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Preliminary Psychometric Evaluation of the Arabic Trichotillomania Dimensional Scale (TTM-D) in an Online Convenience Sample From Five Arab Countries

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ABSTRACT

Background: Trichotillomania (TTM) is a disorder within Obsessive–Compulsive and Related Disorders, involving repetitive hair-pulling leading to hair loss and functional impairment. It remains under-investigated in the Middle East. The Trichotillomania Dimensional Scale (TTM-D) has not been validated in Arabic-speaking populations.

Methods: Arabic-speaking participants from Saudi Arabia, Egypt, Lebanon, Palestine, and Jordan were recruited online via snowball sampling (December 2024 and January 2025). The TTM-D was translated using forward-backward translation and expert panel review.

Results: A total of 1494 participants from five Arab countries completed the survey. The structure of the TTM-D showed mixed model fit (CFI = 0.957, TLI = 0.914, RMSEA = 0.139, SRMR = 0.044), with excellent internal consistency ($\alpha = 0.95$, $\omega = 0.95$) and satisfactory convergent validity (AVE = 0.55). Measurement invariance across gender (biological sex) was supported with no significant differences. Concurrent validity was demonstrated through significant correlations with depression-anxiety ($r = 0.29$), shame ($r = 0.28$–0.30), stress ($r = 0.13$), and loneliness ($r = 0.27$).

Conclusion: The Arabic TTM-D demonstrated strong psychometric properties. These results support it as a culturally sensitive and reliable tool for assessing TTM in Arab populations. Further validation is needed to enhance its diagnostic utility and establish clinical cut-off scores.

Anthony Rizk and Adella Ibrahim are first co-authors; Feten Fekih-Romdhane, Souheil Hallit and Sahar Obeid are last co-authors.

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1 | Introduction

Trichotillomania (TTM) has been recognized throughout the Diagnostic and Statistical Manual of Mental Disorders (DSM) as part of the Obsessive–Compulsive and Related Disorders (OCRDs) category in DSM-5 [1]. This spectrum includes a group of conditions that share important similarities in their clinical course, underlying risk factors, and response to treatment [2]. Individuals affected by disorders within this spectrum typically present with persistent preoccupations and engage in repetitive, often distressing behaviors [3]. The OCRD spectrum comprises OCD, hoarding disorder (HD), excoriation disorder (skin-picking), and body dysmorphic disorder (BDD), and trichotillomania (TTM; hair-pulling disorder) [4].

1.1 | Trichotillomania: Clinical Features, Prevalence and Correlates

Trichotillomania (TTM) is a relatively uncommon body-focused repetitive behavior disorder. Research has provided insights into its characteristics. TTM most often begins around adolescence (11–15 years old), with onset after age 20 being uncommon [5]. The disorder affects approximately 1% of the population, whereas all forms of hair-pulling behavior impact around 8% [6]. Recent meta-analytic findings report a pooled prevalence of about 1.14%. They also show that subclinical hair-pulling may affect up to 8.8% of individuals [6]. Research has found that TTM's prevalence is relatively uniform across different ethnic backgrounds, with little evidence to suggest meaningful differences based on income or educational attainment [7].

The disorder is frequently comorbid with other mental health conditions, especially OCD, anxiety, Attention-Deficit/Hyperactivity Disorder (ADHD), and Post-Traumatic Stress Disorder (PTSD) [8]. In particular, emerging research suggests that ADHD is more frequent in adults suffering from TTM than in the general population [9]. Recent research has further expanded the understanding of comorbidity patterns, indicating that PTSD may be present in approximately 19% of individuals with TTM and is associated with greater clinical complexity and co-occurring impulsive behaviors [10]. In addition, neurocognitive findings suggest that deficits in response inhibition may serve as a predictor of symptom severity and treatment outcomes, pointing to potential underlying cognitive mechanisms contributing to the disorder [11]. Comorbid presentations of TTM with Major Depressive Disorder (MDD) as well as Skin-Picking Disorder (SPD) have also been documented in other studies [12, 13].

Literature has linked TTM to strong feelings of shame, both general and symptom-related shame. Shame often arises from the pulling behavior and its visible effects, which may cause secrecy and social withdrawal [14–16]. Along with shame, TTM has also been linked to low mood, a sense of loneliness, and reduced self-esteem [17, 18]. Despite these findings, assessment remains challenging due to variability in measurement tools and limited standardized evaluation of core symptom dimensions [19]. Understanding these patterns is crucial for improving diagnosis and treatment approaches for those affected by TTM [20].

