

Patient trajectories in a Norwegian unit of municipal emergency beds

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ABSTRACT

Objective: *The Coordination reform* was implemented in Norway from 2012, aiming at seamless patient trajectories. All municipalities are required to establish emergency care beds (MEBs) to avoid unnecessary hospital admissions. We aimed to examine occupancy rate, patient characteristics, diagnoses and discharge level of municipal care in a small MEB unit.

Design: Cross-sectional, observational study.

Setting: A two-bed emergency care unit.

Subjects: All patients admitted to the unit during one year.

Main outcome measures: Patients' age and gender, comorbidity, main diagnoses and municipal care level on admission and discharge, diagnostic and therapeutic initiatives, occupancy rate.

Results: Sixty admissions were registered, with total bed occupancy 194 days, and an occupancy rate of 0.27. The patients (median age 83 years, 57% women) had mostly infections, musculo-skeletal symptoms or undefined conditions. Some 48% of the stays exceeded three days and 43% of the patients were subsequently transferred to nursing homes or hospitals.

Conclusion: Occupancy rate was low. Patient selection was not according to national standards, and stays were longer. Many patients were transferred to nursing homes, indicating that the unit was an intermediate pathway or a short cut to institutional care. It is unclear whether the unit avoided hospital admissions.

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Introduction

The number of people with multiple chronic conditions will increase dramatically over the next decades. This entails organisational challenges for the management and occupies considerable resources, particularly in hospital care. In many countries, there are efforts to reduce acute hospital admissions and duration of hospital stays [1–5]. In Norway, *The Coordination reform* was implemented from 2012, aiming at seamless patient trajectories, and giving the municipalities increased responsibility for treatment [6].

As an alternative to hospital admission, all 428 municipalities are from 2016 required to establish municipal emergency beds (MEB) [7]. MEB is defined as a municipal or intermunicipal emergency overnight service for persons in urgent need of health care. According to the national recommendation, MEBs are intended for short-term stays of maximum three days [7]. Prerequisites for admission to MEB include examination by the referring doctor, establishment of a

diagnosis, and a treatment plan for the next 24 h or until availability of the doctor in charge of MEB.

The municipalities are expected to provide the same quality of care in MEBs compared with hospitals. Encouraged by economic incentives, half of Norway's municipalities had established MEB by 2014. No pilot studies regarding quality and impact were performed prior to implementation of this new health service.


The aim of this study was to examine admissions to newly established MEBs in a single municipality with regard to occupancy rate, patient characteristics, diagnoses, diagnostic and therapeutic initiatives, and to where the patients were discharged.

Material and methods

Study population

This cross-sectional, observational study was conducted in a single municipality with approximately

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 Supplemental data for this article can be accessed [here](#).

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14,500 inhabitants in south-western Norway. Two MEBs equalled a bed rate of 0.14/1000 inhabitants, close to the national norm of 0.13/1000. The MEBs were established in March 2013, located at a nursing home ward, close to intermunicipal out of hours (OOH) emergency service and an X-ray facility. In addition to the two emergency beds, the ward comprised 20 beds assigned rehabilitation after hospital discharge, palliative care and other types of short-term stays. In addition to standard equipment for medical examinations, the unit had access to a modestly equipped laboratory (e.g. urine examinations, CRP and glucose), ECG and bladder scan, while X-ray was available during daytime. Other blood tests had to be sent to the hospital laboratory for analysis, from where test results were received two or more days later. The MEBs were staffed with nurses from the nursing home, while medical service was offered by general practitioners (GPs) a few hours daily five days a week in addition to GPs from the OOH services. A GP was available for telephone consultation if a patient's condition deteriorated between scheduled rounds.

To avoid patients in need of hospital care being admitted to MEB, local exclusion criteria were compiled (Supplementary Table). For instance, patients with chronic obstructive pulmonary disease (COPD) were not eligible for MEB when possibly suffering from concomitant acute heart failure, or if in need of continuous positive airway pressure (CPAP).

The study population comprised all patients admitted to MEB the first year of operation, from 1 March 2013 to 28 February 2014.

Data collection

We collected routinely registered information from patients' stay in MEB. Demographic data (age, gender and residential municipality, date of admission and discharge, municipal care level on admission and discharge, e.g., nursing home, home/nursing home rotational scheme) and clinical data (principal diagnoses on admission and discharge, comorbidity, diagnostic and therapeutic initiatives) were transferred to a data sheet. Nurses in charge of MEB extracted the data from patients' electronic medical record and replaced ID-number with a record number on the individual data sheet; the key to which remained undisclosed to the research group. Data registration was supervised and controlled thoroughly by author HN. Occupancy rate was defined as the total use of beds (days) divided by total available bed days.

Statistical analyses

Due to the exploratory nature of this study, no power analysis was performed. To compare categorical data, we used the χ^2 test for independence. In case of numbers smaller than 5, we used Fisher's exact test. *p* values 0.05 were considered statistically significant. IBM SPSS Statistics 20 (SPSS Inc., Chicago, IL) was used for statistical analyses.

