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Screening by Social Workers in Medical Patients with Risk of Post-Acute Care Needs: A Stepped Wedge Cluster Randomized Trial

Evaluation eines Screenings durch Sozialarbeiter bei medizinischen Patienten mit einem Risiko für post-akuten Nachsorgebedarf: eine stepped wedge clusterrandomisierte Studie

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Abstract

Background: Elderly patients often need post-acute care after hospital discharge. Involvement of social workers can positively affect the discharge planning process.
Aim: To investigate the effect of screening patients at risk for post-acute care needs by social workers on time with respect to social workers' notification, length of stay and delays in discharge compared to usual care.
Methods: Cluster randomized stepped wedge trial design for five clusters (wards) and two steps (control to intervention) was used. A total of 400 patients (200 per period) with high risk of post-acute care needs (defined as Post-Acute Care Discharge score, PACD ≥ 7) were included. Social workers performed a screening to decide about self-referral to their services (intervention period), which was compared to a highly structured standard SW notification by physicians and nurses (control period). A Generalized Estimating Equations model adjusted the clustering and baseline differences.
Results: A total of 139 patients were referred to social services (intervention: n = 76; control: n = 63). Time to social workers' notification was significantly shorter in the intervention period when adjusted for all the differences in baseline (Mdn 1.2 vs 1.7, Beta = -0.73, 95%-CI 1.39 to -0.09). Both the length of stay and the delayed discharge time in nights showed no significant differences (Mdn 10.0 vs 9.1, Beta = -0.12, 95%-CI 0.46 to .22 nights 95%-CI, resp. Mdn 0.0 vs 0.0, Beta = .11, 95%-CI -0.64 to 0.86).
Conclusion: Screening speeded up social workers' notification but did not accelerate the discharge processes. The screening by social workers might show process improvement in settings with less structured discharge planning.

Abstract

Hintergrund: Ältere Patienten benötigen nach dem Spitalaufenthalt oft post-akute Versorgungsangebote, die zu verlängerten Spitalaufenthalten führen. Ein früherer Einbezug von Sozialarbeitern vermag die Austrittsplanung zu verbessern.
Ziel: Es wurde untersucht, ob ein durch Sozialarbeiter durchgeführtes Screening von medizinischen Patienten, die ein Risiko für einen post-akuten Nachsorgebedarf aufweisen, im Vergleich zum Standardprozess Unterschiede beim Zeitpunkt der Sozialdienstanmeldung, der Spitalaufenthaltstage und der Wartezeit zeigt.
Methode: Ein cluster-randomisiertes *stepped-wedge*-Studiendesign für fünf Cluster (Stationen) und zwei Perioden (Kontroll- zu Interventionsperiode) wurde angewendet. Insgesamt wurden 400 männliche und weibliche Patienten (200 pro Periode) mit einem hohen Risiko für einen post-akuten Nachsorgebedarf (PACD-Score ≥7) eingeschlossen. Sozialarbeiter führten ein Screening in der Interventionsperiode durch, um zu entscheiden, ob die Patienten einen post-akuten Nachsorgebedarf haben. Als Kontrolle diente

der bisherige Prozess, bei dem Patienten mit einem potenziellen Nachsorgebedarf von der Pflege und der Ärzteschaft gemeldet wurden. Zur Analyse wurde ein *Generalized-Estimating-Equations*-Modell gerechnet.
Resultate: Insgesamt wurden 139 Patienten beim Sozialdienst angemeldet (Intervention: n=76, Kontrolle: n=63). Die Zeit bis zur Sozialdienstanmeldung (Median) war in der Interventionsperiode signifikant kürzer (1.2 vs. 1.7, Beta = 0.73, 95%-KI −1.39 bis −0.09 Nächte), wenn für alle Unterschiede kontrolliert wurde. Die Aufenthaltsdauer (10.0 vs. 9.1, Beta = −0.12, 95%-KI −0.46 bis 0.22 Nächte) und die Wartezeiten (0.0 vs. 0.0, Beta = 0.11, 95%-KI −0.64 bis 0.86 Nächte) zeigten keine Unterschiede.
Schlussfolgerung: Das Screening durch Sozialarbeiter verkürzte die Zeit bis zur Anmeldung beim Sozialdienst, beschleunigte aber nicht den Austrittsprozess. Das Screening durch Sozialarbeiter könnte in Spitälern mit geringerer strukturierter Austrittsplanung positive Effekte aufzeigen.