1.2 | Theoretical Framework for the Multidimensional Nature of the TTM Construct

This paper is guided by theoretical frameworks that explain the multidimensional nature of TTM. First, Emotion Regulation (ER) suggests that hair pulling is a regulation strategy for negative affects [21]. Individuals may do so to relieve a range of negative affects, such as boredom or anxiety [22, 23]. Consequently, the TTM-D measures distress and perceived control as core aspects of TTM.

Second, the Cognitive-Behavioral (CBT) perspective focuses on the "compulsion loop" and maladaptive coping strategies. Whereas TTM is maintained through negative behavioral reinforcement that provides temporary relief from cognitive or physical tension [18, 24]. This framework justifies the TTM-D's focus on "avoidance behavior." Such avoidance often results in functional impairment.

Finally, psychosocial models emphasize the significant role of shame, social evaluation, and stigma. Visible hair loss frequently leads to social avoidance and withdrawal [14]. These frameworks collectively support a multidimensional view of TTM involving emotional, behavioral, and social components. Cultural contexts that emphasize interpersonal evaluation may intensify shame and social stigma associated with visible hair loss, which has been linked to increased distress and maintenance of trichotillomania symptoms [25–27].

Through these three frameworks, this study evaluates how the TTM-D captures the interplay between internal and external states and consequences.

1.3 | Existing Assessment Tools for Assessing TTM

Several psychometric instruments have been developed to assess TTM, including the Massachusetts General Hospital Hair Pulling Scale (MGH-HPS), the Trichotillomania Scale for Children, and the NIMH Trichotillomania Severity Scale [26–28]. The MGH-HPS is among the most widely used measures and demonstrates good reliability [29–31]. However, existing tools primarily focus on symptom severity and control, while often neglecting functional impairment, avoidance behaviors, and broader dimensional aspects of the disorder. Reliability metrics are robust, with Cronbach's alpha coefficients of 0.89 for the overall score, 0.85 for the Severity subscale, and 0.84 for Resistance and Control. It partially aligns with DSM-5 criteria, which may limit diagnostic specificity [28]. MGH-HPS does not assess functional impairment or avoidance and may not have a fully unidimensional structure [32]. Also, its cross-cultural validity and standardized clinical cutoffs remain limited, which may reduce accuracy in diverse or non-clinical samples [28]. Recent studies show that the MGH-HPS has acceptable internal consistency. However, it may have weaker test–retest reliability and does not always match objective hair loss measures [33].

Although current assessment tools have been instrumental in evaluating specific components of TTM, there remains a gap in capturing the disorder's full complexity. Recent literature

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further reinforces this gap, emphasizing that existing measures often fail to fully capture functional impairment, avoidance behaviors, and the multidimensional nature of TTM, thereby supporting the need for a more comprehensive assessment instrument [33]. Addressing this, the Trichotillomania Dimensional Scale (TTM-D) was developed by the DSM-5 Obsessive-Compulsive Spectrum Disorders Sub-Workgroup to offer a dimensional framework for evaluating core symptoms [34]. Comprising five items, the TTM-D assesses frequency of hair-pulling, emotional distress, perceived control, avoidance behavior, and interference with daily functioning [29]. Validation results from a large U.S. collegiate sample supported the scale's unidimensionality, which explained 72% of the variance, and confirmed its strong internal reliability (Cronbach's $\alpha = 0.89$) [34]. However, the limited ethnic representation in the original sample raises concerns about cross-cultural applicability.

To date, the TTM-D has only undergone linguistic and psychometric adaptation in European Spanish, using data from adolescents in Spain, yielding acceptable reliability ($\alpha = 0.80$) [30]. Arabic-language validation studies for TTM remain scarce, with only limited preliminary adaptation work reported in the literature [35]. This underscores the need for broader validation studies in ethnically and culturally diverse populations to confirm the TTM-D's generalizability [34].

1.4 | The Arab Context

Research on TTM in Arab populations remains limited, with only a small number of studies conducted in the region [36–39]. This gap limits understanding of TTM across Arabic-speaking contexts. Given these differences, it is essential to investigate how TTM presents in Arab populations and to evaluate whether existing assessment tools, such as the TTM-D, retain their psychometric validity. Cross-cultural adaptation is necessary to ensure accurate measurement of psychological constructs across diverse populations.

