

THE IMPACT OF PHYSIOTHERAPY INTERVENTION ON FUNCTIONAL INDEPENDENCE AND QUALITY OF LIFE IN PALLIATIVE PATIENTS

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Abstract

The Physiotherapy Department of the Royal Brisbane Hospital has conducted a review of physiotherapy services to palliative care patients in Australia. As part of this review, a trial was undertaken to investigate the impact of physiotherapy intervention on quality of life and functional level. The results indicated that the provision of an adequately resourced physiotherapy service incorporating early intervention and community follow-up can contribute significantly to the maintenance of functional independence and quality of life among patients receiving palliative care.

Introduction

In the mid to late 1960s, the concept of rehabilitation as a part of the cancer treatment process began to flourish. Dietz¹ developed the four-part framework for cancer rehabilitation – prevention, restoration, support and palliation. Physiotherapy involvement in the treatment of cancer patients began to develop at around this time, but with involvement often limited to the restorative stage². During the 1970s, the input of physiotherapy in the support phase began to be noted. Zislis³ reported the usefulness of physiotherapy to maintain range of motion post-operatively, and Mayer⁴ noted that physiotherapists could implement a graduated exercise program contributing to maintenance of mobility. The role of physiotherapy in cancer rehabilitation was firmly established by the end of the 1970s, with many textbooks devoting space to the role of physiotherapy and also of the importance of a multidisciplinary approach to palliative care^{5,6}. A series of publications by Doyle⁷⁻⁹ demonstrates the development of the contribution of physiotherapy to palliative care. Anecdotal reports suggested that while physiotherapy involvement could value-add to the care of patients in the palliative stage of cancer, there was an inconsistent approach to the referral of patients to physiotherapy or even of the involvement of physiotherapists in palliative care teams and services.

The aim of this study was two-fold: (i) to understand where physiotherapists were involved in palliative care services in Australia, specifically identifying the impediments to those services, and primarily (ii) to conduct an outcome study of physiotherapy to patients receiving palliative care, measuring the effects of a standard physiotherapy service compared to an optimised physiotherapy service. In the context of this project, palliative care is defined as adding quality to life for patients in the non-curative stage of the disease process.

Method

Stage 1

In order to provide a benchmark service against which to assess physiotherapy outcomes, it was necessary to understand what

constituted standard versus optimal physiotherapy practice. Prior to the commencement of the outcome study, a survey of physiotherapy service providers across Australia was conducted. The survey identified a number of impediments to the delivery of a quality physiotherapy service, including the fact that the average time spent in providing physiotherapy to palliative patients was less than 10 minutes per occasion of service.

Other limitations included delayed or absent referral to physiotherapy during hospital admission, limited resources (such as equipment and funding) to provide adequate services, and a lack of community-based services for follow-up after hospital discharge. The specialised physiotherapy service examined during stage two of this study was designed to reduce the impact of the limitations identified in stage one.

Stage 2

The study was conducted over 12 months in an oncology ward of a major metropolitan teaching hospital. The subjects were patients admitted for symptom control (palliative care patients). Forty patients were randomly allocated to receive the optimal trial physiotherapy service (characterised by time and resource allocations, based on an experienced physiotherapist's ability to provide an enhanced/optimised service). The trial group was compared to a control group of 20 patients who received the usual physiotherapy service provided by the ward (characterised by time and resource constraints influenced by inadequate staff to patient ratios).

Subjects were allocated to the study groups in the following way. The project physiotherapist screened new admissions to the ward, and palliative patients with indications for physiotherapy intervention were identified. From this group, randomly selected patients were approached and invited to take part in the trial. These patients received the trial service by the project physiotherapist and were known as the "project group". Patients not randomised to the project group became subjects in the "standard group" when and if they were referred for physiotherapy during their admission. In this way, the standard group was representative of the usual process of referral and physiotherapy service delivery from the ward. Patients in the standard care group received physiotherapy from the staff physiotherapist rostered to the ward.

