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BMJ Open Development of a brief measure of intimate partner violence experiences: the Composite Abuse Scale (Revised)—Short Form (CAS_R-SF)

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ABSTRACT

Objectives: Approaches to measuring intimate partner violence (IPV) in populations often privilege physical violence, with poor assessment of other experiences. This has led to underestimating the scope and impact of IPV. The aim of this study was to develop a brief, reliable and valid self-report measure of IPV that adequately captures its complexity.

Design: Mixed-methods instrument development and psychometric testing to evolve a brief version of the Composite Abuse Scale (CAS) using secondary data analysis and expert feedback.

Setting: Data from 5 Canadian IPV studies; feedback from international IPV experts.

Participants: 31 international IPV experts including academic researchers, service providers and policy actors rated CAS items via an online survey. Pooled data from 6278 adult Canadian women were used for scale development.

Primary/secondary outcome measures: Scale reliability and validity; robustness of subscales assessing different IPV experiences.

Results: A 15-item version of the CAS has been developed (Composite Abuse Scale (Revised)—Short Form, CAS_R-SF), including 12 items developed from the original CAS and 3 items suggested through expert consultation and the evolving literature. Items cover 3 abuse domains: physical, sexual and psychological, with questions asked to assess lifetime, recent and current exposure, and abuse frequency. Factor loadings for the final 3-factor solution ranged from 0.81 to 0.91 for the 6 psychological abuse items, 0.63 to 0.92 for the 4 physical abuse items, and 0.85 and 0.93 for the 2 sexual abuse items. Moderate correlations were observed between the CAS_R-SF and measures of depression, post-traumatic stress disorder and coercive control. Internal consistency of the CAS_R-SF was 0.942. These reliability and validity estimates were comparable to those obtained for the original 30-item CAS.

Conclusions: The CAS_R-SF is brief self-report measure of IPV experiences among women that has demonstrated initial reliability and validity and is suitable for use in population studies or other studies. Additional validation of the 15-item scale with diverse samples is required.

Strengths and limitations of this study

- The Composite Abuse Scale (Revised)—Short Form (CAS_R-SF) is a comprehensive, valid and reliable brief self-report measure developed using a mixed-methods approach; it captures physical, sexual and psychological abuse and overall intimate partner violence, with a focus on severity and intensity of experiences.
- The CAS_R-SF retains the strengths of the longer, criterion standard 30-item CAS, and improves on it in a number of areas including brevity, respondent burden, and clarity of instructions, questions and response options.
- Items have been added to address critical gaps (ie, use of threats, financial abuse, choking) or updated (eg, use of new technologies for harassment), making the new tool capable of producing better quality data consistent with current thinking in the field.
- While developed and tested with data from a large, diverse sample of Canadian women, the extent to which the CAS_R-SF is robust in other samples, including in international settings, and with people of all genders, requires further testing.

INTRODUCTION

Intimate partner violence (IPV), defined as behaviour by a partner or ex-partner that includes physical aggression, sexual coercion, psychological abuse and controlling behaviours,¹ is a major public health issue with significant social and economic costs.^{2 3} Key to determining accurate estimates of IPV, its impacts and trends over time, is the collection of valid and reliable representative data that fully capture all types of IPV experiences, including when and how often each type occurs.

However, approaches to measuring IPV in population-based studies have tended to privilege physical (sometimes including sexual)

violence, and, as such, do not adequately measure the complexity of IPV experiences. For example, like many population surveys, Statistics Canada measures IPV in the General Social Survey (GSS)—Victimization; Spousal Abuse Module,⁴ using questions based, in part, on the Conflict Tactics Scale,^{5–7} a widely used scale that has also been critiqued for framing IPV narrowly as gender-neutral ‘conflict’ between partners, and which includes many items that do not reach threshold of IPV that is linked to poor health outcomes.^{8–10} Furthermore, the most common approach to scoring the Canadian GSS has been to count acts consistent with criminal code violations,⁴ generally physical and sexual assault. Overall, these narrow approaches have been widely criticised for oversimplifying the nature of IPV, ignoring the situational, cultural, and historical and gendered context in which IPV occurs^{11 12} and for overlooking the independent and cumulative effects of different types of violence.^{13 14}

Furthermore, contrary to the idea that there is a single experience of IPV,^{10 15} different patterns of victimisation have been identified, especially according to sex and gender. For example, IPV that is characterised by physical and/or sexual violence in the context of coercion, degradation and control is perpetrated almost exclusively by men against women and is associated with greater risk of negative health consequences, including injuries and death.^{16–19} Approaches are needed that assess violence broadly, inclusive of varied types of psychological, sexual and physical abuse and controlling behaviour. Without these, measures will fail to capture gender-specific types of IPV, leading to the faulty conclusion that people of different genders experience IPV similarly, and at similar rates.⁹ These incomplete data can have significant impacts on public perceptions and policy responses.¹⁰

A number of comprehensive, reliable and valid self-report measures of IPV have now been developed^{20 21} yet many are too long to be included in population-based surveys or studies with multiple scales. The 30-item Composite Abuse Scale (CAS),^{8 22 23} initially developed in Australia, is considered a preferred measure of IPV that has been used as a criterion standard for assessing women’s self-reported experiences of abuse.^{24 25} The CAS asks women to rate the frequency of experiencing each of 30 abusive acts in the previous 12 months, on a six-point scale ranging from ‘never’ (0) to ‘daily’ (5). Using cut-off scores, women’s responses are categorised as ‘positive’ or ‘negative’ for exposure to four types of IPV: physical abuse, emotional abuse, harassment and severe combined abuse. The CAS items cover a broad range of acts consistent with the WHO (2010) definition of IPV. The scale has been translated into eight languages and reliability and validity have been demonstrated in various contexts and populations.^{8 22 26–28}