1.5 | Study Rationale and Aim

The availability of culturally validated instruments is essential for advancing research on TTM. There is a clear need to extend research beyond Western settings and address gaps in underrepresented regions. This study aims to evaluate the reliability and validity of an Arabic-translated version of the Trichotillomania Dimensional Scale (TTM-D) in Arabic-speaking adults.

2 | Methods

2.1 | Sample Size Adequacy

Sample size adequacy was evaluated using a Monte Carlo simulation informed by the factor loadings reported by Banos-Chaparro et al. [31] for the one-factor TTM-D model (factor loadings varying between 0.93 and 0.96). Across 100 replications, sample sizes ranging from 180 to 300 participants were evaluated. Results showed a 100% convergence rate at all tested sample sizes. At $N = 180$, the model demonstrated excellent fit recovery (mean CFI = 0.999; mean RMSEA = 0.025). These findings indicate that a sample size of approximately 180 participants is sufficient for stable estimation of the one-factor TTM-D model. Therefore, the final sample size of 1494 participants exceeded the minimum required one for the planned CFA and measurement invariance analyses.

2.2 | Participants

Data collection was conducted via Google Forms between December 2024 and January 2025. Participants were Arabic-speaking adults from Saudi Arabia, Egypt, Lebanon, Palestine, and Jordan. A social media-based snowball sampling strategy was utilized, in which initial participants were invited to share the survey link with their personal and professional networks [40]. Included were adults (≥ 18 years) who were citizens and residents of the respective countries. Upon giving electronic informed consent, participants proceeded to complete the relevant scales. Participation was entirely voluntary, anonymous, and confidential. The same recruitment strategy was followed in all countries.

2.3 | Translation Procedure

Prior to its application in the current study, the TTM-D scale (see Supporting Information) underwent translation and cultural adaptation to ensure linguistic and conceptual equivalence in Arabic. Permission to translate and validate the scale was obtained from the original authors before initiating the adaptation process.

The Arabic adaptation of the TTM-D followed international protocols to ensure conceptual and cultural adequacy [41, 42]. First, a professional bilingual translator whose native language was Arabic and who had previous experience in psychological and health-related instrument translation conducted the forward translation. An expert review panel (comprising the study researchers, a bilingual translator, and a psychologist familiar with psychometric assessment) evaluated this version. The panel rated each item based on clarity, cultural relevance, conceptual equivalence, and comprehensibility. Special attention was given to the use of Modern Standard Arabic to maximize comprehensibility across Arabic-speaking populations and minimize potential dialect-related differences among participants from the five participating countries. Any discrepancies were resolved through agreement.

Afterwards, an independent bilingual psychologist, blinded to the original version and experienced in cross-cultural adaptation research, performed a back-translation, which was then compared to the original scale text to identify and resolve inconsistencies [42].

A pilot test was conducted with 30 Arabic-speaking adults to assess linguistic clarity. As part of a cognitive debriefing process, participants were asked to comment on the clarity, wording, interpretation and relevance of each item and to identify any terms that were difficult to understand or culturally inappropriate. Item-level feedback indicated that participants found the instructions and items clear, comprehensible, and

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culturally relevant, with no major concerns regarding wording or interpretation. Participants confirmed that the items were easy to understand. No further modifications were required.

2.4 | Questionnaire

Participants were asked to report their age, sex, country of birth, academic major, and the Household Crowding Index (HCI). The HCI was calculated by dividing the number of individuals residing in the household (excluding any newborns) by the total number of rooms, not including the kitchen [43]. In addition, participants were instructed to complete the following scales:

2.4.1 | Jong-Gierveld Loneliness Scale

Perceived loneliness was measured using the adapted 5-item Jong-Gierveld Loneliness Scale, which features statements such as "I experience a general sense of emptiness" and "I miss having people around." Responses were scored dichotomously, with affirmative answers coded as 1 and negative answers as 0. The total score, reflecting overall loneliness, was obtained by summing the item responses, where higher scores indicated greater levels of loneliness [36, 37]. This scale was included to assess the experience of loneliness often linked to TTM [17, 18]. For this study, the Arabic-language version of the scale, previously validated for use in the Lebanese context, was utilized in this study [38].

Trichotillomania Dimensional Scale (TTM-D). A 5-item self-report scale that measures TTM symptom severity over the past 7 days. Answers are rated on a 5-point Likert scale with the total score ranging from 0 to 20. Higher scores show greater symptom severity. LeBeau et al. (2013) showed good reliability (Cronbach's $\alpha = 0.89$) and validity.