The trial service differed from the standard service in three main ways:

- 1 to overcome problems of delayed referral, patients were recruited on admission by the project physiotherapist;
- 2 the project physiotherapist limited her patient load to ensure that each patient received enhanced contact time, thus reducing the problem of limited resources; and
- 3 the project patients received regular community follow-up visits following hospital discharge.

Both groups received best-practice medical and nursing care appropriate to their condition.

The interventions undertaken by the project physiotherapist were numerous and varied but can be grouped into three intervention categories commonly used by physiotherapists.

- a Pain and symptom management, including transcutaneous electrical nerve stimulation (TENS), appropriate positioning of patients to reduce stress on joints and muscles and to prevent development of pressure areas, and the treatment

of lymphoedema by a combination of massage, compression and exercise.

- b Education provided by the physiotherapist covered topics including safe and comfortable transfer and handling techniques to minimise discomfort and injury to both the patient and carer, and techniques to reduce work associated with activities of daily living.
- c Mobility and independence were maximised by designing exercise programs specific to the individuals' needs, providing gait re-education and the provision of appropriate walking aids.

The trial outcomes were assessed with respect to:

- discharge destination;
- place of death;
- functional level;
- patient satisfaction; and
- quality of life (EORTC QLQC30).

The functional level of the subjects was measured using a tool developed for the project that assessed nine tasks. The tasks assessed were ability to roll in bed, transferring from side-lying to sitting up, sitting, transferring from sitting to standing, standing, mobilising (walking), negotiating stairs, toileting and entering/alighting from a car. Each task was graded based on the degree of assistance required to complete the task: independent (3), use of an assistive device (2), requirement for assistance provided by a carer ie supervision only (1.8), minimal

assistance (1.5), moderate assistance (1.2), maximal assistance (0.9), two people to assist (0.5), inability to move (0). A score between 0 and 27 was obtained with 27 representing complete independence in all tasks. The tool was assessed for utility in a number of palliative care services prior to its use in this study.

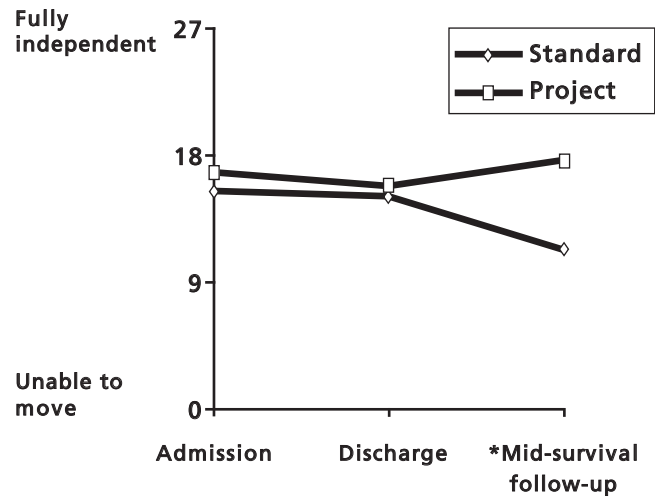


Figure 1: Functional level of project and standard groups at admission, discharge and mid-survival follow-up. At mid-survival follow-up assessment there were weak statistical (*p=0.09) and clinically significant differences between the project and standard groups.