Keywords
Screening by social workers – post-acute care discharge score – discharge planning – social worker notification – self-referral – stepped wedge

Keywords
Screening durch Sozialarbeiter – Nachsorgebedarf – Austrittsmanagement – Sozialdienst-Anmeldung – Selbst-Zuweisung – stepped-wedge-Design

INTRODUCTION

Delayed hospital discharge of medically stable patients is a concern in the healthcare system. In elderly patients, the frequency of post-acute care rehabilitation needs after admission with acute medical conditions has been increasing over the last two decades (Barnes et al., 2013; Burke et al., 2015; Goodwin, Howrey, Zhang, & Kuo, 2011).
Due to delays, half of the medically stable patients are not discharged timely from the hospital. One third of these delays are often found to be avoidable (Hendy, Patel, Kordbacheh, Laskar & Harbord, 2012). The main reasons for delayed discharges of medically stable patients are attributed to lack of access to residential care (Louis Simonet et al., 2008; Salonga-Reyes & Scott, 2016). Reasons such as the organization of a community-based care, acute medical problems others than at admission and patients' concerns about having enough self-care capabilities are reported (Albrich et al., 2013; Costa, Poss, Peirce & Hirdes, 2012; Dusemund et al., 2012).
Since the introduction of the Swiss diagnosis-related group (DRG)-based reimbursement system, many hospitals are putting every effort to reduce the length of hospital stay and the total cost of health care (Thommen et al., 2014). For this reason, starting patient discharge planning at the earliest possible moment of hospitalization is imperative (Alper, O'Malley & Greenwald, 2016; Conca et al., 2013; DNQP, 2009; Federal Ministry of Health., 2012).
Hence, the interprofessional discharge planning should start as early as possible during hospitalization (Schuetz et al., 2013) to reduce delayed discharges due to a lack of timely organization of transfer or access to post-acute care facility. Social workers have an important role to play in early discharge planning, as they inherently focus on the organizational issues related to discharge (Cudjoe & Gyedu, 2015). The post-acute care discharge score (PACD day1) is a tool that was developed to predict the post-acute institutional care needs in medical inpatients, which performed adequately (AUC: 0.81) (Louis Simonet et al., 2008) (90% sensitivity and 62% specificity) (Conca et al., 2015).
The combination and consistent application of the PACD and the self-care index (SPI) (Hunstein, 2009) for the early identification of complicated discharge planning and the early involvement of social workers (SW) in the process are important to combat the factors causing delayed discharge (Schuetz et al., 2013).
SW play an important function in discharge planning (Australian Association of Social Workers (AASW), 2016; Judd & Sheffield, 2010; Morrow-Howell, Proctor, & Mui, 1991). Patients educated by SW in self-management skills, adherence to prescriptions, compliance to follow up appointments and information about support programs, were less readmitted compared to the patients who received usual care (Adler, Lipkin, Cooper, Agolino & Jones, 2009). The role of SW in discharge planning has been highlighted in several studies (Holliman, Dziegielewski & Datta, 2001; Judd & Sheffield, 2010; Oktay, Steinwachs, Mamon, Bone & Fahey, 1992). Cudjoe and Gyedu (2015) illustrated that the interdisciplinary care team including SW is able to capture the patient's needs more quickly due to their own professional point of view. Therefore, potential referrals to post-acute care institutions can require less time for planning and organization. Moreover, the involvement of an interprofessional care team in discharge planning has proved to be cost-effective in reducing healthcare costs (Wong, Chau, So, Tam, & McGhee, 2012). The tasks performed to organize the discharge are part of the task profile of SW. This includes the coordination of services and discharge planning, which in turn improves the continuity of care (Holliman et al., 2001). Despite the well documented contribution of the role of SW in reducing hospital discharge delay, there are no recommendations concerning the optimal time after hospital admission to involve SW in discharge planning.

The early involvement of SW in the discharge planning has proved to be positive. A proactive approach for involving SW in combination with a valid subsequent screening by the SW of a patient at risk and SW self-referral (i.e., SW can directly refer themselves to patients) has not yet been reported.

AIM OF THE STUDY

To evaluate the effect of implementing a PACD-driven screening by the SW on (a) the time to SW notification, (b) the length of stay and (c) the delayed discharge time to post-acute care facilities.

METHODOLOGY

Methods and participants

The present study was conducted at the Medical University Clinic and the Department of Neurology of the Cantonal Hospital of Aarau (KSA), Switzerland — a 600-bed tertiary care hospital.

The study used a cluster randomized stepped wedge trial design. A computer-generated list was prepared by the principal investigator (AC) to determine the order of change of the wards from control to intervention period. The stepped wedge design is a crossover design that is characterized by the crossing over of clusters at different time points (for example, switching from control to intervention in a random rollout). The baseline is the first time point of measurement where no intervention is received. At subsequent time points, the clusters start the planned intervention and the response to the intervention are continuously measured (figure 1).

The time for a cluster to begin the intervention is randomized (Hussey & Hughes, 2007). The design is considered suitable for the evaluation of service delivery interventions, where outcomes are based on routinely collected data, such as on clinical wards (Hemming, Haines, Chilton, Girling & Lilford, 2015). In such settings, the cost and logistical effort of simultaneously implementing the intervention to multiple wards may be too high and withholding screening from entire clusters might be regarded as unethical. Using a stepped wedge design is one way to address and solve these logistical and ethical problems (Barker, McElduff, D'Este & Campbell, 2016).

Adult patients admitted to the internal medical wards with PACD ≥ 7 (risk of post-acute care need), were included in the study. The PACD routine screening was done with all the patients admitted to the Emergency Department (ED) on the first day of admission.