2.4.2 | Patient Health Questionnaire (PHQ-4)

The PHQ-4 is a concise screening instrument consisting of four items designed to assess anxiety and depression symptoms experienced over the past 2 weeks [39]. It includes two subscales: one targeting anxiety (e.g., "Feeling nervous, anxious or on edge") and the other focusing on depressive symptoms (e.g., "Little interest or pleasure in doing things"), with each subscale comprising two items. Responses are rated on a 4-point Likert scale ranging from 0 ("not at all") to 3 ("nearly every day"), and the total score is calculated by summing all four items. Subscale scores of 3 or above suggest clinically relevant symptoms. The total score is categorized as follows: 0–2 (no distress), 3–5 (mild distress), 6–8 (moderate distress), and 9–12 (severe distress). For this study, the validated Arabic version of the PHQ-4, previously tested in the Lebanese population, was utilized [44].

2.4.3 | External and Internal Shame Scale (EISS)

This scale comprises eight items designed to capture four core emotional aspects commonly linked to experiences of general shame: feelings of inferiority, social exclusion, internal emptiness or lack of purpose, and perceived judgment. Each emotional dimension is assessed through both externalized expressions (e.g., "I feel that others see me as uninteresting") and internalized reflections (e.g., "I feel that I am different and inferior to the others"). Responses are recorded on a 5-point Likert scale ranging from 0 ("Never") to 4 ("Always"). The total score spans from 0 to 32, with higher scores indicating more intense feelings of shame. In this study, we used the Arabic adaptation of the scale, previously validated within the Lebanese context [45].

2.4.4 | Single Item Stress Arabic

To evaluate participants' immediate stress levels, participants were asked: "Using a scale from 0 to 10, where 0 means no stress at all and 10 indicates the highest stress imaginable, how would you rate your current level of stress?" [46]. The scale was presented as a horizontal line marked with numbers from 0 to 10, with descriptive labels placed beneath the endpoints. Participants indicated their stress level by selecting or circling the corresponding number. For analysis, responses were categorized into four levels: no stress (0), mild (1–3), moderate (4–7), and severe (8–10) levels of stress [47]. This scale was added to assess perceived stress, offering a brief psychometrically efficient alternative to longer measures while maintaining strong validity [46, 48, 49]. The Arabic version utilized in this study had been previously validated for the Lebanese population [49].

2.5 | Analytic Strategy

No missing data were found in the database since all questions were required in the Google Forms. A confirmatory factor analysis (CFA) was conducted using the lavaan package in R. Given the ordinal nature of the items and their non-normal distribution, the model was estimated using the weighted least squares mean and variance adjusted (WLSMV) estimator [50]. Multiple fit indices were calculated: root mean square error of approximation (RMSEA) (≤ 0.08), standardized root mean square residual (SRMR) (≤ 0.05), Tucker–Lewis Index (TLI) and Comparative Fit Index (CFI) (≥ 0.90 for both) [51]. Additionally, convergent validity was checked via the average variance extracted (AVE) ≥ 0.50 [52].

A multi-group CFA was conducted to examine measurement invariance of TTM-D scores across genders (biological sex) [53] at the configural, metric, and scalar levels [54]. ΔCFI ≤ 0.010 and ΔRMSEA ≤ 0.015 or ΔSRMR ≤ 0.010 supported the evidence of invariance [55]. Comparison of TTM-D scores between genders (biological sex) was done using the Mann-Whitney test and between countries using the Kruskal-Wallis test.

Internal reliability was assessed using McDonald's ω and Cronbach's α, with values greater than 0.70 reflecting adequate composite reliability [56]. The TTM-D scores were not normally distributed, as shown by skewness and kurtosis values outside the −1 and +1 interval [57]. The association between the TTM-D scores and other scores was evaluated using the Spearman test.

3 | Results

3.1 | Sample's Characteristics

A total of 1494 participants filled the survey from five different countries, with a mean age of 24.97 years and 74.5% females.

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TABLE 1 | Characteristics of the sample.

