

Evaluation of a generic integrated care pathway for rehabilitation

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KEY WORDS

integrated care pathway, rehabilitation, aged care, multidisciplinary care plan

ABSTRACT

Objective

The aim of this study was to determine if a process-oriented integrated care pathway (ICP) was effective in a rehabilitation setting and whether the improvement gained through the rehabilitation process was sustained post discharge.

Design

This study incorporated a quantitative analysis of the Barthel Index Score (BIS) for a retrospective convenience sample of patients who had been discharged from the rehabilitation unit. A longitudinal examination of this sample group was conducted and BIS results were compared between admission, upon discharge, and three months post discharge.

Setting

The study was conducted at a rehabilitation unit (the Unit) at a medium-sized general hospital in a rural centre northwest of Melbourne, Victoria

Subjects

The sample consisted of a convenience sample of thirty participants who were discharged from the Unit between December 2003 and January 2004. The mean age of participants was 75 years.

Main outcome measures

Health outcomes and improvements in functional and dependency status were determined using the Barthel Index Score (BIS).

Results

The introduction of the generic clinical pathway yielded positive results with the sample group maintaining functional status and independence post discharge.

Conclusions

Although this study is limited by sample size and homogeneity of sample; nevertheless it demonstrates that process-oriented integrated care pathways may be useful to effectively manage rehabilitation and aged-care units that contain patients with a wide range of complex presentations and diagnosis-related groups.

INTRODUCTION

Integrated care pathways (ICP) aim to improve the effectiveness of clinical practice and patient care. They are designed to co-ordinate essential tasks in patient management and outline patients' expected clinical course (De Bleser et al 2006; Campbell et al 1998). Proponents for their use argue they improve multi-disciplinary co-operation, co-ordination, and communication (Kinsman et al 2004; Campbell et al 1998); ensure quality standards are met (Calligaro et al 2004; Roberts et al 2004); decrease undesirable practice variation (Panella et al 2003; Campbell et al 1998); improve patient-clinician communication and patient involvement (Kinsman 2004; Campbell et al 1998); improve patient outcomes including a decrease in complications (Walter et al 2007; Hauck et al 2004; Roberts et al 2004; Joh et al 2003); are cost effective (Calligaro et al 2004; Joh et al 2003), and reduce patients' length of stay in hospital (Chang et al 2005; Gholve et al 2005; Delaney et al 2003; Cardozo and Aherns 1999).

Not all of the research into the evaluation of ICP has been positive. For example, recent studies, including a Cochrane review, have found that the introduction of ICP for acute stroke management to be of little effect (Taylor et al 2006; Kwan et al 2004). Apart from yielding small or no cost or labour benefits (Atwal and Caldwell 2002), one of the other main arguments against the use of ICP is they are difficult to apply to circumstances where clinical practice is variable or patients present with multiple and different pathologies (Campbell et al 1998). In the Australian health care system, patients are grouped into diagnosis related groups (DRGs), which is a finance classification system that provides a means of relating the number and type of patients treated in hospital with the resources required for that treatment. Many units are specialised, such as neurology and cardiology, and as such treat only a narrow range of DRGs. In these instances ICP are often easier to establish and streamline because of the similarities of the patient mix. In the rehabilitation and aged care settings however, units are often required to treat patients with a wider range of DRGs making the use of ICP more complex.

This study reports the evaluation of a less common approach to ICP for the rehabilitation, and potentially, the aged care setting. The ICP used is generic and process-oriented rather than disease-oriented and therefore represents an alternate approach to the use of ICP in units where patients present with a wide range of DRGs. While the use of process-oriented ICP is not novel (Edwards et al 2004), there is a paucity of information on the potential of this approach in diverse contexts and settings.

