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Development of the Emergency Department Senior Abuse Identification (ED Senior AID) tool

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Abstract

Emergency departments (EDs) are an important health care setting for the identification of elder abuse (EA). Our objective was to develop an ED-based tool to identify EA. The initial tool included a brief cognitive assessment, questions to detect multiple domains of EA, and a physical examination. Refinement of the tool was based on input from clinical experts and nurse and patient feedback. The revised tool, which included 15 questions about EA, was then tested in an academic ED. We calculated the inter-rater reliability, sensitivity, and specificity of individual EA questions. Among ED patients age 65 ($N = 259$), 17 (7%) screened positive for suspicion of EA. We identified a combination of six questions that cover the included domains of EA, demonstrated good or excellent inter-rater reliability, and had a sensitivity and specificity of 94% (95% confidence interval (CI) 71–100%) and 90% (95% CI 85–93%), respectively. These results inform a proposed screening tool for multisite validation testing.

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Keywords

Elder abuse; emergency medicine; geriatrics; screening tool

Introduction

Elder abuse (EA) is “an intentional act, or failure to act, by a caregiver or a person with whom there is an expectation of trust that causes or creates a risk of harm to an older adult” (Prevention, 2017). EA encompasses neglect as well as physical, financial, psychological, and sexual abuse. An estimated 3–10% of community-dwelling older adults in the United States have experienced EA in the past year (Acierno et al., 2010; Comijs, Pot, Smit, Bouter, & Jonker, 1998; Pillemer & Finkelhor, 1988). The risk for EA is greater among women (Laumann, Leitsch, & Waite, 2008), individuals with limited financial resources (Johannesen & LoGiudice, 2013; Lachs, Berkman, Fulmer, & Horwitz, 1994), and individuals who are cognitively impaired (Dong, Simon, Rajan, & Evans, 2011; Dyer, Pavlik, Murphy, & Hyman, 2000; Lachs et al., 1994; Lachs, Williams, O’Brien, Hurst, & Horwitz, 1997; Paveza et al., 1992). In addition to the suffering experienced by abused older adults, EA is associated with functional decline (Dong et al., 2009), mortality (Dong et al., 2009; Lachs, Williams, O’Brien, Pillemer, & Charlson, 1998; M. J. Schofield, Powers, & Loxton, 2013), and increased health care utilization (Dong & Simon, 2013b). The financial cost of EA is difficult to estimate but likely exceeds billions of dollars annually (Connolly, Brandl, & Breckman). Despite the prevalence and burden of EA, the majority of cases are never identified by individuals positioned to intervene (Acierno et al., 2010; Bond & Butler, 2013; Pillemer & Finkelhor, 1988).

Emergency departments (EDs) are an important setting for identifying EA. EDs receive over 20 million visits from older adults annually, and EDs disproportionately care for older adults with risk factors for EA including cognitive or physical impairments, low socioeconomic status, and lack of routine medical care (Lachs et al., 1997). Consistent with this, older adults who have experienced EA visit EDs twice as often as those who have not (Dong & Simon, 2013a). Unfortunately, the potential to use the ED as a setting for identifying EA is currently unrealized (Stevens, Richmond, Pereira, Shenvi, & Platts-Mills, 2014). A formal diagnosis of EA occurs in only one in 10,000 older patients visiting EDs (Evans, Hunold, Rosen, & Platts-Mills, 2017), which is much less than either national or ED-based estimates of the prevalence of EA (Acierno et al., 2010; Evans et al., 2017; Stevens et al., 2014). The failure to identify EA in the ED is likely in part a result of the absence of a validated EA screening tool designed for the ED. While the current availability of protocols and procedures for identifying EA in U.S. EDs is unknown, a survey conducted in the early 1990s found that 75% of U.S. EDs had child abuse protocols, while only 27% had EA protocols (McNamara, Rousseau, & Sanders, 1992). Further, and also in contrast to child abuse, most emergency physicians are unaware of definitions of EA or how to coordinate care for an ED patient identified as a victim of EA (Acierno et al., 2010; Jones, Veenstra, Seamon, & Krohmer, 1997).

The Emergency Department Senior Abuse Identification (ED Senior AID) study aims to develop and validate an ED-based EA screening tool that can be implemented into ED patient flow and used by bedside nurses. Here we present (1) a description of the development of the screening tool and (2) results from a study of the reliability and accuracy of individual screening tool questions.

