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Patient functional independence and occupational therapist time-use in inpatient services: Patient demographic and clinical correlates

Bianca E Summers[1,2], Kate E Laver[1], Rebecca J Nicks[2], Nadine E Andrew[3], Christopher J Barr[1], Laura Jolliffe[4,5] and Natasha A Lannin[4,5]

Abstract

Introduction: Health care expenditure has rapidly increased in Australia. Effective management of occupational therapy services is required to meet clinical demand. Improving our understanding of factors which influence occupational therapy service delivery is a vital step to manage workload distribution and optimise service efficiency. This study aims to examine the influence of patient sociodemographic characteristics, diagnosis and functional independence on the utilisation of occupational therapy resources in hospital inpatients over 18 years old.

Methods: Prospective, cross-sectional, observational cohort study of 4549 inpatients from three hospital sites in Melbourne, Australia. Data extracted from organisational databases and included in this study were: patient demographics, diagnosis, functional level assessed using the SMAF (Functional Autonomy Measurement System) and occupational therapy time-use. Data were analysed using univariable and multivariable modelling.

Results: Occupational therapy time-use was significantly associated with all variables included in analysis ($p < 0.05$). For each variable the amount and direction of effect differed between hospital sites. The SMAF was the only variable consistently associated with occupational therapy time-use. Higher occupational therapy time-use was associated with lower functional independence (leading to a 3.5 min increase in median occupational therapy time for every unit decrease in SMAF score).

Conclusions: Management of resources within busy hospitals require knowledge of factors associated with occupational therapist time-use. This study identified that time-use could in part be predicted by functional independence, diagnosis and sociodemographic characteristics. Occupational therapy managers can use this information to support decision making while acknowledging other patient and therapist level factors also influence time-use.

Keywords

Allied health, occupational therapy, delivery of health care, health planning, time management, functional independence

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Background

An ageing population (Australian Bureau of Statistics, 2013) places pressure on health care costs, primarily because of the increased demand on health care services. Increases in the number of hospitalisations is anticipated to increase the demand for many hospital services, including occupational therapy (Australian Institute of Health and Welfare, 2014; Australian Health Workforce Advisory Committee, 2006;

[1]Flinders University, Australia
[2]Eastern Health, Australia
[3]Monash University, Australia
[4]Alfred Health, Australia
[5]La Trobe University, Australia

Corresponding author:
Bianca Summers, Occupational Therapy Clinical Lead Aged and Complex Care, Eastern Health, Arnold Street, Box Hill, Melbourne, Victoria, 3128.
Email: bianca.summers@easternhealth.org.au

Kendig & Phillips, 2007). Occupational therapy managers will be expected to improve efficiency, contain costs, adapt service delivery, reduce waste and effectively manage workloads to meet increasing demands within existing resources while maintaining quality of care to demonstrate evidence of the value of occupational therapy (Cartmill et al., 2012; Scott et al., 1993).

Health professions have been asked to improve their workforce planning to better manage the increasing demands of an ageing population within Australia (Australian Health Workforce Advisory Committee, 2006; Australian Rehabilitation Alliance, 2011; Crettenden et al., 2014). There are limitations in current workforce planning systems used in occupational therapy and gaps between current systems and their ability to respond to increasing demand for service delivery (Crettenden et al., 2014). The nursing profession have managed these issues by implementing workforce planning models that evenly distribute workloads to meet clinical need and improve efficiency (Buchan, 2005; Duffield et al., 2011; Hébert, Dubuc, et al., 2001). Similar workforce planning models may provide occupational therapy managers with a means of monitoring, evaluating and determining workload and staffing requirements (Cartmill et al., 2012; Schoo et al., 2008). However, to inform any future occupational therapy workforce planning models, there is first a need to better understand clinical needs and time-use within the profession of occupational therapy (Cartmill et al., 2012; Schoo et al., 2008).

There are few studies that describe the impact of different patient and situational variables on how occupational therapists themselves spend their time (Farnworth, 2003; Hunt & McKay, 2015). In the limited research to date, patient-related characteristics including diagnosis, level of independence on admission, age, weight and English as a second language have been reported to influence the amount of occupational therapy time and types of therapy provided (Foy et al., 2011; Richards et al., 2005). Further information is needed to better understand how these characteristics might influence occupational therapist time-use or build a workforce planning model for the profession. The aim of this study was to determine if patient and situational factors, including an assessment of clinical need, can predict the amount of occupational therapist time spent with patients prior to their discharge from hospital and how this may vary across three distinct healthcare settings.

