Published in final edited form as:

Women Health. 2012 ; 52(7): 679–699. doi:10.1080/03630242.2012.724763.

Validity of the Brief Inpatient Screen for intimate partner violence among adult women

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Abstract

Background—Identifying intimate partner violence (IPV) in healthcare settings is becoming the standard of care. The Brief Inpatient Screen (BIS) was designed to assess recent emotional, physical, and sexual abuse in a general inpatient medical-surgical setting and compared to the Composite Abuse Scale (CAS).

Methods—We matched “cases” (inpatients screening BIS-positive) to up to four “controls” (inpatients screening BIS-negative.) Forty-six female hospital inpatients ages 18–64 years completed a self-administered survey. The sensitivity and specificity of the BIS and its subscales were compared to the CAS. We examined the performance of the BIS when used as a verbal screen versus an anonymous written screen.

Results—Twelve of 46 participants (26%) had a positive screen. Compared to the CAS, the overall sensitivity and specificity of the verbal BIS were 52.6% (95% CI 28.9–75.6) and 92.6% (95% CI 75.7–99.1), respectively. The written BIS showed improved sensitivity overall (68.4%, 95% CI 43.5–87.4) for the most severe IPV. Subscale analysis revealed greater sensitivity for emotional and severe combined IPV.

Conclusions—The verbal BIS, when compared to the CAS, was limited in its ability to identify IPV. An anonymous written format improved sensitivity. Future research should optimize IPV screening among inpatients.

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Competing interests

The authors declare that they have no competing interests.

Background

Intimate partner violence (IPV) is a serious public health problem, costing an estimated \$8.3 billion dollars and affecting more than 7 million men and women yearly in the United States (Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, Division of Violence Prevention 2006). The magnitude of this problem is illustrated by the estimation of lifetime prevalence of IPV (including rape, physical violence, and/or stalking), which is 35.6 percent for women and 28.5 percent for men. Furthermore, twelve-month, or recent IPV prevalence is estimated to be 5.9 percent for women and 5.0 percent for men (Black, Basile, Breiding, Smith, Walters, Merrick, Chen, and Stevens 2011). Prevalence of IPV in clinical settings tends to be higher than that reported in community based settings (Coker, Smith, McKeown, and King 2000; Richardson, Coid, Petruckevitch, Chung, Moorey, and Feder 2002) as demonstrated by IPV exposure in the past twelve months among women on an inpatient Internal Medicine service being estimated at 22 percent (Cleary, Keniston, Havranek, and Albert 2008). IPV is usually defined to include at least three domains of abusive behavior: emotional or psychological abuse, physical abuse, and sexual abuse. The threat of any of these types of abuse additionally constitutes IPV (Saltzman, Fanslow, McMahon, and Shelley 2002).

Victims of IPV may experience numerous health-related consequences. Physical consequences range from bruises and pain to broken bones, pregnancy complications, and chronic disorders of the nervous and circulatory systems (Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, Division of Violence Prevention 2008). IPV is one of the major contributors to injuries for women and long-term, adverse health-related effects persist after the violence has stopped (Campbell 2002). Effects on mental health include depression, anxiety, suicidal behavior, and post-traumatic stress disorder (Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, Division of Violence Prevention 2008, Campbell 2002). Additionally, a history of IPV is associated with adverse health behaviors, such as substance abuse and risky sexual behaviors (Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, Division of Violence Prevention 2008).

Despite the adverse health-related consequences of IPV to individuals and the cost to society, identifying IPV in healthcare settings has been challenging. The US Preventive Services Task Force did not find sufficient evidence to recommend for or against routinely screening women for exposure to IPV, citing concerns about accurate identification of IPV, inadequate evidence of effectiveness of interventions, and potential harms of screening (Nelson, Nygren, McInerney, and Klein 2004).

However, other evidence in favor of screening for IPV in healthcare settings is strong and national trends favor identifying IPV in both outpatient and inpatient healthcare settings, which provide an important setting for screening for IPV and subsequently providing resources for victims. Recently, the Institute of Medicine recommended routine IPV screening and counseling for women in healthcare settings (IOM (Institute of Medicine) 2011). Additionally, a systematic review of the literature on IPV screening showed that screening increases IPV identification, with the potential to increase safety and decrease violence and isolation (Trabold 2007). Moreover, women who disclose abuse to a healthcare provider are more likely to utilize domestic violence interventions, to exit abusive relationships, and report better overall health compared to women who did not disclose (McCloskey, Lichter, Williams, Gerber, Wittenberg, and Ganz 2006). The American Medical Association National Advisory Council on Violence and Abuse states that physicians play a major role in identifying and reducing IPV and should therefore routinely inquire about abuse and provide resources for patients (American Medical Association

