Telenursing: A Review of Recent Trends, Emerging Issues and Evolving Practices

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ABSTRACT

Introduction: Telephone triage and advice services continue to be an integral part of health-care service delivery models in many countries. Research in this area has increased since the early 1990s, with a surge of research being published in the late 1990s and again in the late 2000s.

Objective: This paper presents a scoping review of the telephone triage and advice service research to explore some of the most pressing questions related to how telenursing is researched and practiced, as well as how telenursing may complement emergency dispatch services.

Methods: Five electronic databases were searched (1990-2012): Medline, Embase, PsycINFO, PASCAL, and Global Health using the keywords ‘telephone triage’, ‘telenursing’, or ‘telephone consult*’. The search was augmented by bibliographic reviews of retrieved manuscripts.

Results: Overall, 202 relevant studies were retrieved, whereby 170 were empirical studies and 32 were reviews; 11 studies included emergency dispatch or non-clinical staff. The primary outcomes of the included studies were reviewed and categorized into three broad groups: the safety and appropriateness of triage decisions (n = 52), the experience of triage staff (n = 16), and the effectiveness of telephone triage (n = 102).

Conclusions: While most research examining the safety of triage decisions is dated, there is consistent evidence across the past three decades that telenurses provide safe care. Moreover, computer decision-making software appears to support the triage process, although it may not always be used as intended. Emerging research highlights that telephone triage and advice services are evolving in terms of how they are practiced and by whom. Many health services agencies are creating systems and protocols to improve both efficiency and caller access to “triage” personnel. Furthermore, recent research suggests that telenursing may complement emergency dispatch services by validating triage assessment and thereby reducing the number of unnecessary transports to the hospital.

INTRODUCTION

The dwindling availability of primary-care physicians and nurses, coupled with overcrowding in emergency departments and the public’s rising demand for accessible health care, is changing the way scarce medical resources are accessed. Telephone triage and advice services, or telenursing, is an evolving model of care delivery facilitated by technology. It involves collecting and screening a caller’s health-related symptoms via telephone to determine the urgency of the problem and to advise on the best course of action, such as going to an emergency department, making an appointment with a general practitioner, or using self-care.

There are dedicated telephone lines for tele-triage in general practice out-of-hours services and emergency departments, and healthcare call centers have been established in the United Kingdom (UK), Australia, Sweden, United States (US), and Canada for this purpose. These call centers operate 24-hours-a-day, 7-days-a-week and provide health advice from a nurse. The steady increase in telenursing over the past decade demonstrates public demand. For example, calls to the national telephone service in the UK, NHS Direct, increased by 20% every year since being introduced in 1997.
As telephone triage and advice services continue to be one of the most rapidly adopted forms of healthcare delivery, there is a need to map the current state of literature to identify gaps in knowledge and to highlight where further research is required. Therefore, the purpose of this paper is to provide a scoping review of research related to telephone triage and advice services. Specifically, this paper will provide an overview of how research related to telephone triage and advice services has grown in the past three decades, highlight the most commonly researched outcomes, and describe some emerging trends such as how telenursing can potentially complement emergency dispatch services.

METHOD

Design
This paper uses a scoping review, which is a methodology that quickly and systematically identifies the breadth of literature in a given area. Scoping reviews are becoming common in health services research and generally serve four major functions: (a) to chart the state of literature in a specific area, (b) to determine the usefulness or feasibility of conducting a systematic review, (c) to summarize key research findings to policy makers and/or healthcare providers, and (d) to identify gaps where additional research is needed. Compared to a systematic review, a scoping review is less restricted in focus and does not seek to answer particular research questions.

Literature search
In January 2013, research published in English-language peer-reviewed journals that focused on telephone triage and advice services was sought. The following electronic databases were searched (1990-2012): Medline, Embase, PsycINFO, PASCAL, and Global Health using the keywords ‘telephone triage’, ‘telenursing’, or ‘telephone consult*’. This search was augmented by bibliographic reviews of retrieved manuscripts.

As the goal for this paper was to examine the breadth of the research related to telephone triage and advice services, the inclusion criteria were broad. For a study to be included it needed to: (a) include an empirical evaluation of telephone triage and advice services, (b) use any methodology, and (c) include nurses and/or non-clinical staff in the sample. Telephone triage was defined as consultation via telephone that included triage and advice giving. Therefore, discussion or editorial papers were excluded. Two reviewers independently screened titles and abstracts of identified studies to determine suitability for the scoping review.

RESULTS

Search Outcome
There were 660 potentially relevant studies identified electronically. Of these, 251 were reviewed in more detail. After applying the inclusion criteria, we excluded 49 papers because they were brief commentaries or editorials (n = 22), theoretical articles (n = 23), or were duplicate studies (n = 4). The final sample included 202 studies, of which 170 were empirical studies and 32 were reviews (Figure 1). Eleven of the 170 studies included emergency dispatch or non-clinical staff.