The ICP evaluated in this study is used as an interdisciplinary care plan for the entire rehabilitation team. It describes the patients' rehabilitation goals and physical profile which includes mobility and dependency levels, continence management, and observation of vital signs. The ICP covers baseline assessment, goals, the care plan, the record of care, and ongoing assessments and evaluation of the care plan. Baseline assessment on admission incorporates nursing care needs, referrals, additional assessments, depression screening, delirium assessment and continence assessment. The discharge assessment identifies discharge risk and discharge planning needs. The Braden pressure risk score (Pancorbo-Hidalgo et al 2006) which is a risk assessment scale for pressure ulcer prevention, falls risk score, and physiotherapy and occupational therapy initial assessments are all included in the patients' baseline assessment on admission. Patients' needs are identified and goals are recorded after discussion with team members and with the patient and/or their carer. Care plans are then developed and monitored. The ICP includes the medication chart, wound care plans, falls prevention plans, pressure ulcer prevention plan, allied health and medical plan, and a record of planned care actually given. Ongoing assessments are the basis for evaluating the care plans and these are included in the ICP as continence, observation and bowel function chart, routine nursing observations (vital signs, blood sugar levels and weight), wound care chart, physiotherapy assessment and progress, domestic activities of daily living and personal activities of daily living assessments. Ongoing assessments are used to give reports of each

patient's progress and the patients' goals are scored to see if the patients are progressing. The plan is constantly reviewed and updated by the rehabilitation team.

This ICP was applied in a rehabilitation unit (the Unit) which is a modern twenty four bed unit which provides focused rehabilitation using a wide range of therapies. The multidisciplinary team consists of a medical officer, nursing staff, a physiotherapist, occupational therapists, continence advisor, speech therapists, podiatrist, dieticians, pharmacists and welfare staff. The purpose of the Unit is to restore, improve and maintain the functional ability of the patients.

There are a range of complex case presentations and DRGs cared for within the Unit. At any given time the mix of patients within the Unit could range from those who have experienced a cerebro-vascular accident (CVA), traumatic or idiopathic fractures, patients recovering from major surgery such as coronary artery bypass grafts, those suffering from post-operative complications such as wound dehiscence and deep vein thrombosis and frail elderly patients requiring evaluation and management. The unique feature of the ICP is its ability to adapt to this wide range of DRGs. Sulch and colleagues (2002) identified that the success of rehabilitation (beyond restoring basic independence) depends on the ability to tailor therapy to individual needs which are dictated by the nature and severity of deficits, patient expectations and care giver support.

The ICP used in the Unit was evaluated by comparison of Barthel Index Scores (BIS) at admission, discharge and at a three-month post-discharge review. The BIS is a validated instrument for measuring the functional gains made by patients. These gains refer to the patients' performance on ten of the activities of daily living namely: personal hygiene, self-bathing, feeding, toileting, stair climbing, dressing, bowel and bladder control, ambulation, chair and bed transfer, and walking or wheelchair use. Stone and colleagues (1994) identified that the routine clinical use of the BIS is feasible and responds to clinically important change. This group further identified that a significant

rise in BIS between admission and discharge existed. Cognitive functioning also needs to be considered in the evaluation process as cognitively impaired clients are generally unable to accurately report their current abilities and deficits and care givers may over or under estimate function, leading to inaccuracies in BIS measurements (Agostinelli et al 1994; Stone et al 1994). The ICP in this study was evaluated using BIS to determine the effectiveness of a process-oriented generic ICP in the rehabilitation setting.

METHOD

A quantitative design was used for this study which compared BIS at three time-points: admission, discharge and at a three month post-discharge review.

Sample: A retrospective convenience sampling process was used to select participants. Thirty participants were recruited from patients discharged from the Unit between December 2003 and January 2004. To be included in the study the participants had to have been discharged from the Unit three months prior to the measurement of the three month post-discharge BIS scores. The three month time-point was chosen for practical reasons in that it was long enough to show the effect of loss or maintenance of independence post-discharge and not too long that difficulties in retrospective recruitment would be encountered due to changes in care arrangements. Participants were only included if they were mentally alert enough to give informed consent and prevent inaccuracy with BIS measurements as determined by Standard Mini Mental Status Examination (SMMSE) and were over eighteen years of age. Participants who scored less than 23 on the SMMSE at three month review or who declined to participate were excluded from the study.

