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Title Page

Title: Occupational therapy students' contribution to occasions of service during practice placements in health settings.

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Running Title: Students' and supervisors' productivity during placements

Abstract

Introduction

Currently in the Australian higher education sector, the productivity benefits of occupational therapy clinical education placements are a contested issue. This paper will report results of a study that developed a methodology for documenting time use during placements and investigated the productivity changes associated with occupational therapy clinical education placements in Queensland, Australia. Supervisors' and students' time-use during placements and how this changed for supervisors compared to pre- and post-placement is also presented.

Methods

Using a cohort survey design, participants were students from two Queensland universities, and their supervisors employed by Queensland Health. Time-use was recorded in 30 minute blocks according to particular categories.

Results

There was a significant increase in supervisors' time spent in patient care activities ($F=94.011_{2,12.37\ df}$, $p < 0.001$) between pre- and during placement ($p <0.001$) and decrease between during and post-placement ($p<0.001$). Supervisors' time spent in all non-patient care activities was also significant ($F=4.580_{2,16\ df}$, $p=0.027$) increasing between pre- and during placement ($p=0.028$). There was a significant decrease in supervisors' time spent in placement activities ($F=5.133_{2,19.18\ df}$, $p=0.016$) from during to post-placement. Students spent more time than supervisors in patient care activities while on placement.

Discussion

A novel method for reporting productivity and time-use changes during clinical education programs for occupational therapy has been applied. Supervisors spent considerable time in assessing and managing students and their clinical education role should be seen as core business in standard occupational therapy practice. This paper will contribute to future assessments of the economic impact of student placements for allied health disciplines.

Keywords: health services research, organizational efficiency, productivity,

Introduction

The productivity consequences of clinical education in occupational therapy are contested and research based evidence is scarce. Australian universities are facing a clinical education crisis because of limited placement availability and perceptions of decreased productivity associated with hosting placements. Anecdotally at the University of Queensland, prior to this research being undertaken (2009), three to five regular placement providers would withhold placements each block due to workload issues. Changes in health/human services and higher education sectors that have resulted in limited placement availability are reduced funding, shorter length of hospital stay, casualisation of the workforce and workforce shortages, lack of financial support to organisations and supervisors, and new models of care (McAllister, 2005; Rodger et al., 2008,). There has also been a proliferation in occupational therapy programs in Australia (e.g., from 13 programs in 2009 to 17 in 2011) and increased quotas within existing programs. The aim of this paper was to measure the time-use and productivity of occupational therapy supervisors and students on placements in health settings across Queensland, Australia.

In the 1980s there was a small amount of research activity in the United States and Canada looking at the costs and benefits of occupational therapy clinical education (Burkhardt, 1985, Chung & Spelbring, 1983, Chung, Spelbring & Boissoneau, 1980, Shalik & Shalik, 1988, Shalik, 1987, Mackinnon & Page, 1986, Page & Mackinnon, 1987). These studies appeared to stem from scrutiny by health care services regarding the costs to agencies of accommodating student placement experiences. Time-use data were the preliminary indicator of costs and/or benefits but time-use was not often translated to service-delivery outputs. Further, these studies were conducted under traditional 1:1 or apprenticeship models of supervision, as was the norm at the time, did not consider all costs and benefits, basing some costs on market values of labour over twenty years ago and located in the North American health care systems.

Nevertheless, it is useful to review these previous studies and consider their application to contemporary clinical education practice. A study in hospital settings reported on the number of instructional hours provided during the initial weeks of a 12 week occupational therapy placement (M=27.5hrs/week), during the middle and in the last week (M=4.2hours/week) (Chung & Spelbring, 1983). They compared this to the student service contributions to clinical and administrative work showing that it increased rapidly during the first three weeks, plateauing at about week 8 and declining during the last week of placement. Chung and Spelbring (1983) determined that the net work hours added (student

work minus staff instructional hours) was negative during the first two weeks but became positive in the latter 10 weeks.