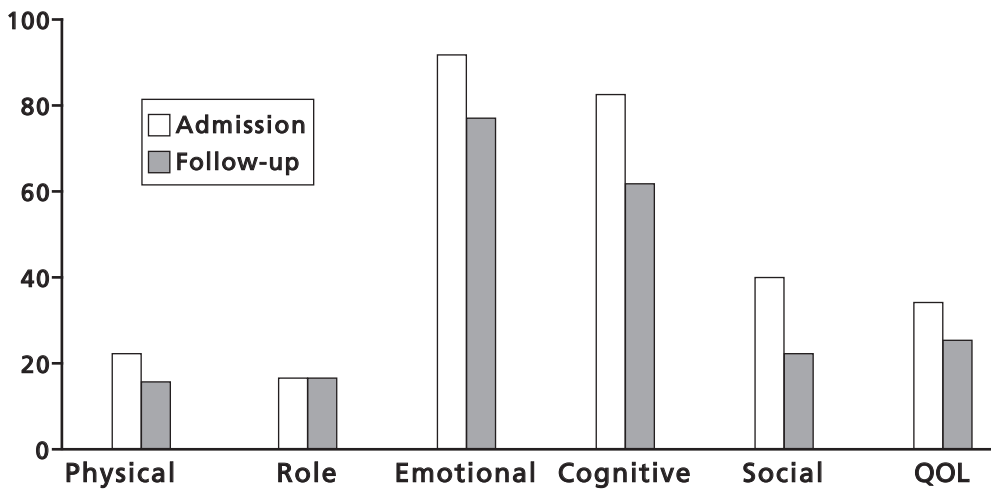


Figure 2: Functional scores for standard group subjects (EORTC QLQ-C30) at admission and follow-up. There was a trend towards decline in function.

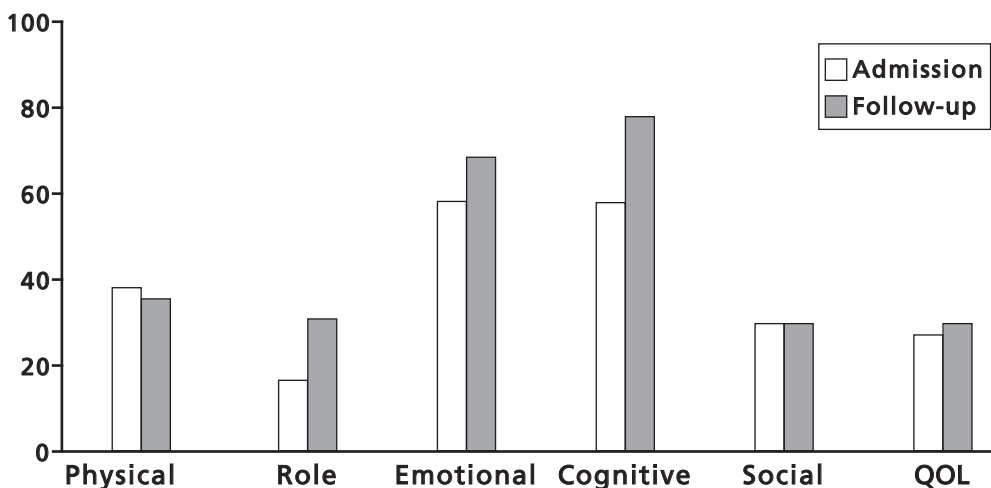


Figure 3: Functional scores for project group subjects (EORTC QLQ-C30) at admission and follow-up. There was a trend towards improvement in function.

Quality of life was assessed using the EORTC QLQ-C30 that produces scores ranging from zero to 100 for six function components and for nine symptom impact components. For the function components a score of 100 represents the best possible level of function, thus an increase in score represents an improvement in function. In the symptom impact components, a score of 100 represents the highest possible impact on QOL thus a decrease in score represents a decrease in the severity of the symptom.

Functional level and quality of life were assessed on admission, at discharge and at regular intervals following discharge.

Patient satisfaction of the physiotherapy service received was assessed at discharge and, where possible, at four week follow-up and subsequent regular intervals. Subjects were asked to rate a number of factors (amount of physiotherapy received, confidence in the abilities of the physiotherapist, consideration by the physiotherapist of the patient's wishes, understanding of advice and instructions given by the physiotherapist and helpfulness of advice and instructions given by the treating physiotherapist) on a five point Likert scale.

In order to develop standards for practice, physiotherapist workload data were collated using a simple bar-code reader. Time required for the management of various components of the episode of care was recorded when the bar-code reader was scanned across bar-codes according to the intervention strategy employed. For reporting purposes, intervention strategies were grouped into major treatment categories.

Results

Results were analysed using Wilcoxon ranked data analysis and chi-square frequency analysis. While the group numbers were relatively low, resulting in weak levels of significance, there were distinct differences between groups.