Data Collection: The demographic profile and BIS scores of the sample for the admission and discharge time-points were accessed retrospectively from medical records. Recruited participants were then visited by staff from the Unit and the SMMSE and BIS measurements were recorded. Changes to medications, services, and social situation were also noted at the three month post-discharge review.

Data Analysis: Comparison of BIS results and the Mobility and Self Care sub-indexes of the BIS were conducted using the statistical program SPSS version 14.

Ethics: Ethics approval for this study was granted by the hospital ethics committee.

FINDINGS

Sample Characteristics

Of the thirty participants in this study, thirty-eight percent were males (12) and sixty-two percent (18) females. This gender proportion is representative of the Unit as a whole. The ages of the participants ranged from 28 to 98. For the purposes of determining age-related correlations, the sample was divided into four groups according to age: Group 1 (5 participants) was aged less than 70 years; Group 2 (11 participants) was aged 70-79 years; Group 3 (9 participants) was aged 80-89 years; and Group 4 (5 participants) was aged 90-99 years.

There was a variation of case presentations within the sample which represented a wide range of DRGs from patients who had experienced stroke, idiopathic fractures, major surgery, post-operative complications, deep vein thrombosis; or who were frail and elderly and requiring assessment and evaluation. As a result, the length of stay for each participant was different. The total bed days for the sample was 506; the longest length of stay was 40 days, the shortest length of stay 5 days, and the average length of stay 16.6 days. Corresponding to the variation of DRGs there were also differing discharge destinations for the sample. For this group, seventy-six percent were discharged back to their own homes. As determined at the three monthly review, five of the patients discharged were supported by Community Aged Care Packages (CACPs) that involved case-management, and fifteen received Home and Community Care Services (HACC) on discharge.

Each of the participants were assessed for cognitive function using Folstein's Standard Mini Mental Status Examination (SMMSE) to determine that mental capability did not impair the participants' capacity

to perform and report self care and give inaccurate BIS scores (Agostinelli et al 1994). The SMMSE for the sample ranged from 23 to 26 which was within normal range.

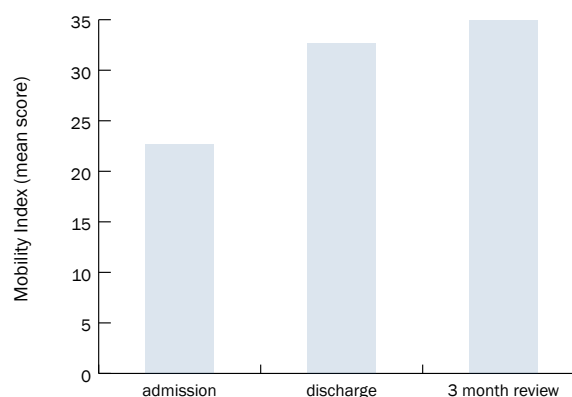
Comparison of Barthel Index Score (BIS) results

The BIS consists of two separate sub indexes: the Mobility index and the Self-Care index, each scored out of 50. The values assigned to each of the items in both of the sub-indexes of the BIS are based on the amount of physical assistance required to perform the task. All the items from both sub-indexes are totalled to give a BIS score out of 100. These scores range from total dependence (0-20), to slight dependence (91-99). When evaluating sub-indexes individually, total dependence would be represented by a score of (0-10) and slight dependence a score of (41-49). The two sub-scores and the total BIS were compared over the three intervals to test for significant change. The results of the scores were also compared against the dependent variables of age and gender. All statistics were calculated using the computer statistical package SPSS version 14 using analysis of variances.

Mobility Index

The mean score for the Mobility Index over the three testing times, admission, discharge, and three months post discharge, are shown in figure 1.