National Advisory Council on Violence and Abuse (NACVA) 2008). Futures Without Violence (formerly The Family Violence Prevention Fund) echoes the important role that the healthcare system plays in detecting and responding to IPV, and provides national consensus guidelines so that healthcare settings can effectively comply with Joint Commission on Accreditation of Healthcare Organizations (JCAHO) standards regarding victims of abuse (Futures Without Violence, accessed 2012). These interventions include acute safety planning and referral to services for women experiencing immediate threats (Family Violence Prevention Fund, 2004). Thus, routine screening for women for IPV in healthcare settings can accurately identify victims of IPV (Nelson, Bougatsos and Blazina 2012). Moreover, identification of IPV in healthcare settings is becoming the standard of care, can improve the immediate and long-term health of women, and improved methods of identifying IPV in diverse clinical settings are necessary (IOM (Institute of Medicine) 2011).

Numerous IPV screening instruments for healthcare settings have been published (Basile, Hertz, and Back 2007). Each of these instruments has limitations making practical use in clinical settings difficult. For example, instruments such as the Composite Abuse Scale (Trabold 2007; Hegarty, Sheehan, and Schonfeld 1999; Hegarty, Bush, and Sheehan 2005), Revised Conflict Tactics Scale (Straus, Hamby, Boney-McCoy, Straus, and Sugarman 1996), Abuse Screening Inventory (Swahnberg and Wijma 2007), NorVold Abuse Questionnaire (Swahnberg and Wijma 2003), and the Index of Spouse Abuse (Hudson and McIntosh 1981) are long, containing between 13 and 78 questions. Because lack of time has often been identified as a barrier to IPV screening in clinical settings (Sugg and Inui 1992; Waalen, Goodwin, Spitz, Petersen, and Saltzman 2000), it may not be feasible to use lengthy instruments for routine IPV screening during patient admission.

Shorter IPV screening instruments have been created and assessed for use in general outpatient and family practice settings (Sherin, Sinacore, Li, Zitter, and Shakil 1998; Sohal, Eldridge, and Feder 2007; Brown, Lent, Schmidt, and Sas 2000) or emergency departments (Paranjape and Liebshutz 2003; Fulfer, Tyler, Choi, Young, Verhulst, Kovach, and Dorsey 2007; Weiss, Ernst, Cham, and Nick 2003; Ernst, Weiss, Cham, Hall, and Nick 2004), but to our knowledge, no previous instrument has been created or validated for use among general hospital inpatients.

The importance of screening hospital inpatients for IPV has been shown by prior work. Women hospitalized on an Internal Medicine service had a relatively high prevalence of IPV (61% lifetime and 22% in the past year), and these women had more positive responses to review of systems questions upon admission as compared to women who had not been exposed to IPV (Cleary, Keniston, Havranek, and Albert 2008). Moreover, more than 807,000 inpatient stays are directly due to IPV, but few studies screen for IPV in this setting (Plichta 2004). This highlights the importance of screening the inpatient population.

Additionally, the inpatient setting provides unique care and referral opportunities for abuse victims. Hospitals can provide many of the interventions recommended by Futures Without Violence, and often 24 hours a day, including extensive safety planning by an expert (such as an IPV advocate or social worker), contacting police and securing protective orders, identifying support systems, accessing a range of services, counseling, and referrals to community services (Family Violence Prevention Fund, 2004). A recent systematic review showed that interventions for IPV victims do provide benefits relatively consistently, and that screening and interventions are associated with few adverse effects for women (Nelson, Bougatsos, and Blazina 2012).

In light of the recommendations to routinely screen for IPV in healthcare settings, as well as to comply with JCAHO standards recommending use of organization-developed criteria to

identify possible abuse victims (Scott and Matricciani 1994), the Domestic and Sexual Violence Task Force at our academic medical center adapted a three-item screening tool from existing instruments to address the task of detecting IPV in an inpatient population (the Brief Inpatient Screen, Figure 1). This instrument was embedded into the nursing-administered assessment in the electronic medical record (EMR) for all inpatients admitted to our institution. The results of this screening are available within the EMR as part of the tabbed inpatient assessment page.

We used a pilot study to assess the performance of the Brief Inpatient Screen (BIS) for IPV compared to the Composite Abuse Scale (CAS) (Hegarty, Bush, and Sheehan 2005), administered to a general medical and surgical population at our academic medical center. We also assessed the performance of the individual subdomains of the Brief Inpatient Screen against the respective subscales of the CAS, as well as the performance of an anonymous, written version of the Brief Inpatient Screen against the nursing-administered verbal screen.