Length of stay, discharge destination and place of death

Participants in the project group were more likely to be discharged home than those in the standard group ($p=0.0858$). Patients in the project group were also more likely to die at home ($p=0.0159$). There was no statistically significant difference in length of stay (LOS) between groups. Patients in the project group had a mean LOS of 17.55 days, and patients in the group that received standard care had a mean LOS of 15.6 days.

Functional level

A comparison of the functional level between the groups was performed using a post-discharge assessment score obtained at a time that was half way between the date of discharge and the date of the patients' death. This method was chosen to ensure that the groups were comparable with respect to extent of disease and the stage of decline.

At admission and discharge, patients in the project group had mean functional independence scores of 16.5 (supervision to complete some tasks) and 15.5 while the standard group means were 14.6 (supervision with some tasks) and 14.3, respectively. The decrease in score at discharge in the project group is in the main due to the higher proportion of patients in this group who died during admission (15%). When these patients are excluded, the difference at admission is

maintained at discharge (17.9). Figure one demonstrates that there was no statistically significant difference in functional ability between the groups at admission or discharge from hospital. At mid-survival follow-up assessment there were weak statistical ($p=0.09$) and clinically significant differences between the project and standard groups. The standard group required light to moderate assistance with all tasks, while the project group was functionally independent with the use of a walking aid in all tasks.

Quality of life

Neither the standard nor the project groups experienced significant changes in any of the function components of the QLQ-C30 questionnaire over the study period. However, noticeable trends existed within the two groups. The trend within the standard group (figure two) was towards a decline in function whereas the trend within the project group (figure three) was towards improvement in function. Comparison of the functional independence measurement tool with the physical function component of the QLQ-C30 demonstrated a weak but significant positive correlation ($r = 0.629$, $*p < 0.01$).

For symptom impact scores between admission and follow-up, the standard group experienced a statistically significant increase in constipation ($**p = 0.027$) and a significant decrease in sleep disturbance ($*p = 0.075$). The project group experienced statistically significant decreases in fatigue ($**p = 0.08$), pain ($***p = 0.052$) and appetite disturbance ($*p = 0.09$). There were no significant differences in either group for the remaining symptom components.

Patient satisfaction

Both the standard and project groups were satisfied with the physiotherapy services received during admission (figure six). For the question regarding the understanding of advice and instructions given by the physiotherapist, patients in the project group were significantly more satisfied ($*p=0.05$) than those in the standard group.

Physiotherapist workload data

The average times devoted to physiotherapy management of patients in the project group and the standard group are presented in table one.

Table 1: Average duration of intervention (minutes:seconds) for each group of patients

Intervention	Standard group	Project group
Chart review	5:19	9:06
Chart entry	3:39	8:43
Cardiorespiratory assessment and treatment	12:06	18:24
Mobility assessment and treatment	13:10	21:42
Pain assessment and treatment	10:58	15:57
Handover/referral	4:14	11:17
Initial assessment and treatment	Not available	60
Follow-up assessment and treatment	Not available	40
Discharge assessment session	Not available	80