Burkhardt (1985) described a series of tasks undertaken by supervisors during occupational therapy placements. The majority of non-patient related tasks were involved with student processing and administration. Orientation to the hospital and clinical procedures were other time consuming tasks as was student evaluation. In her study of University of Michigan hospitals over a one year period, Burkhardt found that students consumed 1.33 full time equivalent (FTE) of additional staff time, while student productivity contributed 1.35 FTE of equivalent staff time in patient workload (independent treatment time) demonstrating a modest net gain.

Ladyshewsky, Barrie and Drake (1998) evaluated the productivity of physical therapy supervisors and students within acute care, aged care and community-based facilities in Perth, Australia. A Clinical Education Quality Audit (CEQA) tool was developed to collect data on time-use and perceptions of teaching and learning experiences from both the physical therapy supervisors and students. The time-use component of the CEQA tool was completed both when students were and were not present. The baseline time-use period occurred from 1 week to 2 months after the study of student placement productivity had been completed. Unlike other studies, Ladyshewsky et al. (1998) also investigated other activities in which supervisors participated beyond time spent in direct patient care. Student productivity results were weighted at 100 per cent and 60 per cent of the supervisor's productivity. Using the 60 per cent weighted results assumes that all students demonstrated a fraction of their supervisors' competence, which may not always be true. With this approach, they reported a reduction in the mean time spent by supervisors in patient care and engagement in other activities during the placement. However, the additional patient care time provided by the students resulted in an overall mean patient productivity increase for the facility of 53.2 per cent for the physical therapy work unit, or 23.4 per cent when the student productivity was adjusted down to 60 per cent.

The difficulty in using time-use data to measure clinical education productivity is the risk of double-counting each team members' contribution to an activity in a certain time period. Measuring productivity and addressing the double-counting issue has occurred by reporting the number of patients seen or treated (Leiken, 1983, Leiken, Stern & Baines, 1983, Dillon, Tomaka, Chriss, Gutierrez & Hairston, 2003). In a large physical therapy department in New York in the early 1980s, Leiken (1983) concluded that students did contribute to productivity defined as number of patients being treated, however other important measures like number

of patients seen (as opposed to treated), indirect patient care activities or other physiotherapy roles were not investigated. Dillon et al. (2003) examined the effects of student placements on acute and hospital inpatient physical therapy clinical instructor productivity in the United States. Physical therapists recorded the number of patients seen and type of activities performed with those patients, the number of evaluations performed and number of hours worked. Productivity was analysed based on the supervisor-student team perspective. Productivity changes were recorded with students present for four weeks and without students for four weeks. When supervisors were accompanied by a student, they saw significantly more (15%) patients per day and generated significantly more charges per day (Dillon et al., 2003). The details of the clinical education sites were not provided and so any comparison with occupational therapy practice in other jurisdictions was not possible. Additionally, they did not investigate any other activities undertaken beyond direct patient care. There was hence a need for Australian-based studies that measure the outputs of student-supervisor teams using time-use data based on contemporary supervision practices to inform the debate about productivity during clinical education.

This study investigated:

1. The impact of student placements on the number and length of occasions of service provided by supervisor-student teams.
2. The time-use of students during, and supervisors pre-, during and post-placements.

In order to do this, a methodology for collecting time use data that was relevant for both students and supervisors and allowed their data to be matched was first developed.

Methods

The cohort of final year undergraduate and graduate entry masters occupational therapy students (N=118) from two Queensland Universities and their Queensland Health supervisors were asked to complete a survey between January and August 2010. Invitation was by email; students were offered petrol vouchers and supervisors a chance to win Apple ipods. Ethics approval was granted by the Human Research Ethics committees at Queensland Health, Mater Health Services and the respective ethics committees at each university and participation was voluntary for both supervisors and students.

A survey was developed and made available in electronic or paper form. Every 30 minute interval for the entire work day (typically 7-8 shours), participants documented: how they spent their time according to particular time-use categories (See Table 1); which patient they were managing, if relevant; and whether they were working independently or with a colleague (supervisor or student).

[Insert Table 1 here]

Placement duration varied from 10 to 14 weeks. Participants were allocated 3 random days out of a 5 day working week on which to complete the survey, with students and supervisors allocated the same days. Supervisors were asked to complete the survey for the 2 weeks prior to placement commencement and for an additional two weeks post-placement.

