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The Risk Factors of Chronic Pain Checklist (RFCP-CK): A New Screening and Assessment Tool for Victims of Violence and Non-Victims

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Abstract

Background/Objectives: Chronic pain in women arises from a complex interplay of biological, psychological, and social factors. Despite its impact, validated screens for these bio-psycho-social risk factors are lacking. This study aimed to develop and validate a new screening and assessment tool to prevent chronic pain onset and detect hidden experiences of violence or trauma in women, also supporting individualized treatment. **Methods**: Conducted from December 2023 to June 2024 as part of a larger project, the original instrument comprised 36 bio-psycho-social risk factors. Rasch analysis was used for validation, assessing Infit, Outfit, DIF, ROC curves, and reliability indexes. **Results**: The sample included 239 women (100 victims), with 103 experiencing chronic pain, and 136 pain-free. Seven items were excluded due to poor fit, resulting in a 29-item version that met Rasch model criteria. **Conclusions**: The validated 29-item checklist, available in Italian, supports the bio-psycho-social model by identifying risk factors for chronic pain onset and detecting violence-related variables in diagnosed individuals. It offers clinicians and operators a practical tool to guide prevention and tailor personalized treatments. In addition, the RFCP-CK holds forensic relevance by offering measurable indicators that can support medico-legal evaluations, especially in cases where chronic pain is claimed to be a consequence of violence.

Keywords: chronic pain; risk factors; bio-psycho-social model; validation study; screening and assessment

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Academic Editors: Ricardo Jorge Dinis-Oliveira and Jarosław Berent

Received: 15 September 2025
Revised: 28 October 2025
Accepted: 12 November 2025
Published: 14 November 2025

Citation: Uvelli, A.; Pugliese, E.; Ferretti, F. The Risk Factors of Chronic Pain Checklist (RFCP-CK): A New Screening and Assessment Tool for Victims of Violence and Non-Victims. *Forensic Sci.* **2025**, *5*, 63. https://doi.org/10.3390/forensicsci5040063

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1. Introduction

Intimate Partner Violence (IPV) is a pervasive public health and social issue encompassing physical, sexual, psychological, and economic abuse perpetrated by a current or former partner [1,2]. Its consequences extend well beyond the direct victim, affecting families, communities, and healthcare systems, and imposing considerable societal costs. For example, the lifetime economic cost of IPV is estimated at $103,767 per female victim. At the same time, medical expenses accounted for 59% of this amount, lost productivity for 37%, and the remaining portion is attributed to criminal justice and property loss [3]. Beyond its economic toll, IPV has a profound psychological and physical impact. Victims are at increased risk of anxiety, depression, post-traumatic stress disorder (PTSD), and substance abuse [4], as well as long-term somatic conditions, including chronic pain [5,6]. Chronic pain, defined as pain lasting for at least three months, is known to impair daily functioning and reduce quality of life significantly. The International Association for the Study of

Pain defines it as "an unpleasant sensory and emotional experience associated with, or resembling that associated with actual or potential tissue damage" [7]. Numerous pain conditions have been identified in women with a history of IPV, such as pelvic and vaginal pain [8], fibromyalgia [9], irritable bowel syndrome [10], and abdominal pain [11]. Others include temporomandibular joint pain [12], breast pain [13], migraines or headaches [14], back pain [15], and neck pain [16,17].

Furthermore, research shows that women tend to report chronic pain more frequently than men and with a lower pain threshold [18,19]. The physical consequences of chronic pain often include limited mobility and persistent fatigue [20]. Psychologically, it increases the risk for depression, anxiety, feelings of helplessness, and sleep disturbances [21,22]. Socially, it can result in isolation, impaired relationships, employment difficulties, and financial strain [23,24]. These interrelated effects illustrate how chronic pain impacts women across all domains of life. The bio-psycho-social model [25] has provided a comprehensive framework for understanding the multifaceted origins of chronic pain. Rather than attributing it solely to biological causes, the model highlights the interaction of biological, psychological, and social factors. This theoretical foundation guided a recent study by Uvelli et al. [26], which examined the relationship between chronic pain and violence exposure in women. The study involved 170 participants, including 68 victims of violence, and compared those with and without chronic pain. Results revealed nine specific risk factors for victims, three biological and six psychosocial, and four for non-victims, two biological and two psychosocial. Twenty-three risk factors (five biological and 18 psychosocial) were shared across the full sample. These findings informed a four-factor model describing risk in victims and a two-factor model for non-victims. The study underscores how biological (e.g., lipid metabolism disorder or respiratory infections), psychological (e.g., depression or anxiety), and social (e.g., social support or violence exposure) factors interact to shape vulnerability to chronic pain. Despite the recognition of chronic pain's multifactorial nature, most existing assessment tools focus on single domains, such as physical symptoms or functional impairment, thus failing to reflect its integrative complexity. A review by Grimmer-Somers et al. [27] identified 116 instruments assessing aspects of chronic pain, but only 45 had acceptable psychometric properties. Overlap in item content, wording, and scoring was common, and few tools adopt a holistic, bio-psycho-social perspective. Finally, no instrument has been developed that simultaneously captures the biological, psychological, and social dimensions of chronic pain and serves as a screening tool for identifying women at risk before the onset of chronic pain symptoms. Existing tools primarily assess the presence and impact of pain once it has already become chronic, thereby missing crucial opportunities for early intervention and prevention. The absence of such a comprehensive and anticipatory approach represents a critical gap in both clinical and research contexts. Addressing this gap is not only crucial for clinical prevention but also for forensic purposes, as the ability to objectively screen for bio-psycho-social risk factors and hidden experiences of violence strengthens medico-legal assessments, compensation claims, and the evaluation of causal links between trauma and chronic pain. Building on this background, the present study aimed to develop and validate a new screening and assessment checklist grounded in the bio-psycho-social model. The tool is designed to support the early identification of women at risk for chronic pain, including those with a history of being subjected to violence, and to promote more personalized clinical pathways. Furthermore, recognizing bio-psycho-social risk factors for chronic pain may serve both clinical and medico-legal purposes, potentially supporting claims for compensation among victims.