Method

Data for patients treated by occupational therapists at three public Australian hospital sites (within the same hospital network) between 1 July 2013 and 31 June 2014 were included in this study. Together, these inpatient occupational therapy programs provide referral-based acute and rehabilitation occupational therapy services and employ a total of 41.4 full time equivalent (FTE) occupational therapists. The acute hospital is a major acute tertiary hospital with state wide and specialty services including a major trauma centre and emergency department ($n = 512$ beds; $n = 17$ FTE occupational therapists); the rehabilitation hospital includes aged care, general and specialty rehabilitation streams ($n = 205$ beds; $n = 23$ FTE occupational therapists); and the community hospital provides acute orthopaedic, ageing and rehabilitation services ($n = 52$ beds; $n = 1.4$ FTE occupational therapists).

Within the public hospital network, occupational therapy is provided on a needs basis (as identified by the clinician) in line with organisational prioritisation policy, evidence based practice and national guidelines with no external governing body directing the amount or type of occupational therapy provided. Data are submitted by occupational therapists at least monthly for all patients seen, and these were used to indicate time-use in the present study. These statistics, recorded in five minute increments, are routinely classified by each therapist as clinical or non-clinical activity according to the National Allied Health Casemix – Health Activity Hierarchy (National Allied Health Casemix Committe, 2001). Clinical activity includes time spent on direct patient contact as well as indirect time including patient related documentation, report writing, phone discussions and liaising with the multidisciplinary team and significant others. Clinical activity data are linked to an individual inpatient, and can thus be reported as both occasions of service (i.e. therapy sessions) and minutes of occupational therapy. Inpatient demographic information recorded for all admissions includes gender, primary language, age, marital status, diagnosis, admitting hospital and discharge destination. Occupational therapy clinical data recorded for all admissions includes the SMAF (French acronym for Functional Autonomy Measurement System) (Hébert, Dubuc, et al., 2001; Hébert, Guilbaukt, et al., 2001).

At the included hospitals, the SMAF is completed routinely on admission by the ward occupational therapist to determine functional independence profile and occupational therapy need for all inpatients. The SMAF is a 29-item scale developed to measure functional independence and resource availability in five domains of activity (activities of daily living, functional mobility, communication, cognitive functions and instrumental activities of daily living). The SMAF was administered by a trained occupational therapist, who rated functional ability after questioning the patient and proxies (including nursing staff, as well as

family members), and also observation during routine activity performance and, at times, testing the patient. Each item is then scored based on a patient's actual performance on a four-point scale from independent (0) to totally assisted by another person (–3). A disability score can be calculated from 0 to –87, as well as calculated by individual domain, with lower scores reflecting higher care needs. ln addition, for each item, a SMAF handicap score is calculated which evaluates if the available resources (i.e. resources currently available in the patients home environment) compensate for the observed disability (Hébert, Dubuc, et al., 2001; Hébert, Guilbaukt, et al., 2001). A handicap score of <–15 is considered an accurate indicator of moderate to severe loss of functional independence (Hébert et al., 2005). While the SMAF (Desrosiers et al., 1995) was developed according to the World Health Organisation International classification of impairments, disabilities and handicaps (World Health Organisation, 1980), it has since been described as consistent with the International Classification of Functioning, Disability and Health (Dubuc et al., 2006; Smith et al., 2001; World Health Organisation, 2001). The reliability and validity of the SMAF have been established in a number of studies across diagnostic groups and services (Desrosiers et al., 1995, 2003; Hébert, Dubuc, et al., 2001; Hébert, Guilbaukt, et al., 2001).

In the present study, the SMAF handicap scores were used in all analyses. For this study, prospectively collected SMAF results were linked using patient identifiers (name, date of birth and unit record number) to patient-related data (patient age, primary language, marital status, admission location) and occupational therapist clinical time-use (occasions of service and total time in minutes). Inpatient cases across all three hospitals were included in this study if they were aged 18 years or older and had a recorded SMAF assessment (no missing items).

