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Day surgery for older people (70 +): selection versus outcome effects

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Abstract

As length of Australian hospital stays decreased, concerns were raised about benefits of shorter stays for older people. We investigated personal characteristics, perceived health outcomes (SF-36) and service use of day-only and other patients aged 70 + , at one and 12 weeks after hospital discharge. Day-only patients were younger, had better self-reported health, were selected for orthopaedic, gastrointestinal and ophthalmic procedures and used similar levels of formal and informal services after discharge as people with longer stays. There was no evidence of ill effects of day surgery for older people, but improved selection and information giving procedures can improve outcomes. © 2000 Elsevier Science B.V. All rights reserved.

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1. Introduction

Day surgery[1] has become the dominant modality in surgical care in the United States of America, Canada, The Netherlands, New Zealand, the United Kingdom, European countries, and Australia amongst many countries [2,3,5–12]. In the United States of America, 80–85% of all elective surgery is conducted as outpatient or day surgery procedures [13]. In 1997, the government in the United Kingdom was aiming to increase their level of day surgery to 50% of elective surgery by the year 2000 [10].

The rate of day surgery in Australia lags behind many OECD countries [3]. Only 34.2% of total surgical admissions in the Australia's largest state, New South Wales, were same day in 1996/1997 [4]. In regions of interest to this study, the South Western Sydney, the South Eastern Sydney, and the rural Macquarie Area Health Services had, respectively, 49.7, 47.2, and 40.1% of total separations as same day cases in 1996/1997. The policy for improved delivery of same day services in New South Wales aims to provide 60% of all surgery on a same day basis by 2001. Older people have a much higher probability of hospital admission than younger people. So the risks and benefits of expanding day surgery for them deserves detailed investigation.

There is evidence that day surgery reduces health expenditure by patients and government, increases satisfaction of surgeons, and facilitates recruitment and retention of staff, especially those with outside commitments [2,9,13–19]. It may also reduce the risk of patient exposure to hospital pathogens, decrease waiting lists, increase patient satisfaction by the convenience surgery facilities, decrease anxiety of patients, families, and friends by allowing others to be present during preoperative and postoperative periods, and minimise disruption to working and domestic life [2,10,15,17–19]. However, concern has been expressed about the impacts of shorter lengths of stay for older people and for community services who respond to their needs when they return home [20].

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[1] Day surgery or procedure is defined as "an operation/procedure, excluding an office/surgery or outpatient operation/procedure, where the patient would normally be discharged on the same working day" [1]. Minor operative procedures undertaken in outpatient or accident and emergency departments are excluded from the definition of day surgery [2,3]. Common day procedures in New South Wales, for example, include gastroscopy, colonoscopy, cataract extraction, release of carpal tunnel, and arthroscopy [4].

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The critical issue for patient benefit in day surgery is the selection of appropriate cases. Careful selection also helps to minimise overnight stays after the operation and the costs of cancellation of treatment on the day of surgery [19]. Operations that take more than 60 min are generally not suitable for day surgery [2]. The Royal College of Surgeons [2] recommends a pro forma to be used for patient selection with strict criteria for social circumstances, medical history, systemic disease, medication, risk behaviours, procedures, and weight of patients [2,17].

The Royal College of Surgeons [2] suggested that the elderly, because of a higher risk of morbidity, should be excluded from day surgery procedures requiring general anaesthetic [21]. Elderly patients may also have elderly carers and poor home support systems, thus, precluding procedures being undertaken on a day basis. Some suggest an upper biological, not chronological, age limit around 65–70 years old [2,17,21]. Other literature suggests that the day surgery is suitable for older people if they meet other organ system criteria and have a supportive home environment [13,22]. For example, elderly patients who are classified as high risk patients (The American Society of Anaesthesiologists Classification of Physical Status Class III or IV) with important comorbidity have been identified as suitable for lower urinary tract instrumentation as a day case, under a well judged general anaesthetic. Age on its own is not the sole factor contributing to complications and recovery processes after day surgery [23–25], which complicates the attribution of factors to outcomes. A stay in hospital can be a disorienting and traumatic experience for the elderly [21], and they may benefit from a return to familiar surroundings where they feel more comfortable and at ease. Day-only and short-stays are, therefore, important options in an ageing society.