	Total ($n = 1494$)	Lebanon ($n = 389$)	Jordan ($n = 308$)	Egypt ($n = 298$)	Saudi Arabia ($n = 282$)	Palestine ($n = 217$)
Age (years)	24.97 ± 9.09	22.65 ± 7.26	26.71 ± 10.62	26.05 ± 8.55	27.63 ± 10.15	21.71 ± 6.76
Gender						
Male	381 (25.5%)	118 (30.3%)	78 (25.3%)	84 (28.2%)	52 (18.4%)	49 (22.6%)
Female	1113 (74.5%)	271 (69.7%)	230 (74.7%)	214 (71.8%)	230 (81.6%)	168 (77.4%)
HCI	1.16 ± 0.52	1.16 ± 0.51	1.10 ± 0.49	1.23 ± 0.51	0.96 ± 0.51	1.40 ± 0.52

Note: Values are presented as mean ± standard deviation (SD) for continuous variables and n (%) for categorical variables. Household Crowding Index (HCI) was calculated as the number of household members divided by the number of rooms (excluding kitchen).

TABLE 2 | Item-level means, medians, standard deviations, skewness, kurtosis, and response distributions of each item of the Arabic Trichotillomania Dimensional Scale (TTM-D).

	Item 1	Item 2	Item 3	Item 4	Item 5
Mean	0.43	0.36	0.45	0.20	0.18
Median	0	0	0	0	0
Standard deviation	0.81	0.79	0.93	0.59	0.54
Skewness	2.10	2.52	2.24	3.09	3.26
Kurtosis	4.28	6.28	4.34	9.02	10.96
Answers distribution					
Not at all	1070 (71.6%)	1168 (78.2%)	1130 (75.6%)	1312 (87.8%)	1301 (87.1%)
Mildly	267 (17.9%)	189 (12.7%)	183 (12.2%)	87 (5.8%)	128 (8.6%)
Moderately	103 (6.9%)	84 (5.6%)	87 (5.8%)	74 (5.0%)	47 (3.1%)
Severely	40 (2.7%)	37 (2.5%)	62 (4.1%)	21 (1.4%)	18 (1.2%)
Extremely	14 (0.9%)	16 (1.1%)	32 (2.1%)	0 (0%)	0 (0%)

TABLE 3 | Inter-item correlations and item-total correlations of the Arabic Trichotillomania Dimensional Scale (TTM-D).

	Total	Item 1	Item 2	Item 3	Item 4
Total	1				
Item 1	0.85***	1			
Item 2	0.85***	0.72***	1		
Item 3	0.83***	0.62***	0.62***	1	
Item 4	0.72***	0.49***	0.50***	0.49***	1
Item 5	0.73***	0.53***	0.52***	0.48***	0.58***

The mean TTM-D score was 1.62 (SD = 2.95), with 957 (64.1%) scoring zero (floor effect). The description by country can be found in Table 1. The item-level means, medians, standard deviations, skewness, kurtosis, and response distributions of each item of the Arabic TTM-D scale are summarized in Table 2, whereas the inter-item correlations and item-total correlations can be found in Table 3.

3.2 | Confirmatory Factor Analysis

The fit indices of the one-factor model were excellent ($\chi^2(5) = 39.19$; RMSEA = 0.068 (90% CI: 0.049, 0.088), SRMR = 0.033, CFI = 0.998, TLI = 0.997). The standardized estimates of factor loadings were all adequate and are shown in Figure 1. Internal consistency was good ($\alpha = 0.85$; $\omega = 0.87$), while composite reliability was excellent (CR = 0.94). The AVE value was 0.76, supporting convergent validity.

3.3 | Gender and Country Invariance

Measurement invariance results of the TTM-D scale across genders and countries at the configural, metric, and scalar levels can be found in Table 4. No significant difference in terms of trichotillomania was found between males (Median = 0.00, $n = 381$) and females (Median = 0.00, $n = 1113$), U = 205535, $Z = -1.04$, $p = 0.298$, Effect size = 0.03.

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The highest mean rank was observed in Palestinians (821.31), followed by Egyptians (758.38), Lebanese (750.71), Saudi (718.89), and Jordanians (707.11) ($\chi^2(4) = 14.26$, $p = 0.007$; Effect size = 0.007).

3.4 | Convergent Validity

Higher trichotillomania was significantly associated with higher depression-anxiety (rho = 0.29; $p < 0.001$), stress (rho = 0.13; $p < 0.001$), external (rho = 0.28; $p < 0.001$) and internal (rho = 0.30; $p < 0.001$) and more loneliness (rho = 0.27; $p < 0.001$) (Table 5).