Data coding and analysis

Prior to analysis the data were examined for outliers and incorrect or illogical values. These were defined as time-use values that could not feasibly be delivered within a standard work day or patient length of stay. Three episodes were removed due to excessive missing data and 11 due to outlier status (total 0.2% of data). Episodes in which the person died in hospital ($n = 34$, total 0.7% of the data) were also excluded as their care pathways may have differed to those who were being discharged. Diagnoses were categorised based on ICD-10 primary diagnosis codes (see Additional Table 1 for full details). To understand occupational therapist clinical time-use on a daily basis, average occupational therapist time-use in minutes per patient per day of their admission was also calculated from the recorded minutes of occupational therapy time.

The distribution of the data was determined, and appropriate descriptive statistics applied. These were reported for the cohort overall and *p*-values calculated to determine differences between sites. Multivariable models were run to identify patient and clinical factors associated with occupational therapist time-use and occupational therapist occasions of service per admission. To better understand the relationship between occupational therapist clinical time-use and patient or situational variables at each hospital site, models were run separately for individual hospital sites. As the dependent variables were highly skewed the assumptions underlying linear regression were violated and so quantile (median) regression was used. Multivariable models that included data from multiple sites were adjusted for correlations among patients within individual hospitals. The Variation Inflation Factor (VIF) was assessed when developing our models. Our mean VIF value of 1.13, indicates low multicollinearity.

Ethical approval for the study was obtained from the hospital human research ethics committee (HREC ID 199-15).

Results

Complete data from 4549 patient admissions across three hospital sites were analysed. As our models contained 12 covariates and a sample size of 4549 our results fall well within the conservative sample size recommendations for predictive modelling of 20 events per variable. Characteristics for participants according to hospital network and individual hospital sites are described in Table 1. The median age of patients seen by occupational therapists across all sites was 71 years with the majority returning home (66%) following a median LOS of seven days (IQR 4–14). Patients were assessed as having a median SMAF score of –13 and received a median of 170 min of occupational therapy time during each admission. All patient and situational characteristics were found to be significantly different between sites (Table 1).

Univariable analysis demonstrated that all variables had a significant impact on the total minutes of occupational therapist time provided per admission in the overall cohort. The impact of each variable on occupational therapist time-use differed between sites, as outlined in Table 2, with patient age and discharge destination being the only two variables significantly influencing occupational therapist time-use at all sites.

In the multivariable models of the whole hospital network, total SMAF, diagnosis, marital status,

Table 1. Characteristics of patients and occupational therapy service provision across multiple hospital sites.

	Overall *n* (%)	Acute hospital	Rehabilitation hospital	Community hospital	Significance
Total SMAF median (Q1:Q3)	–13 (–24: –3)	–10 (–24: –2)	–20 (–28: –12)	–7 (–16: –1)	$p < 0.001$
SMAF <–15 points	2106 (46.3%)	1188 (41.01%)	777 (67.10%)	141 (28.54%)	$p < 0.001$
Total OT time (minutes) per admission median (Q1:Q3)	170 (95:345)	140 (85:230)	480 (255:860)	105 (60:165)	$p < 0.001$
Total OT OOS per admission median (Q1:Q3)	5 (3:9)	4 (2:7)	10 (6:19)	2 (1:4)	$p < 0.001$
Average OT minutes per day (Q1:Q3)	24.42 (15.00:51.25)	25.53 (13.75:46.67)	35.63 (20.00:62.14)	30.00 (17.50:56.25)	$p < 0.001$
Diagnosis – medical	1340 (29.5%)	928 (32%)	183 (15.8%)	229 (46.4%)	$p < 0.001$
Diagnosis – neurological	578 (12.7%)	531 (18.3%)	35 (3%)	12 (2.4%)	
Diagnosis – CVD/resp	653 (14.4%)	480 (16.6%)	92 (7.9%)	81 (16.4%)	
Diagnosis – injury	1198 (26.3%)	929 (32.1%)	110 (9.5%)	159 (32.2%)	
Diagnosis – rehabilitation[a]	708 (15.6%)	0 (0%)	708 (61.1%)	0 (0%)	
Diagnosis – mental health	72 (1.6%)	29 (1.0 %)	30 (2.6%)	13 (2.6%)	
LOS median (Q1:Q3)	7 (4:14)	6 (3:11)	14 (7:24)	4 (2:6)	$p < 0.001$
Age median (Q1:Q3)	71 (54:82))	64 (46:78)	79 (68:86)	80 (69:87)	$p < 0.001$
Not married/defacto	1849 (40.6%)	1263 (43.6%)	401 (34.6%)	185 (37.4%)	$p < 0.001$
Primary language other than English	390 (8.6%)	208 (7.2%)	167 (14.4%)	15 (3%)	$p < 0.001$
D/C destination home	3008 (66.1%)	1974 (68.1%)	700 (60.4%)	334 (67.6%)	$p < 0.001$
D/C destination – another hospital	1171 (25.7%)	909 (31.4%)	104 (9.0%)	158 (32.0%)	
D/C destination – nursing home	168 (3.7%)	12 (0.4%)	154 (13.3%)	2 (0.4%)	