The PACD tool was applied in two versions, namely on day 1 and on day 3. PACD version day 1 includes 15 items related to the number of active medical problems at admission, whether the patient has a person in the same household who can provide help, the number of limitations in the activities of daily living (ADLs) (personal hygiene, dressing/undressing, elimination, bathing/showering, eating/drinking, moving, transfer [bed/chair]), or the instrumental ADLs (IADLs) (transportation [bus/car), shopping, cooking, housekeeping, medication management) and age. On PACD version day 3, five items were included, namely the number of active medical problems at the time of admission, whether the patient lived with someone at home who could provide help, whether the patient needed help with medication management before hospital admission, dependency in bathing/showering on day 3 and dependency in transfer to or from bed/chair on day 3. Active medical problems were defined as diagnoses at admission with recognized therapeutic, diagnostic or monitoring consequences, counting one for each affected organ system (Louis Simonet, personal communication on 17.05.2010).

The SPI is a score of 10 items integrated in the 52-items of the 'result-oriented nursing assessment acute care' (ePA-AC© version 1.0) (Bartholomeyczik & Halek, 2009). The SPI-items assess patients' ability for self-care: activity and mobility, personal hygiene (upper body), personal hygiene (lower body), dressing/undressing (upper body), dressing/undressing (lower body), eating, drinking, urination, defecation and cognitive ability. All items were scored on a 4-point scale from dependent/not able (1 point), severely impaired ability (2 points), low impaired ability (3 points) and independent/full ability (4 points). An overall SPI score can be calculated ranging from 10 (full dependency) to 40 points (full independency). In accordance with the existing literature, the risk of post-discharge care needs was set with SPI < 32 points, because this cut-off value guaranteed an adequate validity with a sensitivity of 80.7% and a specificity of 93.7% (Schlarmann 2007).

In the control period before the implementation of the screening by SW, the discharge management process was carried out as usual.

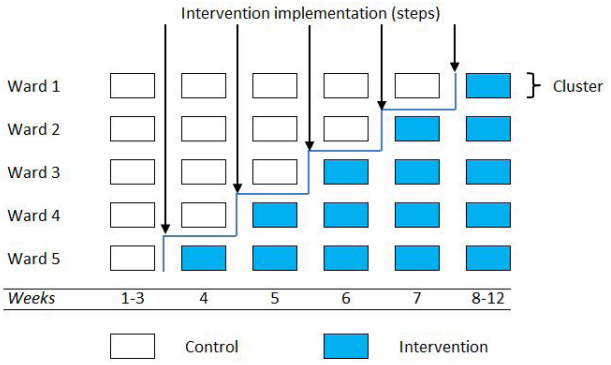


Figure 1: Ward-level randomization in stepped wedge clusters in weeks

In standard care, the interprofessional discharge patient record, called the clinical rounds tool 'Visitentool', was used for a structured discharge planning on a daily basis. The estimated discharge date from physician's, nurse's and SW's views, the aimed at discharge state, the medical stability and organizational progress were discussed during the clinical rounds and documented in the electronic patient record for each patient. The PACD and the SPI were used to screen for post-acute care needs and the nurse and/or physician would then notify a SW, if required. Physicians, nurses and SW were not blinded to the PACD and SPI scores as these were assessed in all patients in routine work. For the control period, the SW notifications were done by physician and nurses after their discussion on the ward round.

In the intervention period, the patients with PACD of ≥ 7, being at risk of post-acute care needs were additionally screened by SW (Monday to Friday at 11 a.m.). For the patients assessed with PACD during weekends, the screening was conducted retrospectively. The screening was conducted by an SW with a nursing background or a clinical nurse scientist. Both were trained to use the discharge planning relevant detail information in the items of the PACD and Self-care Index tool (SPI) (Hunstein, 2009) from the clinical records. They were trained in the assessment and interpretation of the SPI items with regard to the post-acute care needs during the one-hour educational sessions by the principal investigator (AC).

Also, information was gathered by telephone from physicians and nursing staff in order to decide about SW self-referral. Physicians and nurses initiated the notification for SW services in the intervention period only when they identified the need before the screening by the SW, or if there was no initial SW self-referral and the need for post-acute care emerged later in the stay.

Data collection and intervention implementation

Data collection was carried out from 17 November 2014 until 3 February 2015 in all the medical wards. A total of 400 patients were recruited (200 patients each in the control and the intervention period). The rollout started cumulatively at week 4 with the first ward and was completed at week 8 with the fifth ward. Data was collected until week 12. The five study wards were randomized by a computer-generated algorithm to determine the roll-out sequence. The control and the intervention periods were randomized at the ward level and followed a sequential roll-out order at the ward level in weeks (every week a new ward was added, see figure 1). A maximum of 5 patients per group and day were recruited in a convenient consecutive order.