2. Materials and Methods

This study was conducted between December 2023 and June 2024 and forms part of a broader research project [28]. Data were collected from Italian anti-violence centers, the general population, and individuals living with chronic pain. The sample included all categories of victims, encompassing experiences of physical, sexual, and psychological abuse, as well as women reporting chronic pain. Chronic pain was defined according to the criteria proposed by Harris and colleagues [5]. The overarching aim of the project is to develop a validated assessment tool for forensic evaluations of women suffering from chronic pain, to distinguish its biological, psychological, and social components (Figure 1). This tool is intended to support professionals in identifying individualized treatment needs. At this stage, the present study aims to validate the RFCP-CK, a screening and assessment instrument designed both to identify risk factors associated with chronic pain in victims and to uncover hidden experiences of violence among women suffering from chronic pain. From a forensic perspective, the tool is intended to provide structured evidence that can assist in distinguishing pain of traumatic origin from other medical conditions, thus supporting expert testimony in legal proceedings. All procedures involving human participants adhered to the ethical standards of the relevant national and institutional research committees, as well as the 1975 Declaration of Helsinki, revised in 2013. Ethical approval was obtained from the Comitato per la Ricerca Etica nelle Scienze Umane e Sociali (CAREUS) at the University of Siena (registration number: 31/2023, issued on 6 December 2023). All participants provided informed consent after receiving detailed information about the study and its objectives. Only fully completed checklists were included in the final analyses.

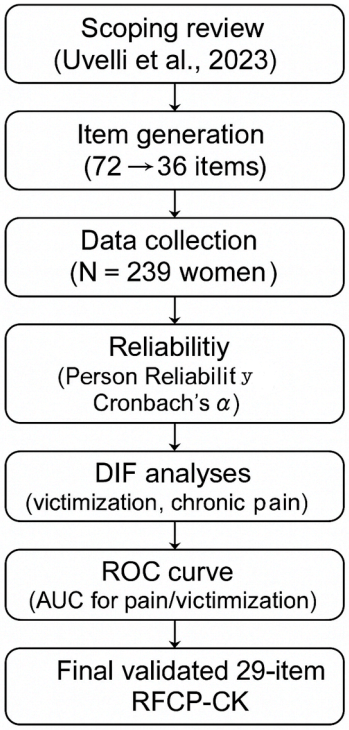

Figure 1. Flowchart of the RFCP-CK development and validation process [29].

2.1. Measure

Based on the scoping review by Uvelli and colleagues [29], the "Risk Factors of Chronic Pain Checklist" (RFCP-CK) was developed and administered to assess and validate the risk factors associated with chronic pain. The checklist was initially composed of two macro-areas, biological and psycho-social factors, organized into 14 categories: weight conditions,

acute upper/lower respiratory tract infection, genitourinary conditions, cardiovascular symptoms and conditions, endocrine disease, hormonal conditions, gastrointestinal disorders, skin problems, specific inflammations, mental health disease, use of psychoactive substances, life events, life quality, and personal characteristics.

The original version included 72 binary items (yes/no), each assessing the presence or absence of a specific condition (See Supplementary Materials). Affirmative responses were scored as 1, while negative responses were scored as 0, resulting in a total possible score ranging from 0 to 72. However, a previous study [26] revealed that certain biological and psychosocial conditions were not significantly associated with the risk of developing chronic pain in this population. These excluded conditions included: overweight/obesity, underweight, transmissible sexual infections, gynecological infections, urine leakage, genital vesicles/ulcers, bleeding after sexual intercourse, uterovaginal prolapse, arterial hypertension, diabetes, hypercholesterolemia, thyroid pathologies, intense menopause symptoms, irregular/absent menstrual cycle, gastroesophageal reflux, otitis/conjunctivitis, eating disorder, psychoactive substance intake, alcohol intake, smoker, recurrent sexual abuse at adult age, single physical abuse at adult age, single psychological abuse at adult age, single sexual abuse during childhood, recurrent sexual abuse during childhood, recurrent physical abuse during childhood, single psychological abuse during childhood, psychiatric diseases in the family, spontaneous abortion/voluntary termination of pregnancy, self-esteem, satisfactory sexual intercourse, sexual desire, meaningful friendships, regular physical activity/sport, age of first sexual intercourse less than 14 years, pain during sexual intercourse. As a result, these items were excluded from the validation process, and the initial version of the checklist to be validated was reduced to 36 items, with a maximum total score of 36 (Appendix A shows the version of the checklist used in the validation process).

2.2. Statistical Analysis

All statistical analyses were conducted using JAMovi software (version 2.6). The validation of the RFCP-CK followed a Rasch modeling approach, suitable for dichotomous items and applicable even in multi-dimensional instruments to examine item functioning and measurement quality. The fit of each item to the Rasch model was evaluated using infit and outfit statistics. Mean square (MNSQ) values were interpreted according to Wright and Linacre [30], with values between 0.6 and 1.4 considered acceptable. Values below 0.6 indicate overfit (item responses too predictable), while values above 1.4 suggest underfit (responses inconsistent with model expectations). The overall reliability of the scale was assessed using the person reliability index and the MADAQ3 statistic within the Rasch framework. A reliability value above 0.80 was interpreted as good, between 0.67 and 0.80 as acceptable, and below 0.67 as poor [31]. To complement Rasch reliability, Cronbach's alpha was also computed, with values above 0.70 considered acceptable [32]. Inter-item correlations were examined to assess item independence. To evaluate the invariance of item functioning across groups, a Differential Item Functioning (DIF) analysis was performed. A Conditional Likelihood Ratio Test (CLRT) was used as a global test for item bias across grouping variables (e.g., presence of chronic pain, history of victimization). Subsequently, Raju's area method was applied to detect DIF at the item level. Statistical significance was evaluated using p-values and adjusted p-values (Benjamini–Hochberg correction), while effect sizes were classified according to Zumbo [33] as negligible (<0.058), moderate (0.058–0.088), or large (>0.088). To evaluate the discriminatory ability of the RFCP-CK, Receiver Operating Characteristic (ROC) curve analyses were performed. Separate ROC curves were computed for chronic pain and victimization as classification criteria. The Area Under the Curve (AUC) was used as a global index of diagnostic accuracy, with