Methods

Sample Selection

Potential participants were identified using the following procedure (Figure 2): the Brief Inpatient Screen for IPV was administered verbally by nursing staff to all patients upon admission to the hospital as part of a larger admission questionnaire incorporated into the Electronic Medical Record (EMR). A “yes” answer to any of the three parts of the question was considered a positive screen, thereby terminating the IPV screen and triggering an automatic social work assessment to perform a more detailed evaluation as well as provide safety and further counseling resources, if needed. Participation in the study did not affect subsequent care, including social work assessment and referral to resources.

Women between the ages of 18 and 64 years, admitted to one of the following services were eligible for inclusion in the study: internal medicine and its subspecialties including oncology and gastroenterology, neurology and neurosurgery, cardiology, orthopedics, family medicine, obstetrics, or surgery. Patients who did not have the capacity to respond to the questionnaires (whether physically or mentally incapable) or who did not speak English were excluded.

Potential participants who screened positive on the initial nursing-administered verbal screen (referred to as “verbal Brief Inpatient Screen”, $n=47$) were identified by one research team member (JS) acting as a “Knowledge Broker.” The Knowledge Broker identified these case patients and then matched them with up to four control patients who otherwise met inclusion criteria and screened negative on the verbal Brief Inpatient Screen ($n=124$). Cases and controls were matched on hospital admitting service and age ($\pm$ five years of the case patient.) Only the Knowledge Broker had access to patient information in the EMR during the study. The Knowledge Broker provided a study number, name, and location in the hospital of eligible patients, including both cases and controls, to research team members (ARS and TP). Other than the Knowledge Broker, investigators remained blinded throughout data collection as to the result of the patient’s initial verbal screen (“verbal Brief Inpatient Screen”), while the Knowledge Broker remained blinded to the results of the survey screens.

After potential participants (cases and controls) were identified, they were approached to enroll in the study. Participants were asked if they wished to participate in a “Women’s Health Study.” In the case that family members or guests were present in the room, they were asked to leave. If complete privacy was not attained, researchers asked if they could come back later; this permission was granted in most cases. Of note, no mention of violence

or abuse was made until the potential participant could be interviewed privately. Researchers subsequently administered a verbal consent. All consenting participants were then left in private to complete a demographic survey, a written version of the complete Brief Inpatient Screen (referred to as “Written Brief Inpatient Screen”), and the Composite Abuse Scale (“CAS”). The results were returned to the researchers in a sealed envelope. All participants were given a small card after returning the envelope with the number to a domestic violence hotline.

Our study protocol identified a total of 171 potential participants, of whom 46 (27%) consented to participate in the study. To assess the representativeness of our sample, we compared our 46 participants with those who did not participate. The majority of potential participants who did not complete the questionnaire were discharged prior to study staff approaching them for participation (N=103, 60%). The remainder refused (N=22, 13%). The age of participants did differ significantly from nonparticipants, although participants were somewhat older (mean age 45 +/- 11.2 years for participants versus 39.8 +/- 12.2 years for nonparticipants). Marital status, ethnicity, and insurance status did not differ significantly between participants and nonparticipants.

At the conclusion of the study, the Knowledge Broker combined survey data with the EMR data using only study numbers. In addition to obtaining verbal Brief Inpatient Screen results from the EMR, some demographic data (including age, relationship status, ethnicity, and insurance status) were collected from the EMR. No permanent link to any participant’s identifying information was kept. This study was approved by our Institutional Review Board. Verbal consent was obtained for this study through a detailed description of the study protocol administered by the investigators when the potential participants were interviewed in private. Signed written consent was not obtained from participants to minimize the safety risk of breach of confidentiality. A written link to study participation could be a greater safety risk if knowledge of study participation was released to an abuser.

Instruments

Verbal Screen—The Brief Inpatient Screen for IPV is a one-item, three-part screen designed to measure IPV experienced in the past 12 months and to address the domains of emotional, physical, and sexual abuse that are inherent in intimate partner violence. In accordance with JCAHO standards for identification of potential abuse victims, the Domestic and Sexual Violence Task Force at our institution adapted the BIS from the existing validated screening instruments found in the Centers for Disease Control and Prevention compilation (Basile, Hertz, and Back 2007), including but not limited to, the Abuse Assessment Screen, Computer-Based IPV Questionnaire, Domestic Violence Initiative Screening Questions, Ongoing Abuse Screen, Partner Violence Screen, American College of Obstetricians and Gynecologists Domestic Violence Screening Tool, Family Violence Prevention Fund Screening Questions, Emergency Nurses Two-Question Screening Tool, and the HARK (Sohal, Eldridge, and Feder 2007). The Task Force included the expertise of an IPV medical advocate, social work, nursing, and medical doctor experts in IPV education screening and healthcare-based services, hospital security, and hospital administration.

