compared to Italian subjects ($TDDS_{\text{Sexual}} = 2.91$ vs $TDDS_{\text{Sexual}} = 2.55$) [34,35], they also found no difference in the pathogen-related domain (3.07 vs 3.15). Since the MEDI-Q items related to bleeding and feeling dirty cannot be assumed to correspond specifically to any of these domains, this remains an open question and future studies will contribute to clarifying potential associations and differences between populations.

Finally, it is plausible that currently unexplored cultural and psychosocial factors contribute to these disparities, as the social stigma surrounding menstruation is a complex phenomenon highlighted in literature. This stigma encompasses linguo-cultural components (e.g., literature, media coverage, euphemisms, and menstrual product advertisements) as well as other factors, including education, background, menstrual experience, and knowledge [36,37]. These elements have substantial implications for health, quality of life, sexuality, and psychological well-being, as internalized negative attitudes toward menstruation have been associated with increased self-consciousness, hypervigilance and menstrual shame [38,39]. Even within a single country, cultural differences seem to play a significant role. For instance, a study conducted in the Netherlands involving both Dutch and Surinamese participants found that different forms of stigma shape attitudes and practices related to menstruation, influencing its perception as unhygienic and unclean [40]. Similarly, previous research has highlighted differences in menstrual knowledge among culturally diverse groups of female teenagers (i.e., African American, Mexican American, Arab American, and European American) in the United States [37]. To the best of our knowledge, this study is the first to investigate menstrual cycle-related experiences and distress in a predominantly Belgian French-speaking population. As such, there are currently no directly comparable data to support more specific hypotheses. Future research should therefore examine how perceptions of menstruation vary across cultural contexts and how these differences may influence responses to instruments such as MEDI-Q.

The present study presents numerous strengths. The cultural adaptation was conducted with rigor in all phases, including focus groups and back-translation steps with contributions from a multidisciplinary and multilingual team, ensuring cultural relevance for French-speaking populations. However, it is also important to consider some limitations. First, the focus group conducted during the development of the French version was composed of PhD students and research assistants; given their high level of education, this could have represented a limitation. A further methodological point concerns the dimensional structure of the MEDI-Q. Although internal

consistency was satisfactory in the present sample, these coefficients should not be interpreted as proof of strict unidimensionality. The MEDI-Q was designed to capture a heterogeneous set of menstrual symptoms and related distress, and it is clinically plausible that some symptom domains are only partially related, whereas others may be relatively independent. For this reason, we did not perform factor analysis in the present study, whose primary aim was the translation, cross-cultural adaptation, and replication of the psychometric approach adopted in previous MEDI-Q validations. Future large-scale studies should specifically examine the structural organization of the questionnaire and determine whether a simple, multidimensional, or more complex item structure best accounts for the observed responses.

An additional limitation concerns the voluntary nature of study participation. It is possible that women with higher levels of menstrual distress were more likely to participate, consequently inflating the observed mean MEDI-Q scores. However, it is important to note that this potential self-selection bias is not specific to the present study, as previous MEDI-Q validation studies also relied on voluntary recruitment. For this reason, comparisons across validation samples may still be informative, although they should be interpreted cautiously. Furthermore, this issue primarily affects the representativeness of the sample and the interpretation of absolute score levels, rather than the psychometric evaluation of the instrument, even if some impact on generalizability cannot be excluded. Given the anonymous nature of the data collection, it was not possible to determine the exact background context of the recruited participants, and in this sense the composition of the sample may be unbalanced. Moreover, the cultural context examined during the validation process was primarily that of the French-speaking Belgian population, and the majority of the sample consisted of Belgian women; thus, findings may not fully generalize to other French-speaking populations (e.g., Canada or France). As with all studies that rely on self-reported measures and data, there is the possibility of further biases not adequately taken into consideration. Finally, because this study was conducted on a non-clinical sample, future studies will be necessary to investigate aspects of criterion validity, such as predictive validity for gynecological conditions like endometriosis.

5. Conclusion

The robust psychometric properties of MEDI-Q support its use across multiple fields. As has already been done in other cultural contexts [12–14], the integration of the French version of MEDI-Q into routine clinical practice in gynecological or psychiatric settings will make it possible to obtain normative values and cut-off scores capable of identifying women experiencing significant menstrual distress. This could guide personalized treatment plans from a gender-based and precision medicine perspective, also allowing reliable monitoring of intervention outcomes over time. Integrating MEDI-Q into public health settings could further contribute to reducing the stigma still associated with menstruation [41–43], which often prevents women from bringing menstrual distress symptoms to the attention of healthcare providers due to embarrassment or lack of validation, and could improve the detection of menstrual disorders that otherwise risk going unnoticed or experiencing significant diagnostic delays [41,43]. The results obtained with MEDI-Q could, in the future, help formulate insights and develop tailored educational materials aimed at improving menstrual health literacy. As mentioned earlier, the availability of MEDI-Q in an increasing number of languages will enable cross-cultural comparisons in the future, providing valuable insights into differences among populations regarding experiences and menstrual-related impairment in quality of life.