values of 0.7–0.8 indicating acceptable discrimination, 0.8–0.9 good, and >0.9 excellent [34]. Youden's index was used to identify the optimal cutoff score maximizing sensitivity and specificity. Furthermore, Spearman's rank-order correlations (ρ) were computed to explore the relationships between the biological, psychological, and social subdimensions of the RFCP-CK. This analysis also served to confirm the internal consistency of the theoretical model underlying the scale. Finally, a post hoc power analysis was conducted using G*Power 3.1 [35] to assess the adequacy of the sample size. Assuming an AUC of 0.77, an alpha level of 0.05, and a total sample of N = 239, the statistical power (1–β) exceeded 99%, confirming excellent sensitivity of the tool. For the Rasch model, the current sample size also exceeds the minimum thresholds proposed by Linacre [36], who recommends a sample of at least 200 participants to obtain stable parameter estimates (with SE < 0.5 logits) in dichotomous models.

3. Results

3.1. Participants

A total of 239 women participated in the study, including 100 victims (classified by the anti-violence centers) and 139 non-victims of violence. Among them, 103 individuals reported chronic pain, while 136 did not. The mean age of the total sample was 41.8 years (SD = 12.9), with an average education level of 15.8 years (SD = 4.33). Descriptive statistics for age and education levels across the sub-groups are reported in Table 1. Within the victim group, 85% reported experiences of revictimization, and 45% reported exposure to multiple forms of abuse. Specifically, 25% experienced sexual abuse, 43% physical abuse, and 84% psychological abuse. Inclusion criteria were identifying as female, being at least 18 years old, residing in Italy, and fluency in Italian. Exclusion criteria included being male, under 18 years of age, non-Italian speaking, and having cognitive impairments. Only fully completed checklists were included in the analyses. Regarding sample size estimation, Wright & Linacre [30] suggest that for Rasch analysis with dichotomous items, a minimum sample of 100–200 participants ensures stable item calibrations and person measures. The current sample size (N = 239) exceeds this threshold, ensuring sufficient power and stability for the planned analyses. Data collection was conducted either through in-person administration or via an online platform, depending on participant availability.

Table 1. Descriptive statistics of the sample.

	Victimization *	Age (Mean, SD)	Scholarship (Mean, SD)
Pain	• 0 • 1	• 42.3 (12.7) • 46.8 (12.2)	• 15.3 (3.71) • 14.5 (4.80)
Pain-free	• 0 • 1	• 39.5 (13.1) • 40.2 (11.6)	• 16.6 (4.32) • 16.2 (3.97)

* 0 = no; 1 = yes.

3.2. Preliminary Analyses

Before conducting the main analyses, a thorough examination of the Rasch model fit indices (infit and outfit statistics), endorsement rates, and differential item functioning (DIF) was carried out to identify potentially problematic items. Two biological items (number 2, respiratory allergies, and 4, vaginal swelling), one psychological item (number 30, suicidal thoughts), and four social items (number 27, relationship with parents, 28, life dissatisfaction, 32, social support, 36, number of sexual partners) showed significant misfit and inconsistent response patterns and they were excluded from the final version of the RFCP-CK. Items 1 and 6, although showing slight outfit statistics above the acceptable threshold (1.53–1.54), were retained because their removal negatively impacted the overall

scale indices and reliability. This careful selection process ensured optimization of the instrument's psychometric properties while maintaining comprehensive coverage of bio-psycho-social risk factors.

The final 29-item version of the RFCP-CK demonstrated good overall fit to the Rasch model, with infit and outfit mean square statistics within the acceptable range (0.6 to 1.4) for all retained items, except the aforementioned slight outfit excess for items 1 and 6 (Figures 2 and 3, Table 2). Person and item reliability indices were satisfactory, with reliability values exceeding 0.82, indicating stable measurement precision across respondents (Table 3). Complementing these findings, the Cronbach's alpha for the scale was 0.89, further supporting the internal consistency of the instrument.

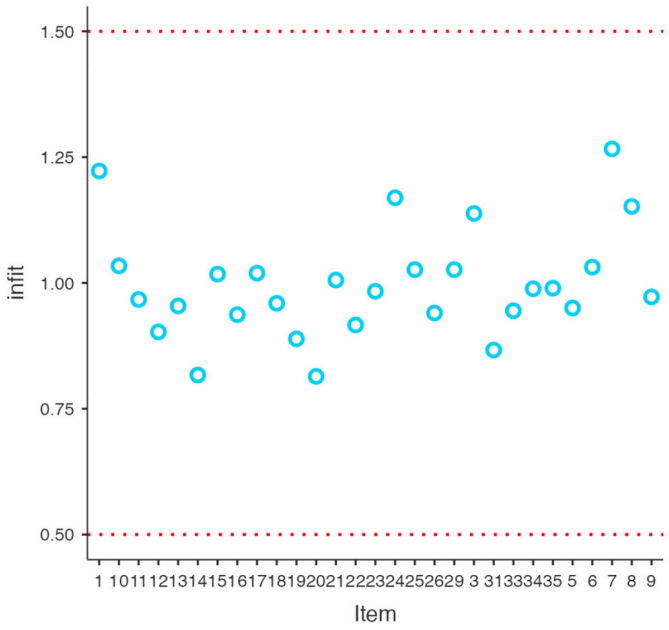

Figure 2. Item Infit Plot.