After an initial screen was drafted by expert, interprofessional consensus using language adapted from existing screens as noted above, wording of the screening tool was optimized for acceptability and comfort by piloting it among a convenience sample of nurses at our institution. At each of three focus groups, volunteer nurses were given several options for wording the IPV screen, asked to suggest changes to the instrument, and chose the wording that they were most comfortable administering. Several iterations of the screen were created, and each was tested and improved before the final version was incorporated into the nurse-

administered inpatient assessment in the EMR. Nursing administration approved the EMR changes.

The BIS functions as one question with three yes or no items (to assess for emotional, physical, and sexual abuse); a “yes” answer to any item constitutes a positive screen and if any items remain following a “yes” answer, they are not asked (Figure 1). We chose to terminate the screen with any “yes” answer to maximize identification of victims while minimizing the burden of the screener, both with time and effort. Expert opinion from the Domestic and Sexual Violence Task Force as well as feedback from user focus groups supported this method. Results referred to as “verbal Brief Inpatient Screen” were obtained from this screening tool embedded in the hospital’s live nursing intake assessment that is given to all patients upon admission.

Demographic Survey—The demographic survey collected data on age, level of education (have not completed high school, high school diploma/GED, some college, Bachelor degree, Master Degree, Doctorate), relationship status (single, married, in a relationship but not married, or separated/divorced/widowed), partner status (gender male, gender female, or no partner), if the participant has children, income level (separated into 6 categories spanning \$0 to over \$100,000), employment status, if the participant was currently uninsured or had Medicaid, and race/ethnicity (options included White, Hispanic, Black/African American, Asian, American Indian/Alaskan, Hawaiian/Pacific Islander, Other).

Written Screen—The Brief Inpatient Screen was re-administered to participants in written form; the wording remained identical to that of the verbal screen (Figure 1). This afforded participants the opportunity to respond anonymously to all three items of the instrument, as compared to the screen terminating after a “yes” answer to any of its elements. Results referred to as “written Brief Inpatient Screen” were obtained from this screening tool provided in the participant packet.

Composite Abuse Scale—To assess the validity of the Brief Inpatient Screen, the Composite Abuse Scale (CAS) was used as a reference standard because it demonstrates internal reliability as well as construct and criterion validity (Hegarty, Bush, and Sheehan 2005). The CAS is a thirty-item screen designed to encompass four dimensions of interpersonal violence – severe combined abuse, physical abuse, emotional abuse, and harassment. Similar to the Brief Inpatient Screen, the CAS uses the same time frame of the past 12 months. The severe combined abuse portion of the CAS consists of eight questions encompassing sexual abuse, severe physical abuse, and the physically isolating aspects of emotional abuse. The remainder of the CAS contains seven items addressing less severe physical abuse, 11 items for emotional (including psychological, verbal, social isolation, and dominance) abuse, and four items to detect harassment. A cutoff score of 3 constitutes a positive screen. It has been validated on large samples of women and shown to have internal reliability with Cronbach’s alpha 0.85 or above (Hegarty, Bush, and Sheehan 2005). The items of the CAS can be found in the Appendix.

Statistical Analysis

Descriptive statistics for the total participating sample were generated and examined for comparisons between respondents who screened positive and negative on the verbal Brief Inpatient Screen using two-sample t-tests for measurement variables, the Fisher’s Exact test for two-level categorical variables (level of education, relationship status, have children, employment status, race/ethnicity, and insurance status), and χ^2 tests for categorical variables with more than two levels (current partner status and income level). Age,

relationship status, ethnicity, and insurance status data for analysis were obtained from the EMR, while the remainder of demographic data were derived from the participants on the demographic survey. All statistical analyses were performed using SAS 9.3.

Primary Outcome—The sensitivity and specificity of the Brief Inpatient Screen-verbal were calculated using the CAS as a reference standard. Exact confidence intervals describe the precision of these estimates. In addition, kappa statistics were generated to describe the overall agreement between tests.

Secondary outcomes—Using the same statistical methods, we compared the written Brief Inpatient Screen domains to relevant CAS domains, using the CAS domain as the reference standard. For these secondary analyses, we used written BIS results instead of the verbal BIS results because all elements of the Brief Inpatient Screen were administered to each patient with the written version.

Written BIS subscale analysis—The emotional and physical domains of the written BIS were compared to the emotional and physical subscales of the CAS, respectively. The CAS does not contain a specific subscale to detect sexual abuse, and the individual items of the CAS are not validated, so the sexual abuse domain was not specifically investigated. However, to determine if the BIS effectively detected severe abuse, the severe combined subscale of the CAS was compared against the written BIS as a whole.