Results

Sixty admissions occurred during the study period; four patients were admitted more than once. More patients were admitted by OOH doctors than by GPs. Patients' median age was 82.5 years, 57% were women; they had on average 3 (range 0–8) chronic conditions (Table 1). Length of stay varied between one and seven days (median 3). Total bed occupancy was 194 days, yielding an occupancy rate of 0.27.

Table 2 shows the main diagnoses on admission. The most common diagnoses were infections (pneumonia 20%, urinary tract infection 7%) and musculoskeletal symptoms (10%). In 10% of the cases, the diagnosis was unclear or not specified.

Diagnostic procedures were performed in 95% of the cases, most commonly blood samples and a variety of basic clinical measurements. Some 17% of the patients received no specific treatment, while the rest received various treatments, such as pain management (30%), intravenous antibiotics (23%) and intravenous fluid (13%) (Table 3).

Table 1. Descriptive data for patients in municipal emergency beds (*N* = 60).

Variable	Number of patients
Age (median and range), years	83 (37–98)
Women	34
Men	26
Referring doctor	
Doctor at out-of-hours services	33
General practitioner	27
Number of known diagnoses (mean and range)	3 (0–8)
Pre-existing comorbidities on admission ^a	
Hypertension	24
Heart disease, including arrhythmia	24
COPD	15
Diabetes	13
Cancer	11
Arthritis or arthrosis	10
Dementia	10
Vascular disease, for example stroke	9
Osteoporosis	8
Depression	6
Other diagnoses	25
Length of stay in MEB (median and range), days	3 (0–7)

Number of patients, if not otherwise indicated.

^aMost patients had more than one pre-existing diagnosis.

Table 2. Main diagnosis on admission to municipal emergency beds ($N = 60$).

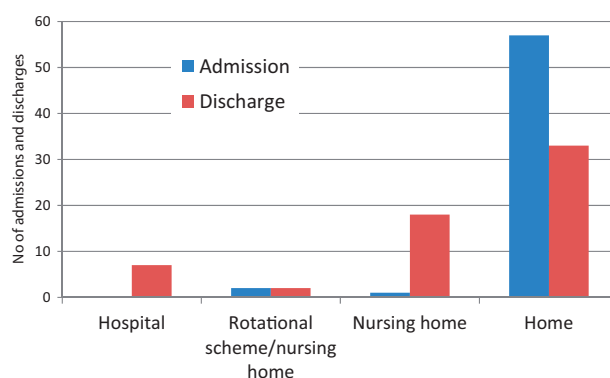
Diagnoses	Number of patients
Infections	
Pneumonia	12
COPD	4
Urinary tract infection	4
Skin infection	2
Musculoskeletal conditions	6
Falls	5
Cardiovascular conditions, including arrhythmia	5
Abdominal symptoms and conditions	5
Mental symptoms, that is, delirium, anxiety	4
Bleeding, that is, epistaxis, hematoma	2
Other, but specified diseases and conditions	5
Undefined conditions, that is, fever and pain	6

Table 3. Diagnostic procedures and treatments during stay in municipal emergency beds for 60 patients.

Diagnostic and therapeutic procedures	Number of patients
Diagnostic procedures	
Blood samples	41
Basic clinical observations only	27
Urine samples	12
Oxygen saturation measurement	11
X-ray	10
ECG	6
Bladder volume; bacterial culture	3
No diagnostic initiatives	3
Treatments	
Pain management/analgesics	18
Intravenous antibiotics	14
Adjustments of medication	15
Intravenous fluid	8
Mobilisation, physiotherapy	8
Oxygen therapy	6
Wound care	1
Catheterisation	1
No therapeutic initiatives	10

In eight cases, diagnoses on admission and discharge differed. Agreement between diagnosis on admission and discharge was 96% (26/27 cases) in patients admitted by GPs and 79% (26/33 cases) in those admitted by OOH doctors ($p = 0.063$).

Altogether 26 patients (43%) were discharged to a higher care level than before admission to MEB; one patient to home/nursing home rotational scheme, 18 to nursing home and seven to hospital ($p < 0.001$ for change in distribution) (Figure 1). Of hospitalised patients, five patients were transferred within one day and two patients after 2–3 days. The most common reasons for hospital admissions were fracture, wound infection, pulmonary embolism, undefined chest pain, pneumonia and stroke. One patient died shortly after transfer to hospital. Five of the seven patients transferred to hospital had been admitted to MEB by OOH doctors and two by GPs ($p = 0.44$). Out of the 31 patients discharged from the MEB within three days, nine were transferred to short-term stay and 10 to long-term stay in nursing home.