Occasions of service were defined as the number of patients seen/managed in one day by the student-supervisor team and the length of an occasion of service was the number of minutes spent with/managing a patient by the student-supervisor team. Time- use data for matched student-supervisor teams showed their combined productivity. Inclusion criteria were established to ensure outputs could not exceed 100 per cent of service delivery capacity. This eliminated double counting of students' and supervisors' contribution and details are available from the authors. Supervisors' and students' time-use was calculated as independent daily means reported over the length of the placement. In the case where a student failed to report an activity but the supervisor did, then the supervisor response was used to augment the student dataset or vice versa.

The dataset was organised for analysis using Microsoft Excel 2007 and statistical analysis undertaken with SPSS Version 18. Mean daily number of occasions of service, length of occasions of service, and time-use in minutes was reported as productivity output indicators. Outliers and low response data (less than 2 responses) from weeks 12 to 14 were removed. The relationship between stage of placement (pre-, during and post-placement) and the various output indicators was modelled using a linear mixed modelling approach. This method was employed to capture the repeated measures structure of the observation and is more versatile than classical approaches of analysing repeated measures data. Linear mixed modells can deal with missing observations and are versatile in implementing different and more appropriate residual covariance structures. A number of residual covariance structures were trialled in the model: unstructured, autoregressive and compound symmetry. Model adequacy was gauged using both deviance and Akaike's Information Criteria. We tested if the overall effect of the stage of placement was significant, and conducted post-hoc t-tests for differences on the estimated marginal means resulting from the linear mixed models.

Results

Of the potential cohort of occupational therapy students (N=118), 13 participated (11.02% response rate). Of the estimated population of 244 occupational therapists, 18 supervisors participated (7.38% response rate). From the students who provided demographic information, more males participated (21.43%) than was expected (student population was 16.10% males) and the mean age was 21.2 years. The mean age of supervisors who provided demographic information was 30.6 years; younger than the estimated mean population age of 37 years (Occupational Therapists Board of Queensland, 2009). The respondent group comprised 12.5% males compared to 7.5% in the population (Occupational Therapists Board of Queensland, 2009). Supervisors' working location was approximately representative with 66.67% of participants working in a metropolitan location, 33.33% in a regional location but no respondents worked remotely. In terms of experience level, 50% of respondents had previously supervised 0 - 4 students, 31.25% had supervised 5 – 10 students, and 18.75% had supervised more than 10 students previously. The mean years of full time equivalent experience was 7.14 years.

At various stages of the placement, 11 student-supervisor teams provided some joint-productivity information regarding number and length of occasions of service. The range of daily number of occasions of service increased from pre- to during placement and narrowed again post-placement (See Figure 1). The length of occasions of service increased from pre- to during placement (See Figure 2). In the two models used to examine differences in time-use across the stages of placement, we used the error covariance structure best fit (deviance and Akaike's Information Criteria). For number of occasions of service, the compound symmetry error covariance structure provided the most adequate model, whereas for length of occasions of service, the autoregressive was the most adequate. None of the stages of placement differed significantly for the number or length of occasions of service delivered by a student-supervisor team and no conclusion could be draw.

[Insert Figure 1 here]

[Insert Figure 2 here]

Supervisors' and students' time data from the various time-use categories in Table 1 were collapsed into the following categories; patient care, placement activities, service management and other. Figure 3 shows the changes in time-use for supervisors and students across the three stages of placement. In the various models used to examine differences in time-use across the stages of placement, we again used the error covariance structure best fit (deviance and Akaike's Information Criteria). For patient care and non-