Overview of the Research
As shown in Figure 1, research related to telephone triage and advice services has increased rapidly since the early 1990s; where we see a surge of research being published
in the late 1990s and again in the late 2000s. The increase in research is accompanied by a number of review studies, most of which are quantitative systematic reviews. Among research published in English-language journals, the majority has been conducted in the US (n = 66), the UK (n = 57) and Australia (n = 24). As shown in Figure 2, comparatively less research on telephone triage and advice services is available from Scandinavian, Mediterranean, and Asian countries.

The primary outcomes of the 170 included studies were reviewed and categorized into three broad groups: the safety and appropriateness of triage decisions (n = 52), the experience of triage staff (n = 16), and the effectiveness of telephone triage (n = 102). Evaluating the safety and appropriateness of triage decisions has been a continuously measured outcome, and has recently involved evaluating the use of protocols as a means of standardizing patient questioning and facilitating the triage decision-making process. The experience of triage staff involves examining how individuals adapt to this line of work, with a growing interest in the factors that influence triage decisions. The final category of outcomes is broad and involves describing or evaluating the effectiveness of telephone triage services. Within this category, studies tended to focus primarily on patient utilization patterns (n = 57), patient satisfaction (n = 21), patient compliance (n = 13), and whether non-clinical staff can accurately triage patients and/or coordinate their services with telenurses (n = 11).

The following section provides an overview of recent research in each of the three topic areas described above, but specifically highlights those areas that represent ongoing debate or innovative approaches. Therefore, the following section will examine: (a) safety and appropriateness of triage decisions, (b) experience of triage staff and the factors that influence their triage decisions, and (c) the effectiveness of telephone triage in terms of patient compliance and coordinating telenursing with emergency dispatch services.

**Safety and Appropriateness of Triage Decisions**

Although telenursing has the potential to decrease physician workload in emergency departments and achieve high levels of patient satisfaction, it is a complex task involving some risk as telenurses cannot physically observe a patient. Thus, debate regarding the safety and appropriateness of triage decisions via telephone continues. A recent systematic review by Huibers et al. assessed the safety of triage decision in out-of-hours primary care by examining 13 studies using real patients and 10 studies using simulated patients. For real patients, triage decisions were deemed safe in approximately 97% of the cases; however, safety decreased to 89% for patients with high urgency. For simulated patients with a highly urgent health problem, triage decisions were deemed safe in only 46% of the cases. The discrepancy in these outcomes may rest on the methodology used. That is, high-risk simulated cases have predefined triage decisions, making deviations from those decisions easily detected. In contrast, real-patient studies often use expert review to assess appropriateness of decisions and may include a range of valid decisions. Thus, the studies using real patients to assess safety may be most valid.

Also noteworthy in Huibers et al.’s review, is that six studies involving real patients and seven studies involving simulated patients were published between 1989 and 1998. Since that time, efforts to improve telenursing have occurred, notably in computer decision-making software and teleconsultation-skills training; thus, one might expect improvements in triage-safety assessments.

Recent research agrees that assessing safety is method-
ologically difficult. A recent study by Meer et al.\textsuperscript{9} investigated the safety of computer-assisted telephone triage for 153 patients with non-life-threatening medical conditions at a Swiss hospital. Patients triaged as urgent by the telenurse were subsequently assessed by a hospital physician, and then assessed by a primary-care physician at a later point in time. Although the results showed that the telenurses’ urgent triage decision was deemed appropriate in 81% of cases, the consistency in triage decisions between the three groups (i.e., telenurse, hospital physician, and primary-care physician) was relatively low, telenurses tending to over-triage compared to hospital physicians and primary-care physicians. The discrepancy triage assessments may in part be due to a change in the patient’s health condition. That is, a patient’s health condition may have changed since he or she was first assessed by the telenurse, and therefore warrant a different assessment. Thus, methods comparing assessments for a given patient across time may not be a reliable means for determining appropriateness and safety of triage decisions. Importantly, this line of research underscores the need for researchers to seriously consider how assessments of safety of triage decisions are conducted.

The study by Meer et al.\textsuperscript{9} raises the question of whether telenurses tend to over-triage compared to physicians. While research has yet to specifically address this, there is some evidence that suggests individuals with less clinical experience may tend to err on the side of caution when making triage assessments via telephone. A recent study by Khorram-Manesh et al.\textsuperscript{10} examined all registered ambulance transports during a 6-month period in Sweden to determine the consistency in triage decisions made by an emergency medical dispatch center with ambulance crews (ACR). In the study, all patients (N = 27,318) received a triage assessment by a trained ambulance dispatcher (EMDC), and then a second triage assessment by the ACR. Three priorities were used for ambulance transports: P1 for acute life-threatening conditions requiring immediate dispatch, P2 for acute but not life-threatening conditions requiring an ambulance when it becomes available, and P3 for non-acute conditions that can wait up to 90 minutes for an ambulance; a P4 assessment was designated for patients not needing medical care.

