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Efficiency in the emergency department – A complex relationship between throughput rates and staff perceptions

Ulrica von Thiele Schwarz^{a,*} (PhD Reg Psychologist), Henna Hasson^{a,b} (PhD), Åsa Muntlin Athlin^{c,d,e,f} (PhD, RN Clin Nurs Spec (Emerg Care))

^a Procome, Medical Management Centre (MMC), Department of Learning, Informatics, Management and Ethics (LIME), Karolinska Institutet, Sweden

^b Center for Epidemiology and Community Medicine, Unit for Implementation, Stockholm County Council, Stockholm, Sweden

^c Department of Medical Sciences, Uppsala University, Sweden

^d School of Nursing, University of Adelaide, Australia

^e Department of Emergency Care and Internal Medicine, Uppsala University Hospital, Sweden

^f Department of Public Health and Caring Sciences, Uppsala University, Sweden

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ABSTRACT

Introduction: It is well known that emergency departments (EDs) suffer from crowding and throughput challenges, which make the ED a challenging workplace. However, the interplay between the throughput of patients and how staff experience work is seldom studied. The aim of this study was to investigate whether staff experience of work (efficiency, work-related efforts and rewards, and quantity and quality of work) differs between days with low and high patient throughput rates.

Method: Throughput times were collected from electronic medical records and staff ($n = 252$ individuals, mainly nurses) ratings in daily questionnaires over a total of six weeks. Days were grouped into low and high throughput rate days for the orthopedic, surgical and internal medicine sections, respectively, and staff ratings were compared.

Results: On days with low throughput rates, employees rated their efficiency, effort, reward and quantity of work significantly higher than on days with high throughput rates. There was no difference in perceived quality of work.

Conclusions: There is a complex relationship between ED throughput rates and staff perceptions of efficiency and efforts/rewards with work, suggesting that whereas low throughput may be troublesome from a patient and organizational perspective, working conditions may still be perceived as more favorable.

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1. Background

In recent decades, emergency care in Western countries has undergone major changes. Changes in the population structure, with an aging population, along with medical and medical-technical developments as well as an increased number of emergency department (ED) visits, have contributed to high demands on EDs [20,21]. The demands are further increased due to many ED patients having multiple, chronic conditions, which require more resources and prolonged ED treatment times. Concurrently, a lack of resources such as specialist expertise and inpatient beds [9,3] is also commonly reported, as are inefficient working procedures [25,33]. The combination of increased demands on

the EDs and insufficient resources to meet these demands leads to their being strained. Overcrowding and excessively long waiting times, factors known to increase risks for patients, are common [25,7,13].

The challenges facing EDs may be addressed at multiple levels of the system, from reducing the influx of patients and improving working procedures in the ED to taking a whole-hospital approach to managing patient flows. On the policy level, one common approach to increasing ED efficiency has been to introduce time-driven targets for throughput times, i.e. setting a target for the total transit times for patients. An example of this, the “four-hour target”, expresses the percentage of patients who should be treated within four hours [35]. The percentage of patients who should be treated within a certain time frame is called the throughput rate, whereby a low throughput means longer transit times and fewer patients discharged within the time target. The assumption is that high throughput rates reflect efficient flows from input (entering

* Corresponding author at: Procome, MMC, LIME, Karolinska Institutet, Stockholm, Sweden.

E-mail address: Ulrica.schwarz@ki.se (U. von Thiele Schwarz).

the ED) to output (admission or discharge), and that high throughput rates would improve health services and patient experience as well as reduce the risks associated with overcrowding and long waiting times [4]. Yet, the evidence supporting this assumption is inconclusive at best. For example, a systematic review of the four-hour target concluded that clinical outcomes had not been systematically improved despite massive investments [16]. Moreover, the time target varies by country (e.g. 4, 6, or 12 h), illustrating the fact that time targets are not based on empirical data [23]. It has also been questioned whether the reported throughput rates reflect true changes [16]. This raises the question of the extent to which throughput rates reflect underlying work processes; that is, the extent to which high throughput rates reflect efficient work processes and vice versa.