Data collection of patients with SW notification after admission (baseline data collection) included information about demographic characteristics, the PACD day 1 (active medical problems on admission, available person for help in the same household, abilities in (I)ADLs prior to admission, age, help needed for transfer or bathing on day 3) and SPI at admission. Main diagnosis, patients' residence prior to admission, discharge destination and length of stay were collected from the electronic medical controlling coding records. Time to SW notification, delayed discharge time and time required for screening were recorded by the SW.

The following outcome variables were measured: (a) time to SW notification for a post-acute care facility defined as the number of nights spent in the hospital before notification; (b) the length of stay as the total number of nights spent in the hospital; (c) delayed discharge time measured as the number of nights (without weekends, because organizational activities of SW were then not possible) spent in the hospital between medical stability and discharge to post-acute care.

Ethical considerations

As the intervention was implemented at ward level as a quality improvement project, the EKBB Ethical Committee ('Ethikkommission beider Basel') approved the study and waived the need for informed consent (EKBB, 1.12.2014).

Data Analysis

Data was analysed by the not-blinded principal investigator (AC). Patient characteristics were analysed descriptively using frequencies, percentages, median, mean and standard deviation depending on the data type and variation. The differences in time to SW notification, length of stay and discharge delay to post-acute care were compared using the multilevel Generalized Estimating Equations (GEE), which is commonly used for clustered and stepped wedge design data (Barker et al., 2016; Campbell, Mollison, Steen, Grimshaw & Eccles, 2000; Hussey & Hughes, 2007). Significant differences between the intervention and the period patient group at baseline and the ward clustering were controlled for using the GEE Model. The power calculation based on 6 clusters and an estimated time to notification of 4.0 vs 3.0 nights (difference 1 night) and an estimated standard deviation of 1.5 nights, an intraclass correlation (ICC) of 0.02 with a α of 5% and a power of 0.80 indicated a sample size of 180 per group. When taking into account that the stepped wedge design estimated 40% power gain (Woertman, de Hoop, Moerbeek, Zuidema, Gerritsen & Teerenstra, 2013), the required sample was a total of 216 patients for both groups. Due to organizational reasons, only five wards have been included in this study.

SPSS Version 23.0 was used for data analysis. Results with a p-value of less than 0.05 were considered statistically significant.

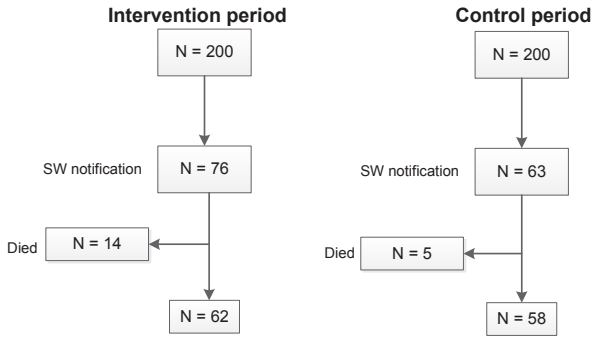


Figure 2: Flow diagram of the study

RESULTS

From the total patients of the intervention period (n = 200), 38.0% (n = 76) were referred to SW services, of which 14 patients died. In the control period, 31.5% (n = 63) were applied for SW services, of which 5 patients died (see figure 2).

Socio-demographic characteristics

The average age of patients in the intervention and the control periods was 78 (SD ± 12) and 80 (SD ± 11) years (p = 0.36), respectively. Almost half of the patients in the intervention period were male (48.4%) compared to 58.6% in the control period (p = 0.62).
The majority of patients who were applied for SW services from both the intervention and the control period (n = 120) lived at home before hospital admission. Only less than half of the patients from the intervention and the control period were discharged and went home (45.2% and 44.8%, respectively, see table 1).

Clinical characteristics

The mean number of active medical problems at admission was 3.3 (SD ± 1.8) in the intervention period and 3.5 (SD ± 1.8) in the control period (p = 0.64), and the average PACD score was similar for both periods (13.0 and 12.9 respectively, p = 0.93). Regarding the ADL and IADL, there was a significant difference between the intervention and the control period in relation to needing help with transportation (p = 0.03), help with shopping (in the last two weeks before admission) (p = 0.02) and help with transfer on day 3 (p = 0.02) (table 2).
The SPI average score was 29 in the intervention and 32 in the control period (p = 0.10), and the average number of limited activities was 5.4 in the intervention period and 4.5 in the control period (p = 0.21).
There was no significant difference between the intervention and the control period regarding the main

Table 1: Admission from and discharge to places for patients notified to SW services