The results showed a discrepancy in triage assessments between the EMDC and ACR, particularly for patients triaged as P1 and P2. Of the 9,208 patients triaged as P1 by the EMDC, there was only 27% agreement with the ACR, suggesting a 73% over-triage by the EMDC. Likewise, there was 53% agreement for patients triaged at P2, 82% agreement for patients triaged at P3, and 99% agreement for patients triaged at P4. While the EMDC may have provided more cautious assessments then their ACR counterparts, the results also suggest that discrepancies in triage assessments may tend to increase as the patient’s acuity level increases.

Factors Contributing to Telenurses’ Triage Decisions

The research on safety and appropriateness of triage decisions also begs the question: How do individuals make triage decisions? One way is using computer decision-making software, which focuses like an algorithm and uses patients’ symptoms to direct the line of questioning in a standardized way. In a recent meta-ethnography of 16 qualitative studies that examined telenurses’ experiences,\textsuperscript{7} the results suggest that digital protocols are not always used as intended, and can contribute to differences in triage decisions between nurses. In fact, many nurses viewed the protocols as necessary but certainly not sufficient. For example, some nurses indicated that not all health problems may be covered or located quickly during the call, prompting them to apply their own clinical knowledge when selecting an algorithm. Other nurses believed the protocols did not incorporcate situational factors such as the caller’s medical history, requiring them to interpret the triage recommendations in light of additional information. As reported in one of the studies included in the meta-ethnography,\textsuperscript{11} four nurses in the sample used the term ‘robot’ to describe anyone who used the software without applying critical thinking skills.

Triaging a patient involves a combination of careful observation, critical thinking and data-gathering skills.\textsuperscript{12} Being a highly-skilled occupational group, telenurses may therefore struggle balancing the application of their clinical expertise with instructions to adhere to protocol recommendations. Regardless, the inconsistent use of protocols raises important issues of quality assurance. Future research should examine how quality management processes can be effectively implemented and what kind of impact they have on compliance to protocols.

Emerging research suggests that deviations from digital protocols may be rather common, even among non-clinical staff. For example, due to the growing public demand for NHS services in the UK, telephone triage is being performed by non-clinical call-handlers supported by computer decision-making software.\textsuperscript{13-14} Traditionally, call-handlers for ambulance and general practice out-of-hours services answered calls and relayed messages to clinicians,\textsuperscript{14-15} but now many are trained users of computer decision-making software.\textsuperscript{14} While this represents a major workforce change and there is little research supporting the safety and effectiveness of this practice, the amount of expertise being invested in digital protocols is expected to allow non-clinical, less expensive staff to apply the technology safely.\textsuperscript{15}

A recent study by Turnbull et al.\textsuperscript{16} reviewed job specification documents to identify the job competencies, skills and experience required of call-handlers doing this work. The analysis highlighted the need for computer, decision-making, negotiation, communication and multi-tasking skills, as well as personal attributes such as being a team player and willingness to work under pressure. What was most interesting in this study was the finding that call-handlers developed ‘pseudo-clinical’ expertise. That is, although digital protocols were developed so users need not rely on expertise or experience, call-handlers applied experiential knowledge of symptoms, expertise and other informal knowledge such as information about health-care resources in their everyday practice of call-handling.
Purc-Stephenson and Thrasher’s qualitative review highlights other factors that may play a role in telenurses’ triage decisions. While telenurses emphasized that they enjoyed the variety of calls received, they also cited problems regarding lack of ongoing training, heavy workload and monotonous work. Issues of heavy workload may leave little time to consult with fellow telenurses, which may be a valuable resource for learning and validation among novice telenurses. Furthermore, because telenurses cannot visually inspect a patient, many reported feeling uncomfortable or uneasy making triage decisions. To reduce possible legal or professional consequences, telenurses reported that they often considered worst-case scenarios, relied more heavily on protocols, and asked other telenurses for advice when making triage decisions. The lack of visual cues certainly increases the chances that a telenurse may provide the “wrong” triage decision, which could then result in an adverse outcome for the patient and/or themselves. This may also help explain why telenurses over-triage patients.

It has been suggested that telenurses’ decision-making process can be viewed as a three-stage model. Specifically, patient-, nurse- and organization-related factors contribute to “building a picture” of the patient, with final triage decisions influenced by balancing the conflicting demands of being both carer and gatekeeper to limited health-care services. While this model needs to be validated, more qualitative research needs to examine telenurse and non-clinical staff experiences of conducting telephone triage.

