Non-emergency patient transport: what are the quality and safety issues? A systematic review

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Abstract

Purpose. Patient transportation is an important component of health-care delivery; however, the quality and safety issues relating to non-emergency patient transport services have rarely been discussed compared with the transport of emergency patients. This systematic review examines the factors associated with the quality and safety of non-emergency transport services.

Data sources. Medline, Pre-Medline, CINAHL and Embase databases were searched for publications between 1990 and September 2009.

Study selection. Articles investigating non-emergency hospital transport services.

Data extraction. Study characteristic and outcome data were abstracted by one author and reviewed by a second and third author.

Results. Twelve articles from seven countries were included. Five studies examined issues relating to the structure of transport services, which focused on the use of policies and protocols to assist the transfer process. All studies addressed factors associated with the transfer process such as communication, appropriateness of personnel, time to arrange transfers, and the safety and efficiency of the process. Outcomes were measured in one study.

Conclusions. Communication, efficiency and appropriateness are key factors that are advanced as impacting on the quality and safety of non-emergency transport services. Standardization of the non-emergency transport process shows promise in reducing risk and increasing efficiency. Applying information and communication technology to improve the quality of transport services has received little attention despite its potential benefits. Patient outcomes in relation to quality and safety of transport services are rarely measured. Available evidence suggests that safety of non-emergency patient transfers is sometimes compromised due to poor standardization and failures in communication processes.

Keywords: transportation of patients, quality of health care, patient safety, ambulances, patient transfer

Introduction

Patient transportation is a major activity in health care with significant resource implications for health systems [1]. Much attention has focused on the emergency transport of acute- and critical-care patients [2, 3]. However, a large percentage of patient transports are of a non-urgent nature [4–6]. These involve the transport of patients between hospitals, rehabilitation services, nursing homes and patients’ homes. Reports from several countries show that these non-urgent transfers are continuing to grow at significant levels [4–6]. For example, in 2007–2008, the Australian government spent $A2 billion on patient transport services, an annual increase of 8.5% [1]. A significant cause of this rise is the increased specialization of many health-care services requiring patients to move between facilities in order to access appropriate services [4, 7–13].

While rarely discussed in the health-care literature, non-emergency patient transfers entail inherent safety risks for patients. These patients, many of whom are seriously and/or chronically (but not critically) ill, have needs similar to those of emergency patients, in terms of requiring the appropriate equipment, staff and support during transportation [14]. Growing costs and safety concerns regarding
non-emergency transfers have been raised [15, 16]. Issues include depending upon emergency ambulances for non-urgent transfers resulting in unnecessary cost, and potentially long delays until an emergency vehicle is available, which may also impact on patients’ care [4, 17, 18]. Such concerns have resulted in attempts to establish policies for effective and safe non-emergency transport services [13, 17, 19–21]. However, the evidence-base to inform such policy development remains largely unappraised.

Our objective was to conduct a systematic review of the evidence regarding non-emergency patient transport services, with a particular focus on factors impacting upon the quality and safety of services.

**Methods**

**Search strategy**

A systematic search of the literature from 1990 to September 2009 was performed using Medline, Pre-Medline, CINAHL and EMBASE databases. Search strategies were specific to the database and included Medical Subject Headings (MeSH) associated with key words. Only English full-text papers published in peer-reviewed journals were selected for further review. Reference lists of relevant articles were hand searched to supplement this process. Table 1 shows the search strategy used to identify articles.

We identified eligible studies through the process outlined in Fig. 1. We were unable to find a clear definition of non-emergency hospital transport [17, 20, 22]. For the purpose of this review, the term non-emergency transport was defined as transport that is available for low-, medium- and high-acuity patients, which could potentially include seriously ill patients requiring clinical skills, but not for patients whose condition is life-threatening or time-critical [17]. The literature shows no clear distinction between ‘transport’ and ‘transfer’. While transfer can often refer to intra-hospital situations, we deemed it necessary to include ‘transfer’ in our searches.

**Data extraction**

A data-abstraction table captured information relevant to the review question, including country, setting, study design, participants, sample size, aim, outcome measures, results and secondary outcomes. We also collected data that related to communication, safety, information technology, quality, clinical skills and limitations. Authors of the included studies were contacted where necessary for further clarification of details. Data from the studies were abstracted by A.M., reviewed by I.H. and A.G. and checked for missing or incomplete data.