Methods

Drafting of the screening tool

Content of screening tool—The screening tool was designed by a multidisciplinary panel of experts in emergency medicine, geriatrics, nursing, social work, psychometrics, and EA. Decisions about the structure and content of the initial draft of the screening tool were made based on a series of conference calls. Development was guided by characteristics that were identified as being necessary for a successful screening tool: (1) applicable to a diverse population of older ED patients regardless of education, race, cognition, or accompaniment by a caregiver in the ED; (2) conducted by bedside ED nurses (i.e., not nurses in triage) because of their close contact with patients throughout the ED visit; (3) sensitive, particularly for identifying patients experiencing EA that meets legal reporting definitions (e.g., individuals with disabilities in need of protective services) (“Chapter 108A, Article 6, Protection of the Abused, Neglected, or Exploited Disabled Act,” 2017); (4) efficient, particularly for ruling out EA in cognitively normal high-functioning patients; (5) utilize questions to determine a patient’s ability to report abuse, followed by additional assessment, including a physical examination, for patients whose ability to report abuse is in question; and (6) incorporate a series of specific questions/prompts to inform a final judgment (rather than a scoring system or rule) to determine suspicion of EA using all available information. The reasons for prioritizing most of the above characteristics should be readily apparent. Regarding item 6, the use of a final judgment by an assessor was considered preferable to a score or some other determination derived directly from responses to individual questions because the determination of whether EA is likely to be occurring is, in most cases, complex and requires the subjective interpretation of patient responses, appearance, and behaviors.

Interviews were conducted by a total of two nurses and seven research assistants (RAs), collectively referred to as assessors. Prior to initiating interaction with patients, the team identified techniques that we thought would improve disclosure of information. These techniques were then reviewed with assessors prior to conducting interviews: speaking to patients once they had been placed in a bed in the ED treatment area (i.e., not in a waiting room, or triage room), ensuring a private conversation by asking all family and caregivers to leave the room, and using empathetic dialogue techniques such as active listening, sitting with the patient at eye-level, appropriate physical touch, and attempting to identify and alleviate any confusion or stress a patient had. We anticipate that during subsequent validation testing standard instructions that describe these techniques will accompany the tool.

Cognitive assessment—The initial draft of the screening tool (Figure 1) began with a cognitive assessment. The Ottawa 3DY (O3DY) assessment was chosen because it is brief

(four questions: day of week, date, spell “world” backwards, and year) and has been validated in the ED (Wilding et al., 2016). A score 3 has an estimated sensitivity of 94% (95% confidence interval (CI) 78–99%) and specificity of 73% (95% CI 66–79%) for identifying cognitive impairment among geriatric ED patients. The cognitive assessment tool was changed during the instrument refinement stage (see below).

EA questions—Following the cognitive assessment, all patients would then be asked questions about EA. We chose to ask these questions to all patients because even patients with severe cognitive impairment may be able to describe a concerning caregiver relationship. Individual questions to assess the presence of EA were selected from existing EA tools (Supplemental Table 1; Aravanis et al., 1993; Connolly et al., 2018; Schofield & Mishra, 2003). In some cases, the wording of individual questions was modified to improve clarity or to reduce overlap with another question. A separate question about sexual abuse was not included because the physical and psychological abuse questions were felt to encompass sexual abuse. This decision is consistent with other EA screening instruments (Yaffe, Wolfson, Lithwick, & Weiss, 2008).

Physical examination—Recognizing some older adults with cognitive impairment may be unable to report abuse, all patients with cognitive impairment received a physical examination. The physical examination specified certain components that would be examined for all patients receiving a physical examination and additional components, which would be completed only if indicated. Components for all patients receiving a physical examination included identifying any bruising in suspicious locations (back of the neck, wrists, ulnar-aspect of forearms) or in multiple stages of healing; patterned injuries (revealing the object used to cause the injury), burns, abrasions, or lacerations; evidence of neglect such as decubitus ulcers on the back and feet; evidence of dehydration; evidence of poor control of medical problems; evidence of malnutrition; and swollen or tender areas on palpation. Additional components of the physical examination, if indicated, included evidence of sexual abuse (genital trauma or infection), fractures concerning for abuse, and an unusual delay in seeking medical attention that is concerning for abuse (Figure 1). For all patients, assessors were also prompted to consider chief complaints that might be indicative of abuse including injuries (e.g., falls, fractures, head injuries, lacerations), indicators of poor home care (e.g., pressure ulcers, dental problems, urinary infections), and vague complaints that might be a sign of a mental health problem or a patient attempting to disclose a harmful situation (e.g., fatigue, weakness, loss of appetite). Assessors were also prompted to consider evidence of a delay in care and observations regarding caregivers’ interactions with patients.

Outcome assessment—Following the completion of the screening tool, the assessor was prompted to make a binary holistic judgment regarding EA in response to the question, “Based on the information available and the answers the patient provided, is there concern for the presence of abuse, or the potential for abuse?” The following guidance was provided to assessors for making this judgment. If the assessor believed there was some ongoing concern for EA, then this was a positive screen. Under this definition, patients who were no longer experiencing EA (i.e., they were no longer living with or exposed to the perpetrator)

were not positive screens. A positive answer to a single screening question was not necessary for a positive screen nor did a positive answer to a single screening question mandate a positive screen. For example, some patients may have answered no to all questions but had a demeanor and physical examination findings that raised suspicion for EA. Alternatively, a patient may have answered yes to a question or have a concerning finding on physical examination but the actual details may have been insufficient to raise a substantive concern for EA (e.g., the patient reports a grandchild occasionally calling them names, a decubitus ulcer that by history and exam appears to be treated appropriately).