Verbal BIS versus written BIS—We further compared the verbal BIS versus the written BIS. Neither screen was considered a gold standard; so, for assessment of overall agreement, only the kappa statistic was calculated.

Results

Demographic descriptive statistics

As expected by our pre-specified 4:1 matching criteria, 26% of the participants screened positive on the verbal Brief Inpatient Screen. Participants screening positive were more likely to report a lower annual income (Table 1). Participants who screened positive had lower average educational attainment and were less likely to be in a current relationship than participants who screened negative, but these differences were not statistically significant. No significant differences were observed between IPV-positive and IPV-negative participants for any other demographic variables.

Among the 46 total participants, 18 came from internal medicine and, 7 from neurology and neurosurgery, 3 from cardiology, 4 from family medicine, 5 from obstetrics, and 9 from the surgical services. Among the 12 participants with a positive IPV screen, 5 came from internal medicine, 3 from neurology or neurosurgery, 1 from cardiology, 1 from obstetrics, and 2 from the surgical services.

Primary outcome

The Brief Inpatient Screen-verbal identified IPV in our population with a sensitivity of 52.6% (95% CI 28.9–75.6) and specificity of 92.6% (95% CI 75.7–99.1) compared to the CAS (Table 2). The overall agreement of the two screens was low, with a kappa of 0.478.

Secondary outcomes

Written BIS subscale analysis—The BIS physical domain (“BIS-physical”) had a sensitivity of 40.0% (95% CI 16.3–67.7) and specificity of 96.3% (95% CI 88.8–100.0) when compared to the physical domain of the CAS (“CAS physical”). This was the lowest

sensitivity but highest specificity of our subdomain analyses. The BIS emotional domain (“BIS-emotional”) detected IPV with a sensitivity of 70.6% (95% CI 44.0–89.7) and specificity of 93.1% (CI 77.2–99.2) when compared to the emotional domain of the CAS (“CAS emotional”). The written BIS detected IPV with a sensitivity of 88.9% (95% CI 51.8–99.7) and specificity of 83.8% (95% CI 68.0–93.8), when compared to the CAS severe combined domain (“CAS severe combined”). This was the highest sensitivity and lowest specificity of the secondary analyses.

To characterize the sexual abuse domain on the written BIS better, we performed a post-hoc analysis comparing the written BIS sexual domain to a single item of the CAS that described completed rape (“Raped me,” found in the severe combined abuse domain of the CAS), as this was the most face valid comparison available. We found that the overall agreement was low, kappa=0.228, and this result was not statistically significant ($p=1.0$). This finding should be interpreted with caution as psychometric properties of the individual items on the CAS have not been established (Hegarty, Bush, and Sheehan 2005).

Verbal BIS versus written BIS—The performance of the BIS when administered verbally (“verbal BIS”) was compared to the BIS administered in an anonymous, written format (“written BIS”). Administering the BIS in a written instead of verbal form improved both the sensitivity and specificity of our screen compared to the CAS (Table 2). The written BIS had a sensitivity of 68.4% (95% CI 43.5–87.4) and specificity of 96.3% (95% CI 81.0–99.9) when compared to the CAS.

Of note, only moderate agreement was observed between the written and verbal forms of the screen, with a kappa of 0.679 (95% CI 44.3–91.5) (Table 2).

Discussion

The results of this pilot study add to the current literature on IPV screening in healthcare settings by examining a new three-item screening instrument, adapted from existing instruments, encompassing three IPV domains - emotional, physical, and sexual violence – in a novel context, a real-world population of general medical and surgical female adult hospital inpatients. Our screen is novel because it was specifically designed for use within the EMR and administered during routine care as part of nursing assessment during routine inpatient admission intake. Advantages of this screen include the brevity of the instrument, which could help to overcome the barrier of time constraints for IPV screening (Sugg and Inui 1992; Waalen, Goodwin, Spitz, Petersen, and Saltzman 2000), and the fact that our screen was optimized by piloting it among users and implemented in a real-world setting within the nursing admission intake process.

Overall, we found that the verbal Brief Inpatient Screen detected only 52.6% of women who screened positive for IPV on the CAS, while having a specificity of 92.6%. This was a low sensitivity for a screening test, and we would prefer to maximize sensitivity to identify as many victims of IPV as possible. Our instrument was developed in a unique manner - accounting for user preference, and validated in a unique population, specifically, hospital inpatients. It is possible that the way that this instrument was developed, or the population in which it was tested, accounts for its overall performance. However, this characteristic of lower sensitivity compared to specificity is consistent with data from studies of other short screens for IPV. A recent systematic review of IPV screening tools showed widely variable sensitivities and specificities among screening instruments with sensitivity reported as low as 35% (Rabin, Jennings, Campbell, and Bair-Merritt 2009).