Despite the public concerns about the impacts of a shorter length of stay for older people and their high utilisation of community services after discharge, there is little outcome research on older people who use day surgery. Assumptions about the impacts of shorter length of stay for younger people do not necessarily translate to the elderly. Community care is an essential feature of appropriate follow-up care for the elderly, but there is as yet no evidence that shorter hospital stays increase actual workloads [26,27]. In addition, cognitive impairments associated with ageing may affect comprehension of information about post surgical recovery, and appropriate health-care practices during convalescence. Current evidence is neutral or positive on older Australians' acceptance of day surgery [27].

Outcomes of day surgery have been measured by mortality, unanticipated hospital transfer [28,29], readmissions following discharge [13,22], major morbidity, and frequency of minor side effects on patients follow-up [29,30]. To date few studies have reported quality of life outcomes of day surgery such as resumption of patient's activity of daily living primarily limited by general malaise and surgical discomfort [30], and patient satisfaction [13,30–32]. The quality of life outcomes are very important for older people returning home from a day admission. There also is a paucity of studies investigating community service use after day surgery [26].

The aim of this study is to address this gap in knowledge by collecting comprehensive evidence of characteristics and outcomes for older people following day surgery. We examined demographic, clinical, and social characteristics of day-only and non-day-only patients aged 70 years and above to determine the characteristics for selecting patients for surgery on a day basis. We also investigated the difference in health outcomes reflected by the Medical Outcomes Study's Short Form 36 (SF-36) scores and community service use during 12 weeks after discharge between day-only and non-day-only patients.

2. Methods and subjects

Data were collected during 1997 in a study of post-acute care outcomes for older people from four hospitals in Campbelltown, Fairfield, Sutherland, and Dubbo in New South Wales (Australia). Campbelltown is a city on the urban fringe of Sydney with a high aboriginal population, and Fairfield is an outer city area with a large population of non-English speaking background (NESB) people [33,34]. Both cities are in the South Western Sydney Area Health Service [35]. Sutherland is an older suburban area in the South Eastern Sydney Area Health Service [34,35]. Dubbo is a regional country centre in the Macquarie Area Health Service serving a rural and remote population. The multiple sites enabled us to investigate different sex, socio-economic, and disadvantaged groups (including people from rural areas, NESB, and aboriginal backgrounds). Subjects were interviewed in person upon their consent immediately prior to discharge from hospital and by telephone after 1 and 12 weeks post discharge. Direct and telephonic interviews resulted in fewer missing data on the SF-36 items compared with self-completion [36]. The questions related to the SF-36 scores and formal and informal care received referred to the 1-week periods prior to the interviews. The questions related to having visited a doctor or received community care services referred to a period of 12 weeks after discharge.

Participants were the people aged 70 years and above who were discharged from each hospital. As such, they represented a snapshot of typical admissions and discharges of people aged 70 years and above from the four sites, and incorporated in-patient and day-stay

patients. The patients recruited from Campbelltown, Sutherland, and Dubbo were sufficiently proficient in English to be interviewed without an interpreter. The patients recruited from Fairfield were proficient either in English, Vietnamese, or Italian and were interviewed in one of these languages. Patients recruited from all of the four sites were cognitively and physically able to complete interviews. A total of 579 people participated in the face-to-face interview. This decreased to 440 when it came to the people who completed both face-to-face interview and the telephonic interview after 1 week of discharge, and subsequently decreased to 376 when came to those who completed all the three interviews.

2.1. Measures

SF-36 is a standard self-reported measure of health status validated in Australia [37,38] with Australian population norms [39]. While the SF-36 has been used among elderly patients in hospital outpatient and general practice settings in the United Kingdom [40], it is used here for the first time as an outcomes measure in day surgery. The responsiveness of the SF-36 for the same individuals over time in older people is also investigated for the first time in a day-surgery setting.

Other informations used in the analysis include age, sex, educational level, whether the person lives alone or not, income, whether the person has private health insurance or not, whether the person has a pet or not, languages spoken at home, diagnosis, and service use represented by visits to doctors, utilisation of community care services, and formal and informal assistance received. Statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS) for Windows 7.5.

Table 1
Logistic regression model for factors contributing to patients undergoing day surgery procedures[a]

Factors	Odds ratio	Significance
Diagnosis		
Orthopaedic	1.6	0.17
Gastrointestinal	8.3	<0.01
Ophthalmic	63.8	<0.01
Age		
75–79	1.0	0.95
80+	0.4	<0.01

[a] Variables dropped in the forward stepwise regression procedure were gender, income, education level, private health insurance, and pet ownership.