Overall, the current knowledge of what throughput rates reflect in terms of clinical practice is highly limited. Notable exceptions to this are two studies using qualitative methods to investigate nurses' views on time targets and how this influences their working conditions. Both studies investigated the four-hour target, and suggested that trying to meet time targets induces both a high workload and an emotional burden from having to compromise between meeting the time target and providing high-quality care [14,24]. Hoyle and Grant [14] also concluded that nurses in the ED carry a disproportionate responsibility for meeting time targets, underlining the importance of considering the relationship between throughput rates and staff experiences in this group. Additionally, pressure to reduce throughput times and increase throughput rates has been found to be a major stressor for ED staff, along with experiences of excess workload [8]. Nevertheless, Mortimore and Cooper [24] also acknowledged that the nurses in their study unanimously perceived the time targets as positive, both in terms of putting a spotlight on the need for improvements in EDs and for improvements in how work was done. Particularly, the nurses pointed out that excessively long waits were troublesome for both patients and staff.

In sum, whereas the introduction of specific time targets may be troublesome even when it leads to high throughput rates, low throughput rates also put a burden on ED staff in general, and on nurses in particular. Similarly, higher throughput rates may make the experience of ED more satisfactory for both patients and staff [24]. Concurrently, since these studies aimed to investigate experiences in relation to a time target for throughput times, it is not clear to what extent the findings reflect the time target or the throughput rates. Thus, the current knowledge of how throughput rates are related to staff experience of their work is limited and contradictory. This study aims to address this gap by answering the recent call for research that advances our understanding of how factors relating to patient flows and time targets relate to emergency practice [22].

The aim of this study was to investigate whether staff experience of work (efficiency, work-related efforts and rewards, and quantity and quality of work) differs between days with low and high patient throughput rates.

2. Method

2.1. Setting

The study was set in an ED at a university hospital in Sweden with approximately 55,000 yearly visits (192 per 100,000 inhabitants). The ED, divided into three medical sections (internal medicine, orthopedic surgery and general surgery), provides level-1 trauma care.

At the time of the data collection, the ED employed approximately 120 nurses (registered nurses (RNs) and nursing assistants)

who rotated between the specialties and the trauma/resuscitation room. The nurses worked in shifts, divided into day, evening and night. One RN and one or two nursing assistants worked each shift and in each section, except for in the internal medicine section, where RNs worked the day and evening shifts. The physicians on call (approximately 180 individuals) were employed within different specialties at the hospital, and worked shifts at the ED. As the number of shifts for which each physician was scheduled varied from a few per year to several a month, their local knowledge of the routines in the ED varied. However, approximately 20 physicians worked regularly at the ED as part of their subspecialization in emergency medicine; hence, these physicians were familiar with the routines in the ED and had knowledge of the nurses' work routines, but were still under training and required supervision. One senior physician and at least one junior physician were scheduled in each section, except for the internal medicine section where one senior consultant, one specialist physician and one specialist trainee worked the day and evening shifts. The work routine was organized as follows: after an initial patient screening at the register, vital parameters were taken by a nurse assistant. An RN then performed the triage assessment according to a five-level triage scale linked to the tracking system of the patient in the ED. Based on the level of acuity, the case was handed over to any available physician. The physicians, in turn, turned over prescriptions and information about treatment to any available RN.

2.2. Study design

This study builds on baseline data from a larger study investigating the implementation of a team-based work approach (described elsewhere, reference omitted for review). The larger study involved a time series design with multiple control conditions, whereby the different specialties in the ED implemented teamwork at different time points. The trauma room was not part of the study, as teamwork was already the established work practice there. For the sake of this study, only data from weeks during which work was organized according to the traditional work routines (that is, not teamwork) are used. Since teamwork was introduced at different time points in the different sections, the number of available days for data collection differed between them. Internal medicine started teamwork first, so there, the data was collected for a period of two weeks. The sections for surgical and orthopedic care started teamwork later, resulting in four weeks of data collection for use in the analysis in the present study.

2.3. Data collection and participants

Data were collected from two sources: electronic medical records (EMRs) and self-ratings in questionnaires from staff. The collection was done Monday to Friday, during the day. Total transit times from registration to discharge for patients who arrived at the ED after 8 a.m. and were discharged before 9 p.m. were retrieved from the EMR. The data contained no identifying information. Staff who worked at the ED regularly (that is, all nurses employed at the ED and a few physicians, mainly from the internal medicine section) and during the day (between 8 a.m. and 9 p.m.) were invited to participate in the study by providing self-ratings in a short questionnaire at the end of each shift. They were informed about the study orally (during staff meetings) and in writing. They were informed that participation was voluntary, that they could withdraw their participation at any time, that the data would be coded so that no identifying information would be kept with it, and that their employer did not have access to any data, or to information on who was participating or not. No one declined to participate, but some chose not to hand in the questionnaire. One envelope

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