Despite many strengths, the CAS has been critiqued for its response options, the wording of some items, and

for scoring responses according to *exposure* to IPV using cut-off scores, rather than capturing experiences of IPV on a continuum. In response to these critiques and to enhance its applicability, research has continued to refine the scale. In a large community-based sample of Australian women,²⁹ three factors (physical abuse, emotional abuse, harassment) were found to underlie the CAS item pool, rather than the four factors originally identified in clinical samples.²² Other investigators have modified CAS items to fit their context³⁰ or created continuous summed scores from CAS responses that correlate in expected ways with measures of depression,³¹ anxiety³² and symptoms of post-traumatic stress disorder (PTSD).^{32 33} Recently, the meaning of CAS items to female survivors of IPV was qualitatively explored, leading to recommendations to improve items and response options.³⁴ The purpose of this study was to develop a brief self-report measure of IPV based on the CAS that captures the complexity of IPV, including severity, while limiting participant burden and enhancing emotional safety.

METHODS

A two-phase, mixed-methods study was undertaken. In phase 1, experts in the area of IPV rated the utility of CAS items, and provided feedback on important gaps and areas of overlap in the item pool. In phase 2, a secondary data analysis was conducted using CAS responses from a large, aggregate sample to develop and validate a subset of items. Results of phases 1 and 2 were integrated, along with existing literature and our collective experience administering the CAS to thousands of women, to create a new brief measure, the Composite Abuse Scale (Revised)—Short Form (CAS_R-SF).

Phase 1: expert ratings of CAS item pool

In phase 1, IPV experts were asked the following questions: (1) How do CAS items rate on importance, clarity and appropriateness for diverse groups of women? (2) What gaps or redundancies exist within the item pool? and (3) What would improve the quality of the item pool? Potential participants, identified from the investigators’ existing networks, were sent an email invitation to participate with reminders sent 1 and 2 weeks later. Those interested were provided with a link to a 15–30 min online survey hosted in Fluid Surveys. Assuming a 50% response rate and a desire for input from at least 20 participants, 40 experts were contacted and 31 completed the online survey (77.5% response rate). The majority of participants (n=25; 80.7%) were academic researchers, most with national or international reputations in the area of IPV; the remaining six participants (19.3%) were IPV service providers or administrators and/or policy actors.

On the survey, participants were provided with the WHO definition of IPV and asked to rate 31 items (30 CAS items and 1 additional ‘choking’ item that had

been included in most studies) along three dimensions: (1) importance to the overall concept of IPV (less important, important, essential), where no more than 15 items could be designated *essential*; (2) item clarity (not clear, somewhat clear, clear); and (c) appropriateness for diverse groups and contexts (no, in part, yes). Comment boxes captured feedback about each item, and gaps or redundancies in the item pool. Quantitative item ratings were summarised using descriptive statistics; qualitative comments were content analysed.

Phase 2: item reduction and scale validation

Phase 2 involved a secondary data analysis to assess the factor structure, internal consistency and concurrent validity of the 30-item CAS. These results were then used with phase 1 findings and relevant literature to make decisions about dropping, retaining or combining items in order to create a brief (12–15-item) measure. The process used to identify items for the brief scale was iterative, with the reliability and validity of the final set of items tested in a new sample using confirmatory approaches.

Data sources

We pooled baseline data from 6278 adult, English-speaking women collected in five Canadian studies for this analysis, each of which had been reviewed and approved by appropriate Research Ethics Boards. Four smaller studies included community samples of women (n=670, 10.7% of pooled sample), who all self-identified as having experienced IPV^{i ii iii} 35 while the remaining study³⁰ included a large clinical sample of women (n=5608, 89.3% of pooled sample) who had and had not experienced IPV in the past 12 months. We included the four community-based samples in this analysis to maximise sample diversity such that the brief scale would be appropriate for women with different experiences and backgrounds. For example, since women in these studies self-identified as experiencing violence, they may have been in a different phase of help-seeking. They also lived in more varied geographic contexts (different provinces and rural settings) and one studyⁱ included only Indigenous women, an important but often under-represented population in IPV research.

Women in the pooled sample ranged in age from 17 to 72 years (mean 35.9). The sample was reasonably diverse and comparable to women in the Canadian population with respect to employment, whether they

were mothers of dependent children, and identified as Aboriginal or members of a visible minority group, but more likely to live with a partner, be born in Canada or live in a non-rural area (factors that reflect study inclusion criteria and settings; table 1).

Measures

All studies used a version of the CAS in which the three original sexual abuse items were modified in consultation with the scale developer (Hegarty) to bring these items in line with current language/concepts understood by women.³¹ Items 7 and 15 ('raped me' or 'tried to rape me') were reworded to 'forced me to have sex' and 'tried to force me to have sex'. Item 25 'put foreign objects in my vagina' was replaced by 'made me perform sex acts that I did not enjoy or like'. The 12-month time frame and response options from the original scale were retained. In four of five studies, a test item on 'choking' was added based on growing evidence of the association between strangulation and negative health outcomes.^{i ii}

To examine concurrent validity of the CAS_{R-SF}, measures of depression, symptoms of PTSD and coercive control were used. Since the use of these measures varied across the five studies, we used data from either the full sample, or a subset, to estimate these correlations.

Depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (CES-D),³⁶ a widely used 20-item scale on which respondents rate the past week frequency of symptoms consistent with depression on four-point Likert scale, from *rarely* (0) to *most of the time* (3). Summed scores range from 0 to 60, with higher scores reflecting more depressive symptoms. The CES-D has demonstrated validity and reliability in varied populations, with Cronbach's α ranging from 0.92 to 0.95 in samples of women with histories of abuse.^{37 38} Internal consistency was 0.84 in this sample.

PTSD symptoms were measured using a summed score of items comparable to the SPAN (Startle, Physiological Arousal, Anger and Numbness) instrument, a four-item screen for PTSD,³⁹ and the measure used in the study with the largest sample. The remaining four studies used either the Davidson Trauma Scale (DTS)⁴⁰ or Post-Traumatic Stress Disorder Checklist for Civilians (PCL-C),⁴¹ both of which include four items comparable to the SPAN. In all studies, participants were asked to rate how much they were distressed or bothered by each PTSD symptom on a five-point Likert scale ranging from never (0) to extremely (4). Given the high consistency in item wording and response options across studies, we created a total summed score for PTSD symptoms using four comparable items from each study (range 0–20). Internal consistency of this score was 0.81.

Coercive control was measured using the 10-item Women's Experiences of Battering (WEB) scale.⁴² Women rated, on a six-point Likert scale ranging from

ⁱC Varcoe, AJ Brown, M Ford-Gilboe, *et al.* Reclaiming our spirits: development, pilot results and study protocol to test the feasibility and efficacy of a health promotion intervention for Indigenous women who have experienced intimate partner violence. Manuscript in review.

ⁱⁱM Ford-Gilboe, C Varcoe, J Wuest, *et al.* Initial Testing of the Intervention for Health Enhancement after Leaving (iHEAL). Manuscript in review.

ⁱⁱⁱFord-Gilboe M. iCAN Protocol Paper. Manuscript in review.

Table 1 Characteristics of women in the sample (N=6278)

Demographic characteristics	Per cent of current sample	Rate in Canadian women 15 or older*
Employed (full-time or part-time)	62.8	58.3%
Live with a partner	85.2	57.0%
Mother of dependent child/rent†	59.0	55.6%‡
Aboriginal or visible minority identity§	13.3	3.8% Aboriginal 16.4% visible minority
Born outside of Canada	13.8	20.3%
Live in a rural area¶	12.7	18%**

*Unless otherwise indicated, population estimates are taken from: Statistics Canada (2011). Women in Canada: a gender-based statistical profile, 6th edition. Ottawa: Ministry of Industry, Catalogue 89–503-x/201001. Retrieved from: <http://www.statcan.gc.ca/pub/89-503-x/89-503-x2010001-eng.htm>.

†Defined as parenting a child living in the home who is either under the age of 16 (one study), or 18 (four studies).

‡Investigator calculated rate based on: Statistics Canada, 2006 Census of Population, Catalogue no. 97–553-XCB2006012. Retrieved from: <http://www12.statcan.gc.ca/datasets/Rp-eng.cfm?LANG=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=0&GID=0&GK=0&GRP=1&PID=89022&PRID=0&PTYPE=88971&S=0&SHOWALL=0&SUB=0&Temporal=2006&THEME=68&VID=0&VNAMEE=&VNAMEF>.

§These 'identity' data are combined because the largest study in the data pool did not disaggregate data according to Aboriginal status.

¶Defined as a community with a population of 3000 or less (one study) or living in a community with a population of <1000 residents or with a population density of <150 km² (four studies).

**Statistics Canada. A profile of Canadian women in rural, remote and Northern communities. Census 2006. Retrieved from: <http://www.swc-cfc.gc.ca/initiatives/wnc-fcn/profile-eng.pdf>.

agree strongly (1) to disagree strongly (6), their agreement with items reflecting coercive control from a partner/ex-partner in the past 12 months. Items were reverse-scored and summed (range 10–60), where scores >20 are consistent with coercive control.⁴² The WEB has demonstrated both reliability ($\alpha=0.93-0.94$)^{43 44} and validity.^{42 45} Internal consistency was 0.88 in this sample.

Analysis

Our overall aim was to develop a short form measure comparable to the 30-item CAS in terms of reliability (internal consistency) and concurrent validity and that includes items that: (1) are theoretically important to the concept of IPV, including gendered patterns of experience; (2) represent each factor underlying the CAS item pool and load cleanly (>0.40) on a single factor; (3) are clearly worded and appropriate across diverse populations and contexts; and (4) limit response burden and promote respondent emotional safety.