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Figure Captions

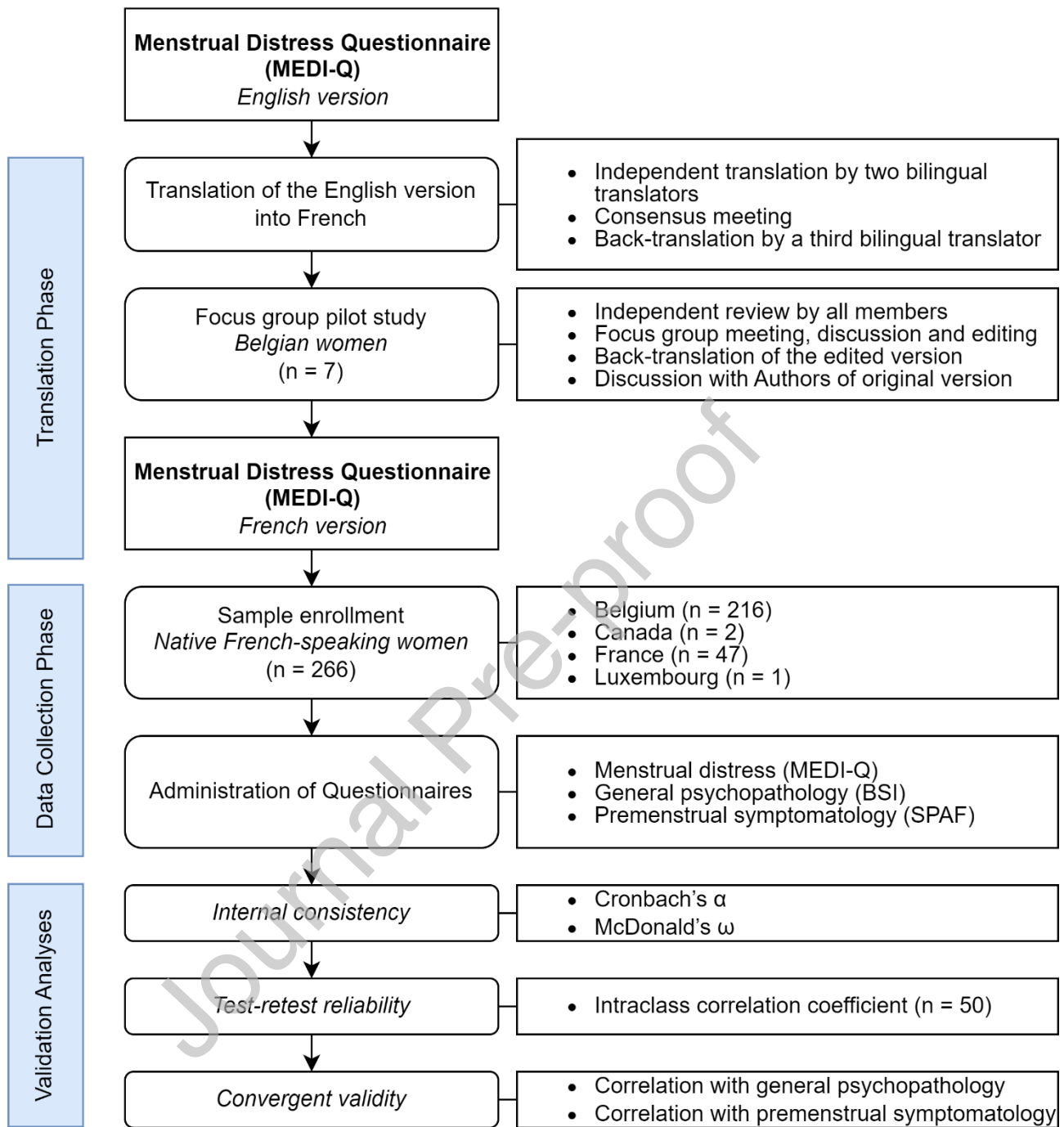


Figure 1 – Study flow chart.