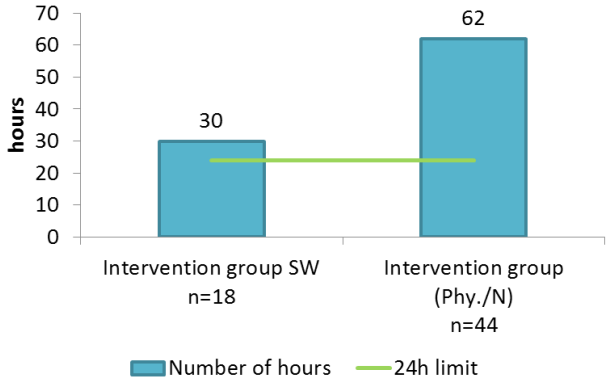
(n=120)	Admitted from[a]		Discharged to[b]	
	Intervention	Control	Intervention	Control
Home	82.3%	70.7%	17.8%	15.5%
Home with home care service	11.3%	20.7%	24.2%	24.1%
Geriatric home, other social medical institutions	0%	1.7%	6.5%	8.6%
Nursing home	1.6%	1.7%	20.9%	22.5%
Rehabilitation	NA		25.8%	22.4%
Psychiatric clinic	0%	1.7%	NA	
Acute hospital	NA		1.6%	1.7%
Others	4.8%	3.5%	3.2%	5.2%

Note.
NA = not available
[a]Chi², p = 0.57 exact test
[b]Chi², p = 0.97 exact test

Table 2: ADL, IADL and unavailability of help at home

	Intervention period (n = 62)	Control period (n = 58)	p-Value
PACD total score (M, SD)	13 (± 4.7)	13 (± 4.4)	.91
Needs help in general	77.4%	74.1%	.68
Help with personal hygiene	46.8%	44.8%	.83
Help with dressing/ undressing	37.1%	31.0%	.48
Help with toileting (urine/ defecation)	19.4%	20.7%	.86
Help with bathing / showering	53.2%	41.4%	.19
Help with mobility	37.1%	24.1%	.13
Help with eating / drinking	14.5%	15.5%	.88
Help with transfer (bed / chair)	24.2%	20.7%	.65
Help with transportation (car / public)	66.1%	46.6%	.03*
Help with shopping	71.0%	50.0%	.02*
Help with cooking	59.7%	50.0%	.29
Help with house keeping	69.4%	63.8%	.52
Help with medication management	45.2%	44.8%	.97
Unavailability of help at home	45.9%	54.1%	.20
Help with transfer on day 3	56.1%	34.0%	.02*
Help with bathing / showering on day 3	84.2%	71.7%	.11

Note. M = mean, SD = standard deviation **p < .05*



SW = social worker, Phy. = physician, N = nurse

Figure 3: Average duration from admission to SW notification

medical diagnosis (affected organ system). In the intervention period, the most prevalent main medical diagnosis was infections (26%), whereas in the control period these were cardiovascular diseases and other diagnoses (19%) (p = 0.70) (table 3).

Time to SW notification

In the intervention period, SW self-referred 18 of 62 patients to social services within an average of 30 hours from admission, while physicians and nurses initiated 44 of 62 notifications within an average of 62 hours (see figure 3).

All 58 notifications to SW in the control period were initiated by physicians and nurses within an average of 63 hours from admission.

The screening improved time to SW notification in the intervention period with a median of 1.2 (IQR: 1.9) vs 1.7 (IQR: 2.4) nights compared to the control period, not adjusted for difference between groups (p = 0.42). However, the patients in the intervention period showed longer median length of stay (Mde 10.0, IQR 8.9 vs Mde 9.1, IQR: 6.4) nights (p = 0.41), and some more variation in delay in discharge time (Mde 0.0, IQR 2.5 vs Mde 0.0, IQR 1.4 night) in the intervention period than in the control period (p = 0.39; see table 4).

The average time from admission to notification to SW services was not statistically significantly shorter, if only the ward cluster and day 1 differences were controlled for in the analysis (Beta = -0.55, p = 0.08, see table 5). However, when controlling for the difference in help for transfer on day 3, the model showed that notification to SW services was significantly faster in the intervention period (Beta = -.74, p = 0.03).

Length of stay

There was no statistically significant difference in the length of hospital stay between intervention and control period controlling for the ward cluster, help with transportation, help with shopping, and help with transfer on day 3 (Beta = -0.12, p = 0.49, see table 6).

Table 3: Affected organ system (main diagnosis) of the patients with SW notification

	Intervention period (n = 62)	Control period (n = 58)
Infections	26%	17%
Respiratory system	19%	17%
Cardiovascular system	14%	19%
Digestive system	10%	7%
Neoplasms	8%	9%
Nervous system	8%	5%
Genitourinary system	2%	7%
Others	13%	19%

Chi^2, p = 0.70 exact test

Table 4: Unadjusted time to SW notification, hospital length of stay and delayed discharge time in nights

	Intervention period (n = 62)		Control period (n = 58)		p-Value
	Median	IQR	Median	IQR	
Time to SW notification	1.2	1.9	1.7	2.4	.42
Hospital length of stay	10.0	8.9	9.1	6.4	.41
Delayed discharge time	0.0	2.5	0.0	1.4	.39

Note. IQR = interquartile range

Delayed discharge time

No significant difference was found in the discharge delay time without weekends between the intervention and control period, controlling for help with transportation, help with shopping and help with transfer on day 3 and the ward cluster (Beta = 0.11, p = 0.77, see table 7).