Our screen performed modestly, but lower than is desirable, in detecting IPV among hospital inpatients when compared to the CAS as a reference standard. Although other short IPV detection instruments assessed in clinical settings also have limitations, our screen performed lower than expected and not as well as other screens. For comparison, the three-item Partner Violence Screen (PVS) was tested in two emergency departments, two family practice clinics, and two women's health clinics, and had an overall sensitivity of 49.2% and specificity of 93.7% when compared with the CAS (MacMillan, Wathen, Jamieson, Boyle, McNutt, Worster, Lent, and Webb 2006). The STaT, another three-item screen, was tested in an emergency department and had a sensitivity between 64% (95% CI 50–78%) and 96% (95% CI 90–100%), and specificity between 75% (95% CI 59–91%) and 100% when compared to the reference standard of a semistructured interview using preset IPV criteria (Paranjape and Liebschutz 2003).

Four-item screens have shown a slightly higher sensitivity and specificity. For example, the HITS had a sensitivity of 96% and specificity of 91% when compared to a 15-item modified CTS when tested among outpatients in family practice offices (Sherin, Sinacore, Li, Zitter, and Shakil 1998). However, these data should be interpreted with caution, as the 15-item CTS used is not accepted as a reference standard. The Ongoing Violence Assessment Tool (OVAT), tested in an emergency department, had a sensitivity of 86% and specificity of 83% when compared to the Index of Spousal Abuse (ISA) (Ernst, Weiss, Cham, Hall, and Nick 2004).

Comparing our data to the HARK leads to interesting findings. The sensitivity of the HARK four-item screen in comparison to the CAS was 81% (95% CI 69–90%), with a specificity of 95% (95% CI 91–98%), when studied in women in general practice waiting rooms (Sohal, Eldridge, and Feder 2007). Both the BIS and the HARK each are comprised of nine different abusive behaviors; however, the BIS categorizes them into three different domains of abuse while the HARK categorizes them into four domains. Thus, having a fewer number of individual abuse behaviors does not account for the lower sensitivity of the BIS as compared to the HARK. Our sensitivity of 52.6% may be related to having fewer overall abuse categories, the specific activities named in the BIS, or the different populations used for validation.

The variability of the effect estimates for both our screen and these other short screens reflects the challenges of accurately identifying IPV, as described by the U.S. Preventive Services Task Force clinical guidelines for IPV screening (Nelson, Nygren, McInerney, and Klein 2004). The complexity of IPV identification complicates the creation of a true “gold standard” for comparison (Rabin, Jennings, Campbell, and Bair-Merritt 2009), so statistical analysis of new instruments is limited by accuracy of the existing accepted reference standards.

Subdomain analysis of the written BIS versus corresponding domains within the CAS revealed important findings about our screen. The BIS physical domain had the lowest sensitivity of the domains, at 40.0%, with the highest specificity of 100.0% when compared to the CAS physical domain. This may be due to the fact that the CAS names a greater number of specific physically abusive acts compared to our screen, allowing for detection of physical abuse more broadly. A limitation of IPV detection instruments is that not every abusive act considered by an individual is available in a screening instrument; thus, abused individuals may screen negative on an instrument not specifically listing these conditions (Waltermauer 2005). The emotional domain of the written BIS showed an improved sensitivity of 70.6% with a decreased specificity of 93.1%.

Studies of the HITS and PVS instruments have shown similar findings to our instrument (Rabin, Jennings, Campbell, and Bair-Merritt 2009). When compared to corresponding revised CTS domains, the HITS physical domain had a sensitivity of 46% and specificity of 88%, while the HITS psychological domain had a sensitivity of just 30% and a specificity of 88%. Likewise, in comparison with the same CTS domains, the PVS physical domain had a sensitivity of 46% and specificity of 83%, while the PVS psychological domain had a sensitivity of 35% and specificity of 85%. Thus our brief inpatient screen, when tested as an anonymous written screen, performed similarly in the detection of IPV to short screening instruments validated in different populations. This is expected given that our screen constitutes an adaptation of elements with similar wording to many existing instruments. It may also represent a property of short screens – physical and emotional violence are detected poorly, with physical violence the most difficult to identify with brief instruments.

Reassuringly, the written Brief Inpatient Screen as a whole performed well in detecting the most severe abuse. When compared to the severe combined abuse domain of the CAS, the sensitivity was nearly 90% with a specificity of 83.8%. Although our written screen overall detected IPV with a sensitivity of 68.4%, it detected the most severely abused victims with greater accuracy. This will allow patients most in need of support services to be identified.