3. Results

One hundred and fifty-eight patients stayed at the hospital for 1 day while 420 patients stayed for more than 1 day. The mean age for the day-only patients was 74.6 years, 4.1 years lower than the mean age for the non-day-only patients, 78.7 years ($P < 0.01$). There were more day-only patients between the age of 75 and 79 and fewer day-only patients who were aged 80 and above compared with non-day-only patients ($P < 0.01$). There was no significant difference between day-only and non-day-only patients in relation to gender, education levels, living situation, income, insurance, possession of pets, and languages spoken at home (all $P > 0.05$).

The largest diagnostic categories for day-only patients were gastrointestinal, ophthalmic, and orthopaedic procedures. The three largest diagnostic categories and the day-only status at the hospital were related. There were more day-only patients for gastrointestinal and ophthalmic procedures, and fewer day-only patients for orthopaedic procedures ($P < 0.01$). In the present study, 94, 89, and 80% of the colonoscopy, gastroscopy, and colonoscopy/gastroscopy procedures, which were the three major day-only gastrointestinal procedures, were undertaken as day cases. The three most common diagnoses for non-day-only gastrointestinal patients were laparoscopic cholecystectomy, abdominal pain, and diverticulitis.

Cataract extraction was the major ophthalmic procedure undertaken as a day case. Ninety-two percent of 39 patients underwent cataract extraction alone on a same-day basis. There were only seven non-day-only ophthalmic patients, and four of these patients also underwent cataract extraction alone. There were three arthroscopy, three carpal tunnel and two toe surgery day-only orthopaedic patients. There were also one arthroscopy, one carpal tunnel and no toe surgery non-day-only orthopaedic patients. Knee replacement, a neck of femur procedure, and total hip replacement were the three common non-day-only orthopaedic procedures. None of these procedures was undertaken as a day case.

The demographic, clinical, and social characteristics were introduced into a logistic regression model in forward stepwise fashion, yielding a progressively enlarging model (Table 1). Only age and diagnostic category variables were included in the final model. Variables for social characteristics were not included in the final model with the likelihood ratio test criterion of 0.05. The odds of undergoing gastrointestinal and ophthalmic procedures as a day case increased by a factor of 8.3 and 63.8, respectively, relative to all other diagnoses apart from orthopaedic, gastrointestinal and ophthalmic procedures. On the other hand, the odds of undergoing procedures on a day basis for people aged