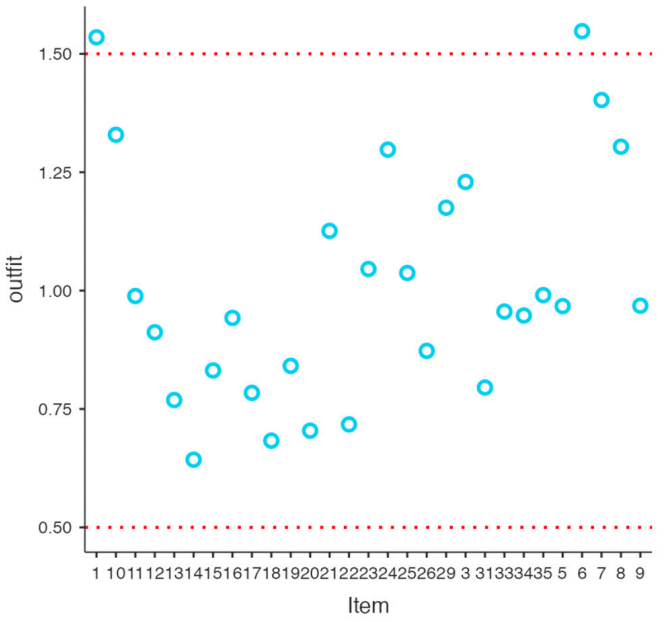

Figure 3. Item Outfit Plot.

Table 2. Item statistics.

Item	Proportion	Measure	S.E. Measure	Infit	Outfit
1	0.22	1.65	0.17	1.22	1.53
3	0.17	2.09	0.19	1.13	1.22
5	0.28	1.21	0.16	0.95	0.96
6	0.07	3.15	0.25	1.03	1.54
7	0.43	0.36	0.15	1.26	1.40
8	0.27	1.29	0.16	1.15	1.30
9	0.25	1.46	0.17	0.97	0.96
10	0.12	2.55	0.21	1.03	1.32
11	0.37	0.69	0.15	0.96	0.98
12	0.42	0.41	0.15	0.90	0.91
13	0.23	1.58	0.17	0.95	0.76
14	0.22	1.65	0.17	0.81	0.64
15	0.19	1.91	0.18	1.01	0.83
16	0.20	1.81	0.18	0.93	0.94
17	0.19	1.87	0.18	1.02	0.78
18	0.10	2.80	0.23	0.96	0.68
19	0.11	2.64	0.22	0.88	0.84
20	0.29	1.15	0.16	0.81	0.70
21	0.08	3.03	0.24	1.00	1.12
22	0.17	2.02	0.19	0.91	0.71
23	0.31	1.02	0.16	0.98	1.04
24	0.46	0.20	0.15	1.16	1.29
25	0.36	0.74	0.15	1.02	1.03
26	0.28	1.24	0.16	0.94	0.87
29	0.62	0.72	0.15	1.02	1.17
31	0.41	0.48	0.15	0.86	0.79
33	0.24	1.49	0.17	0.94	0.95
34	0.51	0.07	0.15	0.98	0.94
35	0.64	0.79	0.15	0.99	0.99

Table 3. Model Fit indices.

Person Reliability	MADaQ3	*p*
0.827	0.0746	<0.001

Person Reliability = internal consistency of person estimates; MADaQ3 = mean absolute deviation of adjusted Q3 residuals; *p* = significance level for the MADaQ3 statistic.

3.3. Correlation Analyses and Differential Item Functioning

Residual correlation analyses based on the Q3 matrix showed generally low inter-item correlations, with most values below 0.20. Exceptions were observed for items 9 and 10, related to musculoskeletal inflammation and osteoarthritis, respectively, and items 18, 19, and 20, which assess different types of abuse, with correlations around 0.33 to 0.34. These higher correlations are consistent with the conceptual similarity of the items (see Supplementary Materials). Overall, the residual correlations support the appropriateness of the scale structure and suggest that the items measure distinct but related constructs within the bio-psycho-social framework.

The differential item functioning analysis was conducted for both victimization and chronic pain grouping variables. The Conditional Likelihood Ratio Test (CLRT) confirmed the presence of significant DIF at the overall scale level ($p < 0.001$) (Table 4). These findings indicate that individuals respond differently to the items depending on whether they experience chronic pain and/or have a history of victimization, suggesting that the scale is sensitive to these conditions and effectively discriminates between groups. Item-level

DIF analysis using Raju's method for the variable victimization identified one item (Item 1: respiratory infections) with a statistically significant adjusted *p*-value and large effect size, suggesting that victims are more likely to report these symptoms beyond overall trait levels. Additional items (Items 7, 8, and 29) showed significant unadjusted *p*-values and large effect sizes, though they did not remain significant after correction, indicating a potential trend rather than definitive bias. Two items (Items 14 and 26) emerged as significant only after adjustment, both with large effects, reinforcing their clinical relevance in victim populations. Given the conceptual framework of the RFCP-CK, such differences appear to reflect genuine variance in symptom expression rather than psychometric bias. For this reason, item-level DIF findings for the chronic pain grouping, although initially explored, were excluded from the final report, as observed differences were consistent with the scale's intended sensitivity rather than indicative of measurement distortion.

Table 4. Conditional Likelihood Ratio Test.