Patient Compliance to Triage Decisions

Regardless of how telenurses arrive at their triage decisions, it is just as important to know how patients act upon those recommendations. However, within the domain of research evaluating the effectiveness of telephone triage and advice services, comparatively few studies have examined patient compliance. Some research suggests very high caller compliance rates. For example, according to a postal survey of 268 callers who contacted NHS Direct because of abdominal pain or a cough and sore throat, approximately 93% of callers followed the triage recommendation. Compliance rates for self-care, for contacting a GP, and for visiting an urgent pain or a cough and sore throat, approximately 93% of 268 callers who contacted NHS Direct were categorized as Omega, he or she is transferred to a triage clinician for secondary triage. In their study, of the 530 patients who were inspected a patient, many reported feeling uncomfortable or uneasy making triage decisions. To reduce possible legal or professional consequences, telenurses reported that they often considered worst-case scenarios, relied more heavily on protocols, and asked other telenurses for advice when making triage decisions. The lack of visual cues certainly increases the chances that a telenurse may provide the “wrong” triage decision, which could then result in an adverse outcome for the patient and/or themselves. This may also help explain why telenurses over-triage patients.

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Coordinating Telenursing with Emergency Medical Services

Managing the escalating demand and cost of health care has inspired creative thinking from US emergency medical services (EMS) agencies. While EMS is designed to respond efficiently to serious medical events, the majority of patients transported tend to have non-urgent health issues. One approach for reducing the volume of non-urgent patient transports has involved developing dispatch algorithms, such as the Medical Priority Dispatch System (MPDS), to categorize each call with a code based on the line of questioning. Low-acuity patients are categorized as “Omega” and may only need to visit a general practitioner at a later time. In the UK, EMS agencies have implemented an MPDS Omega protocol, whereby once a caller is identified as Omega, he or she is transferred to a triage clinician for secondary triage.

As the use of an MPDS Omega protocol is relatively new in the US, Studnek et al. examined the experience of a US-based EMS agency to categorize patients using MPDS and determine whether secondary triage by a telenurse was related with a hospital admission among those patients. The results showed that initial triage by certified 911 dispatchers using MPDS may slightly under-triage callers who require immediate care. In their study, of the 530 patients who were categorized as Omega and transferred to a telenurse for secondary triage, approximately 27% of them actually required a hospital admission. Although not included in this study, research that traces the patient and reports on the hospital outcome would be valuable. While further research in this area is needed, these results suggest that EMS agencies who adopt the MPDS Omega protocol may be more successful at accurately identifying low-acuity patients. Prioritizing callers is not new, but implementing an MPDS Omega protocol in the US is a rather innovative approach and represents a fruitful area for dispatch researchers to explore the effectiveness, cost savings, and caller satisfaction with this coordinated intervention.
SUMMARY

In many countries, telenursing continues to play a crucial role in the delivery of health-care services. Despite good evidence that telenursing is safe and patients generally comply with the triage recommendations, a common question among healthcare practitioners and policy makers is how telenursing can be improved. The past decade has seen considerable growth and development in terms of expert computer decision-making software to support safe triage decisions. However, it appears that nurses and non-clinical staff are not passive users of this technology and will deviate from digital protocols to apply their own experience and knowledge. But understanding which occupational group is more likely to deviate from protocols may rest in appreciating how their roles have changed with the introduction of telephone triage and advice services. For non-clinical staff, performing telephone triage following protocols may represent an expanded role—they are carrying out tasks that were once beyond their scope of practice. For nurses, however, performing telephone triage following protocols may represent a reduced role whereby they are no longer required to draw upon their clinical expertise and advanced critical-thinking skills to make triage recommendations. Some nurses may want to exercise some level of the autonomy they once enjoyed in other clinical settings and provide individualized care. In addition to evaluating the implementation of quality management processes, future research needs to compare the various types of software and examine telenurse and non-clinical staff experiences using them.

It is clear that assessment skills used in face-to-face consultations are not directly transferable to the telephone. As telenursing continues to evolve and triaging is practiced by a broader workforce, ensuring staff receive specific training in telephone consultation and assessment so that patients with urgent-health issues are identified has never been more important. Studies examining the safety of triage decisions are becoming dated, particularly in light of healthcare reforms over the past two decades. Research applying more suitable methods of assessing the safety and appropriateness of triage decisions is needed to inform health policy and practice. But perhaps the most exciting area of future research involves the coordinated services of telenursing with emergency dispatch services. Although limited, emerging research suggests that telenursing may complement emergency dispatch services by validating triage assessment and thus reducing the number of unnecessary transports to the hospital and the overcrowding of emergency departments.

References