DISCUSSION

This cluster randomized stepped wedge trial evaluated the effect of screening patients at the risk of post-acute care needs by SW on time to SW notification, length of stay and delays in discharge compared to usual care. The screening by SW shortened the time to SW notification but did not induce acceleration in the discharge process. However, in the current study, the involvement of SW early enough in the discharge planning process with the help of the screening showed a marginal improvement in the time

Table 5: GEE Results for the dependent variable: SW notification

	Model adjusted for calendar days, help with transportation, help with shopping (day 1), and help with transfer (day 3)					
	day 1 adjusted (n=120)			day 1 & 3 adjusted (n=110)		
	ß	CI (95%)	p-Value	ß	CI (95%)	p-Value
Intervention	-.548	-1.155 to .060	.077	-.736	-1.387 to -.085	.027
Control	-	-	Referent	-	-	Referent
Calendar days	.010	-.003 to .022	.142	.009	-.005 to 0.22	.212
No help with transportation	.127	-.418 to .671	.648	.052	-.475 to .580	.846
Help with transportation	-	-	Referent	-	-	Referent
No help with shopping	.003	-.586 to .591	.993	-.148	-.656 to .361	.570
Help with shopping	-	-	Referent	-	-	Referent
No help with transfer day 3	-	-	-	.165	-.281 to .611	.469
Help with transfer day 3	-	-	-	-	-	Referent

Table 6: GEE Results for the dependent variable: length of stay

	Model adjusted for calendar days, help with transportation, help with shopping (day 1), and help with transfer (day 3)					
	day 1 adjusted (n = 120)			day 1 & 3 adjusted (n = 110)		
	ß	CI (95%)	p-Value	ß	CI (95%)	p-Value
Intervention	.001	-.358 to .360	.995	-.119	-.460 to .221	.492
Control	-	-	Referent	-	-	Referent
Calendar days	.004	-.003 to .010	.298	.004	-.022 to .011	.180
No help with transportation	-.140	-.377 to .096	.246	-.088	-.296 to .120	.408
Help with transportation	-	-	Referent	-	-	Referent
No help with shopping	.239	-.028 to .506	.079	.159	-.055 to .373	.145
Help with shopping	-	-	Referent	-	-	Referent
No help with transfer day 3	-	-	-	.009	-.211 to .228	.939
Help with transfer day 3	-	-	-	-	-	Referent

Table 7: GEE Results for the dependent variable: discharge delay

	Model adjusted for calendar days, help with transportation, help with shopping (day 1), and help with transfer (day 3)					
	day 1 adjusted (n = 120)			day 1 & 3 adjusted (n = 110)		
	ß	CI (95%)	p-Value	ß	CI (95%)	p-Value
Intervention	.090	-.560 to .740	.786	.110	-.637 to .857	.773
Control	-	-	Referent	-	-	Referent
Calendar days	.005	-.009 to .019	.498	.003	-.013 to .019	.713
No help with transportation	-.722	-1.231 to -.214	.005	-.764	-1.312 to -.217	.006
Help with transportation	-	-	Referent	-	-	Referent
No help with shopping	.798	.295 to 1.300	.002	.689	.122 to 1.256	.017
Help with shopping	-	-	Referent	-	-	Referent
No help with transfer day 3	-	-	-	.084	-.314 to .482	.680
Help with transfer day 3	-	-	-	-	-	Referent

to SW notification considering the already fast referral in the control period. Length of stay and the delayed time waiting for discharge did not show significant differences between the intervention and control period. This might be attributed to the fact that during the discharge planning, SW – even with early involvement – certainly cannot influence other factors affecting patient readiness for discharge such as changes or deterioration in patients' health condition, the transferability as planned to post-acute institutions or the time required for organizational and administrative tasks to organize the discharge.

However, Galati, Wong, Morra and Wu (2011) found that the presence of SW influenced positively the discharge rate. The Galati et al. study's finding contrasts to our findings, possibly due to the differences in usual care discharge between the Galati study (i.e., no support in usual discharge planning) as compared to the usual care in our study (clinical rounds in place to support usual discharge planning).

The average age of patients in both the intervention and the control period was over 75 years of age. Patients in the intervention period needed more help with transportation, shopping before admission and transfer at day 3 in comparison to the control period. For this reason, patients in the intervention period might be considered as moderately frail, which is in turn related to longer length of stay (Juma, Taabazuing & Montero-Odasso, 2016), explaining their longer length of stay.

The study was conducted at the KSA where PACD, SPI and the clinical round tool 'Visitentool' are integrated in the standard care of all patients. With physicians and nurses already considering the discharge management at admission, the early involvement of SW using the screening might not make a difference because of the already optimized processes. If the screening processes by SW were applied in another setting where discharge management is less supported by clinical round tools in the standard routine and SW notifications are usually done later in the stay by nurses and physicians, a significant difference in length of stay might be possible. Then, the screening through SW might be an option to be considered, in order to refer patients to social services earlier than physicians and nurses usually are able to do.

Limitations

Although the PACD screening was a routine process, it might not have always been possible to do the screening at the ED at patients' admission (e.g., off-hours, weekends). It was not possible to control whether all the consecutive patients during the study period had undergone the standard screening. A further limitation was the non-blinding of the principal investigator and data analyst AC.