patient care activities, the unstructured error covariance structure provided the best model, whereas for placement and service management activities a first order autoregressive was appropriate. There was a significant change in supervisors' time spent in patient care activities ($F=94.011_{2,12.37\ df}$, $p < 0.001$). Differences were seen between pre- and during placement ($p <0.001$) and during and post-placement ($p<0.001$). Mean daily supervisor time spent in patient care across the three stages of placement was 265 minutes, 223.58 minutes and 227.06 minutes. Mean daily student time in patient care activities was 266.44 minutes. The model for supervisor time spent in all non-patient care activities was also significant ($F=4.580_{2,16\ df}$, $p=0.027$). The significant increases were between pre- and during placement ($p=0.028$), and between during and post-placement ($p=0.007$). There was a significant difference in supervisors' time spent in placement activities ($F=5.133_{2\ 19.18\ df}$, $p=0.016$). A decrease in time spent in placement activities from during to post-placement was seen. Mean daily supervisor time spent in placement activities across the three stages of placement was 28.75 minutes, 49.82 minutes and 14.71 minutes. Mean daily student time in placement activities was 90.11 minutes. There were no significant changes in supervisors' time spent in service management across the three stages of the study (pre, during and post placement).

[Insert Figure 3 here]

Discussion

We investigated time-use and productivity changes during occupational therapy clinical education placements. The response rate was poor requiring cautious interpretation of the findings. Outputs measured were number of occasions of service, length of occasions of service and minutes spent in various non-patient care related time-use categories. Previous studies have recommended that measures of productivity outputs other than number of patients seen or number of billable activities be used in studies such as these. In response, we collected supervisors' and students' independent time spent in non-patient care related activities. For these types of activities, occupational therapists have wide-ranging approaches to measuring outputs making it difficult to assess productivity outside the patient care context. Additionally, it was apparent that productivity outcomes directly associated with clinical education such as patients' improved performance/functioning and independence of individuals/patients treated is difficult to measure.

Non-significant results for number and length of occasions of service are likely to be due to a lack of power within the models. In a paper (Rodger et al., under review) which combined data for occupational therapy and nutrition/dietetics students in Queensland Health facilities,

an increase in both the number and length of occasions of service undertaken by student supervisor teams during student placements was found (Rodger et al., under review).

The key contribution to the literature from this study is the finding relating to time-use data. This has not been systematically studied before within the Australian context or in recent times. Students spent more time than supervisors in patient care activities during placements. This may assist supervisors whose time in patient care activities decreases from pre- to during placement as they 'hand over' patients to students and have them engaged in providing additional therapy to patients. Supervisor time in patient care activities did not return to pre-placement levels after the students completed their placements. Supervisors' time spent in placement activities doubled from pre- to during placement and there was some residual time spent in placement activities after the placement has finished. Placement activities seem to displace patient care activities for supervisors, while some of these patient related tasks are undertaken by students. This important clinical education role should be seen as core business by occupational therapists, managers and health services policy makers and recognised as such.

A mean of 49.82 minutes per day of supervisor time was spent in placement activities over the entire duration of the placement. We also found a significant drop in the mean daily time spent in placement activities when the students left the placement. In contrast to our study, Chung and Spelbring (1983) reported that a high number of staff instructional hours were needed in week one. However, over the course of the placement the time dropped to four hours per week which is a comparable to the mean daily number of minutes reported in our study. Chung and Spelbring did not measure time-use pre- and post- placement making further comparisons impossible.

The major limitation of this study was that two weeks of data collection pre- and post-placement may not provide valid indications of 'normal' productivity for all supervisors. In particular, there may be a workload flow-on effect post-placement, from the students' presence. In terms of sample representativeness, the low response rate is also a major limitation to this study. Despite these limitations this is one of the largest known studies of its kind and provides useful preliminary data and new knowledge for the occupational therapy profession in Australia.

From the perspective of clinical implications of the study findings, it seems that in this small pilot study, students do take time to supervise. Studies in the early 1980s (e.g., Shalik, 2987; Shalik & Shalik, 1988) suggested that there was an increase in productivity for supervisors over the length of the placement, with more time spent with students in the first few weeks.

In this study therapists spent a mean of 49 minutes with students a day in placement activities over the duration of the placement. It may be difficult for individual clinicians to focus on the longer term potential benefits for organisation in terms of recruitment as well as the already established benefits to individual supervisors which are not always immediate (Thomas et al., 2007), however we encourage a broader perspective than a focus on daily workload. Further studies are needed to look more definitively at productivity benefits.