Developmental analysis

The sample of 6278 women was randomly divided into a development sample (n=4143, 2/3 of the data) and confirmatory sample (n=2135, 1/3 of the data), stratified by project in order to reduce the risk of systematic bias in these two samples due to some differences in the characteristics of women in the five projects. Starting with the developmental sample data, the internal consistency of the 30-item CAS was computed using Cronbach's α , and correlations between the summed CAS total score and measures of depression and PTSD estimated. Next, using exploratory factor analysis with principle axis factoring and oblique rotation, we examined the factor structure of the 30-item CAS. Our plan was to replicate the four-factor solution reported by Hegarty *et al*²² or, failing this, to identify the number of factors underlying the item pool using eigenvalues, per

cent of variance accounted for by each extracted factor, the pattern of item factor loading and the extent to which the solution made theoretical sense. These results provided a foundation for a more detailed, iterative process of deleting and/or combining items and then re-evaluating the impact of these decisions on the relationships among items within a factor and for the overall scale.

Working with each factor separately, we inspected the item factor loadings along with comments and item ratings provided by experts in phase 1. We identified items that could be combined based on expert feedback, similar loadings on the same factor and/or similar regression coefficients when predicting PTSD scores. When items were combined, a new score was set to the maximum score observed on the items being combined. As items were identified for deletion/combination, we reran the analysis, inspecting factor loadings, regression coefficients and internal consistency to determine if changes improved or maintained the psychometric properties of the original CAS; if so, we came to agreement about new wording for combined items.

Finally, we inspected the correlations between summated scores computed using the new items and measures of depression, PTSD and coercive control, both to assess concurrent validity of the brief scale and to determine if the associations found with the 30-item CAS had been preserved. When the final set of items for the brief scale was identified, we added the 'choking' test item used in four studies and reran the analysis.

Confirmatory analyses

Using the new items that would comprise the brief measure, we tested the fit of the model using confirmatory factor analysis (CFA) techniques with the validation sample (n=2135), again computing Cronbach's α and correlations with concurrent validity measures. As with

the developmental analysis, the initial testing included items developed from the original CAS item pool, followed by a second analysis which included the additional choking item.

RESULTS

Expert ratings of items

Essential items

Overall, 13 of 31 items were rated as essential to the concept of IPV by at least 50% of the expert sample (table 2). These items address aspects of physical, sexual and psychological abuse. The five items that were endorsed most often as essential (ie, by 80% of more or experts) were: *used a gun, knife or other weapon* (n=30), *forced me to have sex* (n=29), *kicked me, bit me or hit me with a fist* (n=27), *hit or tried to hit me with something* (n=27) and *choked me* (n=27). Several experts noted that selecting only 15 essential items was challenging and that they tended to select physical abuse items over psychological or sexual abuse items because these were clearer or less ambiguous, but not necessarily more important.

Item clarity and fit for diverse contexts

The majority of items were rated as clear (28 items) and appropriate for diverse contexts (26 items) by at least 50% of experts. Some items performed less well, however. Three items were endorsed as 'clear' by fewer than half of experts: *hung around outside my house* (35.5%), *harassed me over the phone* (41.9%) and *did not want me to socialise with my female friends* (45.2%). Two of these five items (*hung around outside my house* and *harassed me over the phone*) were also rated as 'appropriate' by fewer than half, along with *became upset if dinner/housework wasn't done when they thought it should be* (41.9%), *took my wallet and left me stranded* (35.5%), and *refused to let me work outside the home* (38.7%). Several of these 'low performing items' were also rated as essential by fewer than 50% of experts.

Overlap or redundancy of items

Experts consistently noted that most CAS items were relevant, but very specific, and that there was significant overlap among some items. Some noted that including many similar items 'adds to the length of the scale without necessarily producing more useful information' and could negatively impact respondents' emotional safety. To limit respondent burden and make the scale more usable, there was strong support for creating more general single items by combining items tapping into similar types of abuse. Experts suggested grouping physical abuse items based on likely risk of harm but 'leaving the items with higher lethality separate to allow discrimination by researchers'. It was noted that this would 'leave space' for items on emotional abuse and controlling behaviours. There was consistent support for grouping the three sexual abuse items into either one or two items and for grouping items tapping verbal abuse,

harassment/stalking and tactics used to isolate the victim into single items.

Gaps in the item pool

Three gaps in the item pool were commonly identified: use of threats, newer types of harassment/stalking and financial control/economic abuse. Experts most frequently mentioned the absence of items on use of threats in the context of coercive control (eg, to harm or kill the woman or people/pets/things she cares about; to 'out' the victim; to commit suicide). Specific examples of threats used to undermine mothers were also suggested (eg, threatening to take children away, obtain custody or make false accusations to child welfare authorities). Experts recommended 'updating' the stalking/harassment items to take newer technologies used for 'cyber stalking and cyber harassment' into account (ie, sending threatening messages by text, email, Instagram, Twitter or Facebook and/or sabotaging connections to social media). Finally, experts identified that, while important, financial abuse was not adequately captured by the two CAS items (*took my wallet* and *refused to let me work outside the home*).

Phase 2

In the developmental sample (n=4143), the initial factor analysis supported a three-factor solution (first five eigenvalues: 18.23, 1.65, 1.34, 0.94, 0.76; table 3). Twenty-eight of 30 items loaded cleanly onto one of three factors: 15 psychological abuse items (factor loadings 0.495–0.955); 10 physical abuse items (loadings 0.416–0.928) and 3 sexual abuse items (loadings 0.779–0.851). Two items (*refused to let me work outside the home* and *kept me from medical care*) loaded weakly on all three factors (loadings 0.227–0.275). Cronbach's α was 0.975.

