Investigating the validity and usability of an interactive computer programme for assessing competence in telephone-based mental health triage

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ABSTRACT: Telephone-based mental health triage services are frontline health-care providers that operate 24/7 to facilitate access to psychiatric assessment and intervention for people requiring assistance with a mental health problem. The mental health triage clinical role is complex, and the populations triage serves are typically high risk; yet to date, no evidence-based methods have been available to assess clinician competence to practice telephone-based mental health triage. The present study reports the findings of a study that investigated the validity and usability of the Mental Health Triage Competency Assessment Tool, an evidence-based, interactive computer programme designed to assist clinicians in developing and assessing competence to practice telephone-based mental health triage.

KEY WORDS: competency, mental health, telephone triage, triage.

INTRODUCTION

The proliferation of telephone-based health services worldwide in the past decade is indicative of the growing demand for tele-health programmes (Christensen et al. 2004; Currell et al. 2000; George et al. 2006; Wooten 2001). Telephone-delivered health programmes have been successfully applied to a range of mental health settings (Free et al. 2013; Kevin 2002; Mohr et al. 2008; Richards & Suckling 2009), and to treat a broad range of mental illnesses (Brenes et al. 2011; Depp et al. 2010; Gates et al. 2012). There is growing evidence to suggest that telephone-delivered mental health care can be an effective way of providing treatment and ongoing follow-up care for people with a range of mental health problems. A number of studies have shown positive outcomes in telephone delivered, cognitive behavioural therapy (CBT)-based interventions for anxiety disorder (Boschen & Casey 2008; Olthuis et al. 2014) and depression (Ludman et al. 2007; Whittaker et al. 2012). In a randomized, controlled trial (Gates et al. 2012) of a telephone-based motivational interviewing and CBT intervention to reduce cannabis dependence, reductions in symptoms of cannabis dependence and improvements in the rates of abstinence, as compared to the control group, were reported. Using a randomized, effectiveness trial to examine the efficacy of a tele-medicine-based care...
model for improving post-traumatic stress disorder (PTSD) outcomes among rural veterans, Fortney et al. (2015) found significant improvements in PTSD scores in the group receiving the intervention.

In countries with populations spread across large geographical regions, telephone-delivered health services are critical to ensuring timely access to health care (Ledeck et al. 2002; Saeed et al. 2011). Saeed et al. (2011) observed that tele-psychiatry provides a viable way of providing mental health care to rural areas, reducing the current disparities in access to mental health care, and improving care coordination. In countries such as Australia, telephone-based mental health triage services (MHTS) are used nationwide to provide a 24/7 single point of access to mental health assessment, crisis intervention, treatment, support, and advice for people of all ages with mental health problems (Grigg et al. 2002; Sands 2004). MHTS provides a telephone-based, psychiatric screening assessment on all referrals to triage to identify the nature and urgency of the presenting problem, and to determine a course of action commensurate with the urgency of the problem and associated risk (Sands et al. 2013a). As frontline health services, MHTS are critical for the early detection of mental illness, risk assessment, and facilitating access to early treatment, and are therefore pivotal to patient safety (Sands et al. 2013b).

In spite of the wide use of telephone-based mental health services globally, there are currently no evidence-based methods for assessing competence to practice telephone-based mental health triage. The lack of uniform standards and evidence-based approaches for assessing competence to practice telephone-based mental health triage has implications for quality and patient safety. In the present study, we report on research undertaken to determine the validity (clinical relevance) and usability of a novel computer programme, the Mental Health Triage Competency Assessment Tool (MHTT-CAT), which was designed to assist clinicians in assessing competence to practice telephone-based mental health triage.

METHODS

Aims
The primary aims of this study were: (i) to establish the content validity of the MHTT-CAT; and (ii) to examine to usability of the MHTT-CAT.

Research question
The primary research question used to guide the study was as follows: What is the clinical relevance and usability of a novel computer programme designed to assess competence to practice telephone-based mental health triage?

Setting
The research was undertaken in one metropolitan and one regional mental health service in Victoria, Australia, in 2013–2014. Each of the services provides a full range of community and inpatient mental health services for a specified geographical catchment area, serving a population of 250 000–300 000 people.

Ethical clearance
The study was granted ethical approval by the human research and ethics committees of each health service, and by Deakin University Health Human Research and Ethics Committee.