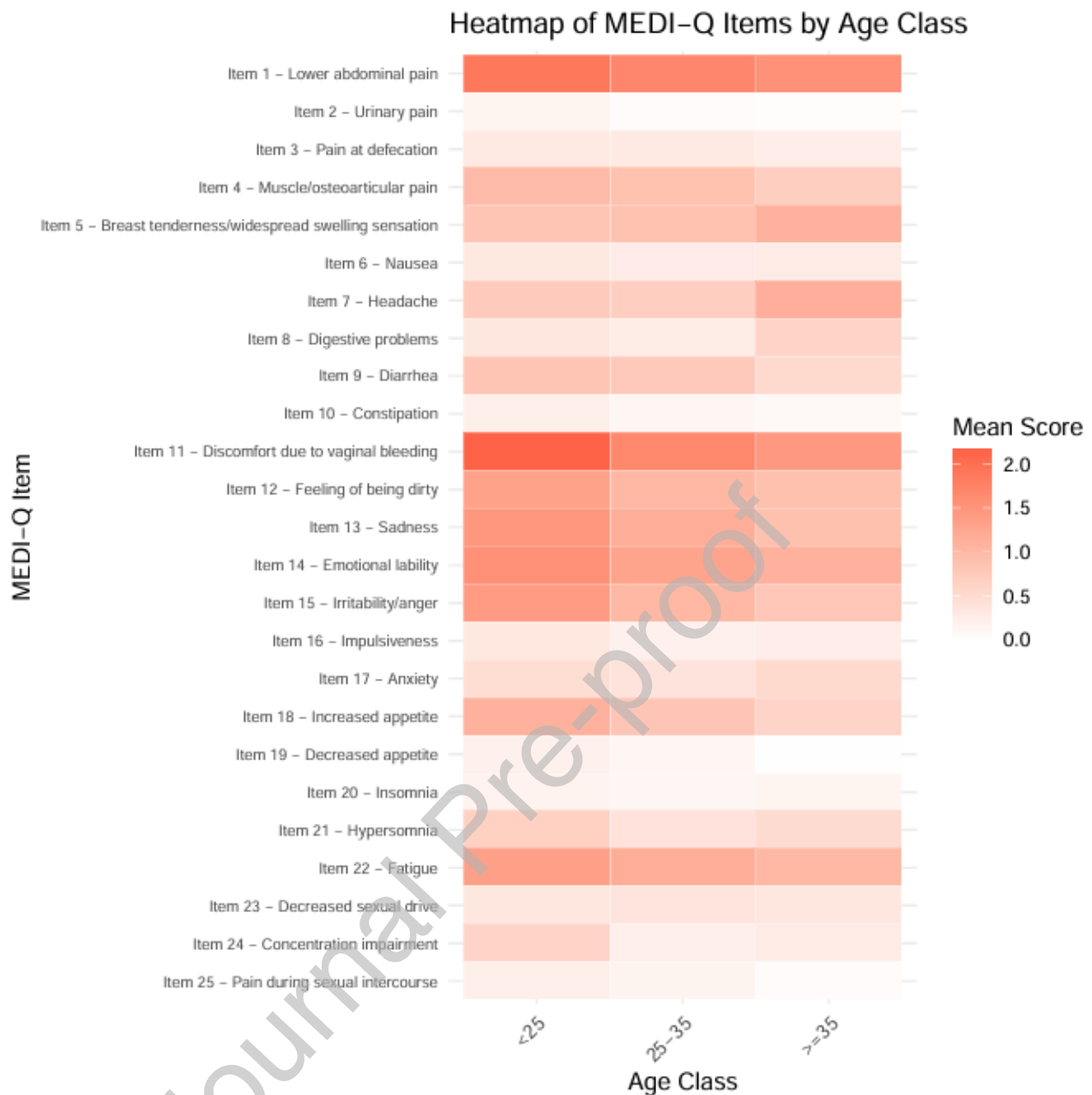


Figure 2 - Heatmap illustrating the distress scores of individual Menstrual Distress Questionnaire (MEDI-Q) items, divided by age groups.

Table 1 – General and psychometric characteristics of the sample.

	Mean $\pm$ SD/Frequency (%) (n = 266)
Age (years)	27.95 $\pm$ 7.98
Age at menarche (years)	12.73 $\pm$ 1.59
Menstrual cycle interval (days)	29.33 $\pm$ 6.47
Menstrual cycle duration (days)	4.96 $\pm$ 1.53
Hormonal contraceptive use	157 (59.0)
BSI Somatization	0.56 $\pm$ 0.68
BSI Obsessive-Compulsive	0.78 $\pm$ 0.82
BSI Interpersonal Sensitivity	0.76 $\pm$ 0.84
BSI Depression	0.75 $\pm$ 0.95
BSI Anxiety	0.52 $\pm$ 0.73
BSI Hostility	0.62 $\pm$ 0.73
BSI Phobic Anxiety	0.38 $\pm$ 0.70
BSI Paranoid Ideation	0.46 $\pm$ 0.73
BSI Psychoticism	0.47 $\pm$ 0.74
BSI PST	16.52 $\pm$ 13.35
BSI PSDI	1.62 $\pm$ 0.59
BSI GSI	0.59 $\pm$ 0.65
SPAF	26.03 $\pm$ 10.32
MEDI-Q Total Score	17.63 $\pm$ 13.99
MEDI-Q MS	7.48 $\pm$ 4.44
MEDI-Q MSD	2.05 $\pm$ 0.91
MEDI-Q MESI	0.56 $\pm$ 0.33