Q1:Q3: Quartile 1, Quartile 3; *N*: sample size; LOS: length of stay; SMAF: Revised Functional Assessment and Measurement Scale; OT: occupational therapy; OOS: occasions of service; CVD: cardiovascular disease; resp: respiratory disease; D/C: discharge; SMAF <–15: moderate to severe loss of functional independence.

[a]Rehabilitation was not a diagnosis option in the acute and community settings.

primary language and discharge destination were all independently associated with occupational therapy clinical time-use (Table 3). Across the hospital network, patients with greater loss of autonomy received statistically more occupational therapy time across their admission. For every unit decrease in SMAF score, there was a 3.5-min increase in the median occupational therapy time across their admission (coef: –3.5, (95% CI: –6.35 to –0.71) $p < 0.05$). Additionally, across the hospital network, patients not in a married or defacto relationship and patients whose primary language was not English received statistically more occupational therapy time during their admission. Diagnosis was found to have a significant association with occupational therapist time-use with significant variability between diagnosis groups. Discharge destination was also found to have a significant impact on occupational therapist time-use with variation between sites.

In the results from the multivariable models stratified by site (Table 3), the SMAF was the only variable that consistently significantly predicted occupational therapy clinical time-use at each hospital site. At the acute site for every unit decrease in SMAF there was a 2.2 min increase in occupational therapy time-use across the admission (coef: –2.21, (95% CI: –2.67 to –1.76) $p < 0.05$). In comparison at the rehabilitation site each unit decrease in SMAF was associated with a 13.2 min increase in occupational therapy time-use (coef: –13.17, (95% CI: –16.99 to –9.35) $p < 0.05$) and a three-minute increase in occupational therapy time-use at the community hospital site (coef: –2.97, (95% CI: –3.94 to –2.00) $p < 0.05$). Large variability was observed in occupational therapist time-use between sites based on primary diagnosis. For example in the acute setting those admitted with an injury received less occupational therapist time-use compared to those with a medical problem (coef: –20 (95% CI: –32.17 to –7.83), $p < 0.05$) whereas in the rehabilitation setting those with an injury received much more occupational therapist time-use compared to those with a medical problem (coef: 195 (95% CI: 60.28–329.73), $p < 0.05$). Increased age and not being in a married/defacto relationship were associated with increased occupational therapy time-use at the acute and community sites but not at the rehabilitation site.

A positive association was seen between average occupational therapist time-use and SMAF scores such that those with a milder disability received more occupational therapist time per day of their admission (coef: 0.11 (95% CI: 0.04–0.18), $p < 0.05$) (see Additional Table 2). To explore this further the influence of length of stay on this relationship by SMAF categories for mild loss of autonomy (SMAF ≥–15) and moderate to severe loss of autonomy (SMAF <–15) was analysed (Figure 1). The average

Table 2. Univariable regression – occupational therapy time-use per admission (minutes) with patient and situational variables.