Design
The research design employed in the study was heuristic evaluation methodology, one of the most widely-used approaches for evaluating the usability of computer software (Nielsen 1994). One of the core principles of this approach is the importance of user-centric design, in which the needs of the ‘end users’ of a product are given extensive input into the development of a product at each stage of the design process (Nielsen 1994). The goal of usability evaluation is to determine the product’s capacity to meet its intended purpose, and this is achieved by observing and measuring the use of the product to discover errors and areas for improvement. Heuristic evaluations usually triangulate quantitative and qualitative data (Neilson 1994). The present study was conducted in two phases. In phase 1, the MHTT-CAT prototype was subject to expert panel review. A 10-member expert panel (5 from each study site) of senior mental health triage clinicians and service leaders was established, and each panel member reviewed the MHTT-CAT prior to commencement of the main study. Modifications were made to the prototype programme based on this feedback. In phase 2, the MHTT-CAT was trialled by two cohorts of multidisciplinary mental health triage clinicians from the two study sites.

Participants
The study population was comprised of multidisciplinary mental health clinicians employed in telephone-based mental health triage and crisis assessment team roles in two major health-care networks in Victoria, Australia.

Sample
No previous or similar research has been conducted in this area, thus establishing a representative sample for the...
‘user’ population was not feasible for the present study. To address the lack of representative sample size, we aimed to recruit the total population of mental health triage clinicians employed at the two sites (approximately 35 clinicians). Due to the lack of published studies in this area, it was also not feasible to establish a baseline sample size for the number of individual trials of the product required to determine its usability or relevance. There were also a number of practical considerations to be taken into account in the research environment, especially the impact of the research on service workflow. Therefore, the aim was to undertake as many trials of the product as possible and practical during the data-collection period, which was 6 weeks in duration at each site.

MHTT-CAT
An interactive computer-based MHTT-CAT prototype was developed based on the telephone-based mental health triage competencies and related elements identified in previous research (Sands et al. 2013a). The MHTT-CAT was designed for clinicians to record observations made of trainee clinicians undertaking MHTT. Using a dual headset, the trainer listens to the trainee undertaking a telephone consultation, and records observations of completed competency items into the programme. On completing the call, the ‘submit’ button is used to submit the user responses into the MHTT-CAT for analysis. The programme then produces a brief summary report of any expected screening items that were not assessed during the triage consultation. The feedback suggests additional screening questions or areas of assessment relevant to the main presenting problem that were not assessed at the time of triage. A free-text comments field is available for every item, which enables the trainer to record notes, such as the reasons an item was not used. The feedback on missed screening items produced by MHTT-CAT is derived from the composite international diagnostic interview, which is a comprehensive psychiatric interview framework that can be used to assess mental illnesses according to the definitions and criteria of the World Health Organization’s International Classification of Diseases 10th Edition (1990). The MHTT-CAT prototype was reviewed by an expert panel and modified to include 17 additional youth-and aged-assessment screening items. Minor changes were also made to the navigation layout of the programme based on expert panel feedback. The subsequent version of the MHTT-CAT was then trialled by two cohorts of mental health triage clinicians.

Data collection
The main outcomes of interest in the study were: (i) construct validity, which measures included frequency and percentage of the use of competency items; and (ii) usability, which measures qualitative feedback about the ease of use, acceptability, and general feedback.

Three methods of data collection were used in the study:

1. Expert panel feedback. Meetings were held at both sites to demonstrate and discuss the MHTT-CAT prototype. Field notes were taken to demonstrate and discuss the MHTT-CAT prototype. Field notes were taken to record panel feedback.

2. The trial version of the MHTT-CAT was set up as a continuous electronic quantitative and qualitative data-collection tool. Each mouse click (items/responses selected by users) and all comments were recorded by the programme, and these data were then exported into an Excel database for analysis.

3. On completion of the trial, the site coordinators provided a summary report on the usability and acceptability of the programme, and general feedback attained from field notes during and following the data-collection period.

Data analysis
The construct validity of the MHTT-CAT was determined in two ways; first by analysing the quantitative user data recorded by the MHTT-CAT for each competency item. The frequency and percentage of use of each of the competency items and their related standards were calculated using descriptive statistics. Second, content analysis was then used to analyse the qualitative comments recorded by the MHTT-CAT. Consistent with hermeneutical approaches, expert panel feedback attained in phase 1 of the study, and user feedback retrieved from the MHTT-CAT and the site coordinators’ summary reports were analysed using content analysis method (Krippendorf 2004). Two researchers examined the keyword frequencies and phrases in the text to identify reoccurring keywords, ideas or themes in the text. Similar keywords and phrases were then collated into categories representative of the main themes in the data.

RESULTS
Phase 1: expert panel review
An expert panel comprising 10 senior mental health triage experts (8 nurses, 1 psychologist, 1 social worker) from the two study sites reviewed the prototype MHTT-CAT in phase 1 of the project. All panel members were senior
clinicians with more than 5 years’ clinical experience in triage and crisis assessment and intervention roles, and there was representation from youth, aged, and drug and alcohol settings. The expert panel feedback (n = 10) was analysed and collated into various categories, including programme design related (e.g. visual, text), feedback on clinical items (relevance, missing items), and usability: (i) include specific items for youth assessment in a separate section; (ii) include specific items for aged-person assessment in a separate section; (iii) include two additional items for drug and alcohol assessment; (iv) add screening item ‘ask to speak with patient’; (v) extend technology platform of MHTT-CAT to Web-based application; and (vi) include print function to produce summary reports.