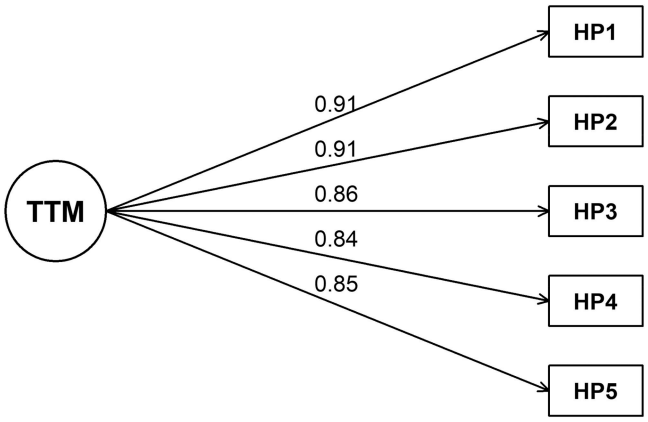

FIGURE 1 | Standardized factor loadings from the confirmatory factor analysis of the one-factor model of the Trichotillomania Dimensional Scale (TTM-D). HP = Hair Pulling measured by the TTM-D scale (observed variables). The model shows standardized loadings for items HP1–HP5 on the latent TTM-D factor.

4 | Discussion

This study sought to assess the psychometric properties of the TTM-D in a convenience sample drawn from five Arabic-speaking countries—Lebanon, Jordan, Egypt, Saudi Arabia, and Palestine—and to examine its applicability across gender and cultural groups. The scale demonstrated good factorial structure, with model fit indices supporting the unidimensionality of the construct. These findings align with previous studies supporting the scale's unidimensional construct. LeBeau et al. [34] and Cheyne et al. [32] both identified a single-factor solution in non-clinical U.S. and Australian samples, explaining over 70% of the variance with high item loadings. Our results provide preliminary support for this structure within this sample of Arabic-speaking participants. Additionally, Moreno-Amador et al. [58] found that hair-pulling items formed a distinct factor within a broader model of OCRDs, further supporting the internal consistency of hair-pulling symptoms as a coherent construct across cultural contexts. The RMSEA was elevated (0.139), likely due to the model's low degrees of freedom; in such cases, RMSEA may not be a reliable indicator. Therefore, model evaluation should rely on other fit indices, such as CFI and SRMR, which have been shown to be more stable under these conditions [59].

Internal consistency was excellent ($\omega = 0.95$, $\alpha = 0.95$), slightly higher but still confirmatory with LeBeau et al. [34] and Cheyne

TABLE 4 | Measurement invariance of the trichotillomania dimensional scale.

Model	CFI	RMSEA	SRMR	Model Comparison	ΔCFI	ΔRMSEA	ΔSRMR
Model 1: Invariance across sex							
Configural	0.999	0.062	0.034				
Metric	0.998	0.054	0.036	Configural vs metric	< 0.001	0.008	0.002
Scalar	0.999	0.038	0.034	Metric vs scalar	< 0.001	0.016	0.002
Model 2: Invariance across countries							
Configural	0.998	0.072	0.041				
Metric	0.997	0.075	0.053	Configural vs metric	0.001	0.002	0.012
Scalar	0.999	0.029	0.041	Metric vs scalar	0.002	0.046	0.012

Note: CFI = comparative fit index, RMSEA = root mean square error of approximation, SRMR = standardized root mean square residual. Measurement invariance was evaluated using changes in fit indices.

TABLE 5 | Correlation matrix between scores.

	1	2	3	4	5	6
1. Trichotillomania	1					
2. Depression–anxiety	0.29***	1				
3. Stress	0.13***	0.46***	1			
4. External shame	0.28***	0.53***	0.27***	1		
5. Internal shame	0.30***	0.50***	0.25***	0.81***	1	
6. Loneliness	0.27***	0.45***	0.24***	0.42***	0.46***	1

Note. Values represent Spearman's rank correlation coefficients (ρ).
***$p < 0.001$.

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et al. [32] ($\alpha = 0.89$, $\alpha = 0.89$, respectively) and equal to Moreno-Amador et al. [30] ($\alpha = 0.95$), indicating strong reliability in capturing hair-pulling symptoms. Convergent validity was supported by an AVE of 0.55, exceeding the 0.50 threshold, and the square root of AVE (0.74) was higher than any inter-factor correlation, thus confirming discriminant validity. These results suggest that the TTM-D demonstrated acceptable psychometric performance in this sample, showing expected patterns of associations with related psychological constructs [60].