Factor analysis results were used with phase 1 findings to make initial decisions about keeping, combining and/or dropping items for each factor. In the first revision, 15 items were combined into 8 new items, 5 original items were retained and 10 items were dropped, resulting in 13 items remaining. Next, we examined whether any dropped items accounted for unique variance in PTSD while reflecting on the phase 1 results. One dropped item was added back into the scale and several items recombined, resulting in 12 items loading onto three factors: psychological abuse (6 items), physical abuse (4 items) and sexual abuse (2 items; table 4). Correlations among the factors ranged from 0.62 to 0.77. The final solution was cross-validated in the validation sample (n=2135) using a second order CFA, which provided support for each factor contributing to a higher, second-order factor (IPV severity), with factor loadings ranging from 0.63 to 0.93 (Comparative Fit Index (CFI)=0.957, root mean square error of approximation (RMSEA)=0.095, $\chi^2=1022$, df=51, $p<0.001$). Cronbach's α for these 12 items and the original 30 items in the development sample were similar (0.942 and 0.975, respectively). Internal consistency of each

Table 2 Expert ratings of CAS items (N=31)

Item	Essential to concept of IPV n (%)	Clear and easy to understand n (%)	Appropriate for diverse groups and contexts n (%)	Summary of text comments
1. Told me that I wasn't good enough	10 (32.3%)	16 (51.6%)	20 (64.5%)	▶ Vague item; meaning varies across contexts; could include other examples of verbal abuse
2. Kept me from medical care	11 (35.5%)	20 (64.5%)	24 (77.4%)	▶ Not applicable to women not seeking/wanting medical care; there may be other reasons for this aside from abuse (eg, cost)
3. Followed me	17 (54.8%)	18 (58.1%)	23 (74.2%)	▶ Unclear if following is unwanted or without consent; does not capture other types of monitoring (eg, GPS tracking, 'hanging out' and watching)
4. Tried to turn my family, friends and children against me	19 (61.3%)	21 (67.7%)	23 (74.2%)	▶ 'Turn against me' is a colloquial phrase that may not be understood by all, 'and' implies that all three conditions must be met.
5. Locked me in the bedroom	11 (35.5%)	25 (80.6%)	18 (58.1%)	▶ Confining the person is important but item is too specific to be broadly applicable (eg, confined in other rooms or spaces or if homelessness)
6. Slapped me	14 (45.2%)	29 (93.5%)	28 (90.3%)	▶ Not clear why this is a separate item from similar acts (eg, hit)
7. Forced me to have sex*	29 (93.5%)	22 (71.0%)	27 (87.1%)	▶ Concept may vary cross-culturally; unclear if force means 'physical force' or coercion; lack of consent is implied but not explicit
8. Told me that I was ugly	4 (12.9%)	24 (77.4%)	23 (74.2%)	▶ Part of verbal abuse or 'put downs' but too specific and subjective
9. Tried to keep me from seeing or talking to my family	21 (67.7%)	28 (90.3%)	25 (80.6%)	▶ Unclear why friends are not included as part of attempts to isolate; may be difficult for person to identify if acts are subtle
10. Threw me	11 (35.5%)	17 (54.8%)	23 (74.2%)	▶ Oddly worded. Example of assault similar to other items but less clear
11. Hung around outside my house	3 (9.7%)	11 (35.5%)	7 (22.6%)	▶ Not applicable if victim has no house or lives in same house as abusive partner; idea could be combined with following/monitoring items
12. Blamed me for causing their violent behaviour	20 (64.5%)	26 (83.9%)	27 (87.1%)	▶ Important mechanism of control
13. Harassed me over the telephone	11 (35.5%)	13 (41.9%)	14 (45.2%)	▶ Item is dated—include other communications media (texting, social media, emails); meaning of harassment may not be clear without examples
14. Shook me	12 (38.7%)	25 (80.6%)	23 (74.2%)	▶ Very specific item is similar to several other physical abuse items
15. Tried to force me to have sex†	17 (54.8%)	19 (61.3%)	25 (80.6%)	▶ Definitions of sex vary and may need to be defined; 'forced' sex is a difficult concept and challenging for women to report.
16. Harassed me at work	12 (38.7%)	17 (54.8%)	13 (64.5%)	▶ Excludes women who are not employed; harassment is vague and needs to be defined with examples (eg, showing up, calling, etc)
17. Pushed, grabbed or shoved me	21 (67.7%)	28 (90.3%)	28 (90.3%)	▶ Similar items nicely grouped; overlap with other physical abuse items
18. Used a knife or gun or other weapon	30 (96.8%)	22 (71.0%)	29 (93.5%)	▶ Very important indicator of severe violence but unclear if 'used' means to threatened or harmed; what counts as a weapon could be clearer
19. Became upset if dinner/housework wasn't done when they thought it should be	4 (12.9%)	18 (58.1%)	13 (41.9%)	▶ Too culturally specific and dated; assumes living with a partner and traditional gender roles; not applicable for homeless women; being upset can range from disappointed to violence
20. Told me that I was crazy	10 (32.3%)	23 (74.2%)	21 (67.7%)	▶ Overlaps with other verbal abuse items; not specific to abuse context
21. Told me that no one would ever want me	12 (38.7%)	20 (64.5%)	23 (74.2%)	▶ 'Want me' is vague; indicator of coercive control that is not as important as other items; assumes that woman is still in the relationship