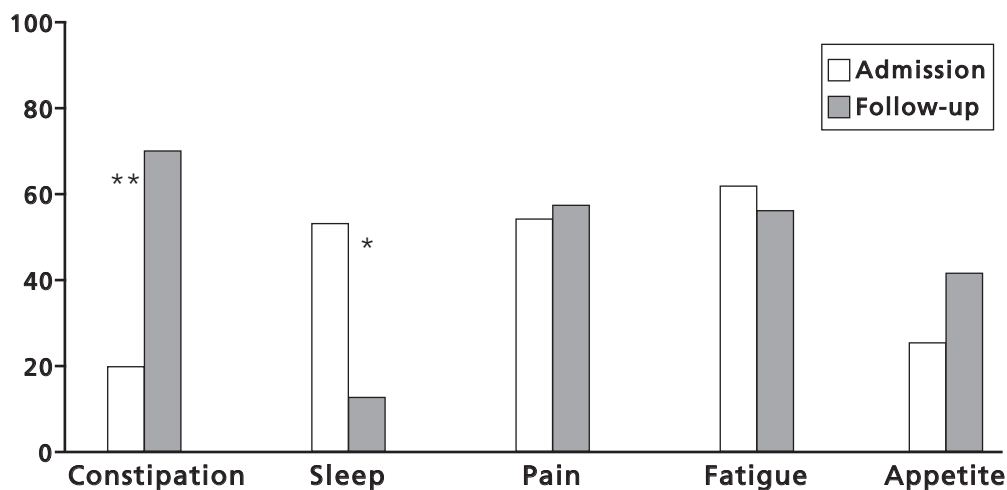


Figure 4: Symptom impact scores for standard group subjects (EORTC QLQ-C30) at admission and follow-up. Symptoms of constipation increased (** $p = 0.027$) and sleep disturbance decreased (* $p = 0.075$) significantly.

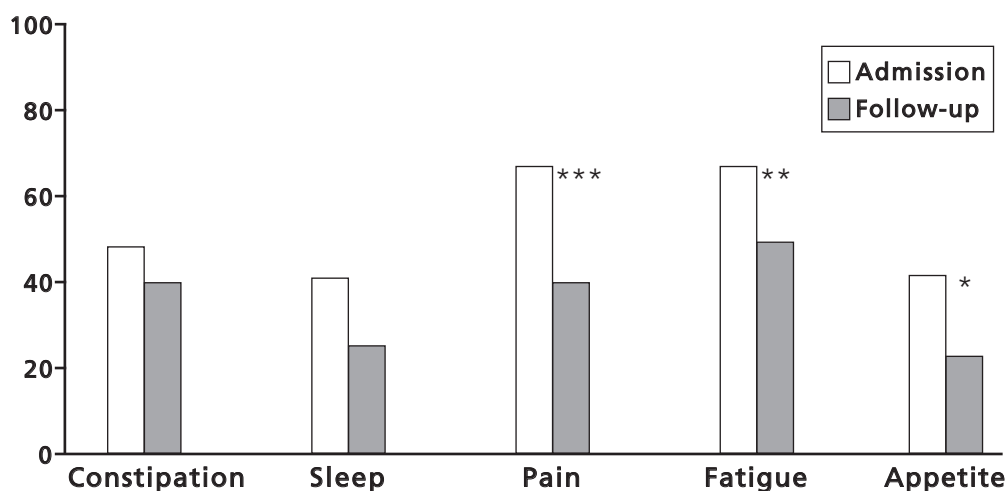


Figure 5: Symptom impact scores for project group subjects (EORTC QLQ-C30) at admission and follow-up. Symptoms of pain (***) $p = 0.052$, fatigue (**) $p = 0.08$ and appetite decreased (* $p = 0.09$) significantly.

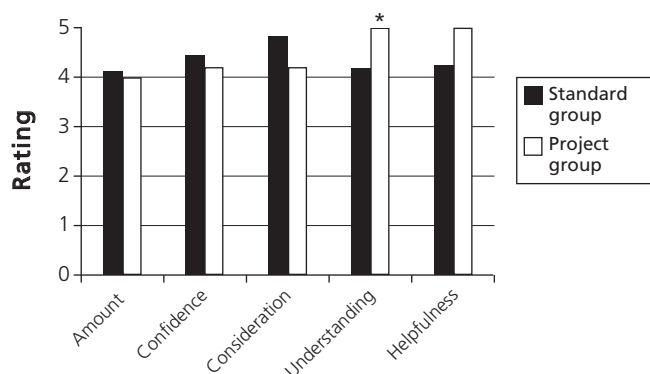


Figure 6: Patient satisfaction for project and standard groups. Understanding of advice and instructions given by the treating physiotherapist was significantly better among patients in the project group (* $p=0.05$).

Discussion

Length of stay, discharge destination and place of death

Examination of the length of stay data revealed that patients in the project group had a mean stay of two days longer than those in the standard group. The specific reason for this was not apparent from the analysis, however it was noted that in general a higher proportion of patients in the project group died during admission. This may denote a difference in severity of illness status not discernible by other means.