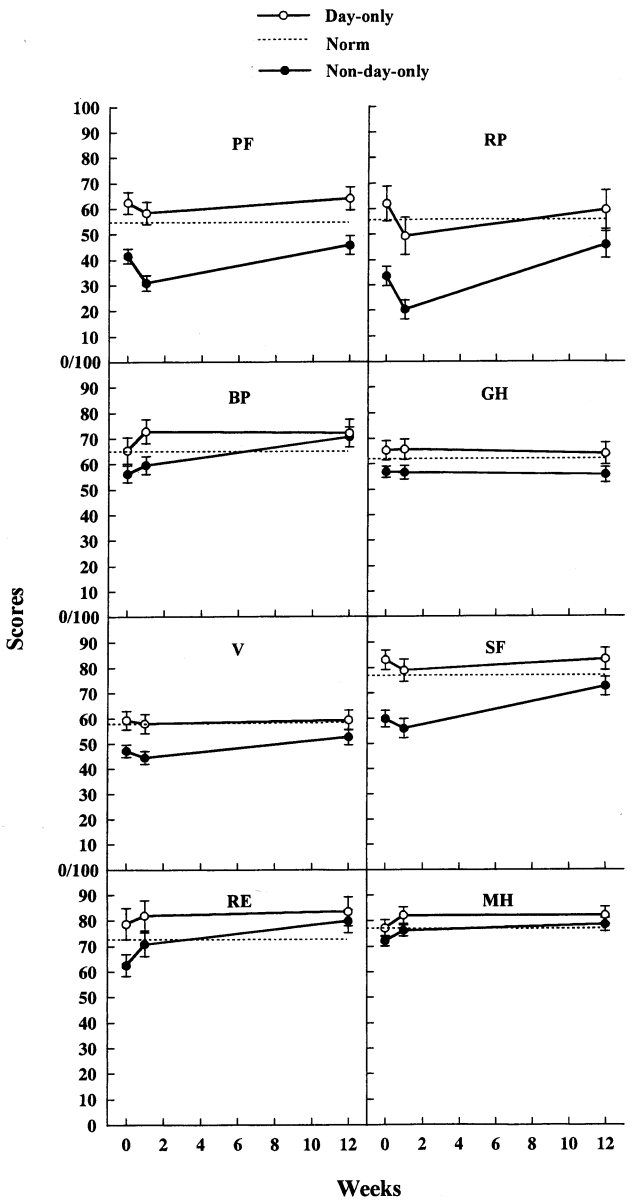

Fig. 1. Mean scores and S.E.M. for the SF-36 subscales across time for day-only and non-day-only patients aged 70 and above with the Australian population norm [41] for people aged 75 and over. The eight subscales of the SF-36 are physical functioning (PF), role limitations due to physical health problems (RP), body pain (BP), general health (GH), vitality composed of energy and fatigue (V), social functioning (SF), role limitations due to emotional problems (RE) and general mental health composed of psychological distress and psychological well-being (MH) [36,42]. The scores on each of these eight subscales range from 0 to 100, and a higher score on each scale indicates a better health status or no limitations. For example, a score of 100 physical functioning scale indicates that the person perceives that he/she is functioning well physically.

80 and above decreased by a factor of 0.4 relative to people aged between 70 and 74.

There was a significant difference between day-only and non-day-only patients for all eight subscales of the SF-36 (all $P < 0.05$; Fig. 1). The scores for each subscale for day-only patients were higher than those for non-day-only patients across contacts, thus indicating better health across each subscale for day-stay patients.

There was a significant quadratic trend across contacts for physical functioning, role-limitations physical, vitality, and social functioning scores (all $P < 0.01$; Fig. 1). The physical functioning, role-limitations physical, vitality, and social functioning scores were higher at discharge and 12 weeks after discharge than at 1 week after discharge. There was also a significant interaction between the quadratic trend and day-only status for physical functioning, role limitations-physical, vitality, and social functioning scores (all $P < 0.05$; Fig. 1). The decrease in physical functioning, role limitations-physical, vitality, and social functioning scores 1 week after discharge compared with discharge and 12 weeks after discharge was greater in non-day-only patients than in day-only patients. The physical functioning, role limitations-physical, vitality, and social functioning scores for day-only patients showed little decrease at 1 week after discharge compared with discharge and 12 weeks after discharge.

There was a significant linear trend across contacts for body pain, role limitations-emotional, mental health, and general health scores (all $P < 0.05$; Fig. 1). The body pain, role limitations-emotional, and mental health scores increased while the general health scores decreased across contacts. There was a significant interaction between the linear trend and day-only status in role limitations-emotional scores across contacts ($P = 0.03$; Fig. 1). The increase in role limitations-emotional scores across contacts for non-day-only patients was more substantial compared with that for day-only patients.

There was no evidence to suggest that day-only patients visited doctors more often or received more community care services than non-day-only patients during a period of 12 weeks after discharge ($P > 0.05$ for both). Both day-only and non-day-only patients received on average 1.8 h of formal help per week both at 1 week and 12 weeks after discharge. Both day-only and non-day-only patients received 17.4 h of informal help per week at 1 week after discharge. The amount of informal help received by both day-only and non-day-only patients decreased to 16.0 h per week at 12 weeks after discharge ($P = 0.03$).

4. Discussion

Day-only older patients appear to be selected on the basis of age, procedure and health status. They were about 4.1 year younger on average, consistent with the Audit Commission Report [43] but not with the study by Fan et al. [14] who examined cataract surgery exclusively. Low numbers undergoing non-day-only cataract

surgery in this study do not allow further comparison with the study by Fan et al. [14]. Health problems, such as circulatory disease, and social support factors, such as living alone, have been shown to influence patients' choice of day surgery [14]. While older people expect more problems in these areas, age per se should not be considered to be an exclusion factor on practical or ethical grounds for day surgery. Better criteria for selecting older people, by focusing on conditions and the environment of the patients and not solely on their chronological age, may increase day surgery rates observed here and improve benefits to patients.

Day-only patients were also selected on the basis of need for gastrointestinal and ophthalmic procedures. The percentages of the same day separations in public hospitals between 1996 and 1997 in Australia have been reported as 71 for gastrointestinal, and 61 for ophthalmic procedures [5]. For example, diagnostic procedures on small intestine and large intestine, and extracapsular extraction of lens by fragmentation and aspiration technique were conducted on the same day 79 and 68%, respectively, in public hospitals during 1996 and 1997 in Australia. The high proportion of older day-only patients undergoing gastrointestinal and ophthalmic procedures compared with non-day-only patients in the present study was consistent with the high proportions of the same day separations in public hospitals. A key issue with the growth in numbers of day-only procedures for the elderly people is whether they substitute for more expensive in-patient procedures or simply increase numbers of procedures undertaken. An increase in procedures without substitution may be justified when there are measurable gains for older people in health and independence.