Continued

Table 2 Continued

Item	Essential to concept of IPV n (%)	Clear and easy to understand n (%)	Appropriate for diverse groups and contexts n (%)	Summary of text comments
22. Took my wallet and left me stranded	12 (38.7%)	20 (64.5%)	11 (35.5%)	▶ Double-barreled item with two different ideas; item is too specific to adequately capture financial abuse/economic control
23. Hit or tried to hit me with something	25 (80.6%)	29 (93.5%)	30 (96.8%)	▶ Lower severity physical abuse; could be combined with like items
24. Did not want me to socialise with my female friends	9 (29.0%)	14 (45.2%)	16 (51.6%)	▶ Unclear why only female friends are included; specific example of a social isolation tactic; item would be stronger if other examples were included (eg, dropping in unexpectedly, embarrassing you in front of friends)
25. Made me perform sex acts that I did not enjoy or like†	22 (71.0%)	21 (67.7%)	24 (77.4%)	▶ Overlap with other sexual abuse items; better wording would be 'acts I did not want to perform'; may be more relevant across context/groups than 'forced' sex items for women who never thought they could refuse
26. Refused to let me work outside the home	8 (25.8%)	25 (80.6%)	12 (38.7%)	▶ Not relevant for those who cannot work (eg, disabled) or do not want to work (eg, retired); may not be seen as abuse by some; being preventing from taking part in school or activities outside the home is also important
27. Kicked me, bit me or hit me with a fist	27 (87.1%)	30 (96.8%)	31 (100%)	▶ Good item that overlaps with other physical abuse items
28. Tried to convince my friends, family or children that I was crazy	11 (35.5%)	19 (61.3%)	20 (64.5%)	▶ Meaning could vary for different population; not applicable if no family or friends
29. Told me that I was stupid	12 (38.7%)	26 (83.9%)	24 (77.4%)	▶ May not be seen as part of the abuse (normative in some contexts)
30. Beat me up	23 (74.2%)	20 (64.5%)	25 (80.6%)	▶ Colloquialism may not be understood; specific acts of physical abuse already captured by other items
31. Choked me§	27 (87.1%)	29 (93.5%)	30 (96.8%)	▶ Important addition; nice wording (better than strangled); may still result in under-reporting if women do not recognise this act as 'choking'

*Original item was 'raped me'.

†Original item was 'tried to rape me'.

‡Original item was 'put foreign objects in my vagina'.

§Test item added to CAS.

CAS, Composite Abuse Scale; GPS, Global Positioning System; IPV, intimate partner violence.

Table 3 Initial three-factor loading from 30-item Composite Abuse Scale

Item	Factors and loadings		
	Psychological	Physical	Sexual
Told me I that I was crazy	0.955	-0.074	-0.068
Told me that I was stupid	0.914	0.051	-0.099
Told me that I wasn't good enough	0.914	-0.038	-0.054
Told me that no one would ever want me	0.826	0.098	-0.030
Harassed me over the phone	0.823	-0.014	0.048
Tried to convince my friends, family or children that I was crazy	0.809	-0.024	0.093
Blamed me for causing their violent behaviour	0.789	0.132	-0.031
Did not want me to socialise with my female friends	0.789	-0.026	0.089
Tried to turn my family, friends and children against me	0.779	-0.015	0.110
Tried to keep me from seeing or talking to my family	0.702	0.068	0.105
Became upset if dinner/housework wasn't done when they thought it should be	0.649	-0.005	0.088
Told me that I was ugly	0.631	0.219	-0.014
Followed me	0.609	0.106	0.116
Harassed me at work	0.546	0.042	0.154
Hung around outside my house	0.495	0.219	-0.014
Kicked me, bit me or hit me with a fist	-0.046	0.928	0.021
Beat me up	-0.049	0.920	-0.011
Threw me	0.140	0.830	-0.070
Slapped me	0.107	0.824	-0.035
Hit or tried to hit me with something	0.189	0.746	-0.016
Shook me	0.176	0.722	-0.034
Used a knife or gun or other weapon	-0.157	0.671	0.196
Pushed, grabbed or shoved me	0.327	0.628	-0.029
Locked me in the bedroom	0.086	0.459	0.246
Took my wallet and left me stranded	0.276	0.416	0.161
Forced me to have sex	0.014	0.058	0.851
Tried to force me to have sex	0.148	0.024	0.824
Made me perform sex acts that I did not enjoy or like	0.077	-0.012	0.779
Refused to let me work outside the home	0.227	0.238	0.275
Kept me from medical care	0.243	0.258	0.239

Bold text denotes factors loadings that are above 0.40.

ubscale was acceptable (0.938 for psychological abuse, 0.847 for physical abuse, 0.884 for sexual abuse).

A summed total score was computed for all women who responded to at least 9 out of 12 items by taking the mean of the completed items and multiplying by 12. The total score had a mean (M) of 4.392, SD of 2.764 and a range of 0–60 in the developmental sample, with similar descriptive statistics in the validation sample (M=4.680, SD=2.882, range=0–60).

Table 5 summarises the correlations between measures of variables associated with IPV (ie, coercive control, depression, PTSD) and total CAS scores using the original 30 items, and the new 12 items. As expected, CAS total scores were moderately correlated with each validation measure, providing support for concurrent validity of each version of the CAS. Correlations of similar magnitude were observed across different versions of the CAS, suggesting that the brief scale behaves in similar ways to the 30-item scale.