	Value	DF	*p*
Overall	70.0	27	<0.001
Pain	72.4	28	<0.001
Victimization	65.2	23	<0.001

3.4. ROC Curve Analyses

Receiver Operating Characteristic (ROC) curve analyses evaluated the screening accuracy of the RFCP-CK total score. The area under the curve (AUC) for discriminating between victims and non-victims was excellent at 0.90, with an optimal cutoff score identified via Youden's index yielding 87.5% sensitivity and 76.8% specificity (Figure 4). For detection of chronic pain status, the AUC was 0.77, demonstrating good discriminatory power. The optimal cutoff identified via Youden's index balanced sensitivity (71.84%) and specificity (72.06%), confirming the tool's utility for early identification of individuals at risk of chronic pain (Figure 5, and Table 5). The excellent accuracy in discriminating victims from non-victims highlights the forensic potential of the RFCP-CK as an evidentiary instrument in medico-legal contexts where establishing the presence of violence-related risk factors is essential.

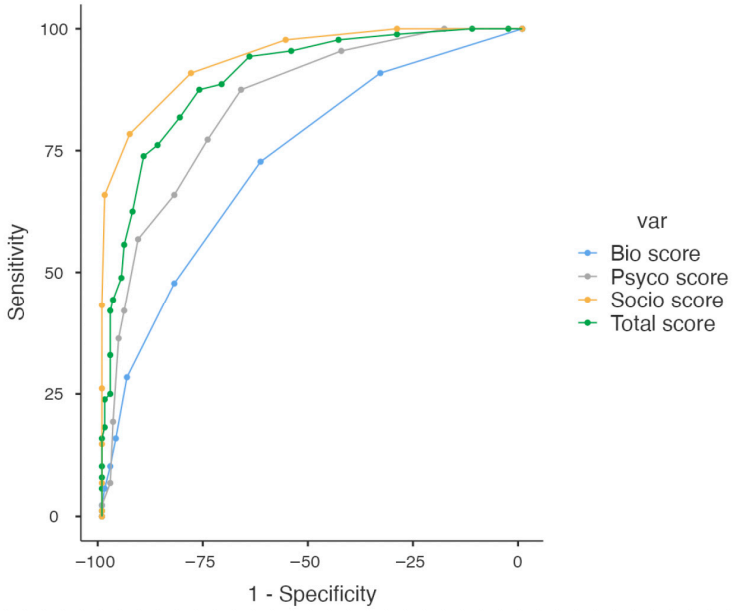

Figure 4. ROC curve combined for victimization.

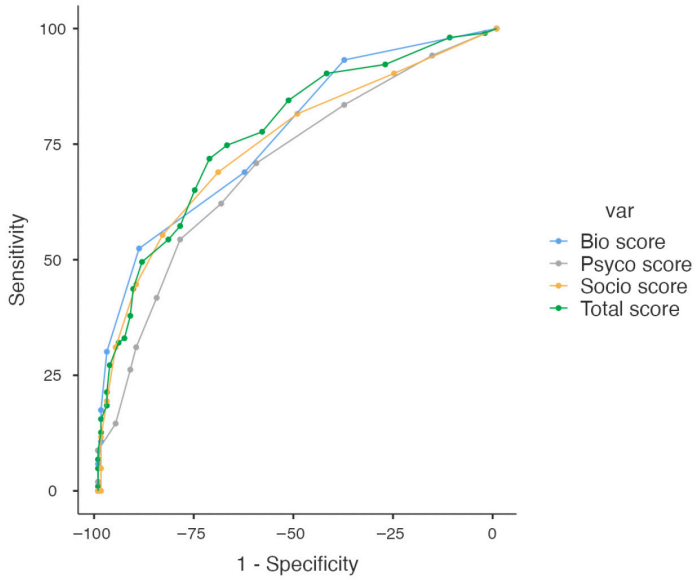

Figure 5. ROC curve combined for pain.

Table 5. ROC results table.

Cutpoint: 8	Sensitivity	Specificity	Youden's Index	AUC
Victimization	87.5%	76.82%	0.643	0.90
Pain	71.84%	72.06%	0–439	0.774

Overall, these psychometric validation procedures support the RFCP-CK as a reliable and valid instrument capturing the multidimensional bio-psycho-social risk profile for chronic pain among women, especially those with histories of victimization. The refined item set and demonstrated diagnostic accuracy provide a strong basis for clinical and forensic applications.

3.5. Intercorrelations and Scores

To further examine the internal structure of the RFCP-CK, intercorrelations were calculated between the three subdimensions: biological, psychological, and social. All correlations were large and statistically significant, ranging from $\rho = 0.52$ (biological and social) to $\rho = 0.73$ (psychological and social), indicating that the subdimensions are interrelated yet distinct, and each meaningfully contributes to the overall construct measured by the scale. Furthermore, all subdimensions showed strong positive correlations with the total score (ρ values ranging from 0.72 to 0.91), supporting their convergent validity within the biopsychosocial framework (Table 6). Additionally, mean subdimension scores were computed for participants with and without chronic pain, and with and without experience of violence. Victimized women with chronic pain scored higher on all subdimensions, particularly on psychological risk factors, highlighting the multidimensional nature of chronic pain risk factors (Table 7).

Table 6. Intercorrelations between the three subdimensions and the total score.

	Total Score	Biological Score	Psychological Score
Biological score	0.72 ***	-	-
Psychological score	0.91 ***	0.52 ***	-
Social score	0.89 ***	0.52 ***	0.73 ***

*** $p < 0.001$.

Table 7. The mean of the scores obtained by the total sample and the subgroups.

		Biological Risk Factors (Mean, SD)	Psychological Risk Factors (Mean, SD)	Social Risk Factors (Mean, SD)	Total Score (Mean, SD)
	Victimization	2.08 (1.85)	3.41 (3.31)	3.68 (2.40)	9.17 (6.63)
Pain	• 0	• 2.33 (1.69)	• 2.27 (2.21)	• 3.29 (2.23)	• 7.88 (4.96)
	• 1	• 3.72 (2.12)	• 7.46 (2.60)	• 6.02 (1.93)	• 17.20 (5.43)
Pain-free	• 0	• 1.14 (1.20)	• 1.22 (1.38)	• 2.39 (1.74)	• 4.75 (3.29)
	• 1	• 1.91 (1.22)	• 5.24 (2.85)	• 4.41 (2.03)	• 11.60 (5.08)

0 = no; 1 = yes.