	Overall			Acute hospital			Rehabilitation hospital			Community hospital		
	Coefficient	95% CI	*p*	Coefficient	95% CI	*p*	Coefficient	95% CI	*p*	Coefficient	95% CI	*p*
Total SMAF	–4.66	–10.47, 1.150	**0.000**	–2.5	–2.89, –2.11	**0.000**	–12.78	–15.99, –9.56	**0.000**	–2.41	–3.37, –1.45	0.163
Age	1.61	–0.57, 121.17	**0.000**	0.91	0.70, 1.12	**0.030**	–2.57	–4.95, –0.19	**0.000**	0.74	0.45,1.04	**0.005**
Diagnosis – medical (reference)			**0.000**			**0.007**			**0.000**			0.295
Diagnosis – neurological	–5	–35.48, 25.48		–13	–17.18, 17.18		–120	–277.74,37.74		15	–34.76,64.76	
Diagnosis – CVD/resp	–12	–13.94, 13.94		–5	–19.95, 9.95		–60	–172.29, 52.29		–5	–27.75,17.75	
Diagnosis – injury	–20	–33.20, –6.80		–20	–32.17, –7.83		195	60.28, 329.73		–15	–34.71,4.71	
Diagnosis – rehabilitation	370	318.28, 421.72		NA	NA		120	32.58,207.42		NA	NA	
Diagnosis – mental health	25	–12.02, 62.02		–13	–31.00, 31.00		75	–192.39, 342.39		30	–21.65,81.65	
Not married/ defacto	–20	–71.73, 31.73	**0.000**	–10	–20.28, 0.28	0.977	–10	–20.28, 0.28	0.977	–15	–36.31,6.31	0.962
Primary language other than English	60	–77.05, 197.05	**0.000**	30	13.45, 46.55	0.960	–60	–133.74, 13.74	0.150	35	–3.77, 73.77	0.982
D/C destination home (reference)			**0.000**			**0.000**			**0.028**			**0.030**
D/C destination – another hospital	30	–33.71, 93.71		60	50.26, 69.74		90	–42.35, 222.35		15	1.24, 28.76	
D/C destination – nursing home	120	189.83, 230.17		170	29.96, 310.04		–90	–172.09, –7.91		–15	–45.09, 15.09	

CI: confidence interval; SMAF: Revised Functional Assessment and Measurement Scale; CVD: cardiovascular disease; resp: respiratory disease; D/C: discharge; NA: not applicable.
Note: Bold – significant result at $p < 0.05$.

Table 3. Multivariable regression – occupational therapy time-use (minutes) per admission with patient and situational variables.

	Overall			Acute hospital			Rehabilitation hospital			Community hospital		
	Coefficient	95% CI	*p*	Coefficient	95% CI	*p*	Coefficient	95% CI	*p*	Coefficient	95% CI	*p*
Total SMAF	–3.53	–6.35, –0.70	**0.014**	–2.21	–2.67, –1.76	**0.000**	–13.17	–16.99, –9.35	**0.000**	–2.97	–3.94, –2.00	**0.000**
Age	0.51	–0.04, 1.05	0.069	0.42	0.20, 0.65	**0.000**	–2.14	–5.20, 0.92	0.170	0.45	0.10, 0.79	**0.011**
Diagnosis – medical (reference)			**0.001**			0.070			**0.000**			0.681
Diagnosis – neurological	–5.40	–20.69, 9.88		–11.71	–23.69, 0.28		–146.35	–369.73, 77.03		23.61	–23.21, 70.44	
Diagnosis – CVD/resp	9.38	0.69, 18.08		2.25	–10.86, 15.35		–38.90	–123.44, 45.63		5.79	–13.11, 24.90	
Diagnosis – injury	–12.27	–15.67, –8.88		–13.18	–24.57, –1.79		107.11	–32.26, 246.47		–5.35	–18.16, 7.46	
Diagnosis – rehabilitation	357.97	321.31, 394.62		NA	NA		120.60	42.50, 198.70		NA	NA	
Diagnosis – mental health	3.34	–9.95, 16.64		–5.19	–74.82, 64.44		45.57	–137.38, 230.51		–8.76	–58.86, 41.34	
Not married/ defacto	–10.08	–18.80, –1.36	**0.023**	–13.94	–22.53, –5.35	**0.001**	–23.51	–86.14, 39.12	0.462	–16.33	–27.84, –4.83	**0.005**
Primary language other than English	26.71	7.18, 46.24	**0.007**	16.31	–6.21, 38.84	0.156	–20.21	–93.28, 52.87	0.588	58.96	31.35, 86.57	**0.000**
D/C destination home (reference)			**0.000**			0.090			0.068			**0.000**
D/C destination – another hospital	–16.63	–72.55, 39.29		13.60	–1.73, 28.92		34.18	–110.22, 178.58		–20.94	–36.02, –5.86	
D/C destination – nursing home	91.42	24.94, 157.90		57.01	–10.15, 124.18		–107.57	–199.70, –15.44		–141.09	–210.69, –71.49	

CI: confidence interval; SMAF: Revised Functional Assessment and Measurement Scale; CVD: cardiovascular disease; resp: respiratory disease; D/C: discharge; NA: not applicable.
Note: Bold – significant result at $p < 0.05$.