The study used the stepped wedge trial design to randomize five wards distributing the control/intervention periods. This resulted in two wards having most of the study period either control or intervention patients, namely on ward 1, the control period was from week 1—7 and on ward 5, the intervention period was from week 4—12 (Figure 1) limiting comparison between periods.

We based our power calculation on the plan to include 6 wards (one more) and estimated a longer time to notification (4 versus 2.6 in our sample) in the control period, which caused a loss of power and might explain the non-significant results.

In addition, the rate of patients lost to follow up (died) in the intervention period was somewhat higher (7%) than that in the control period (2.5%), which could have excluded patients with complex care profiles.

Implications for Practice

The involvement of SW within 24—72 hours from admission in the process of discharge planning is important in order to gain time to organize discharge, especially in frail patients and in patients who are at a risk of post-acute care needs. The screening offers a starting point to initiate the discharge planning and the involvement of SW at an early stage, when there is no clinical rounds tool to support planning. This will help in more time being available to organize the discharge into an appropriate post-acute care facility and potential discharge delay will be prevented.

CONCLUSIONS

The study showed time saving and organizational opportunities of process optimizations. The screening by the SW of patients at risk for post-acute care needs resulted in an optimized discharge process by offering more time for discharge organization. A screening by SW might be considered in a setting without nurses and when physicians forced early referral to SW.

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CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

References

Adler, A., Lipkin, C., Cooper, L., Agolino, M., & Jones, V. (2009). Effect of Social Work Intervention on Hospital Discharge Transition Planning In a Special Needs Population. *Managed Care*, 49-53.

Albrich, W. C., Ruegger, K., Dusemund, F., Schuetz, P., Arici, B., Litke, A., . . . Muller, B. (2013). Biomarker-enhanced triage in respiratory infections: a proof-of-concept feasibility trial. *Eur Respir J, 42*(4), 1064-1075. doi: 10.1183/09031936.00113612

Alper, E., O'Malley, T., & Greenwald, J. (2016, 2016). Hospital discharge and readmission. Retrieved 04.05, 2016, from http://www.uptodate.com/contents/hospital-discharge-and-readmission

Australian Association of Social Workers (AASW). (2016). Scope of Social Workers: Hospital Social Work (pp. 1-9).

Barker, D., McElduff, P., D'Este, C., & Campbell, M. J. (2016). Stepped wedge cluster randomised trials: a review of the statistical methodology used and available. *BMC Med Res Methodol, 16*, 69. doi: 10.1186/s12874-016-0176-5

Barnes, D. E., Mehta, K. M., Boscardin, W. J., Fortinsky, R. H., Palmer, R. M., Kirby, K. A., & Landefeld, C. S. (2013). Prediction of recovery, dependence or death in elders who become disabled during hospitalization. *J Gen Intern Med, 28*(2), 261-268. doi: 10.1007/s11606-012-2226-y

Bartholomeyczik, S., & Halek, M. (2009). *Assessmentinstrumente in der Pflege. Möglichkeiten und Grenzen.* Hannover: Schlütersche Verlagsgesellschaft mbH & Co. KG.

Burke, R. E., Juarez-Colunga, E., Levy, C., Prochazka, A. V., Coleman, E. A., & Ginde, A. A. (2015). Patient and Hospitalization Characteristics Associated With Increased Postacute Care Facility Discharges From US Hospitals. *Med Care, 53*(6), 492-500. doi: 10.1097/mlr.0000000000000359

Campbell, M. K., Mollison, J., Steen, N., Grimshaw, J. M., & Eccles, M. (2000). Analysis of cluster randomized trials in primary care: a practical approach. *Fam Pract, 17*(2), 192-196.

Conca, A., Gabele, A., Regez, K., Brunner, C., Schild, U., Guglielmetti, M., . . . Albrich, W. C. (2015). Erfassung eines Nachakutpflegebedarf bei hospitalisierten, medizinischen Patienten durch die "Post-Acute Care Discharge scores" (PACD) *Pflegewissenschaft*(11), 584-597. doi: 10.3936/1311

Conca, A., Regez, K., Schild, U., Reutlinger, B., Schafer, P., Schweingruber, R., . . . Albrich, W. C. (2013). [At admission planning discharge already]. *Krankenpflege. Soins infirmiers, 106*(1), 20-23.