4. Discussion

This study represents the first attempt to develop and validate a screening and assessment tool grounded in the bio-psycho-social model for identifying risk factors for the onset of chronic pain in women. The tool was designed to facilitate early screening and individualized clinical understanding of chronic pain development. Following meticulous item-by-item analysis, seven items were removed from the original 36-item version due to poor fit to the Rasch model or detrimental effects on the overall scale indices. These included items 2, 4, 27, 28, 30, 32, and 36. The final version of the RFCP-CK consists of 29 items and demonstrated strong psychometric properties, including adequate reliability, good item fit, and meaningful item intercorrelations, all supporting its unidimensionality within the broader bio-psycho-social conceptual framework.

Some of these results were unexpected. For instance, vaginal swelling and poor parental relationships had previously shown strong associations with chronic pain in Uvelli et al. [26], reporting odds ratios of 16.34 and 3.89, respectively. However, these conditions may exert an indirect or context-specific effect that becomes diluted in a broader sample. Vaginal swelling, for example, might act more as a symptom or epiphenomenon rather than a standalone risk factor, especially in contexts where sexual abuse is less frequently reported than psychological or physical violence. Likewise, parental relationships might be better conceptualized within the broader framework of familial dysfunction, as other retained items (e.g., tense relationships with the family of origin) were more predictive and aligned with previous literature [37,38]. Similarly, although social support is widely regarded as a buffer against psychological distress and chronic pain, recent studies, including Uvelli et al. [26] and Moreno-Ligero et al. [39], have questioned its direct predictive role in the onset of chronic pain, particularly in mixed samples of victims and non-victims. In our prior findings, its effect emerged only among victims, suggesting that in general populations, it may not serve as a core discriminative factor. Life dissatisfaction and suicidal ideation are often related to pain outcomes, but evidence [40] indicates that these variables may influence the intensity or maintenance of pain rather than its initial development. As such, their exclusion reflects a decision to retain items with greater primary relevance to the onset of chronic pain, rather than its secondary correlates. Finally, the item concerning more than four sexual partners over the lifetime, while associated with trauma exposure and relationship instability in some studies [41,42], lacked sufficient specificity in our sample. Its correlation with chronic pain may be confounded by multiple psychosocial mediators, reducing its direct predictive validity within a unified screening framework. In sum, these exclusions reinforce the scale's focus on direct and reliably measurable risk factors for chronic pain, improving its diagnostic precision while acknowledging the nuanced, often indirect contributions of other psychosocial variables.

The final 29-item version of the RFCP-CK aligns well with the scientific literature and captures the complexity of chronic pain through three interrelated domains. Biological items primarily relate to stress, immune dysregulation, and inflammatory responses, all of which

are central mechanisms in chronic pain, particularly among women [43–45]. Conditions such as respiratory and urinary tract infections, cardiac symptoms, lipid metabolism disturbances, skin issues, muscle inflammation, and osteoarthritis have all been linked to chronic pain through inflammatory or endocrine pathways [46–48].

Psychological risk factors included in the checklist, such as anxiety, mood disorders, PTSD, somatic symptoms, and general psychological suffering, are supported by a wide range of studies demonstrating both their predictive and maintaining roles in chronic pain [49–51]. The bidirectional relationship between psychological distress and chronic pain has been extensively documented [52], and the inclusion of guilt, shame, and stress reflects the growing consensus on the role of transdiagnostic factors in pain disorders [53].

The social dimension of the checklist includes items reflecting interpersonal trauma, adverse childhood experiences, and relational dysfunction. Several studies confirm that victims of violence, especially those with repeated exposures, are more likely to develop chronic pain [54–56]. In particular, repeated psychological and physical abuse in both childhood and adulthood significantly increases the risk of somatization and pain syndromes [57,58]. The inclusion of items on family conflict, relational stress, and difficulty in daily functioning (e.g., fatigue, emotional overload) reflects how these social stressors not only contribute to pain onset but also compromise coping strategies and overall functioning [59–61].

Importantly, the scale demonstrated good sensitivity and specificity in identifying women at risk of chronic pain, as shown by ROC curve analyses (AUC = 0.77), and was particularly effective in distinguishing victims of violence (AUC = 0.90). This supports the clinical and forensic utility of the RFCP-CK in both preventive and diagnostic frameworks. The scale's capacity to detect differential item functioning based on pain and victimization further confirms its sensitivity to relevant life conditions, indicating that the same items are interpreted and endorsed differently depending on women's trauma exposure and current symptomatology.

In conclusion, the RFCP-CK demonstrates strong theoretical and empirical grounding. It responds to the need for a psychometrically validated tool capable of capturing the multidimensional etiology of chronic pain in women, integrating biological, psychological, and social determinants. The findings also emphasize the value of individualized assessment and suggest directions for both clinical intervention and forensic evaluation. In forensic practice, the RFCP-CK can serve as a standardized measure to support causal attributions between violence and chronic pain, providing courts and medico-legal experts with a scientifically validated framework for interpreting complex symptomatology. The scale's ability to detect hidden patterns of violence and discriminate between victims and non-victims provides additional support for its use in prevention, treatment planning, and legal contexts.