Reporting cases of EA—For all patients with a positive screen, the assessor would first communicate this concern and the reason for the concern with the treating emergency physician. The assessor would then consider the details of the case to determine if they met the North Carolina’s mandatory reporting criteria. These criteria state that EA must be reported if there is “reasonable cause to believe that a disabled adult is in need of protective services,” whereby a disabled adult needs protective services, “due to his physical or mental incapacity, is unable to perform or obtain for himself essential services and if that person is without able, responsible, and willing persons to perform or obtain for his essential service” (“Chapter 108A, Article 6, Protection of the Abused, Neglected, or Exploited Disabled Act,” 2017). If so, the details of the case would be reported to Adult Protective Services (APS) in the patient’s county of residence. For cases in which it was not clear whether the problem identified by the assessor met the state’s mandatory reporting criteria, the decision of whether the assessor would report the case to APS was made in consultation with the lead investigator of the study. Additionally, depending on the nature of the concerns, the timing of ED care, and whether the patient was going to be admitted, information would be reported to the ED social worker or the social worker on-call for the hospital’s family and domestic violence care team.

Instrument refinement—The usability and acceptability of the initial screening tool from the perspectives of assessors and of patients was determined by administering the tool to 20 older adults receiving care in the ED of a large academic medical center (instrument refinement study). Based on feedback from assessors and patients, the following changes to the screening tool were made (Figure 2). First, the O3DY was replaced with the Abbreviated Mental Test 4 (AMT4) as the instrument for assessing cognition. The O3DY asks patients to report the date, which is often difficult for older adults, even those who do not have cognitive impairment. Asking about the date was thought likely to result in too many false positives, meaning patients categorized as being unable to report abuse due to cognitive impairment but who actually are able to report abuse. The AMT4 asks the patient to report their age, date of birth, current location, and year, which are all questions that are usually answerable by patients with normal cognition. Consistent with this judgment, the AMT4 has similar sensitivity and higher specificity than the O3DY in the ED (I. Schofield et al., 2010). For patients with an AMT4 ≤ 3 , a Mini-Mental State Exam (MMSE) was performed to better define the cognitive capacity of these study participants (Tombaugh & McIntyre, 1992). The research group recognized that a full MMSE would be too long to include in a final version of the screening tool, and the MMSE is not part of the final tool. Third, we added 11 EA questions to the screening tool. Some of these questions were conceptually

similar to questions in the initial draft but had different phrasing in order to evaluate which version may be more clear and perform better for assessing EA. Fourth, in order to increase the ability of assessors to accurately determine the presence or absence of EA, it was decided to conduct the physical assessment on all patients for this phase of the study. As before, the final determination of suspicion of EA was a holistic judgment based on the cognitive assessment, EA questions, physical assessment, and observations of the patient and caregiver, if present. There were no changes to the reporting procedure for patients who screened positive.

Methods of predictive accuracy and reliability study

Following refinement of the tool, the tool was tested on a larger sample of ED patients aged 65 years and older to determine the predictive accuracy and reliability of individual questions. The purpose of this phase of the study was to inform derivation of a final set of questions for validation testing. All assessors had more than 1 year of experience as an ED nurse caring for older adults or as an RA conducting prospective clinical studies of older adults in the ED. Assessors received an initial training on identifying EA by the principal investigator and received ongoing training through the discussion of positive screens with the study team. One assessor interviewed each patient. Every other day of screening, a second assessor observed interviews in-person and recorded an independent assessment of the screening tool for the purposes of calculating inter-rater agreement.

Participants—Patients aged 65 years and older presenting to the ED were screened for eligibility to participate. Patients were excluded if they were critically ill (Emergency Severity Index score of 1), on a psychiatric hold, did not speak English, were receiving face-mask oxygen or positive pressure ventilation, were enrolled in another research study, or if access to the patient was restricted by a medical provider. For patients who were not in their room or were speaking with a provider, assessors checked their availability at least one other time. Signed informed consent was required either from the patient or from a physically present legally authorized representative. Patients and anyone accompanying patients were informed that the purpose of the study was to develop a questionnaire about safety at home. Capacity to consent was determined based on the patient's ability to answer three questions about the study (purpose, risks, voluntary nature) within three attempts (Resnick et al., 2007). After obtaining consent, any individuals accompanying the patient were asked to leave the room to limit their influence on the patient's responses. The study was approved by the University's Institutional Review Board. The methods were also consistent with the requirement of the funding agency (Department of Justice) that patient consent be obtained before sharing patient information, as would be necessary for cases in which EA was suspected.