Costa, A. P., Poss, J. W., Peirce, T., & Hirdes, J. P. (2012). Acute care inpatients with long-term delayed-discharge: evidence from a Canadian health region. *BMC Health Serv Res, 12*, 172. doi: 10.1186/1472-6963-12-172

Cudjoe, E., & Gyedu, D. (2015). The Significance of Discharge Planning in Medical Social Work. 2016, from https://www.socialworkhelper.com/2015/03/04/significance-discharge-planning-medical-social-work/

DNQP. (2009). [Expert standards of discharge management in nursing]. [Expertenstandard Entlassungsmanangement in der Pflege]. *Osnabrück, Hochschule Osanbrück.*

Dusemund, F., Steiner, M., Vuilliomenet, A., Muller, C., Bossart, R., Regez, K., . . . Albrich, W. C. (2012). Multidisciplinary Assessment to Personalize Length of Stay in Acute Decompensated Heart Failure (OPTIMA II ADHF). *J Clin Med Res, 4*(6), 402-409. doi: 10.4021/jocmr1154w

Federal Ministry of Health. (2012). *[Instrument collection of federal quality standards to admission and discharge management in Austria].* Retrieved from http://www.bmg.gv.at/cms/home/attachments/1/3/0/CH1333/CMS1350910195632/bqll_aufem_materialiensammlung_2012.pdf.

Galati, M., Wong, H. J., Morra, D., & Wu, R. C. (2011). An Evidence-Based Case for the Value of Social Workers in Efficient Hospital Discharge. *Health Care Manag (Frederick), 30*(3), 242-246.

Goodwin, J. S., Howrey, B., Zhang, D. D., & Kuo, Y. F. (2011). Risk of continued institutionalization after hospitalization in older adults. *J Gerontol A Biol Sci Med Sci, 66*(12), 1321-1327. doi: 10.1093/gerona/glr171

Hemming, K., Haines, T. P., Chilton, P. J., Girling, A. J., & Lilford, R. J. (2015). The stepped wedge cluster randomised trial: rationale, design, analysis, and reporting. *Bmj, 350*, h391. doi: 10.1136/bmj.h391

Hendy, P., Patel, J. H., Kordbacheh, T., Laskar, N., & Harbord, M. (2012). In-depth analysis of delays to patient discharge: a metropolitan teaching hospital experience. *Clin Med (Lond), 12*(4), 320-323.

Holliman, D. C., Dziegielewski, S. F., & Datta, P. (2001). Discharge planning and social work practice. *Soc Work Health Care, 32*(3), 1-19. doi: 10.1300/J010v32n03_01

Hunstein, D. (2009). Das ergebnisorientierte PflegeAssessment AcuteCare (ePA-AC). In S. Bartholomeyczik & M. Halek (Eds.), *Assessmentinstrument in der Pflege. Möglichkeiten und Grenzen* (pp. 60-78). Hannover: Institut für Pflegewissenschaft Witten.

Hussey, M. A., & Hughes, J. P. (2007). Design and analysis of stepped wedge cluster randomized trials. *Contemp Clin Trials, 28*(2), 182-191. doi: 10.1016/j.cct.2006.05.007

Judd, R. G., & Sheffield, S. (2010). Hospital social work: contemporary roles and professional activities. *Soc Work Health Care, 49*(9), 856-871. doi: 10.1080/00981389.2010.499825

Juma, S., Taabazuing, M. M., & Montero-Odasso, M. (2016). Clinical Frailty Scale in an Acute Medicine Unit: A Simple Tool That Predicts Length of Stay. *Can Geriatr J, 19*(2), 34-39. doi: 10.5770/cgj.19.196

Louis Simonet, M., Kossovsky, M. P., Chopard, P., Sigaud, P., Perneger, T. V., & Gaspoz, J.-M. (2008). A predictive score to identify hospitalized patients' risk of discharge to a post-acute care facility. *BMC Health Serv Res, 8*, 154. doi: 10.1186/1472-6963-8-154

1472-6963-8-154 [pii]

Morrow-Howell, N., Proctor, E. K., & Mui, A. C. (1991). Adequacy of discharge plans for eldery patients. *Social Work Research & Abstracts, 27*(1), 6-13.

Oktay, J. S., Steinwachs, D. M., Mamon, J., Bone, L. R., & Fahey, M. (1992). Evaluating social work discharge planning services for elderly people: access, complexity, and outcome. *Health Soc Work, 17*(4), 290-298.

Salonga-Reyes, A., & Scott, I. A. (2016). Stranded: causes and effects of discharge delays involving non-acute in-patients requiring maintenance care in a tertiary hospital general medicine service. *Aust Health Rev*. doi: 10.1071/ah15204

Schuetz, P., Hausfater, P., Amin, D., Haubitz, S., Fassler, L., Grolimund, E., . . . Mueller, B. (2013). Optimizing triage and hospitalization in adult general medical emergency patients: the triage project. *BMC Emerg Med, 13*, 12. doi: 10.1186/1471-227x-13-12

Thommen, D., Weissenberger, N., Schuetz, P., Mueller, B., Reemts, C., Holler, T., . . . Hug, B. L. (2014). Head-to-head comparison of length of stay, patients› outcome and satisfaction in Switzerland before and after SwissDRG-Implementation in 2012 in 2012: an observational study in two tertiary university centers. *Swiss Med Wkly, 144*, w13972. doi: 10.4414/smw.2014.13972

Wong, F. K., Chau, J., So, C., Tam, S. K., & McGhee, S. (2012). Cost-effectiveness of a health-social partnership transitional program for post-discharge medical patients. *BMC Health Serv Res, 12*, 479. doi: 10.1186/1472-6963-12-479