**Data synthesis**

We categorized the research findings according to their impact on structure (‘attributes of the setting’), process (‘what is actually done in giving and receiving care’) and outcome (‘the effects of care on the health status’) [23]. These categories are not mutually exclusive and as such, some studies were included in more than one category according to the outcomes measured.

**Results**

Our initial database searches yielded 5739 references (Fig. 1). After reviewing the titles and abstracts, we excluded 5662 articles and 77 papers were read in full-text form. Of these, 12 articles met our inclusion criteria. A full summary of study characteristics and results are given in Supplementary material, Table S1.
Jamaica [35]. Study designs were either retrospective or prospective in nature and included eight audits [24, 26–30, 33, 35], three surveys [27, 31, 34], one observational study [32] and one based on consensus by expert panel [25]. Only three papers measured an intervention [26, 30, 34]. Six studies were undertaken prior to 2000 [24, 26, 27, 29, 33, 34], while three did not report when the study was carried out [30, 31, 34].

Structure

Five papers measured a structural element of non-emergency transport services [25, 27, 31, 34, 35]. Several studies investigated the presence and application of policies and guidelines for non-emergency transfers. Although limited in their scope, these studies reveal an absence of policies or good knowledge of their contents when available. For example, a survey of six acute trusts in the UK by Antwi et al. [31], examining the transfer of patients with mental illness from the emergency department (ED) to acute mental health wards, found that only 10% of trusts had a transfer policy applicable to these patients. Similarly, a study by Hickey and Savage [27] looking at the issues affecting the quality of care for inter-hospital transfers established that doctors in six of eight medical centres in the USA had insufficient knowledge of the policy that detailed the requirements for inter-hospital transfers. The authors commented that non-compliance with policies likely resulted in the problems they identified in the transfer process, such as poor communication and inappropriate transport mode or accompanying personnel. A study by Lee et al. looked at the effectiveness of an educational programme for a sample of Australian clinicians (n = 43) in the use of guidelines about inter-hospital transfer procedures and how to arrange appropriate escorts. The guidelines allowed the clinicians to check their patients’ condition (physiology, treatment and diagnosis) on a colour-coded chart. The colour relating to the patient’s condition determined the level of escort required. They found that 3 months post-training, 29 participants had the need to arrange transfers. Of these, 89% reported using the guidelines to assist them to make informed decisions when transferring patients [34].

Casey et al. [25] used an expert panel to identify a number of safety interventions relevant for small and rural hospitals and concluded that standard protocols for inter-facility transfers would be both valuable and easy to implement as an intervention. Two studies (Antwi et al. [31] and Crandon et al. [35], respectively) considered issues of the distance to be transported and the equipment required during transfer and their impact on patient risk of harm during a non-emergency transfer.

Process

All studies addressed issues related to the transport process [24–35]. Communication factors were addresses in over half. Most studies (n = 6) reported that communication in the transfer process was inadequate. Hickey and Savage [27] and Crandon et al. [35] highlighted poor documentation, including incompleteness, legibility and missing patient records, at the transferring and receiving facilities. Hickey and Savage also found poor verbal communication between staff at both facilities, particularly between nurses. Delayed communication between facilities was identified as a reason for both delays [28] and long transfer times for non-priority patients [24]. In an observational study to describe the inter-hospital transfer process, Craig [32] reported that an average of 4.7 telephone calls per patient was required to facilitate an inter-hospital transfer. Use of satellite phones by ambulance crews to allow them to have continual contact with clinicians at receiving facilities was judged as one strategy to improve inter-transfer communication by Casey et al. [25] in their study looking at safety interventions. Geehr et al. [26] assessed a newly established transfer centre to manage transfer requests in response to an increasing number of requests for inter-facility transfer, many of which were deemed inappropriate. They reported improved communication between the transferring and receiving facilities. The use of a computerized system for
collecting data allowed the centre to store a record of all transfers and produce a weekly activity report.

Five studies addressed the nature of personnel used to accompany patients during transportation. The use of inadequate or inappropriate escorts was reported in two studies. An audit conducted by Deane et al. [33] in an Australian hospital to examine the appropriateness of transfers found that 15 of 47 (32%) patient transfers ought to have been accompanied by a staff member who was more appropriately qualified to ensure the safety of the patient. The study of Crandon et al. in an attempt to evaluate the inter-hospital transfer process in Jamaica reported that 89% of patients did not have an accompanying doctor during their transfer due to the unavailability of suitably qualified medical staff, and the majority of transfers were arranged by junior medical staff (94%), contrary to international guidelines [35]. In contrast, the majority of survey respondents in the study by Antwi et al. [31] of UK mental health patient transfers reported the use of appropriate personnel.