We recommend this study be repeated with a larger sample of occupational therapy and other allied health students and supervisors. It is also recommended that for Australian studies, the Australian Health Classification System (National Allied Health Casemix Committee, 1997) time-use categories be used in the future so that a consistent approach to time-use classification is applied nationally. Future research questions worthy of consideration include:

- What is an appropriate measure of productivity for occupational therapists who do not work directly with patients/clients?
- How could other measures such as patient satisfaction or quality of student work/competence be used to evaluate the productivity impacts of clinical education?
- Do students become more independent in their work over time on placement and what impact does this have on supervisor time-use and productivity?
- Does the case-mix of new versus continuing patients and complexity of diagnostic related groups being serviced change during student placements and how does this affect productivity?

In this study, we established a method for reporting productivity and time-use changes during occupational therapy clinical education placements. Detailed time-use data based on 30 minute intervals was collected for students and supervisors on three randomly-allocated working days throughout the entire students' placement and for supervisors for two weeks pre- and post-placement. We developed two survey instruments one for students for completion during placements and one for supervisors for completion two weeks pre-, during placement, and two weeks post-placement. We found that supervisor time-use changed significantly between pre and during and during and post placements with decreases in patient care activities time during placement and increases in placement activities. Students appeared to assume a significant amount of supervisors' patient care activities while on placement. Hence the productivity of students and supervisors needs to be viewed collectively as a student-supervisor team.

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Table 1: Definitions of Time-Use Categories for Students and Supervisors

Patient Care Activities	
Direct patient care	Individual or group patient/client contact (member of the public); ward rounds; school visits; group-based therapy
Indirect patient care	Preparing for patient/client contact (member of the public); travel; documentation and discharge planning; managing patient issues; documentation and evaluation of patient/client contact; peer support; case conferences
Placement Activities	
Engaging in placement assessment	Placement reports; completing other assessment requirements
Managing the placement	Orientation; tuition; debriefs; feedback to student; communication with universities: not discussing specific patients/stakeholders
Service management	Work unit meetings/communication eg. Emails; staff management/supervision; forms; human resource/payroll issues
Other	
Project interventions (no ethics approval required)	Primary prevention community interventions; community/stakeholder consultations; communication; peer support; partnership projects; consultancy work; reviewing workplace policies; undertaking quality improvement projects; audits; establishing evidence based practice
Project management processes	Reading literature; project preparation; report writing
Research (ethics approved)	Formal research project – leading or participating; completing this survey
Teaching and training – not related to the placement	Delivering in-service; guest lecture
Break	Paid or unpaid breaks eg. Morning tea
Undefined	Tasks not described above