The feedback attained from the expert panel review was then incorporated into version 2 of the MHTT-CAT. Adapting MHTT-CAT to a Web-based application was not undertaken at the prototype stage, but was addressed in the final iteration of the programme.

Phase 2: MHTT-CAT trial

A total of 28 mental health triage clinicians from two health services trialled the MHTT-CAT. The years of mental health triage experience of the sample ranged from 1 year to 20 years, and the age range of participants was 26–55 years of age. The disciplinary backgrounds of the total clinician cohort (n = 28) were: (i) nursing, n = 21; (ii) psychology, n = 1; (iii) occupational therapy, n = 21; and (iv) social work, n = 5. The postgraduate qualifications were: (i) postgraduate diploma; n = 23; Master, n = 3; and none, n = 2.

The MHTT-CAT was trialled by clinicians on 165 real occasions of triage. The types of calls (main presenting problem) assigned were: (i) non-mental health (n = 17); (ii) anxiety disorder (n = 12); (iii) cognitive disorder (n = 0); (iii) depression (n = 26); (iv) mania (n = 3); (v) personality disorder (n = 21); (vi) psychosis (n = 47); (vii) substance disorder (n = 31); and (viii) other (unclear/further triage required; social stressors, i.e. housing, violence) (n = 8). The range of triage urgency categories were: (i) A, immediate (n = 5); (ii) B, within 2 hours (n = 1); (iii) C, within 8 hours (n = 21); (iv) D, within 72 hours (n = 14); (v) E, 0 hours; (n = 15); (vi) F, 0 hours (n = 35); and (vii) G, 0 hours (n = 57).

Triage categories were not assigned to all calls. The reason for these omissions were documented in the MHTT-CAT notes as being because the main presenting problem was not mental health and these contacts were triaged out, the contact was administrative in nature, or the triage category was not assigned at the time of the observation due to insufficient information being available at the time of triage.

MHTT-CAT makes provision for trainers to enter free text comments on competency items. More than 1200 comments were entered into the programme during the data-collection period. The comments recorded by MHTT-CATT during the trial were analysed using content analysis method (Krippendorf 2004). Comments were categorized according to the frequency of their occurrence in the text, and also grouped according to similarity of content. This process generated several main categories that explain the ‘typical’ use of the comments function of the programme, and the nature of the comments provided by participants. The most frequent use of free text comments was to document when an item was not appropriate to assess (i.e. ‘NA’). Typically, the trainer also included a few dot points as to why it was not appropriate to assess the item. The second most frequent use of comments was to record brief clinical observations about the case (risks, social situation, other agency involvement), which were used to explain decisions made in the triage; for example, ‘has a case manager, advised to call the clinic’. The third most frequent use of comments was to record when a call was primarily to provide support to an existing client, rather than for a new assessment. The next most frequent use of comments was for recording when the purpose of the call was for information transfer and other administrative functions.

To examine the construct validity of the competency standards and elements, we measured the frequency of use of these items recorded by the MHTT-CAT for all occasions of triage. The results attained were similar from both sites; seven of the eight core competency standards and elements (opening the call; mental status assessment; risk assessment; planning and action, call termination; refer and report; documentation) were used frequently in screening assessments, but the lifespan-specific aged and youth mental health screening items were used infrequently or not at all. The mean percentage of competencies (average of all elements for each competency) recorded for the total sample of 165 calls is shown in Figure 1.

There were no significant differences between the research sites in terms of percentage of use of competency items. The trend towards infrequent use of the lifespan-specific screening items was clear in the results from both sites. As per the heuristic framework, we sought feedback from the stakeholders (site coordinators and panel members) about the usefulness of retaining redundant or little-used lifespan items in the final version of the programme. The feedback was unanimous that the
items should be retained. The infrequent use of the lifespan items was explained by stakeholders as being related to the organization of specialist services, where most aged and youth mental health services manage their own triage during business hours, and mainstream MHTS manage the referrals after hours. This means that age-specific referrals are less frequent, thus the screening items are used less frequently. The main rationale provided for retaining the infrequently-used items was that the MHTS service profile extends to all people across the lifespan, thus age-specific items should be available to cater for all potential presentations to triage.