Measures—Following consent, sociodemographic information was collected before initiating the screening tool illustrated in Figure 2. An AMT4 score ≥ 3 , indicating cognitive impairment (I. Schofield et al., 2010), was used to identify patients who might not have the ability to report abuse. For patients with an AMT4 score ≥ 3 , the MMSE was conducted. For descriptive purposes, MMSE cutoffs were as follows: 21–26 mild cognitive impairment, 11–20 moderate cognitive impairment, and <11 severe cognitive impairment (Folstein, Folstein,

& Fanjiang, 2001). Following cognitive assessments, assessors asked a series of EA questions. The majority of these questions were sourced from published EA assessments (Supplemental Table 1). Responses that may indicate suspicion of EA (no to 1 or 2, yes to 3–15, as defined in Figure 2, or refusal to respond to any question) prompted follow-up questions to obtain details regarding the problem; the order of questions in Figure 2 is the order in which they were asked during screening. The extent and duration of followup questions was at the discretion of the assessor with the goals of determining whether or not EA was likely a problem and obtaining sufficient information to allow reporting to APS regarding the nature of the problem and the people involved. A physical assessment was completed for all participants. During the physical assessment, verbal patients were asked about concerning physical findings so that the assessor could make a judgment of suspicion of EA. At the end of the screening, assessors made a holistic judgment of suspicion of EA using all information available.

Data analysis—Data were recorded and stored using Research Electronic Data Capture. Assessors determined if they did or did not suspect that the patient was experiencing EA. There was 100% agreement for this judgment by paired assessors, so there was no need for adjudication of conflicting judgments. Predictive accuracy values including sensitivity, specificity, positive predictive value, and negative predictive value with 95% CIs were calculated for each EA question using overall suspicion of EA as judged by the assessor as the reference standard.

We also calculated the sensitivity and specificity of combinations of EA questions, using the assessor's overall judgment regarding whether they suspected abuse as the reference standard. Various approaches were used to identify combination of EA questions with the goal of identifying a combination that was both sensitive and specific. Simply optimizing sensitivity, as is often done in emergency medicine-based decision instruments, was not considered appropriate because of the potential burden of false positives on patients and family members (Beach, Carpenter, Rosen, Sharps, & Gelles, 2016). One approach began with the requirement that the combined questions cover each of the four domains of EA (psychological abuse, financial abuse, physical abuse, and neglect). Under this constraint, various combinations of questions were tested based on the sensitivity and specificity of individual questions and the overlap of cases identified (Figure 3). A second approach used classification and regression tree (CART) analysis. A third approach used backwards stepwise logistic regressions with selection at the $p = 0.1$ and $p = 0.2$ levels, without requiring all four domains to be covered. The solutions identified based on CART and logistic regression were then modified to (1) ensure that questions covering the four specified domains of EA were included, (2) ensure all questions had good or excellent kappas, and (3) optimize sensitivity and specificity. For interviews conducted by two assessors, we calculated the percentage agreement and kappa statistic for assessors' recording of responses to each of the EA questions and for the overall judgment of whether EA was suspected. CART analysis was conducted using SPM Salford Predictive Modeler (Salford Systems, San Diego, CA). All other statistical analyses were conducted using STATA 14.1 (StataCorp LP, College Station, TX).

Results

Results of the predictive accuracy and reliability study

In total, 981 individuals were preliminarily identified as eligible based on being age 65 or older and being listed on the ED electronic health record tracking board during screening periods (Figure 4). The most common reason for ineligibility was that the patient was not physically present when the assessor went to their room (i.e., admitted, discharged, or completing diagnostic imaging). Of 552 who remained eligible and were screened by assessors, 263 consented to participate. The most common reasons for declining consent were not wanting to participate in a study and not feeling well. Of 22 patients who lacked capacity to consent, 15 had a legally authorized representative present in the ED who was willing to provide consent. Following consent, 3 participants withdrew from the study and 1 patient left the ED before completion of the assessment and the available information was insufficient to allow a decision regarding suspicion for EA, leaving a final sample of 259. One other patient did not finish the interview, but responses were sufficient to allow a global judgment of suspicion of EA; their responses are included in calculations for the questions to which they responded.

Of the study participants ($N = 259$), about half were aged 65–74 years, about one-third were 75–84 years, and about one-fifth were 85 years or older (Table 1). The majority of participants were female (60%), white (75%), and lived independently (90%). Level of formal education was broadly distributed from less than high school to postgraduate education. Twenty-five participants (10%) had AMT4 scores ≤ 3 . Of these individuals, 11 (44%) had mild cognitive impairment and 14 (56%) had moderate cognitive impairment as determined by the MMSE. The percentages of patients with specific chief complaints were similar for eligible individuals who did and did not enroll, except that gastrointestinal complaints were approximately twice as common among those who did not enroll (Supplemental Table 2). Injury was the most common chief complaint category for both enrolled and non-enrolled patients.