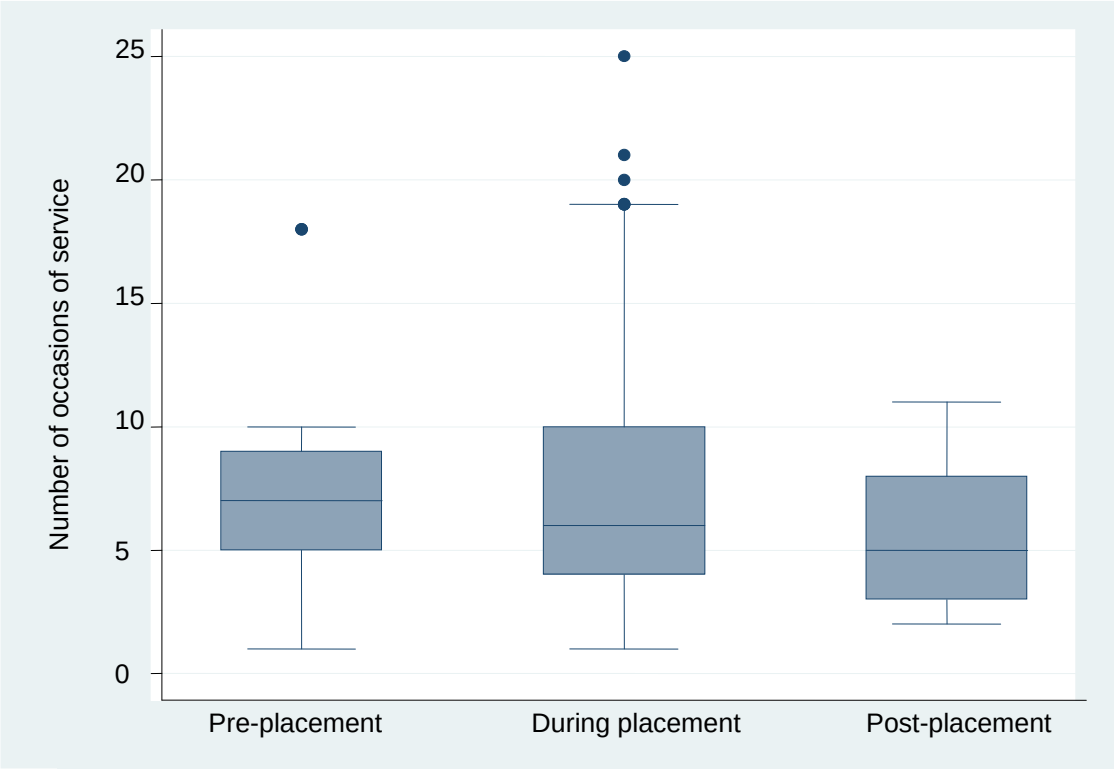

Figure 1: Number of occupational therapy occasions of service; pre, during and post placement

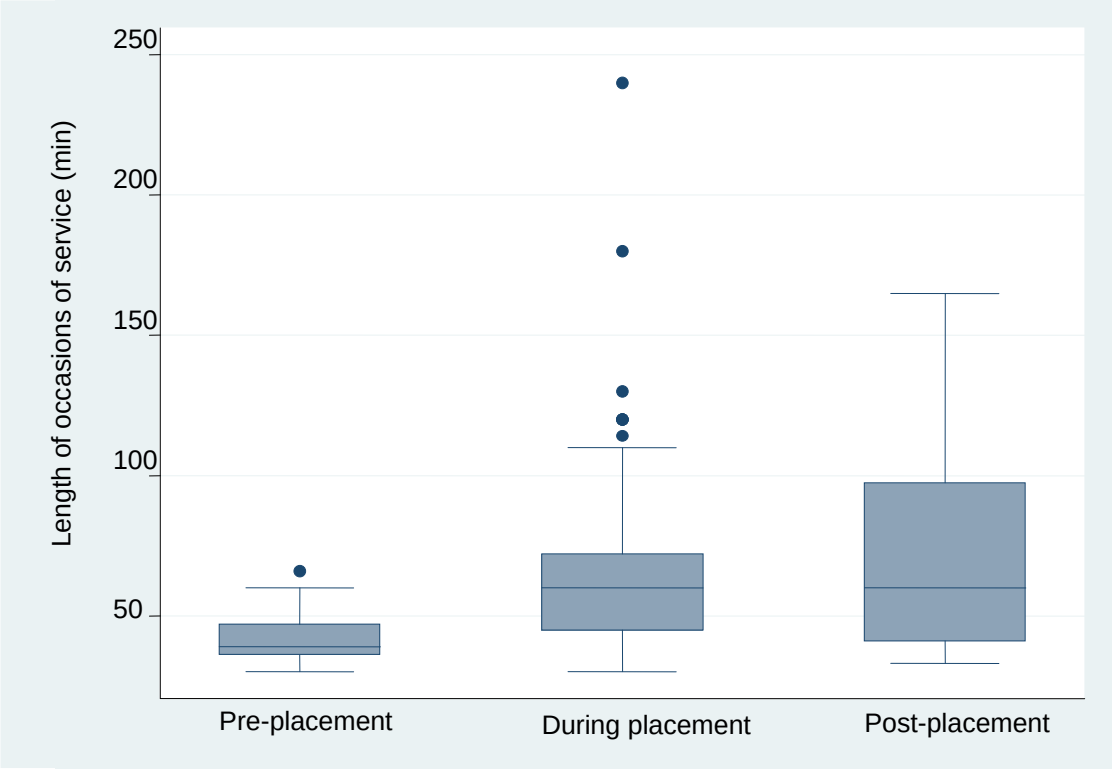

Figure 2: Length of occupational therapy occasions of service; pre, during and post placement