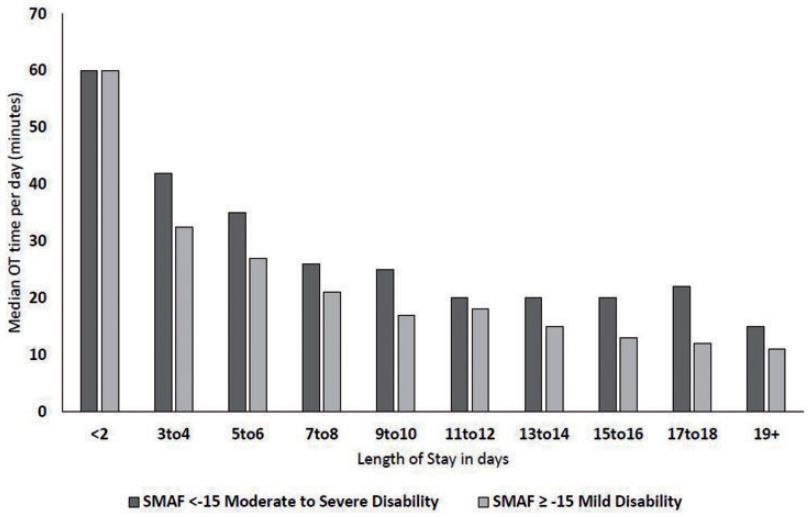

Figure 1. Relationship between average occupational therapist time-use per day (minutes), functional ability and length of stay.

occupational therapy time-use per day differed based upon length of stay with clinical time-use batched and more average time-use provided per day to patients with a shorter length of stay regardless of their level of functional independence. As length of stay increased, patients experiencing moderate or severe loss of autonomy received more average occupational therapist time-use per day across their admission than patients with mild loss of functional independence.

Discussion

This study showed that patient demographics and level of functional independence were associated with the amount of time occupational therapists spent with a patient prior to discharge. The size and direction of each variables' effect on occupational therapist time-use differed between hospital sites. This information could be used by occupational managers to help inform workload distribution for occupational therapy teams acknowledging that there are patient-level and therapist level factors that were not included in the analysis that will also influence therapy time. However, the model tested was not sufficiently informative to recommend it's use in development of more extensive occupational therapy workforce planning models.

Previous studies suggest that age, level of function and language spoken impact on occupational therapist time-use in rehabilitation and community settings (Davidson & Bressler, 2010; Foy et al., 2011; Richards et al., 2005). This study found these variables to be significant predictors of occupational therapy time-use overall but they were not all associated with time-use when considering individual hospital sites (i.e. acute versus rehabilitation versus community). Interestingly, our findings are comparable with those of Dunal et al. (2006), who found that patient and situational characteristics predicted only about 10% of occupational therapist time-use. Despite our sample size being significantly larger ($n > 4000$) than previous research studies, we did not detect any factors beyond those highlighted already in the literature.

Our study found that higher occupational therapy time-use was associated with loss of functional independence at all hospital sites, that is, occupational therapists do spend more time with patients who are admitted with lower functional independence. Patients with a SMAF score of –40 were receiving a median of 77 min more of occupational therapy across their admission at the acute site, 462 min more at the rehabilitation site and 105 min more at the community site, than patients with a SMAF score of –5. The difference in time spent with patients between sites may reflect that acute care hospitals require occupational therapists to prioritise their time and that they need to spend with patients who are unlikely to access occupational therapy services post-discharge (i.e. those who are more independent, since they will not transfer from acute care to a rehabilitation hospital). Other authors have suggested a greater priority is given to discharging higher functioning patient's home from acute hospitals, with less independent patients transferred to sub-acute rehabilitation (Kendig & Phillips, 2007), supporting our hypothesis for differences we observed in our results.