Approaches to ensure appropriate escort personnel were examined in two studies. Wasserfallen et al. developed an algorithm (which classified patients according to their transfer destination, equipment required for transfer and their medications) to assess transport risk, thus determining appropriate personnel for transport. A transfer centre was set up, which received bookings via computer to book transport according to the algorithm results [30]. This led to a decrease in unsafe transfers from 6% to 4%. However, ‘safer than necessary’ transfers increased from 0 to 20% with over-qualified personnel accompanying patients. Similarly, the previously described Australian study by Lee et al. established that education in the use of guidelines to aid the clinician in deciding on suitable personnel decreased the error rate of staff arranging inappropriate escorts from 35% to 14% 3 months post-training [34].

The time a non-urgent patient spent in waiting to be transferred was examined in four studies with three showing that delays were common. Ammon et al. reviewed the length of time 116 paediatric patients spent in a Level-II trauma centre in the USA before being transferred to a paediatric trauma centre [24]. They found that the overall time taken was significantly longer for non-priority patients than for priority patients; however, the authors did not comment on the potential care implications of this outcome. The audit conducted by Deane et al. [33] found that 20% of patients were delayed at the sending hospital, which—according to their conclusion—could negatively affect patient management and outcomes. Similarly, Alraqi and Coughlan [28] audited the transfer time for patients to reach the receiving hospital, after referral by an ED officer at the sending hospital. They found that the transfer time was unacceptable for 60% of patients and that transfer delays hindered the care given to the patients. However, they indicated that further research was required to determine the consequences of this. Craig looked at the time taken for a proposed transfer to be accepted together with the total time a patient spent in an Australian ED before transfer. Time for a transfer agreement to be made after the first phone call was significantly less for non-urgent patients (10 vs. 38 min) and the ED length of stay was also shorter than for emergency patients (219 vs. 243 min) [32].

Four studies highlighted the importance of safe patient transfers. Antwi et al. [31], Hickey and Savage [27] and Crandon et al. [35] all recommended the use of standardized protocols or transfer forms to ensure appropriate transport and medical supervision of the patient during transfer, as well as the documentation of essential patient information. Crandon et al. reported that injured patients were not being safely transferred, as 55% of road-traffic-accident patients in their Jamaican study sample did not receive cervical immobilization during transfer. A Spanish study by Etxebarría et al. [29] looked at the impact of risk scores to ensure safe inter-hospital transport. The risk involved in transferring the patient was evaluated using a standard protocol containing 11 individual items (such as ‘haemodynamics’, ‘arrhythmias’, ‘ECG monitorization’, ‘intravenous line’, ‘respiratory support’ and ‘technopharmalogical support’), which were given scores from 0 to 2. The individual scores were combined and the patient was given a final risk score, which fell into a low- or high-risk category. These scores allowed the assignment of appropriate clinical staff and transport vehicles to each patient that required a transfer. They subsequently found that there was a low incidence of complications during transfer and concluded that the use of risk scores facilitated safe transfers.

The efficiency of the transport system was investigated in four studies. A transfer centre, described by Geehr et al. [26], improved the efficiency of resource utilization, reducing the numbers of medically inappropriate transfers (though no quantification of this was reported) or ‘transfers of convenience’ with only 1% of transfer requests denied. They also reported that the coordinating centre resulted in annual ‘savings’ of US$550 000. Deane et al.’s [33] Australian study reported that almost half of all transfers to an ED were inappropriate. Delays in the transfer process were commented on by Alraqi and Coughlan [28], Craig [32] and Deane et al. [33] and drew attention to factors such as transport availability, waiting for test results, shift changes, bed availability and arranging personnel, which could all play a role in transfer delays.

**Outcome**

Outcomes were measured in only one study [29]. Etxebarría et al. found that the in-hospital mortality rate within the first 24 h of transfer or thereafter in hospital was greater for patients categorized as high risk compared with those at low risk (14 vs. 9 patients and 6 vs. 0 patients, respectively). Likewise, the length of stay in the intensive care unit (1.3 ± 3.4 vs. 9.4 ± 14.6 days) and in the hospital (14.6 ± 15.8 vs. 30.5 ± 36.7 days) was significantly lower for the low-risk patients.