Figure 1: The mean score of the sample for the BIS Mobility Index



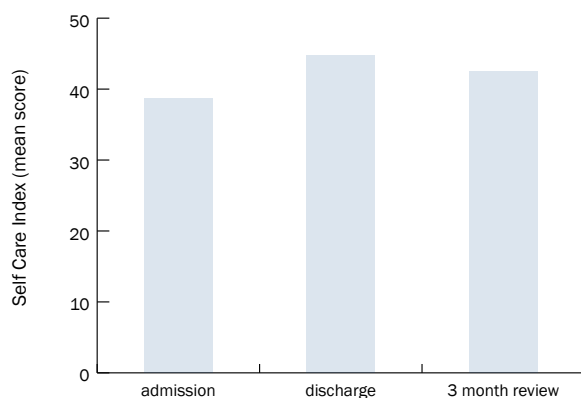
A one-way ANOVA found that the means were significantly different $F(2,28)=6.073$, $p<0.01$. Differences were found to be significant between admission and discharge, $(t(58)=-2.925)$, $p<0.001$,

and admission and review, ($t(58)=-3.381, p<0.05$). No significant difference was found between the discharge and the three-month review score.

Self-Care Index

The Self-Care Index looks at the patients' ability to care for themselves independently. As shown in figure 2 there was improvement in the mean score of the patients from admission (38.7) to discharge (44.8) and a slight decrease from discharge to the three-month review (42.5).

Figure 2: The mean score of the sample for the BIS Self-Care Index



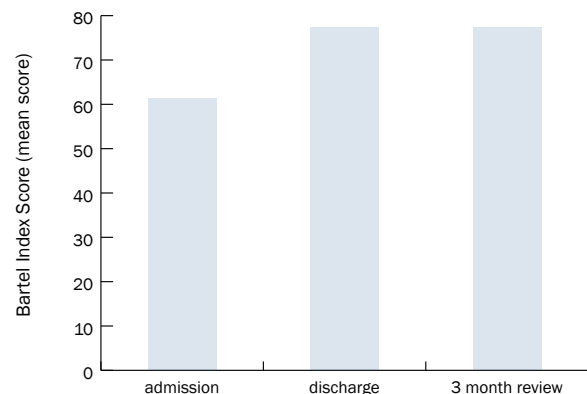
A t-test analysis showed a significant difference between the patients' scores at admission and discharge, $t(58)=-1.988(58), p=0.05$. No significant differences were found between the discharge and review scores or the scores from admission and review.

The Barthel Index Score (BIS)

The total mean score for the 30 patients for the BIS over the three time-points showed an increase of 16.1 from admission to discharge. However from discharge to review there was exactly the same mean, showing no further change over the subsequent three months (figure 3).

A one-way ANOVA was performed on the total score and a significant difference was found: $F(2,28)=4.208, p<0.05$. As can already be concluded visually, the difference occurred in the initial change from admission to discharge, ($t(58)=2.653, p<0.001$), and from admission to review, ($t(58)=2.475, p<0.005$).

Figure 3: The mean score of the sample for the Barthel Index



Demographic Correlates

Participants were categorised into four groups according to age: <70; 70-79; 80-89; and 90-99. These four groups were then compared against each other for differences in their means over the three testing times for the total BIS score as well as the Mobility and Self-Care Index sub-sections. One-way ANOVA showed no significant differences between any of the four groups at each testing time-point. A one-way ANOVA was also performed to determine the relationship of gender on the mean scores. No significant difference was found for gender in the Self-Care Index, Mobility Index, or total BIS at each of the testing times.

Limitations

This study contained a number of limitations which influence the general applicability of the results. Firstly, the sample size is small and may not be representative of the Unit as a whole, or the wider population. Secondly, the sample is homogenous in terms of culture and the results obtained in this study may not be representative of more diverse groups. Thirdly, the sample selected participants with a high SMMSE score to ensure accuracy of BIS measurements. Such a selection process may result in a group that is not representative of rehabilitation or geriatric units where the majority of patients are elderly.