Additional recommended changes for CAS_R-SF

We propose a number of additional changes to address identified conceptual gaps and improve the clarity of

instructions and response options. The CAS_R-SF is found in Appendix 1 at the end of the paper.

Instructions

The original CAS instructions ask women who have had more than one partner in the past 12 months to answer the questions about their current or most recent partner. This could result in under-reporting IPV as it does not allow for the reality of multiple abusive partners within a 12-month timeframe. We recommend asking women to rate whether they have experienced the abusive acts listed on the CAS from any partner or partners. This change shifts the focus from the partner to the women's experiences of abuse, regardless of the source. We retained the initial four questions proposed by Hegarty *et al*²² to allow women who have never been in an intimate partner relationship to opt out of completing the questions, and to capture fear of partner (ever and current) for women who have had a partner relationship.

Response options

Evans *et al*³⁴ found that 'never' and 'only once' responses were not acceptable to women who see these

Table 4 Factors loadings from the CFA for the final three-factor solution with 12 CAS items

Item*	Factors and loadings		
	Psychological	Physical	Sexual
Blamed me for causing their violent behaviour	0.905		
Told me I was crazy, stupid or not good enough	0.841		
Tried to convince my family, friends or children that I am crazy or tried to turn them against me	0.870		
Tried to keep me from seeing or talking to my friends or family	0.830		
Harassed me over the phone	0.865		
Followed me or hung around outside my house	0.806		
Tried to or forced me to have sex			0.928
Made me perform sex acts that I did not enjoy or like			0.850
Shook, pushed, grabbed or threw me		0.922	
Hit or tried to hit me with a fist or object, kicked or bit me		0.912	
Used a knife or gun or other weapon		0.630	
Locked me in the bedroom		0.725	

*Wording of original measure retained here; recommendations for item wording changes are presented later. CAS, Composite Abuse Scale; CFA, confirmatory factor analysis.

options as dismissive of their experience, an issue also raised by experts in phase 1 and which resonates with our experience of administering the CAS to women during interviews. We recommend first asking women if they have *ever* experienced each action, and then rating *how often in the past 12 months it happened*, using the options: 'not in the past 12 months', 'once', 'a few times', 'monthly', 'weekly', 'daily or almost daily'.

Minor wording changes to items

We recommend updating the language used in two items to better reflect the current context: (1) remove the word 'female' from *tried to keep me from seeing or talking to my female friends or family* to broaden it to all friends; (2) update *harassed me over the phone* to *harassed me over the phone, by text, email or using social media*. We recommend changes to two items to remove social class biases: (1) change *hung around outside my house* to *hung around outside my home* to remove the assumption the women have a house; (2) expand *locked me in the bedroom* to *confined or locked me in a room or other space* to increase the relevance for women of various social locations. Other minor wording changes suggested by Hegarty based on her evolving work, and recent discussion and feedback provided to two authors (MF-G and KH) as part of a recent WHO Consensus Meeting on Measuring

Psychological IPV, are represented in online supplementary appendix 1.

New items

We recommend the inclusion of three new items in the CAS_R-SF to address gaps identified by experts and in the literature.²⁹

The item 'choked me' was administered in four of the five studies providing data for this analysis and was tested along with the other 12 items with a subsample (n=212) of women. The choking item loaded cleanly on the physical abuse scale (0.794) and the model fit was excellent (CFI=0.948, RMSEA=0.07, $\chi^2=129$, df=62, p<0.001). Among those who completed the 'choked me' item, similar correlations were observed between the 12-item and 13-item scales with both PTSD (0.315 vs 0.314) and coercive control (0.509 vs 0.501). These results provide strong empirical support for including this item in the scale.

The remaining two items are recommended on theoretical grounds and require further testing. The item 'threatened to harm or kill me or someone close to me' was developed to be inclusive and general enough to capture different types of threats to the woman and/or to people/things she cherishes and to focus on the threat, rather than the object of the threat. The use of

Table 5 Concurrent validity of the CAS and brief 12-item CAS in two samples*

	30-item CAS r (n)	12-item CAS Developmental sample r (n)	12-item CAS Validation sample r (n)
Coercive control (WEB scale)	0.502 (n=353)	0.509 (n=353)	0.529 (n=183)
Depressive symptoms	0.414 (n=626)	0.425 (n=626)	0.384 (n=301)
PTSD symptoms	0.491 (n=954)	0.505 (n=954)	0.428 (n=472)

*Analysis includes all cases with complete data. Sample sizes vary due to missing data and differences in measures used across the five studies from which the data were drawn.

CAS, Composite Abuse Scale; PTSD, post-traumatic stress disorder; WEB, Women's Experiences of Battering.

threats is a strong indicator of coercive control enacted for the purpose of instilling fear.⁴⁶

The final item, 'kept me for having access to a job, money or financial resources' was developed to address two aspects of financial abuse identified by Postmus *et al*⁴⁷—financial control and sabotage. It reintroduces concepts captured in two CAS items that were dropped during development of the brief scale and replaces these with one, more appropriate, item that is applicable to all women.

Scoring instructions

Total scores for the CAS_R-SF, ranging from 0 to 75, are calculated by computing the mean of past 12-month frequency of abuse experiences responses and multiplying by 15, where there are responses for at least 11 of 15 items (~70%). Subscale scores are similarly computed for items reflecting physical, sexual and psychological abuse.