**Discussion**

We have conducted the first known systematic review on the quality and safety factors associated with non-emergency
hospital transport services. We identified 12 studies from 7 different countries. The limited evidence base, made up of an eclectic mix of study designs, suggests that there remains a lot to understand and explore in this area. Moreover we found that there is no consistent and recognized definition of ‘non-emergency transport’. The external validity of the studies was also an important issue with four studies limited in the generalizability of their results due to small sample sizes and the study context [24, 30–32]. All studies were conducted at a single site with the context specific to each site playing a significant role in defining each study and its outcomes.

Despite the limitations and variability of the evidence base, the results highlight key factors where there is some evidence to suggest their impact on the quality and safety of non-emergency transport services. These factors are illustrated in Fig. 2. Communication relates to the consultations between facilities to arrange transfers and the flow of information between sending and receiving facilities. Efficiency describes how proficiently the transport service is organized, the timeliness of the transfer and effective resource utilization. Appropriateness relates to the manner in which the transportation is conducted and its necessity.

Communication

Communication is an integral part of the health-care process and is identified by the World Health Organization as a key patient-safety priority [36] because poor communication, particularly in relation to patient handover, can lead to errors in care with one report commenting that 11% of preventable adverse outcomes are a result of this [37–41]. Inadequate communication also has important consequences for the efficiency of the health-care process [37, 38]. Communication-related factors were discussed in over half the studies. Many highlighted the lack of (or delayed) communication when organizing for patients to be transported between facilities and how this may affect time to treatment and patient outcomes [32]. Patient information is also often poorly documented between health-care providers [27, 35].

Efficiency

While non-emergency patient transport is not time-critical for the patients, a degree of efficiency in the process is still required for the patients to get to the ‘right place at the right time’ [14]. There is some limited evidence that poor efficiency can lead to increased costs for the hospital, longer hospital stays and patient anxiety [18, 42]. While little research appears to have been conducted regarding the impact of transfer time on patient outcomes, a study by Belway et al. [43] showed an association between the time taken to transport critically ill patients and an increased length of stay in hospital. Time delays in transportation were observed in a number of studies; however, the impact of these on patient care were not measured or discussed [28, 32].

Appropriateness of transfer

The literature suggests that the ambulance transfer of non-emergency patients is often ‘medically unnecessary’, taking up resources that could be utilized more efficiently [4, 44]. It has been argued that, personnel ought to be sufficiently trained in how to safely and appropriately transport patients [45, 46]. Several studies in our review discussed the appropriateness of transfers. Most frequently this issue has been addressed via guidelines for patient transport [47–49], and while these focus specifically on critically ill patients, the

![Figure 2: Key issues impacting on the quality and safety of non-emergency hospital transport.](image-url)
requirements are equally relevant to the transportation of non-emergency patients. However, guidelines to help regulate inter-hospital transport were not in place or followed in several studies [27, 31, 35]. Lee et al. [34] demonstrated that education on the use of guidelines allowed clinicians to make more appropriate decisions regarding accompanying personnel when organizing inter-hospital patient transportation. Such training is advocated by others to facilitate the uptake of guidelines thus ensuring more appropriate care of patients while being transported [50, 51].

Limitations

The indexing of studies in this area is not consistent and so although we used a broad search strategy, it is possible that we did not capture all available peer-reviewed literature. While the grey literature often contains interesting and relevant information, we chose not to include this in our search as it generally consists of policies and strategic plans based on evidence that may not be easily verified. Lastly, we may have missed articles in languages other than English.

Recommendations

Many studies in our review discussed the need to standardize processes. Clearly defined protocols and procedures are a solution for standardization and are supported in the literature as the key to improving quality and safety in health care [14, 38, 41, 52, 53]. Facilities should have in place standard protocols to guide those involved in non-emergency patient transport (Fig. 3). Examples of such protocols are available [54], but appear to be few and far between.

Interestingly, only two studies mentioned the use of information and communication technologies to aid the transport process [26, 30]. This technology can be used to standardize practice and improve communication, efficiency and appropriateness of care through, for example, allowing services to be booked online, and information to be protocol-driven and conveyed immediately, thus improving efficiency, standardization and completeness of information, as has been found with other hospital services utilizing such a technology [55–59].

Only one study measured patient outcomes [29] and thus little is known about the impact that the problem areas identified have on patient care.

Despite potential quality and safety implications associated with poor transport, there is clearly a lack of research evidence for guiding the design of effective interventions. The distilled evidence from this review provides the first building block by bringing together what is known and providing an initial framework for future investigations.

Supplementary material

Supplementary material is available at International Journal for Quality in Health Care online.

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