In total, 17 of 259 (7%, 95% CI 4–10%) participants screened positive for suspicion of EA (Table 2). Most of these 17 patients were female (75%) and did not have cognitive impairment (i.e., AMT4 = 4; 76%). For these 17 patients, responses to specific EA questions are presented in Figure 3. Psychological abuse was the most prevalent form of abuse (12 cases, 71%). Seven cases (41%) included a mixture of abuse types. Patients who screened positive for suspected EA were similar in regard to age and race as those for whom EA was not suspected. A chief complaint of musculoskeletal pain was more common among those who screened positive for suspected EA (23% vs. 11%; Supplemental Table 2). Chief complaints pertaining to cardiac problems (0% vs. 13%), vascular problems (0% vs. 4%), and syncope (0% vs. 7%) were less common among those who screened positive than those who screened negative.

Sensitivity and specificity estimates for the 15 EA questions and for combinations of EA questions are presented in Table 3. The numbering of questions in Table 3 differs from the numbering in the figures to reflect the EA category to which questions correspond (psychological, neglect, financial, physical, and risk factor). Sensitivities of individual EA

questions range from 12% (95% CI 1–36%) to 75% (95% CI 48–93%). Specificities of individual EA questions range from 67% (95% CI 61–73%) to 100% (95% CI 98–100%). For combinations of questions, a sensitivity of 100% was possible (identifying all 17 cases), but only through the inclusion of the question “Have you been sad or lonely often?” (Psy-5). Combinations including this question were not selected for the final version of the tool because this question was very nonspecific. CART analysis identified a three-question solution (Table 3). The logistic regressions using thresholds for inclusion of $p = 0.1$ and $p = 0.2$ yielded three- and five-question solutions, respectively; the three-question logistic regression solution was the same as the CART solution. The five-question logistic regression solution was modified in the following ways: (1) Psy-7 was removed because of a kappa = 0.58 and replaced with Psy-1; (2) Neg-3 was removed because it did not increase sensitivity and decreased specificity. The resulting combination (Combination 11) included six questions covering the four specified domains and had a sensitivity of 94% (95% CI 71–100%) and a specificity of 90% (95% CI 85–93%).

For evaluations for which two assessors were present ($n = 125$), there was perfect agreement regarding the overall global determination of whether EA was suspected (Supplemental Table 3). Agreement between assessors for patient responses to individual EA questions ranged from 94% to 100%. The kappa statistic for EA questions ranged from 0.58 to 1, with all but four demonstrating almost perfect agreement (kappa >0.80). Twenty-eight of these duplicated screens were completed by a nurse paired with an RA.

Final version of the screening tool

Consistent with other screening and assessment tools frequently used in the ED (e.g., NEXUS Low-Risk Criteria (Hoffman, Schriger, Mower, Luo, & Zucker, 1992) and Canadian C-Spine Rule (Stiell et al., 2001)), we aimed to develop a tool with 3–7 questions assessing EA. Based on the content of specific questions, predictive accuracy, inter-rater reliability results, and the number and distribution of positive cases identified in the predictive accuracy and reliability study ($N = 259$), six questions were selected for the final screening instrument (Figure 5): (Neg-1) Is this person always there when you need them (if the individual reported needing help and receive help from someone with activities including bathing, dressing, shopping, banking, and meals)? (Psy-1) Has anyone close to you threatened you or made you feel bad? (Psy-3) Has anyone close to you called you names or put you down? (Psy-4) Has anyone told you that you give them too much trouble? (Fin-1) Has anyone tried to force you to sign papers or use your money against your will? (Ph-1) Has anyone close to you tried to hurt you or harm you? In addition, the screening tool utilizes the AMT4 as the initial cognitive assessment, and a judgment of the patient’s ability to report abuse is based on responses to the AMT4 and the EA questions. The physical examination is then completed in individuals judged to be unable to report abuse, in individuals for whom the presence of EA is uncertain, or in individuals for whom the assessor suspects EA (to collect additional information to support a report to APS).

Discussion

Tool refinement

We describe the development of the ED Senior AID tool, an ED-based EA screening tool. The initial version of the tool contained a four-item cognitive assessment and four EA questions, with a physical examination to be administered for patients with cognitive impairment or for whom EA was suspected. The version used in the predictive accuracy and reliability study differs from the initial version in several ways. First, we changed the cognitive assessment from the O3DY to the AMT4, the latter being less challenging for most patients to answer correctly and thus more specific for identifying cognitive impairment. Second, we added more EA questions to explore alternative themes and wording in the assessment of EA. The EA questions selected for the final tool are based on the content covered, interrater reliability, and predictive accuracy and contribution to the identification of cases in the predictive accuracy and reliability study.