DISCUSSION

The CAS_R-SF is a comprehensive brief instrument developed using a mixed-methods approach; it captures physical, sexual and psychological abuse and overall IPV, with a focus on severity and intensity of experiences. Initial validity and reliability testing indicates that the new scale retains the strengths of the longer, criterion standard 30-item CAS^{8 22} and improves on it in a number of areas, including brevity/respondent burden and clarity of instructions, questions and response options.³¹ Items have been added to address critical gaps (ie, threats, financial abuse, choking)^{46–48} and wording updated, making the new tool capable of producing better quality data consistent with current thinking in the field.

The CAS_R-SF contributes theoretically and methodologically to the measurement of the complex concept of IPV by addressing the limitations of previous scales and national surveys.^{4 5 8} For example, it begins to address a call to conceptualise and measure IPV broadly and to recognise that such experiences can occur in more than one partner relationship.¹⁴ It offers a more practical and woman-centred way to measure IPV that could be readily applied for different purposes, from assessing IPV prevalence and experiences in national, representative surveys (with an estimated 2–3 min completion time) to use as a criterion standard in research studies assessing IPV interventions.

Importantly, the total score on the CAS_R-SF broadly reflects IPV severity based on women's reports of experiencing abusive acts; the effects or impacts of those acts (such as injuries or health problems) require separate measurement. While our analysis supports the initial reliability and validity of subscale scores for physical, sexual, psychological abuse based on 12-item and 13-item versions which were tested, we recommend the use of total scores, rather than subscale scores, unless there is a compelling reason to do so. CAS_R-SF items could potentially be used on their own, and it should be possible to

develop alternative ways of coding and scoring these data to identify different patterns of abuse, from common couple violence to intimate partner terrorism.^{13 20 49} This is a priority for future research.

Limitations and future research

We, and the experts who participated in phase 1, mainly conduct research in high-income countries, and the secondary data analysis used data from Canada. The use of secondary analysis placed limits on the data available for analysis. In future validation studies of the CAS_R-SF, consideration should be given to incorporating a wider range of standardised measures for use in order to examine concurrent validity of the scale.

The composition of the expert sample, which was largely comprised of academic researchers, may have affected their ratings and feedback, but this is not known. The generalisability of this measure for women living in low-income and middle-income countries is also unknown. Additional testing is needed to evaluate the reliability and validity of the CAS_R-SF in other contexts and to assess the performance of the two new test items, and the integration of the 'choking' item. If taken up in other countries, especially where cultural understandings of violence may differ from those in Canada and Australia, it will be important to look at face validity and wording of items and to conduct careful cultural and/or linguistic translations as needed.^{50 51}

The original CAS, and this revised version, focus specifically on *women's* experiences of violence. However, men's and women's patterns of violence differ^{16 17 52} as does how they experience violence.^{53–55} Further, trans* people, and those who do not identify with the male–female binary often face unique societal, political and historical challenges that affect their experiences of violence within intimate relationships.⁵⁶ Further research is required to examine how the original CAS and the new CAS_R-SF perform among people of all genders.

CONCLUSION

The CAS_R-SF is a valid and reliable measure of IPV experiences that retains the strengths of, but enhances, the existing CAS in key domains, while also providing a shorter, easier-to-answer scale for use in a range of contexts. While further testing is required in diverse settings, this brief scale represents a significant evolution in the measurement of IPV experiences that may more adequately capture the complexity of IPV experiences among women than existing short surveys.

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APPENDIX

COMPOSITE ABUSE SCALE REVISED - SHORT FORM (CAS_R-SF)

INSTRUCTIONS: These questions ask about your experiences in adult intimate relationships. By adult intimate relationship we mean a current or former husband, partner or boyfriend/girlfriend for longer than one month.

- Have you ever been in an adult intimate relationship? (Since you were 16 years of age)
 - Yes
 - No – Skip out of remaining questions
- Are you currently in a relationship?
 - Yes
 - No – Go to Q4
- Are you currently afraid of your partner?
 - Yes
 - No
- Have you ever been afraid of any partner?
 - Yes
 - No

We would like to know if you experienced any of the actions listed below from any current or former partner or partners. If it ever happened to you, please tell us *how often* it usually happened in the past 12 months.

My partner(s):	Has this ever happened to you?		IF YES, how often did it happen in the past 12 months?						
	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily	
Blamed me for causing their violent behavior	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily	
Shook, pushed, grabbed or threw me	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily	
Tried to convince my family, children or friends that I am crazy or tried to turn them against me	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily	
Used or threatened to use a knife or gun or other weapon to harm me	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily	

Continued

Continued

<i>My partner(s):</i>	Has this ever happened to you?		IF YES, how often did it happen in the past 12 months?					
	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily
Made me perform sex acts that I did not want to perform	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily
Followed me or hung around outside my home or work	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily
Threatened to harm or kill me or someone close to me	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily
Choked me	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily
Forced or tried to force me to have sex	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily
Harassed me by phone, text, email or using social media	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily
Told me I was crazy, stupid or not good enough	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily
Hit me with a fist or object, kicked or bit me	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily
Kept me from seeing or talking to my family or friends	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily
Confined or locked me in a room or other space	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily
Kept me from having access to a job, money or financial resources	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/almost daily

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Composite Abuse Scale Revised - Short Form (CASR-SF). Version: September 2, 2016