The characteristics of patients undergoing day surgery introduced in logistic regression analysis were gender, age, diagnosis, income, levels of education, private health insurance cover, and ownership of pets. Age and diagnosis were the significant predictors for patients undergoing day surgery, consistent with our univariate analysis. The absence of social class and economic factors is a positive result for the equity of access in Australia's heavily public-funded health system.

On a well validated, multi-dimensional measure of health status, the SF-36, day-only patients had consistently better health than non-day-only patients. Day-only patients also generally rate their health better than the population norm for people aged 75 and above [41], whereas non-day-only patients generally rate their health lower. On three domains, body pain, role limitations-emotional, and mental health, non-day-only patients recovered to report scores higher than the population norm, but still lower than the day-only mean. It is worthy of note that two of these three measures relate to mental health more than physical health. Thus, relatively healthy persons are selected for day-only procedures but non-day-only patients recover mentally to near the population norm while their physical health remains relatively poor.

The drop in the SF-36 scores immediately after discharge is the characteristic behaviour for self-report measures [44]. Day-only patients also showed less of a drop in rates at 1 week after discharge on physical functioning, role limitations-physical, vitality and social functioning. This may be due to more invasive procedures for non-day-only patients, however, the patterns appear to be more complex for body pain, general health, role limitations-emotional, and mental health. The SF-36 is clearly responsive to changes over time in health status of older people.

Swan et al. [31] and Jackson et al. [45] also found that moderate levels of symptom distress and reduced functional status were common 1 week after surgery especially with patients who underwent hernia procedures. The drop in patients' perception of physical functioning, impact of physical health on their roles, vitality, and social functioning 1 week after discharge compared with that at the time of discharge, might be due to their inadequate education of patients on what to expect after surgery, thereby causing discrepancy between their expectation and actual recovery. Patients, for example, are better prepared to deal with minor side effects causing disruption to their normal activities after day surgery if they are informed about this issue with written instructions on how to handle them prior to discharge [13].

In previous studies, a prospective audit of short-stay patients, who underwent general surgery, revealed that they were highly satisfied with the surgical service but were dissatisfied with communication between staff and patients [46]. Forty-nine percent of the short-stay patients did not know when they would be able to resume their normal activities. The short-stay patients also displayed less knowledge before surgery concerning what to expect after surgery regarding pain control compared with their preoperative requirements. This may reflect the difficulty in absorbing such information compared to information related to pre-operative requirements. The audit suggested that there was room for improvement in providing information to the short-stay patients. This improvement may decrease suffering from the side effects during their recovery at home.

We found no evidence that day-only patients had more visits to doctors or formal community service use. Given that they appear healthier, we might have expected less service use. Lewis and Bryson [26] in a study of children and adults reported lower than average service use for day-only patients. The advanced age of our participants (aged 70 and above) may explain the similarity in service use between groups. Nor was there evidence to suggest that day-only patients received

more informal care compared with non-day-only patients. While the amount of formal care received was constant across 1 and 12 weeks after discharge, patients, on average, received more than eight times the amount of informal care relative to the formal care. The amount of informal care received per week at 12 weeks after discharge was reduced to 92% of the informal care received at 1 week after discharge. There was no evidence that day surgery generates extra workload for families of older people or primary and community health staff.

5. Conclusion

In the present study with older people aged 70 years and above, day-only patients were slightly younger, tended to have less invasive gastrointestinal and ophthalmic procedures, and reported better health status compared with non-day-only patients. There was also no evidence to suggest that day-only patients had higher postacute service use compared with non-day-only patients. Selection criteria exercised by doctors may have been complex and subtle. Given this skilled selection, generally characteristic of Australian health care, there is no evidence in this study of worse quality of life or of shifting burdens from hospital to formal services or to informal carers in communities arising from day surgery.

Given the potential benefits and lower cost of day surgery, it will be important to apply the same skill in selection to other procedures and to fine tune selection within the current non-day-only group. One option is to develop more extensive before and after care in the community for this group [17]. Availability of adequate community support enables more difficult procedures to be conducted on a day basis. Another option is to improve communication and giving information during the procedure. Finally, if costs are to be constrained for the same or better outcomes, it is important that shorter stays substitute for current longer stay procedures.

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