Considerable discussion took place regarding the construction and wording of the final prompt to guide assessors in making a determination of whether EA was present. Many ED-based decision instruments use a cutoff score or a rule (i.e., positive if any of the above are present) to inform a decision. Because EA is a complex disease, we felt that this approach would yield inaccurate results and fail to leverage the clinical expertise and intuition of the nurses who will be using the tool. So, rather than using a rule, we chose to ask the assessor to make a holistic judgment regarding the presence or absence of EA. For the predictive accuracy and reliability study, we made that prompt explicit: “Based on the information available and the answers the patient provided, is there concern for the presence of abuse, or the potential for abuse?” Despite this wording, assessors generally did not consider patients whose experiences indicated only the potential for abuse as positive. For the final version of the tool, the phrase “potential for abuse” is removed. Additionally, in the study the prompted question was framed around “concern.” However, concern connotes a value judgment on the part of the assessor (i.e., they think EA is happening and they are worried about the effect of it on the patient), which was felt not to be necessary for a positive screen. In contrast, suspect was felt not to carry this meaning and so is used in the final version of the screening tool. The phrasing for the prompted question in the final version of the screening tool is, “Based on all information available including the answers the patient provided, patient’s chief complaint, and any observations you have made, do you suspect an ongoing problem of elder abuse?”

Positive cases

In our testing of the screening tool, 17 of 259 study participants (7%) were identified in which the assessor suspected EA. This is similar to another estimate of the prevalence of EA among a selected ED population: among older ED patients without cognitive impairment, 7% reported physical or psychological abuse in the past year (Stevens et al., 2014). It is possible that applying the screener without requiring consent would yield an even higher prevalence of EA. Among patients in whom EA was suspected, the majority were female. While some studies identify female gender as a risk factor for EA (Laumann et al., 2008), other studies have not observed this relationship (Acierno et al., 2010; Johannesen &

LoGiudice, 2013). Also, 5 of the 17 individuals with positive screens were black (29%), which is similar to the percentage of blacks in the screened sample (24%). Among the 17 patients who screened positive, psychological abuse was the most prevalent type of EA (12 patients). And 6 of these 12 patients and 7 of all 17 positive screens provided responses indicating multiple types of EA. Three patients reported physical abuse, but none of them had physical findings suggestive of EA at the time of screening in the ED. In contrast, six of eight patients with neglect-type EA had concerning physical findings, suggesting that physical examination should not be restricted to patients reporting physical abuse. In our study, patients with positive screens had a wide range of chief complaints, none of which were specific for EA or neglect. For this reason, we feel that a screening tool needs to be broadly applied and cannot be triggered based on specific chief complaints. The greater prevalence of musculoskeletal pain as a chief complaint in those who screened positive versus those who screened negative (23% vs. 11%), may reflect the psychological impact of EA on the subjective experience of pain.

We found that when given the opportunity to disclose information in an environment of safety with helpful resources many participants were willing to share their experiences. Further, because our tool encourages assessors to obtain detailed responses from patients who indicate a problem, a conversation is encouraged and perhaps results in the patient feeling that their concerns will be heard.

Selection of EA questions for the final screening tool

Of the 15 questions tested, 6 were selected to be in the final screening tool. The selection of these six questions was based on a desire to limit the length of the screener, cover various domains of EA, and optimize predictive accuracy. There was one patient in the study who screened positive but who did not have a positive response to any of the six screening questions selected for the final tool (patient 6 in Figure 3). Since the overall judgment is based on all available information, it is possible that this case would have been identified as a positive screen even if they were only asked the six questions. We can't know if this is true because we tested a 15-question screener, not a 6-question screener. The addition of Psy-5 to the tool would allow us to have identified this patient. However, it would substantially reduce the specificity of the tool. The relative benefit of improving the sensitivity at the price of decreased specificity is a complex decision that depends on the costs and benefits of true and false positives and true and false negatives. The final version of the tool attempts to balance both sensitivity and specificity.

Conclusions

We describe the development of the ED Senior AID tool intended to be used by nurses to screen all ED patients for EA. We approached this challenge with the intent of creating a tool that can be applied to all older adults, can be rapidly completed (i.e., <1–3 min) in most patients, and will be sensitive for identifying EA. A tool is presented meeting these criteria, and a multisite validation study is planned.

Limitations

Our study has several limitations. First, despite our intent to create a screening tool that would be used for all older adults receiving care in the ED, because of consent requirements the screener was not tested on all eligible patients. There were no patients in our study who had severe cognitive impairment. Fifteen patients who lacked capacity to consent were enrolled after consent by a legally authorized representative, but none of these patients had severe cognitive impairment based on MMSE testing. Additionally, there were a number of patients who were excluded because a family member or friend refused to leave (52 of 552 eligible) or because the patient did not want those present to leave (19 of 552 eligible). It is possible that the consent process, which included an explanation of the purpose of the study as identifying safety problems, resulted in the selective exclusion of victims of EA who were unwilling to participate for fear of disclosing information. We also excluded patients on psychiatric holds, despite the known co-occurrence of psychiatric and behavioral illness in patients with EA (Johannesen & LoGiudice, 2013). We do not know what percentage of older ED patients on a psychiatric hold are experiencing EA or how well the tool would perform in these patients. Second, our measures of agreement are based on a method in which one assessor conducted the interview while the other assessor observed. This approach likely yields higher estimates of agreement than if each assessor conducted an independent interview. We chose to do a single interview observed by two individuals in order to reduce the burden on the patient. Third, the approach used for assessing the accuracy of individual EA questions and combinations of questions suffers from incorporation bias because the questions and the reference standard were determined by the same individual. A much more rigorous reference standard for determining the presence of EA is the LEAD approach (longitudinal, expert, all data) (H. R. Kranzler, Kadden, Babor, & Rounsaville, 1994; Henry R Kranzler, Tennen, Babor, Kadden, & Rounsaville, 1997; Wigglesworth et al., 2009). We intend to use the LEAD approach in determining the accuracy of the derived instrument. Fourth, the level of formal training and professional experience of assessors varied, so holistic judgment, which partially relies on clinical judgment, was not completely standardized. Fifth, it is possible that we missed cases of EA in some screened patients either due to the limitations of the tool or because patients may have chosen not to disclose information due to fear of consequences for their own living situation or for their caregiver. Finally, with a sample with only 17 positive screens, the CIs around estimates of the sensitivity of individual questions and combinations of questions are quite broad. A validation study with a larger sample size is planned.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.
Initial screening tool used in the instrument refinement study.