In comparing the BIS administered as a written screen versus verbally administered by nursing staff, sensitivity was better on the anonymous, written screen, improving from 52.6 to 68.4%. The two versions of the screen exhibit moderate agreement with a kappa of 0.679. The increased sensitivity of the written screen may have been due in part to administering the same question to participants a second time, potentially increasing the likelihood of obtaining a positive screen. Nonetheless, our findings were concordant with the current literature that shows face-to-face interviewing is less preferable than a self-administered, written screening method (MacMillan, Wathen, Jamieson, Boyle, McNutt, Worster, Lent, and Webb 2006). Likewise, audio computer assisted self-interview showed improved rates of IPV disclosure compared to interview by a healthcare provider (Klevens, Sadowski, Kee, Trick, and Garcia 2012). Therefore, as IPV screening in healthcare settings evolves, careful attention to the wording of screening instruments as well as the context in which they are administered should remain pertinent considerations.

Strengths

The BIS is an instrument adapted from many existing short tools that encompasses the emotional, physical, and sexual domains of IPV. This screen is the first, to our knowledge, that was specifically designed for users and tested in a real-world application, embedded in the EMR. To address the challenges of time constraints as a barrier to IPV screening, we maximized the instrument for brevity and ease of administration. We studied hospital inpatients, a population that has not yet been addressed in validation studies for IPV screening tools, and thus our study helps to address an important knowledge gap. We also show an important comparison, that a written, self-administered version of the same instrument performed well in detecting severe violence.

Limitations

This study had several limitations. First, the small number of participants was reflected in the low precision of our effect estimates. Despite the relatively small numbers of participants, however, we did achieve statistically significant ($p < 0.05$) results on most of our kappa estimates. Second, although few patients refused participation, it is possible that the investigators were less able to secure a private setting – and thus proceed with the study protocol -- among participants who were accompanied by an abusive or controlling partner. If this was the case, data from the most severely controlled participants would not have been

included in the estimates of our sensitivity and specificity. Third, many potential participants were missed simply due to inability to approach identified patients prior to discharge from the hospital. We cannot comment on whether patients who were discharged earlier, and thus missed by the investigators, were discharged due to confounding factors such as controlling behavior by an abuser or differential severity of illness differences between participants and nonparticipants. Although this discharge effect would be unlikely to bias our results, it could be hypothesized that it reduced the generalizability of our results to a population that remains hospitalized for a longer period of time, and may be sicker. Fourth, as our screening instrument terminated after any “yes” answer, we were unable to determine how the domains of the initial verbal screen compared with the CAS. Fifth, we used an investigator-developed instrument to collect demographic information, which could have led to misclassification of these variables so that comparability of demographics to other studies may have been reduced. Fifth, although our instrument was optimized based on user feedback, we have not performed formal psychometric evaluation of the BIS, and the domains were created based on face validity. Finally, due to the psychometric properties of the CAS, we were unable to evaluate adequately the sexual abuse domain of the BIS.

Additionally, inherent limits occur in detecting IPV. Not every act that could be considered abuse by a patient can be included within a screening instrument, so sensitivity of any tool will be limited. Whereas the CAS was chosen as a reference standard, it is not a perfectly accurate instrument for IPV detection and this must be considered when interpreting our results. Finally, our instrument was tested in a single institution among a largely white, non-Hispanic, middle-aged population, and our results may not be extrapolated to younger or more racially and ethnically diverse populations. For example, McFarlane and colleagues found significantly different rates of abuse disclosure between ethnic groups; specifically, white and African American women were more likely to report abusive behaviors than Hispanic women (MacFarlane, Groff, O’Brien, and Watson 2005). This suggests evaluation of IPV is culturally informed.

Future studies

To assess the psychometric properties of the BIS better, a larger study with a more representative sample should be performed. Further study could include a semi-structured interview for comparison against our verbal screen, to establish the screen’s validity, and could evaluate IPV prevalence based on service to define further the victim population. Also, the BIS was only tested among women. Further study is needed to determine whether instruments that detect IPV perpetrated against women can effectively identify IPV perpetrated against men.

Conclusions

As IPV detection in healthcare settings becomes the standard of care (IOM (Institute of Medicine) 2011), improved methods for detecting IPV in health care settings must be developed. A verbal, face-to-face screening method, with potentially limited privacy, is not optimal as evidenced by this study and other literature (MacMillan, Wathen, Jamieson, Boyle, McNutt, Worster, Lent, and Webb 2006; Kleven, Sadowski, Kee, Trick, and Garcia 2012). Although the written Brief Inpatient Screen has limitations, it does perform well in identifying severe IPV among hospital inpatients - a patient population which has not been well-studied in IPV screening instrument validation. Our findings are reassuring that brief, written, self-administered screens are promising for future detection of severe IPV among inpatients. Future work should focus on optimizing IPV detection in this population.