**Figure 1.** Distribution of care level on admission and discharge of patients in municipal emergency beds ($N = 60$).

Discussion

Our study has shown that the new ward with two municipal emergency beds had a low occupancy rate, that OOH doctors and not GPs referred most patients. These were old and had complex health problems. The length of stay was longer than three days for half of the patients [7], and although admitted from home, only about half the patients were discharged back to their home.

This small one-year observational study with complete data can shed light on some of the most important issues concerning the MEB innovation from the Coordination reform in Norway. The main weaknesses of the study are the restriction to one municipality and the small sample size. Also, we were unable to validate diagnoses with regard to severity and completeness of information.

MEBs have been used less frequently than anticipated all across Norway, with a mean occupancy rate of 0.34 in 2014 [8]. Our results indicate an overestimated demand of the facilities [9], as many patients admitted to the MEBs did not fulfil the recommended criteria for admittance, because of comorbidity and inability to be discharged to their home.

More patients were admitted by doctors from the OOH service than by GPs. Doctors' decisions about admission to MEB instead of hospital, or treatment at home, have not been evaluated in the study, but it is known that several factors influence such decisions. OOH doctors have less knowledge of their patients compared to GPs; they have no access to patients' medical records; and consultation time is often too short for comprehensive assessment. Studies also show that GPs have difficulties selecting which patients are best suitable for treatment in MEBs [9,10]. Diagnostic clarification prior to admission may be challenging, particularly in OOH emergency settings, and

eagerness to avoid hospital admission may lead to delayed diagnostics and/or reduced therapeutic quality.

Acutely sick, old patients with multimorbidity deserve a comprehensive geriatric assessment including medical, functional and social aspects [11,12]. Previous research indicates reduced mortality among patients treated in geriatric units compared with general medical wards [13]. The question arises whether MEBs, staffed with primary care personnel and limited diagnostic and therapeutic options, may ever be able to provide equally good health services for this vulnerable patient group compared to appropriate hospital departments. A worrying finding is that basic clinical observations were recorded in less than half of the patients. On the other hand, MEB personnel might have better knowledge of social aspects important for old and vulnerable patients, and better co-operation with other primary care providers than hospitals. Norwegian patients seem to be rather satisfied with the MEB system, although they point at limitations in diagnostic capacity [14].

Infections and exacerbation of COPD, a third of the patients in our study, may probably be handled appropriately in MEBs. In contrast, almost a fifth of our patients had unsettled conditions and some of them were subsequently transferred to hospital with severe conditions. Thus, initial hospitalisation should not be considered 'unnecessary' in many cases, in contrast to the MEB guidelines [7]. Our findings also align with previous research in Norway [15] and Great Britain [16] reporting deviation from admission criteria in 17% and 18% of cases, respectively.

Half of the MEB stays exceeded the predefined three-day limit. Lack of essential medical information on admission may have delayed treatment. Probably more important, acutely sick, older patients are often in need of more comprehensive care than could be provided within three days. Low occupancy rates may be another explanation. The MEB environment is probably less effective at diagnostic and therapeutic procedures compared to hospital. Patients with multimorbidity often have a gradually loss of function, indicating the need for a higher care level rather than advanced medical treatment. Our finding that every third patient was transferred to nursing home suggests that MEBs to some extent are used as a short cut to institutionalised care or as an intermediate care level until a nursing home bed is available. A recent report indicates that patients from MEBs compete for the same nursing home resources as patients discharged from hospital or referred directly from home [17].

To the best of our knowledge, no study has shown that establishment of community medical wards such as MEBs has reduced hospitalisation. In Great Britain, the number of hospital admissions is still increasing [18]. In other countries, implementation of 'hospital at home' or 'medical homes' has been shown to decrease unnecessary hospital admissions [19], an alternative that may be worthwhile in Norway as well.

There are wide variations between municipalities regarding organisation, staffing and number of MEBs, hampering generalisation of our results. A systematic review, comparing MEB to hospitalisation [20] identified three small studies of low quality conducted in Norway [15] and United Kingdom [21,22]. These studies suggest that patients admitted to MEB are slightly more satisfied with their stay in smaller departments closer to their home, shorter transportation distance and waiting time, compared with those who were hospitalised. Another study revealed no significant differences in activities of daily living or number of readmissions to hospital and nursing home after one year [23]. However, there is insufficient scientific evidence to determine whether there are differences in outcomes such as quality of life. We believe that if the MEB system in Norway is to be continued and the occupancy rate to increase, we need better risk assessment instruments, larger involvement of the GPs, and probably somewhat better equipped units, diagnostically and therapeutically.

Conclusions

Occupancy rate was low in the small MEB unit in our study. Patient selection was not according to national standards, and stays were longer. Many patients were transferred to nursing homes, indicating that the unit was an intermediate pathway or a short cut to institutional care. It is unclear whether the unit avoided hospital admissions.

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Ethical approval

The Regional Committee for Medical and Health Research Ethics approved the study (REC West ref. 2014/1389).

Disclosure statement

No potential conflict of interest was reported by the authors.

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