Figure 2.
Screening tool used in predictive accuracy and reliability study.

Figure 3.

Responses to each elder abuse question for patients who screened positive (question numbers refer to those in Table 3). Dark gray: positive response; light gray: refusal to respond; white: negative response; Psy: psychological; Neg: neglect; Fin: financial; Ph: physical; RF: risk factor.

Figure 4.
Flow diagram of enrollment process.

Figure 5.
Proposed final screening tool to be tested in a validation study.

Table 1.Characteristics of study participants ($n = 259$).

Characteristic	<i>N</i>	(%)
Age, years		
65–74	141	(54)
75–84	72	(28)
85	46	(18)
Female	155	(60)
Race		
White	194	(75)
Black	62	(24)
American Indian	1	(0.5)
Asian	2	(0.5)
Hispanic ethnicity	3	(1)
Education		
Less than high school	43	(17)
High school graduate or GED	59	(23)
Some college or technical degree	53	(20)
College graduate	38	(15)
Post-graduate education	66	(25)
Living arrangement ^a		
Independent living	136	(90)
Assisted living	7	(5)
Nursing home	3	(2)
Other	3	(3)
AMT4 ₃ ^b	25	(10)
MMSE ^c		
Not assessed	234	(90)
Mild impairment	11	(4)
Moderate impairment	14	(5)
Severe impairment	0	(0)

^a $N = 222$.^bAbbreviated Mental Test-4, where scores <4 indicate impaired cognition.^cMini-Mental State Evaluation, administered to patients with AMT4 scores <4. Scores of 21–26 indicate mild impairment, 11–20 indicate moderate impairment, and <11 indicate severe impairment.

Table 2.

Characteristics of individuals identified with suspicion of abuse ($n = 17$). The shading indicates the type of abuse described by each individual.

Type of abuse									
Age	Sex	Race	Chief complaint	AMT4, MMSE scores ^a	Psychological	Neglect	Financial	Physical	Alleged perpetrator
65	F	White	MVC, back pain	4					Husband
65	F	White	Seizure	4					Son
66	F	White	Wrist pain	4					Husband
67	M	Black	Pneumonia	2, 21					Uncertain
68	M	Asian	Alcohol problem	4					Friend
69	F	Black	Medical problem	4					Nursing home
71	F	White	Diarrhea	4					Son
71	F	Black	Arm pain	2, 18					Husband
73	F	Black	Anxiety	3, 17					Husband
73	F	Black	Abdominal pain, emesis	4					Husband
75	M	White	Knee pain, alcohol	4					Children
76	F	White	Failure to thrive	4					Assisted living
76	M	White	Fever, syncope	4					Wife
77	F	White	Back pain	4					Boyfriend
79	F	White	Shortness of breath	2, 16					Daughter
84	F	White	Stroke, aphasia	4					Daughter
90	F	White	Fall, possible UTI	4					Son

^aPatients with an Abbreviated Mental Test-4 (AMT4) score <4 completed the Mini-Mental State Exam (MMSE), where MMSE scores of 21–26 indicate mild impairment, 11–20 indicate moderate impairment, and <11 indicate severe impairment. MVC - Motor vehicle collision; UTI - urinary tract infection

Table 3.

Predictive accuracy values for elder abuse questions and for combinations^a of questions proposed for the final screening tool based on positive screens for suspicion of elder abuse ($n = 17$)