Patients in the standard group were more likely to be discharged to another care facility instead of home than those in the project group. In order to determine whether this

outcome was a consequence of stage or severity of disease or of diagnosis, further examination of the demographics of the patients in the standard group revealed that the subjects were a representative sample of all patients normally admitted to the ward. The fact that patients assigned to the project group were more likely to be discharged home than patients in the standard group was considered to be a positive outcome of the study. Anecdotal evidence suggests that there is an increasing trend towards patients and families wishing to care for loved ones in the home environment. Where possible, and due to shortages of beds in extended care facilities, the aim of discharge facilitation on the oncology ward is to discharge the patient home where possible, if the family and patient desire this outcome and are in a position to facilitate it.

The success of follow-up community physiotherapy among project group patients was affirmed by the fact that more patients in the project group were likely to die at home than those patients in the group that received standard care limited by lack of physiotherapist time, resources and community follow-up. When considering the place of death, it is important to remember that some patients elect to be admitted to a formal care facility in preference to dying at home. While there are many factors that influence a person's ability to remain at home until death, the ability of the carer(s) to effectively manage is a primary concern. The ability of the patient to move or be moved is a major component of the ability to cope at home. The greater proportion of project group patients dying at home suggests that the contribution of physiotherapy to the maintenance of mobility and function enhanced the choice of place of death.

Functional level

On admission, the project group had a higher level of functional independence. This was not considered to be sampling bias but rather a reflection of referral practices on the ward. Patients were randomly recruited to the project group on the initiative of the project physiotherapist as sufficient time and resources became available through the discharge or death of other patients. Patients recruited to the project group were newly admitted patients whose medical notes identified an indication for physiotherapy intervention and who had not at that time been referred for physiotherapy. Conversely, patients in the standard group were those who may have had indications for physiotherapy intervention at admission but who were not referred to the ward physiotherapist by medical or nursing staff until some time after admission. Such referral was often based on the inability of the patient to manage functionally on the ward even though he or she had been managing earlier in the admission. The ward physiotherapist had 15 years of clinical experience and had been working in the field of chronic care and palliative care over a number of years leading up to this study. The increased human and material resources available to the project physiotherapist, and the palliative-specific focus of the project service increased the variety and effectiveness of the physiotherapy interventions undertaken.

While the difference in admission levels of functional independence between the project and standard groups may be viewed as significant clinically, the difference reflects a crucial variable potentially affecting outcomes for physiotherapy intervention in palliative care. The ability to provide timely intervention is essential to maximise outcomes. The results from the standard group indicate that due to referral practices in existence at the time of this study, there was a population of patients passively being denied access to physiotherapy when they clearly had indicators for physiotherapy.

While the level of statistical significance is weak, there were distinct clinical differences between groups in patients' functional abilities. Such differences could be considered to have greater clinical significance when attached to related factors such as quality of life and ability to function effectively in the home. The comparison of the functional independence measurement tool with the physical function component of the QLQ-C30 demonstrated a significant positive correlation, suggesting that the components assessed were representative of factors contributing to the quality of life of the patients. At mid-survival follow-up, the patients in the standard group required light to moderate assistance of a carer with all tasks, while patients in the project group were independent with the use of a walking aid in all tasks. The level of independence alone strongly supports the benefits of optimising physiotherapy in outcomes for patients requiring palliative care. The deterioration noted in the standard care group of patients has an impact on the amount of carer support required, the costs of that support (financial, physical and psychological) and the potential need for re-admission to a formal care facility with the attendant costs of such care.

Quality of life

Patients in neither the standard nor the project group experienced significant changes in any of the function components over the study period. However, noticeable trends existed within the two groups. The trend within the standard group was toward a decline in function, whereas the trend within the project group was towards improvement in function. These trends are verified by the results acquired from the functional independence measurement tool.