Measurement invariance analyses further supported the scale's measurement equivalence across diverse subgroups. The results supported configural, metric, and scalar invariance of the TTM-D across gender, indicating comparable measurement properties across males and females, allowing for cautious group comparisons. Furthermore, no statistically significant differences in TTM-D scores were observed between men and women ($p = 0.298$; Cohen's $d = 0.125$), indicating no statistically detectable differences in scores between genders within this sample. This is consistent with prior literature reporting associations between hair-pulling behaviors and emotion regulation processes [24]. In contrast, earlier validations by LeBeau et al. [34] and Cheyne et al. [32] confirmed TTM-D's unidimensionality and reliability in U.S. and Australian samples, respectively, but did not test for invariance across demographic subgroups. Similarly, Moreno-Amador et al. [58] confirmed factorial validity of hair-pulling symptoms as part of a broader OCRD model but did not evaluate subgroup invariance, noting this as a limitation. To our knowledge, this study provides initial evidence on measurement invariance of the TTM-D across gender and countries in Arabic-speaking samples.

The Arabic version of the TTM-D was translated using Modern Standard Arabic, which is the formal written language shared across Arabic-speaking countries and commonly used in educational, clinical, and research settings. Therefore, linguistic differences attributable to local dialects are expected to be minimal. We acknowledge, however, that the use of a common written language does not necessarily guarantee complete measurement equivalence across different cultural contexts. According to the measurement invariance testing across countries, results supported configural and metric invariance, suggesting that the latent construct and factor loadings were comparable across national groups. Nevertheless, evidence of scalar invariance was less clear and showed a larger deterioration in fit (ΔRMSEA = 0.046), indicating that some caution is warranted when interpreting country-level mean differences. Country-level comparisons revealed significant differences in hair-pulling severity, with Palestinians reporting the highest scores, followed by Lebanese, Egyptians, Saudis, and Jordanians. Although effect sizes were small, these findings reflect group-level differences within this specific sample and should be interpreted cautiously given sampling and measurement limitations. Importantly, given the cross-sectional design, non-representative sampling, and lack of measurement invariance support across countries, these differences should not be interpreted as evidence of true population-level or cultural differences in trichotillomania symptoms. Prior work has linked BFRB with emotion regulation processes [61].

TTM-D scores correlated significantly with higher psychological distress, shame, and loneliness. The magnitude of these correlations was small to moderate, indicating that TTM is related to, yet distinct from, these psychological constructs, suggesting preliminary evidence of convergent validity within this non-clinical sample given the absence of clinical diagnoses or a gold-standard trichotillomania-specific criterion measure. In addition, internal convergent validity was supported using the Fornell–Larcker criterion, as the square root of the AVE ($= 0.74$) exceeded the inter-factor correlations. These associations are consistent with patterns reported in prior studies. TTM has been reported to co-occur with depression, anxiety, and stress symptomatology in prior research [2, 3]. Feelings of internalized and socially induced shame and loneliness are also common among individuals with TTM, particularly due to the visible consequences of hair-pulling and the secrecy that often surrounds it, consistent with models linking BFRB to broader social-emotional processes [14, 16, 18]. Additionally, these associations are consistent with previous research describing associations between repetitive behaviors and emotion regulation processes [20, 62].

4.1 | Limitations

Although the study provides useful insights into the validation of the scale, several limitations should be considered. Firstly, its cross-sectional design restricts our capacity to conclude causal relationships and does not allow for the evaluation of scale stability over time (test-retest reliability). Secondly, the sample consisted of a non-clinical population recruited online, with very low levels of trichotillomania symptoms (median score = 0), which limits the ability to evaluate the scale's performance in detecting clinically meaningful symptoms. Although the measures used have been widely applied in research and shown strong psychometric properties, interpretations should be approached with caution. Future studies including clinical samples and structured diagnostic assessments are warranted. Moreover, criterion validity was not assessed, as no gold standard diagnostic instrument or structured clinical interview for TTM was included. Future studies should incorporate clinically validated diagnostic tools to further examine criterion validity. Third, the use of online snowball sampling may have introduced selection bias and contributed to the overrepresentation of individuals with low symptom severity. Fourth, the sample was predominantly young, female, and recruited online using convenience and snowball sampling methods, which limits its representativeness. As such, the sample does not reflect the general Arab adult population or individuals with trichotillomania, and the findings should be interpreted accordingly. Although measurement invariance was assessed, future research should further evaluate cross-cultural measurement properties in broader and more representative samples. To evaluate the consistency of TTM-D scores over time, especially in groups exposed to trauma, longitudinal studies are also required. LeBeau et al. [34] also talk about the importance of expanding TTM research across diverse cultural contexts to maintain assessment tools' reliability and validity. Like our study, their research calls for continued diverse demographic and cross-cultural validation. Other psychometric properties (i.e., test-retest) were not assessed due to