Limitations

This tool has so far been validated exclusively in Italian, which limits its applicability to other linguistic and cultural contexts. Future adaptations and validations in different languages are necessary to extend its use to a broader and more diverse population. Additionally, to safeguard the anonymity and privacy of victims, only minimal demographic data, age, and educational background were collected. This constraint reduces the scope for more in-depth subgroup or moderator analyses. The recruitment of participants from anti-violence centers may limit the generalizability of the findings, as the sample represents a high-risk group with well-documented histories of interpersonal violence. Although this context provided a reliable gold standard for victim/non-victim classification, future studies are needed to validate the instrument in more heterogeneous populations to ensure

broader applicability. Being the first study to develop and validate this specific screening tool, further research is essential to confirm and generalize these findings across different settings and populations. Lastly, the exclusive focus on a female sample narrows the generalizability of the results, as it does not address the experience of chronic pain and victimization in males, thus limiting the tool's applicability to all genders.

5. Conclusions

Despite some limitations, this study provides valuable insights into a previously underexplored phenomenon while also confirming existing evidence. Our findings highlight that exposure to specific bio-psycho-social factors, such as respiratory infections, urinary infections, heart palpitations, lipid metabolism disorders, intestinal transit alterations, skin problems, muscle inflammation, osteoarthritis, various psychological diagnoses, experiences of violence and trauma, familial conflicts, stress, feelings of guilt and shame, daily functional impairments, fatigue, and high emotionality significantly contribute to the onset of chronic pain. Conversely, vaginal swelling, social support, life satisfaction, parental relationships, and number of sexual partners do not appear to be direct risk factors. This evidence supports the development of a new screening tool capable not only of preventing the onset of chronic pain in victims but also of detecting hidden experiences of violence in chronic pain patients. Designed for ease of use by a wide range of professionals, including healthcare providers and personnel at anti-violence centers, this tool can be administered via self-report or by integrating information gathered by operators, maximizing the potential for early identification and intervention. Beyond clinical implications, the RFCP-CK offers forensic professionals a structured checklist that can inform medico-legal evaluations, strengthen the assessment of damage, and contribute to the documentation of violence-related health consequences in judicial settings.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/forensicsci5040063/s1. Table S1: Checklist in Italian, English, and Spanish; Table S2: Inter-item correlations table.

Author Contributions: Conceptualization, A.U. and F.F.; methodology, A.U. and F.F.; software, A.U.; validation, A.U., E.P. and F.F.; formal analysis, A.U.; investigation, A.U. and E.P.; resources, A.U. and E.P.; data curation, A.U. and F.F.; writing—original draft preparation, A.U., E.P. and F.F.; writing—review and editing, A.U., E.P. and F.F.; supervision, F.F.; project administration, F.F. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: All procedures involving human participants adhered to the ethical standards of the relevant national and institutional research committees, as well as the 1975 Declaration of Helsinki, revised in 2013. Ethical approval was obtained from the Comitato per la Ricerca Etica nelle Scienze Umane e Sociali (CAREUS) at the University of Siena (registration number: 31/2023, issued on 6 December 2023).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The original contributions presented in this study are included in this article/Supplementary Materials. Further inquiries can be directed to the corresponding author.

Acknowledgments: The authors thank the Italian anti-violence centers and all the participants in the study for their collaboration.

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

Appendix A

Table A1. The 36-item tested checklist.

BIO-PSYCHO-SOCIAL Categories	YES	NO
1. Recurrent respiratory infections (sinusitis, nasal congestion)		
2. Allergies resulting in respiratory symptoms (asthma, allergic rhinitis)		
3. Recurrent urinary infections (cystitis, urethritis, pyelonephritis)		
4. Vaginal swelling		
5. Heart palpitations		
6. Lipid metabolism disorder		
7. Recurrent alterations of intestinal transit (constipation, diarrhea)		
8. Skin problems/irritations (dermatitis, eczema, rush)		
9. Muscle inflammation		
10. Osteoarthritis		
11. Sleep disorders (insomnia, hypersomnia)		
12. Anxiety disorder (panic disorder, social anxiety disorder, generalized anxiety disorder, specific phobia)		
13. Mood disorder (depression, bipolar disorder)		
14. Post-Traumatic stress disorder		
15. Somatic disorder (somatic symptoms, hypochondria, conversion disorder)		
16. Request for a medical advice for a disorder without receiving assistance for it		
17. Diagnosis of any psychological disorder		
18. Single sexual abuse by your partner at adult age (>18 years)		
19. Recurrent physical abuse by your partner at adult age (>18 years)		
20. Recurrent psychological abuse by your partner at adult age (>18 years)		
21. Single physical abuse during childhood (<18 years)		
22. Recurrent psychological abuse during childhood (<18 years)		
23. Traumatic experiences during childhood endured or witnessed		
24. Traumatic experiences in adulthood endured or witnessed		
25. Tense relationships within the family of origin		
26. Tense relationships within the current family unit		
27. Good relationship with parents		
28. Satisfaction for one's life as it is		
29. High stress levels		
30. Recurrent suicidal thoughts		
31. Recurring feelings of guilt and shame		
32. Getting support in case of need		
33. Impediment in carrying out normal daily activities due to pain		
34. Tiredness/absence of energy even in the early morning		
35. High emotionality (very intense expression and experience of emotional states)		
36. More than 4 sexual partners during the course of life		

Appendix B

Table A2. The final and validated checklist in Italian, English, and Spanish (for English or Spanish validation, contact the corresponding author).