While it is intuitively appealing to make sweeping claims from these results, it would be unwise to do so in the context of the

lack of supporting data regarding pharmacological, dietary and other factors that may have influenced these results. It is interesting to note though, that the patients in the standard group experienced an improvement in symptoms during the inpatient period followed by a decline in five of six function components assessed at follow-up to a point below the admission score. Conversely, the project group maintained or improved function in all but one component over the same period. The results for each group are similar in the scores for symptom impact over the same time course. The links between quality of life factors, well-being, follow-up and physical independence/activity have been noted by other authors¹⁰⁻¹² and so it would seem reasonable to conclude that the maintenance of independence and physical activity, along with community follow-up, were likely to have been directly related to quality of life scores noted in the project group.

Patient satisfaction

While satisfaction with various aspects of physiotherapy services was high among patients of both groups, patients in the project group were significantly more satisfied with the advice and instructions given to them by the treating physiotherapist. As the project physiotherapist had more time and was able to adjust her workload to maintain adequate patient intervention time, it may be expected that the project group would be more satisfied with the amount of physiotherapy received. It is important to emphasise that the individual skills or approaches of the physiotherapists concerned were not the subject of this investigation but rather the way in which the service was delivered. Given the extensive knowledge base and skills of physiotherapists it is not surprising that the two groups were equally satisfied. Regardless of the communication skills of the individual physiotherapists, the increased time available to the project physiotherapist would have influenced the ability to ensure understanding of advice and instructions contributing to this result. Where general commentary was given in the QLQ-C30, it was found that no patients reported dissatisfaction with the service provided by any of the healthcare professionals involved in their care.

Physiotherapist workload data

The individual treatment episodes provided by the project physiotherapist were longer than those of the ward physiotherapist. One must note that while the project physiotherapist was employed solely for the study and her time was quarantined for the provision of enhanced patient care, the ward physiotherapist providing the standard level of care was required to provide a service to three busy medical wards and a specialist outpatient clinic. Based on the results of the nation-wide survey (stage one), the latter situation is typical of physiotherapy work allocation in Australian public hospitals providing palliative care services.

The cost of providing the physiotherapy services under the project model of care was greater than the standard service. This was due to the increased time spent with each patient as well as the addition of community follow-up. However, a comparison of discharge destination and place of death indicates that the project group required less long-term formal care. While a detailed cost-efficiency analysis of the two models of physiotherapy service delivery is not possible without further investigation, given the increased costs associated with terminal stage care⁹ it is likely that the project model of service would attract savings through the reduced utilisation of formal care facilities leading up to death.

The nation-wide survey of physiotherapy service providers conducted in stage one found that those patients receiving physiotherapy did so for an average of less than 10 minutes per

day. An examination of the workload data of the project physiotherapist identified the time required to conduct an effective assessment and treatment session was well in excess of this (table one). Clearly, the physiotherapy services currently being provided by palliative care services are inadequate and severely impair outcome. The inadequacy of the current level of service is even more apparent when considering the potential numbers of oncology inpatients (and outpatients) who do not receive any physiotherapy despite known indications¹³. Given that all patients do not require daily treatment, and allowing time for administrative aspects associated with clinical positions, a conservative recommendation for physiotherapy staff to patient ratio is 1:12 based on the findings of this study. Community visits require approximately 120 minutes and in services where these occur, staff to patient ratios should be adjusted accordingly.

Conclusion

In summary, in comparison to the standard treatment group, patients in the project group were significantly more likely to be discharged home and significantly more likely to die at home. The provision of a specialised physiotherapy service resulted in significantly higher functional levels on follow-up assessment. A trend towards the maintenance or improvement of the functional component of quality of life and significant improvements in fatigue, pain and appetite were noted in patients who received optimised levels of physiotherapy time and resources. The provision of an adequately resourced physiotherapy service incorporating early intervention and community follow-up can contribute significantly to the maintenance of functional independence, patient satisfaction and quality of life among patients requiring palliative care. In turn, this may result in decreased demand for formal inpatient care and subsequent cost savings. A physiotherapist to inpatient ratio of 1:12 is recommended in order to produce such results.

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