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the cross-sectional design; longitudinal studies are required to measure the changes in TTM symptoms over time and their changeability alongside treatment. No criterion validity was assessed as we did not compare the TTM-D against a structured clinical interview, clinician diagnosis, or another established trichotillomania measure. Additionally, the absence of a clinical sample and a diagnostic reference standard (e.g., structured clinical interview) precludes any conclusions regarding the clinical utility, diagnostic validity, or cut-off scores of the Arabic TTM-D. Future studies are needed to evaluate the Arabic TTM-D in clinical samples of individuals diagnosed with trichotillomania and are necessary to be able to develop a cut-off score that helps separate clinical from non-clinical samples. Another limitation is that the country-specific sample sizes were not perfectly balanced. Although all groups were sufficiently large for the planned analyses, differences in sample size may have affected the precision of parameter estimates and measurement invariance results. Finally, no contextual or environmental variables were measured; therefore, no interpretation regarding external influences on group differences can be made.

4.2 | Implications

Providing a validated Arabic version of the Trichotillomania Dimensional Scale will provide researchers with a standardized tool for assessing TTM symptoms in Arabic-speaking populations. This tool may be used alongside other assessment approaches in research and, pending further validation, may inform future clinical investigations. Furthermore, this validation study provides a tool relevant to the cultural contexts of the Arab world. Future research should combine quantitative assessments with innovative qualitative methods, such as Online Photovoice (OPV), Online Interpretative Phenomenological Analysis (OIPA), and Community-Based Participatory Research (CBPR), to capture participants' lived experiences, thoughts, and feelings with minimal researcher manipulation [63–66]. Incorporating these approaches can provide richer insights into cultural stigma, regional stressors, and psychosocial impacts, while informing future research on culturally relevant mental health approaches.

5 | Conclusion

This study provides preliminary evidence of internal consistency and a partially acceptable one-factor structure of the Arabic TTM-D in a non-clinical convenience sample. The TTM-D may be useful for research purposes and for describing symptom patterns and in research where TTM needs to be measured with other psychiatric conditions, especially as this study adds to the rather limited body of research within both the Middle Eastern and Arab world. These results should be interpreted within the context of a non-representative convenience sample and do not provide evidence of cross-national or population-level generalizability and further validation is needed. These findings should not be generalized to clinical populations or to the broader Arab population. Further research into culturally sensitive assessment approaches is needed, and a validated Arabic version of the TTM-D may serve as a preliminary measure of TTM symptoms in research contexts. In line with Cheyne et al. [32], our study further examines the TTM-D, providing further proof of internal consistency and factorial validity.

Author Contributions

Anthony Rizk: writing – original draft. **Adella Ibrahim:** writing – original draft. **Diana Malaeb:** resources. **Amira M Ali:** resources. **Mirna Fawaz:** project administration. **Nouran Omar El Said:** project administration. **Nisma Merdad:** project administration. **Rizwana Amin:** project administration. **Wizra Saeed:** project administration. **Muna Barakat:** project administration. **Rami Mosleh:** project administration. **Rita Doumit:** resources. **Marie-Anne El Khoury:** resources. **Feten Fekih-Romdhane:** validation. **Souheil Hallit:** formal analysis. **Sahar Obeid:** supervision.

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The authors have nothing to report.

Ethics Statement

The Institutional Review Board of Rayak University Hospital granted this study ethical approval. Written informed consent was obtained from all subjects; the online submission of the soft copy was considered equivalent to receiving written informed consent. Every step of the process was carried out in compliance with all applicable laws and rules (such as the Declaration of Helsinki).

Consent

The authors have nothing to report.

Conflicts of Interest

The authors have nothing to disclose.

Data Availability Statement

The datasets generated and/or analyzed during the current study are not publicly available but are available from the corresponding author on reasonable request (SH).

Transparency Statement

The lead/Corresponding author (S.H.) affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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Supporting Information

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

Supporting File: hsr273112-sup-0001-Trichotillomania_Scale.docx.

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