Single questions	Sensitivity (%; 95% CI)	Specificity (%; 95% CI)	PPV (%; 95% CI)	NPV (%; 95% CI)
Psy-1 Has anyone close to you threatened you or made you feel bad? ^b	59 (33, 82)	96 (93, 98)	50 (27, 73)	97 (94, 99)
Psy-2 Have you been afraid of anyone? ^b	24 (7, 50)	99 (96, 100)	57 (18, 90)	95 (91, 97)
Psy-3 Has anyone close to you called you names or put you down? ^b	59 (33, 82)	97 (94, 99)	56 (31, 78)	97 (94, 99)
Psy-4 Has anyone told you that you give them too much trouble? ^c	38 (15, 65)	98 (96, 100)	60 (26, 88)	96 (93, 98)
Psy-5 Have you been sad or lonely often? ^c	75 (48, 93)	67 (61, 73)	13 (7, 22)	98 (94, 99)
Psy-6 Do you distrust anyone close to you? ^c	25 (7, 52)	93 (89, 96)	20 (6, 44)	95 (91, 97)
Psy-7 Do you feel you need more privacy at home? ^c	25 (7, 52)	97 (94, 99)	36 (11, 69)	95 (92, 97)
Neg-1 Is this person always there when you need them? ^d	50 (19, 81)	88 (78, 94)	36 (13, 65)	93 (84, 98)
Neg-2 Does this person always do what you need? ^d	30 (7, 65)	97 (91, 100)	60 (15, 95)	91 (83, 96)
Neg-3 Has anyone failed to give you the care you need to stay well? ^b	29 (10, 56)	96 (93, 98)	36 (13, 65)	95 (92, 97)
Neg-4 healthy? ^c	25 (7, 52)	98 (95, 99)	44 (14, 79)	95 (92, 97)
Fin-1 Has anyone tried to force you to sign papers or use your money against your will? ^b	12 (1, 36)	99 (97, 100)	50 (7, 93)	94 (90, 97)
Fin-2 Has anyone taken things that belong to you without your OK? ^c	44 (20, 70)	94 (90, 96)	32 (14, 55)	96 (93, 98)
Ph-1 Has anyone close to you tried to hurt you or harm you? ^b	24 (7, 50)	100 (98, 100)	100 (40, 100)	95 (91, 97)
RF-1 Does anyone close to you drink a lot of alcohol or use drugs? ^c	31 (11, 59)	93 (89, 96)	24 (8, 47)	95 (92, 98)
<i>Combinations: hand selected, including all four domains</i>				
C1: Psy-1, Neg-3, Fin-1, Ph-1	76 (50, 93)	92 (88, 95)	41 (24, 59)	98 (96, 100)
C2: Psy-1, Neg-3, Fin-2, Ph-1	76 (50, 93)	88 (84, 92)	32 (18, 48)	98 (95, 99)
C3: Psy-1, Neg-4, Fin-1, Ph-1	65 (38, 86)	94 (90, 96)	42 (23, 63)	97 (94, 99)
C4: Psy-1, Psy-5, Neg-3, Fin-1, Ph-1	88 (64, 99)	64 (58, 70)	15 (8, 23)	99 (95, 100)
C5: Psy-4, Neg-3, Fin-1, Ph-1	76 (50, 93)	95 (91, 97)	52 (31, 72)	98 (96, 100)

Single questions	Sensitivity (%; 95% CI)	Specificity (%; 95% CI)	PPV (%; 95% CI)	NPV (%; 95% CI)
C6: Psy-1, Psy-4, Neg-3, Fin-1, Ph-1	82 (57, 96)	92 (88, 95)	41 (25, 59)	99 (96, 100)
<i>Combinations: classification and regression tree (CART) analysis</i>				
C7: Psy-3, Psy-4, Neg-1	88 (64, 99)	91 (87, 95)	42 (26, 59)	99 (97, 100)
<i>Combinations: logistic regression</i>				
C8: Psy-3, Psy-4, Neg-1 ^e	88 (64, 99)	91 (87, 95)	42 (26, 59)	99 (97, 100)
C9: Psy-3, Psy-4, Psy-7, Neg-1, Neg-3 ^f	94 (71, 100)	87 (82, 91)	33 (20, 48)	100 (97, 100)
<i>Combinations: logistic regression, modified</i>				
C10: Psy-1, Psy-3, Psy-4, Neg-1 ^g	94 (71, 100)	90 (86, 94)	40 (25, 57)	100 (97, 100)
C11: Psy-1, Psy-3, Psy-4, Neg-1, Fin-1, Ph-1 ^h	94 (71, 100)	90 (85, 93)	39 (24, 55)	100 (97, 100)

^aPredictive accuracy values for combinations of elder abuse questions are based on "suspicion of elder abuse" responses to either question in each combination.

^b $N = 259$.

^c $N = 258$.

^dThese were asked if patients reported needing help and received help from someone in the past 6 months with activities including bathing, dressing, shopping, banking, and meals. $N = 85$.

^eStepwise logistic regression, $p = 0.1$.

^fStepwise logistic regression, $p = 0.2$.

^gModified C8 due to the fact that Neg-3, despite being identified by logistic regression ($p = 0.2$), does not identify additional cases that C9 does not. Psy-7 replaced with Psy-1 due to low kappa for Psy-7 and no change in sensitivity and improved specificity with Psy-1.

^hModified C10 in order to include the domains of elder abuse that C10 does not (financial and physical abuse).

Psy: psychological; Neg: neglect; Fin: financial; Ph: physical; RF: risk factor; PPV: positive predictive value; NPV: negative predictive value.