Acknowledgments

The authors gratefully acknowledge the assistance of the Domestic and Sexual Violence Task Force at the our institution. [AUTHOR]'s contribution on the project described was supported by Award Number K12HD055882 ([INSTITUTION]'s BIRCWH Program) from the Eunice Kennedy Shriver National Institute of Child Health and Human Development. The content is solely the responsibility of the authors and does not necessarily represent the official views of the Eunice Kennedy Shriver National Institute of Child Health and Human Development or the National Institutes of Health.

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At any time in the past 12 months, has your partner or anyone close to you...

- Put you down, humiliated you, controlled you, or made you feel afraid? (Emotional Abuse)
- Hit, slapped, kicked, or otherwise physically hurt you? (Physical Abuse)
- Forced you to have sexual activities? (Sexual Abuse)

Figure 1.

Brief Inpatient Screen for IPV – a yes answer to any part constitutes a positive screen

Figure 2.
Flow chart for participant recruitment into study

Table 1

Participant Demographic Characteristics; Screening Result based on verbal Brief Inpatient Screen

Characteristic	Positive Screen n (percent) N=12 (26.1)	Negative Screen n (percent) N=34 (73.9)	p-value
Age(years)			
Mean (+/- standard deviation)	43.8 +/- 11.9	45.5 +/- 11.1	0.647
Level of Education			
Up to High School Diploma or GED	8 (66.7)	13 (38.2)	0.107
Beyond High School	4 (33.3)	21 (61.8)	
Relationship Status			
Single, Separated, Divorced, or Widowed	8 (66.7)	16 (47.1)	0.321
In a relationship or Married	4 (33.3)	18 (52.9)	
Current Partner Status			
Current partner is male	6 (50.0)	21 (61.8)	0.613
Current partner is female	1 (8.3)	4 (11.8)	
No partner	5 (41.7)	9 (26.5)	
Have children	8 (66.7)	24 (70.6)	1.000
Yearly household income			
\$0 – \$30,000	10 (83.3)	11 (32.4)	0.007
\$30,000 – \$75,000	2 (16.7)	13 (38.2)	
> \$75,000	0 (0.0)	10 (29.4)	
Currently unemployed	6 (50.0)	17 (50.0)	1.000
Ethnicity			
White, non-Hispanic	11 (91.7)	30 (88.2)	1.000
Non-White	1 (8.3)	4 (11.8)	
Insurance Status			
Medicare, Medicaid, Self-Pay	3 (25.0)	7 (20.6)	0.706
Commercial	9 (75.0)	27 (79.4)	

Table 2

Study Results

Comparison	Sensitivity (95% CI)	Specificity (95% CI)	Kappa (95% CI)	p-value (95% CI)
Verbal Brief Inpatient Screen vs. CAS	52.6 (28.9–75.6)	92.6 (75.7–99.1)	0.478 (22.7–73.0)	0.035
Written Brief Inpatient Screen vs. CAS	68.4 (43.5–87.4)	96.3 (81.0–99.9)	0.673 (45.7–89.0)	0.059
Brief Inpatient Screen-physical vs. CAS physical	40.0 (16.3–67.7)	100.0 (88.8–100.0)	0.473 (21.1–73.6)	0.003
Brief Inpatient Screen-emotional vs. CAS emotional	70.6 (44.0–89.7)	93.1 (77.2–99.2)	0.661 (43.4–88.9)	0.257
Written Brief Inpatient Screen vs. CAS severe combined	88.9 (51.8–99.7)	83.8 (68.0–93.8)	0.601 (34.3–85.9)	0.059
Verbal vs. written Brief Inpatient Screen	n/a	n/a	0.679 (44.3–91.5)	0.414

Appendix 1

Composite Abuse Scale Dimensions and Items

Severe combined abuse

Kept me from medical care
Used a knife or gun or other weapon
Locked me in the bedroom
Put foreign objects in my vagina
Refused to let me work outside the home
Raped me
Tried to rape me
Took my wallet and left me stranded

Emotional abuse

Told me I was crazy
Tried to convince family, friends, and children that I was crazy
Became upset if dinner/housework wasn't done when they thought it should be
Told me that I wasn't good enough
Tried to keep me from seeing or talking to my family
Told me that I was stupid
Tried to run my family, friends, and children against me
Did not let me socialize with my female friends
Told me that I was ugly
Told me no one else would want me
Blamed me for their violence

Physical abuse

Shook me
Hit or tried to hit me with something
Pushed, grabbed, or shoved me
Kicked me, bit, or hit with a fist
Slapped me
Threw me
Beat me up

Harassment

Harassed me over the telephone
Harassed me at work
Followed me
Hung around outside my house