Categorie BIO-PSICO-SOCIALI/ BIO-PSYCHO-SOCIAL Categories/ Categorías BIO-PSICO-SOCIAL	SI/Yes	NO
1. Infezioni delle vie respiratorie ricorrenti (sinusiti, congestioni nasali)—Recurrent respiratory infections (sinusitis, nasal congestion)—Infecciones recurrentes del tracto respiratorio (sinusitis, congestión nasal)		
2. Infezioni delle vie urinarie ricorrenti (cistiti, uretriti, pielonefriti)—Recurrent urinary infections (cystitis, urethritis, pyelonephritis)—Infecciones recurrentes del tracto urinario (cistitis, uretritis, pielonefritis)		
3. Palpitazioni cardiache—Heart palpitations—Palpitaciones del corazón		
4. Disturbo del metabolismo dei lipidi—Lipid metabolism disorder—Trastorno del metabolismo de los lípidos		

Table A2. *Cont.*

Categorie BIO-PSICO-SOCIALI/ BIO-PSYCHO-SOCIAL Categories/ Categorías BIO-PSICO-SOCIAL	**SI/Yes**	**NO**
5. Alterazioni ricorrenti nel transito intestinale (stitichezza, costipazione, diarrea)—Recurrent alterations of intestinal transit (constipation, diarrhea)—Alteraciones recurrentes en el tránsito intestinal (estreñimiento, diarrea)		
6. Problemi/irritazioni cutanee (dermatite, eczema, rash)—Skin problems/irritations (dermatitis, eczema, rush)—Problemas/irritaciones de la piel (dermatitis, eczema, erupción)		
7. Infiammazione muscolare—Muscle inflammation—Inflamación muscular		
8. Osteoartrite—Osteoarthritis—Osteoartritis		
9. Disturbi del sonno (insonnia, ipersonnia)—Sleep disorders (insomnia, hypersomnia)—Trastornos del sueño (insomnio, hipersomnia)		
10. Disturbo d'ansia (disturbo di panico, disturbo di ansia sociale, disturbo d'ansia generalizzato, fobia specifica)—Anxiety disorder (panic disorder, social anxiety disorder, generalized anxiety disorder, specific phobia)—Trastorno d'ansiedad (trastorno de pánico, trastorno de ansiedad social, d'ansiedad generalizada, fobia específica)		
11. Disturbo dell'umore (depressione, disturbo bipolare)—Mood disorder (depression, bipolar disorder)—Perturbación de'estado de ánimo (depresión, trastorno bipolar)		
12. Disturbo da stress post-traumatico—Post-Traumatic stress disorder—Trastorno de estrés postraumático		
13. Disturbo somatico (sintomi somatici, ipocondria, disturbo di conversione)—Somatic disorder (somatic symptoms, hypochondria, convertion disorder)—Trastorno somático (síntomas somáticos, hipocondría, trastorno de conversión)		
14. Richiesta di parere medico per un disturbo senza poi ricevere assistenza per quello—Request for a medical advice for a disorder without receiving assistance for it—Solicitar consejo médico para un trastorno sin recibir luego asistencia para ello		
15. Diagnosi di qualsiasi disturbo psicologico—Diagnosis of any psychological disorder—Diagnóstico de cualquier trastorno psicológico		
16. Singolo abuso sessuale da parte del partner durante l'età adulta (>18 anni)—Single sexual abuse by your partner at adult age (>18 years)—Abuso sexual individual por parte de la pareja durante su edad adulta (>18 años)		
17. Ricorrenti abusi fisici da parte del partner durante l'età adulta (>18 anni)—Recurrent physical abuse by your partner at adult age (>18 years)—Abuso físico recurrente por parte de la pareja durante el embarazo (>18 años)		
18. Ricorrenti abusi psicologici da parte del partner durante l'età adulta (>18 anni)—Recurrent psychological abuse by your partner at adult age (>18 years)—Abuso psicológico recurrente por parte de la pareja durante su edad adulta (>18 años)		
19. Singolo abuso fisico durante l'infanzia (<18 anni)—Single physical abuse during childhood (<18 years)—Abuso físico único durante infancia (<18 años)		
20. Ricorrenti abusi psicologici durante l'infanzia (<18 anni)—Recurrent psychological abuse during childhood (<18 years)—Abuso psicológico recurrente durante infancia (<18 años)		
21. Esperienze traumatiche durante l'infanzia subite o assistite (lutti, incidenti, violenza assistita, gravi malattie, guerra)—Traumatic experiences during childhood endured or witnessed (be reavement, accidents, assisted violence, serious illnesses, war)—Experiencias traumáticas durante infancia sufrida o presenciada (duelo, accidentes, violencia presenciada, enfermedades graves, guerra)		
22. Esperienze traumatiche durante l'età adulta subite o assistite (lutti, incidenti, violenza, gravi malattie, guerra)—Traumatic experiences in adulthood endured or witnessed (be reavement, accidents, violence, serious illnesses, war)—Experiencias traumáticas durante edad adulta sufrido o presenciado en la edad adulta (muerte, accidentes, violencia presenciada, enfermedades graves, guerra)		
23. Rapporti tesi all'interno della famiglia di origine—Tense relationships within the family of origin—Relaciones tensas dentro de la familia de origen		
24. Rapporti tesi all'interno dell'attuale nucleo familiare—Tense relationships within the current family unit—Relaciones tensas en todo el interior de la unidad familiar actual		

Table A2. *Cont.*

Categorie BIO-PSICO-SOCIALI/ BIO-PSYCHO-SOCIAL Categories/ Categorías BIO-PSICO-SOCIAL	SI/Yes	NO
25. Elevati livelli di stress—High stress levels—Altos niveles de estrés		
26. Ricorrenti sentimenti di colpa e vergogna—Recurring feelings of guilt and shame—Sentimientos recurrentes de culpa y vergüenza		
27. Impedimento nello svolgimento di normali attività quotidiane a causa di dolore—Impediment in carrying out normal daily activities due to pain—Impedimento para realizar actividades normales adiariamente debido al dolor		
28. Stanchezza/assenza di energie anche di prima mattina—Tiredness/absence of energy even in the early morning—Cansancio/falta de energía incluso temprano en la mañana		
29. Elevata emotività (espressione ed esperienza degli stati emotivi molto intensa)—High emotionality (very intense expression and experience of emotional states)—Alta emocionalidada (expresión y experiencia muy intensa de estados emocionales)		

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