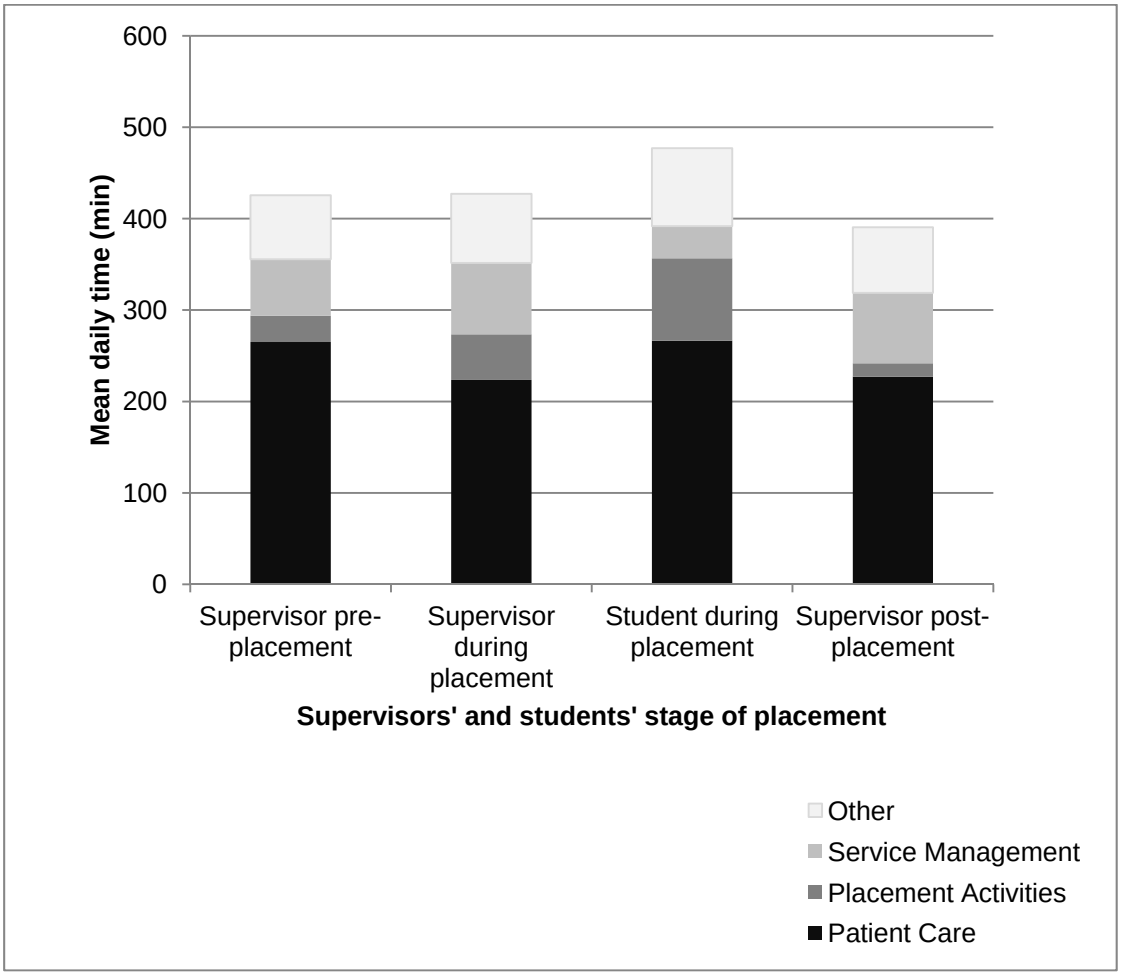

Figure 3: Occupational therapists' and students' mean daily time spent in various activities pre-, during and post-placement

Figure legends

Figure 1

This box and whisker plot shows the changing trend in student-supervisor teams' number of occasions of service across the three time periods of interest.

Figure 2

This box and whisker plot shows the changing trend in student-supervisor teams' length of occasions of service across the three time periods of interest.

Figure 3

The proportion of time (minutes) spent in each of the four key time use categories is shown for supervisors pre-, during and post-placement, and for students during placement. Time spent in all non-patient care activities is the combined time spent in placement activities, service management and other activities.