The differences in time-spend found between sites and the low proportion of workload predicted by our assessment may be due to the nature of occupational therapy practice, in which occupational therapists play

a role in optimising patient independence regardless of the extent of functional loss (Townsend, 2002). Any future workforce planning models for predicting time-use in occupational therapy must take into account the breadth of occupational therapy practice and the client centred nature of the profession (Farnworth, 2003; Townsend, 2002). Ratio-based workforce planning models have been recommended (e.g. Australian Faculty of Rehabilitation Medicine (2011)), however this study presents evidence that occupational therapist time-use differs between hospital settings and patients level of independence, suggesting that ratio based workforce planning is difficult to implement and may under-represent patient need. Research suggests the organisational culture, in addition to client features, influence the type and amount of occupational therapy provided (Putman et al. 2006; Griffin & McConnell, 2001). Since our study held organisational culture consistent, our findings suggest that individual therapist factors should also be assessed.

This study has a number of strengths including the large sample size and inclusion of multiple hospital sites. However, despite evidence suggesting that multimorbidity and the role of allied health assistants impact occupational therapist clinical time-use (Lizarondo et al., 2010; Somerville et al., 2015), these variables were not able to be included due to the complexity of diagnostic coding and time-use data at the study sites. A second limitation is that time-use captured in this study was self-reported and entered retrospectively by therapists which may lead to inaccuracies in the data due to recall bias (Burke et al., 2000; Collopy, 1996).

Conclusion

In conclusion, predicting time-use in occupational therapy is complex and varies based upon a range of situational characteristics including the hospital setting, a patients functional status, their age, diagnosis, language, marital status and anticipated discharge destination. This study linked data from three datasets and identified that some of occupational therapist time-use could be predicted by a needs assessment, patient and sociodemographic characteristics. Occupational Therapy managers could use the size and direction of each variables' effect on occupational therapist clinical time-use at different hospital settings to help inform workload distribution, acknowledging it is likely that patient-level factors not yet defined as well as therapist-level factors will also influence therapy time. Further research could focus on better understanding occupational therapist time-use within specific patient populations, clinical settings and organisations to allow for inclusion of a wider range of variables to inform predictive occupational therapy workforce planning models in future.

Key points for occupational therapy

- Occupational Therapist time-use is complex and influence by a range of patient and professional factors which are not yet fully understood.
- The average occupational therapy time-use per day is impacted by patient length of stay and functional independence.
- Across an admission, occupational therapists spend more time overall with patients who are admitted with lower functional independence.

Declaration of authorship

The study was conceptualised by NAL and designed by BES, RJN, KEL and NAL. Data were collected and entered by LJ, RJN and BES. The database and data linkage were managed by NAL, NEA and BES. BES, KEL, CJB, RJN, NEA and NAL were all involved in data analysis and interpretation. BES wrote the first draft of the manuscript and all authors were involved in critical review and editing. All authors were involved in the interpretation of the results and approved the final version of the manuscript.

Ethical approval statement

Ethical approval for the study was obtained from The Alfred Health Ethics Committee (HREC ID 199-15).

Consent for publication

All authors have reviewed the publication and provide consent for submission.

Authors' Note

Rebecca J Nicks is also affiliated with Department of Medicine, Peninsula Clinical School, Central Clinical School, Monash University, Moorooduc Hwy, Frankston, Victoria, Australia. Nadine E Andrew is now affiliated with Occupational Therapy Department, Alfred Health, 55 Commercial Road, Prahran, Melbourne, Australia, 3004. Laura Jolliffe is also affiliated with Department of Neurosciences, Central Clinical School, Monash University, The Alfred Centre, Commercial Road, Melbourne, Victoria, Australia, 3044 and School of Allied Health, College of Science, Health & Engineering, La Trobe University, Plenty Road and Kingsbury Drive, Bundoora, Victoria, Australia, 3083. Natasha A Lannin is now affiliated with Department of Neurosciences, Central Clinical School, Monash University, The Alfred Centre, Commercial Road, Melbourne, Victoria, Australia, 3044 and School of Allied Health, College of Science, Health & Engineering, La Trobe University, Plenty Road and Kingsbury Drive, Bundoora, Victoria, Australia, 3083.

Availability of data and material

Not applicable as the project involves analysis of existing datasets and ethical approval was subject to maintaining confidentiality of these datasets.

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Declaration of conflicting interests

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ORCID iDs

Bianca E Summers https://orcid.org/0000-0001-7546-6022
Laura Jolliffe https://orcid.org/0000-0002-1369-9442

Supplemental material

Supplemental material for this article is available online.

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