Site coordinators’ feedback
On completion of the trial, the site project coordinators provided a brief summary report of usability feedback provided by clinicians who participated in the trial. The overall feedback about the aim and purpose of the MHTT-CAT was positive, with good levels of acceptability of the programme reported at both sites. There was consensus about the potential benefits of using MHTT-CAT for training clinicians in telephone triage competencies, in addition to competency assessment. A potential benefit of MHTT-CAT identified in the feedback was on the job training, which could have economic and practical benefits. Most clinician participants trialled MHTT-CAT as both a trainer and a trainee, and feedback on this process indicated that the tool was useful for peer-to-peer professional development in addition to training novices.

The site coordinators’ feedback summary on MHTT-CAT items that require modification or inclusion included: (i) add screening item ‘ask to speak with patient’; (ii) include specific items for youth assessment in a separate section; (iii) include specific items for aged-person assessment in a separate section; (iv) include two additional items for drug and alcohol assessment; (v) Extend MHTT-CAT to Web-based application; (vi) include print function to produce summary reports; and (vii) develop a train-the-trainer manual.

The site coordinators’ feedback was addressed in the final iteration of the MHTT-CAT. The MHTT-CAT was transferred to a Web-based application that can be used in all common Web browsers. A video tutorial was developed to use as a training tool for MHTT competencies and as an MHTT-CAT field guide.

DISCUSSION
This the first study in Australia or internationally to address methods for determining competence to practice telephone-based mental health triage. The project is significant because it addresses a gap in the safety and quality of acute mental health care; the lack of a standardized, evidence-based framework or method for competency assessment in telephone-based mental health triage. Given the inherent complexity of the patient population and their associated risks, and the dynamic, often time-pressured environment of triage (Sands 2009), close attention must be paid to the clinical systems and processes that support clinical work to ensure that they provide sufficient guidance and a consistent standard for practice that can be measured and benchmarked.

As the central access point to public mental health services, telephone-based MHTS play a crucial role in risk assessment and management, prevention of harm, and early intervention (Victorian Department of Health 2009). There is considerable variation in the severity, acuity, and type of mental health problems managed by triage, ranging from non-urgent mental illnesses to serious mental illness problems. The complexity of mental health problems managed by telephone-based MHTS requires a comprehensive and standardized approach to telephone triage.

FIG. 1: Mean percentage of competencies recorded (n = 165).
high-risk conditions involving life-threatening emergencies (Sands et al. 2013b). Telephone-based mental health assessment is complex, and there are multiple risks associated with acute mental illnesses that require careful management to prevent adverse outcomes (Erdman 2001). One of the more demanding aspects of telephone-based triage is suicide risk assessment (Sands 2009). Suicidality (thoughts of suicide, history of attempts) is one of the most common reasons for seeking assistance from MHTS (Elsom et al. 2013). Previous studies indicate that in many cases, people who completed suicide had recent contact with a mental health service (Crawford 2004; Hyden 1996), and factors related to service organization and delivery appear to be important in the aetiology of suicide, especially following hospital discharge. A case-controlled study of completed suicides by King et al. (2001) found that in addition to known social and demographic patient risk factors for suicide, service-related factors (especially continuity of care issues) had the strongest association with suicide, increasing the risk sixfold.

In spite of the complexity of mental health triage (Sands 2009), there are no minimum educational standards or mandated years of clinical experience required to practice as a triage clinician, or nationally standardized models for practice. From the quality and patient safety perspective, it is problematic that evidence-based competency assessment frameworks and tools are not available to provide a consistently high standard for mental health triage clinical practice. While there are no specific guidelines or standards for telephone-based mental health triage, the Australian Department of Health and Aging has established a framework to guide the quality and practice standards for telephone counselling and Internet-based support services (Department of Health and Aging 2008). The principles underpinning the framework identify the need for evidenced-based approaches, and the policies supporting the framework stipulate the need for ongoing staff training, professional development, work appraisal, and mentorship to ensure the delivery of a ‘competent’ service.

The study findings suggest that MHTT-CAT is an effective and acceptable framework and approach for training and competency assessment in telephone-based mental health triage. The present study is limited by the relatively small sample size and the lack of economic evaluation to determine if the programme provides a cost-effective and sustainable solution for workforce training and competency assessment. However, the 24/7 accessibility of the MHTT-CAT and the fact that it requires only two clinicians to find a mutually-convenient time to undertake an assessment or training session, suggests considerable savings compared to traditional approaches involving presenters, training venue, staff release, and other resources. Further research is also required to benchmark competency scores for the eight core mental health telephone triage competencies and related elements. Future studies could also focus on examining the relationship between mental health triage performance (indicated by the number of competencies and elements ‘attained’ using MHTT-CAT) and patient outcomes, such as perceptions of responsiveness, collaboration, and satisfaction, and other outcomes, such as the accuracy of dispositional decision-making.

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REFERENCES