BSI = Brief Symptom Inventory; GSI = Global Severity Index; MEDI-Q = Menstrual Distress Questionnaire; MS = Menstrual Symptoms; MSD = Menstrual Symptoms Distress; MESI = Menstrual Specificity Index; PSDI = Positive Symptom Distress Index; PST = Positive Symptom Total; SD = Standard Deviation; SPAF = Shortened Premenstrual Assessment Form.

Table 2 – Average distress score for each MEDI-Q item.

Item number	Item description	Mean $\pm$ SD (n = 266)
Item 1	Lower abdominal pain	1.76 $\pm$ 1.68
Item 2	Urinary pain	0.08 $\pm$ 0.47
Item 3	Pain at defecation	0.29 $\pm$ 0.91
Item 4	Muscle/osteoarticular pain	0.89 $\pm$ 1.37
Item 5	Breast tenderness/widespread swelling sensation	0.90 $\pm$ 1.32
Item 6	Nausea	0.29 $\pm$ 0.81
Item 7	Headache	0.80 $\pm$ 1.33
Item 8	Digestive problems	0.36 $\pm$ 0.89
Item 9	Diarrhea	0.76 $\pm$ 1.30
Item 10	Constipation	0.16 $\pm$ 0.65
Item 11	Discomfort due to vaginal bleeding	1.85 $\pm$ 1.91
Item 12	Feeling of being dirty	1.13 $\pm$ 1.58
Item 13	Sadness	1.24 $\pm$ 1.56
Item 14	Emotional lability	1.38 $\pm$ 1.64
Item 15	Irritability/anger	1.16 $\pm$ 1.46
Item 16	Impulsiveness	0.27 $\pm$ 0.84
Item 17	Anxiety	0.45 $\pm$ 1.08
Item 18	Increased appetite	0.90 $\pm$ 1.47
Item 19	Decreased appetite	0.14 $\pm$ 0.61

Item 20	Insomnia	0.15 ± 0.61
Item 21	Hypersomnia	0.54 ± 1.12
Item 22	Fatigue	1.21 ± 1.55
Item 23	Decreased sexual drive	0.36 ± 0.98
Item 24	Concentration impairment	0.39 ± 1.01
Item 25	Pain during sexual intercourse	0.17 ± 0.62

MEDI-Q = Menstrual Distress Questionnaire; SD = Standard Deviation

Table 3 – Correlates of MEDI-Q indices, calculated using age-adjusted linear regressions (with MEDI-Q scores as dependent variables). Standardized regression coefficients are reported, along with their respective p-values (*: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$).

	MEDI-Q Total Score	MEDI-Q MS	MEDI-Q MSD	MEDI-Q MESI
Age (Years)	-0.19**	-0.22***	-0.20**	-0.15*
BSI Somatization	0.28***	0.29***	0.13*	-0.08
BSI Obsessive-Compulsive	0.10	0.14*	0.01	-0.11
BSI Interpersonal Sensitivity	0.16**	0.17**	0.09	-0.19**
BSI Depression	0.16**	0.15*	0.14*	-0.09
BSI Anxiety	0.16**	0.17**	0.08	-0.13*
BSI Hostility	0.21***	0.16**	0.16*	-0.07
BSI Phobic Anxiety	0.14*	0.11	0.06	-0.08
BSI Paranoid Ideation	0.12*	0.12*	0.06	-0.07
BSI Psychoticism	0.12*	0.13*	0.07	-0.09
BSI PST	0.24***	0.27***	0.10	-0.13
BSI PSDI	0.16*	0.12*	0.18**	-0.13*
BSI GSI	0.19**	0.19**	0.10	-0.12
SPAF	0.50***	0.46***	0.46***	-0.30***

BSI = Brief Symptom Inventory; GSI = Global Severity Index; MEDI-Q = Menstrual Distress Questionnaire; MS = Menstrual Symptoms; MSD = Menstrual Symptoms Distress; MESI = Menstrual Specificity Index; PSDI = Positive Symptom Distress Index; PST = Positive Symptom Total; SD = Standard Deviation; SPAF = Shortened Premenstrual Assessment Form.

Declarations of interest:

none.

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