DISCUSSION

It would appear from the evaluation of the ICP that independence is strongly reinforced in the Unit. This

is evidenced by the maintenance of self-care, as measured by BIS, up to three months post discharge. The sub-indexes of the BIS: the Self-Care and Mobility Indexes also showed positive patient outcomes with a mean gain in independence post discharge. Following discharge, the mean for the Self-Care index was seen to reduce slightly; however this was not significantly different for this sample. It is possible that a real decrease in the Self-Care index occurred but because of the small sample size, a significant difference was not measurable. A decrease in Self-care Index may be a result of environmental factors. The home environment may be less than optimal or may not lend itself to appropriate modification. Furthermore, without continuing supervision and encouragement from staff, patients' self-care activity levels might diminish. This concept is reinforced in the study by Forrest and colleagues on patients discharged from a rehabilitation unit where it was identified that "much of the help reported was companionship and reassurance rather than physical assistance" (Forrest et al 2002 p.61). The social environment may also play a role when returning home. Formal or informal carers may undertake the task of assisting unnecessarily with self-care, resulting in reduced independence. Conversely well-meaning family members may underestimate the patient's capacity for independence.

The evaluation using the Mobility Index showed that gains made from admission to discharge were maintained at the three-month post discharge review. A slight, but not statistically significant, increase was made between the discharge and review time-points. It is possible that a significant improvement could be seen with a larger sample size. An increase in mobility may occur as a result of adaptation to the home environment. This improvement could reflect the need of patients to mobilise more in their own home due to geographical layout or necessity. The environmental setting in which the patient is assessed may be a factor which influences how they perform and should therefore be considered (Gosman-Hedstrom and Svensson 2000). Gosman-Hedstrom and Svensson describe this as "the gap between the person's ability and

the environmental demand" (Gosman-Hedstrom and Svensson 2000 p.712). Ongoing outpatient attendance at physiotherapy and/or occupational therapy may also be a contributing factor to continued improvement.

Overall the application of the ICP during the rehabilitation process resulted in total BIS scores that were maintained for at least three months after being discharged from the Unit. This indicates that the emphasis on education, self-care and independence that is such an important part of the rehabilitation process, and is built into the ICP, yielded positive patient outcomes. Identification of cognitive status using the SMMSE assisted the assessment function and is a feature of the ICP. The SMMSE ensures that treatments and interventions target specific behavioural and environmental aspects to compensate for deficits and reinforce strengths (Agostinelli et al 1994). The positive gains made using the ICP were independent of age and gender.

The use of ICP in general is still contentious. Depending on the clinical setting and DRG there are mixed views. While there has been much research to support their use, some recent reviews in certain settings have yielded ambivalent findings (Taylor et al 2006; Kwan et al 2004). Concerns have been raised that ICP are labour intensive; discourage individual clinical judgment; can potentially be misused to reduce patient care costs, and may be of little actual benefit (Atwal and Caldwell 2002; Campbell et al 1998). Much of this research investigates disease-oriented ICP rather than process-oriented ICP; however one paper in the neuro-rehabilitation setting also showed the effective use of a process-oriented ICP (Edwards et al 2004). The results of this study support the use of ICP for rehabilitation. It was however beyond the scope of this study to evaluate the cost analysis of this approach.

CONCLUSIONS

This research project sought to evaluate the effectiveness of a generic process-oriented ICP for the rehabilitation setting. The ICP underpins the whole rehabilitation process and is used as an

interdisciplinary care plan for the entire rehabilitation team. This pathway has contributed to the patients gaining and maintaining their independence following the rehabilitation program. The study has also demonstrated to staff the positive outcomes achieved by using a process-oriented ICP to guide and assist the process of rehabilitation. It has been found to be a valuable tool that monitors and guides the patients' rehabilitation goals and physical profiles including functional and dependency levels. Because of the process-orientation of the ICP, it was able to be effective in the management of the Unit where care involves multiple DRGs. This success may be attributed to the planned approach to rehabilitation using the ICP including the incorporation of effective discharge planning.

RECOMMENDATIONS

Three general recommendations arise from the results of this study:

1. Further research with a larger, more diverse sample is required to more rigorously test the effectiveness of the ICP.
2. Longitudinal tracking of patients would enable studies to be conducted to determine the length of time independence is maintained after cessation of outpatient appointments.
3. Further research into the application and evaluation of process-oriented ICP for other hospital settings such as aged care where multiple DRG are common would be useful.

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