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Abstract

A survey of the food service departments in 93 hospitals throughout NSW Australia (covering 51% of hospital beds in the state) was conducted using a mailed questionnaire and the results compared with those from similar surveys conducted in 1986 and 1993. Over the past eight years there has been a significant increase in the proportion of hospitals using cook-chill food service production systems, from 18% in 1993 to 42% in 2001 ($p < 0.001$). Hospitals with cook-chill systems had lower staff ratios than those with cook-fresh systems (8.3 vs 6.4 beds/full time equivalent staff; $p < 0.05$), but there was no significant difference in the ratio of meals served per FTE. There was no difference between public and private hospitals in terms of ratios of beds or meals to food service staff. Managers using cook-chill systems reported significantly lower levels of satisfaction with the food service system compared to those using cook-fresh. Two aspects of the services have not changed since the last survey: approximately a quarter of food service departments are still managed by staff without formal qualifications and meal times remain the same, with more than 90% of hospitals serving the evening meal before 5.30pm and a median of 14.25 hours gap between the evening meal and breakfast.

Keywords

food service, hospitals, cook-chill

Disciplines

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Title: **FOOD SERVICES TRENDS IN NEW SOUTH WALES
HOSPITALS, 1993-2001**

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Abstract

A survey of the food service departments in 93 hospitals throughout NSW Australia (covering 51% of hospital beds in the state) was conducted using a mailed questionnaire and the results compared with those from similar surveys conducted in 1986 and 1993. Over the past eight years there has been a significant increase in the proportion of hospitals using cook-chill food service production systems, from 18% in 1993 to 42% in 2001 ($p<0.001$). Hospitals with cook-chill systems had lower staff ratios than those with cook-fresh systems (8.3 vs 6.4 beds/full time equivalent staff; $p<0.05$), but there was no significant difference in the ratio of meals served per FTE. There was no difference between public and private hospitals in terms of ratios of beds or meals to food service staff. Managers using cook-chill systems reported significantly lower levels of satisfaction with the food service system compared to those using cook-fresh. Two aspects of the services have not changed since the last survey: approximately a quarter of food service departments are still managed by staff without formal qualifications and meal times remain the same, with more than 90% of hospitals serving the evening meal before 5.30pm and a median of 14.25 hours gap between the evening meal and breakfast.

Introduction

These are difficult times for hospitals and other health care related services. Health care administrators who are forced to balance budget constraints with the ever increasing demand for service provision are seeking ways to increase efficiencies and reduce costs. Compounding this challenge is the demand to provide quality service to their customers. Consequently in healthcare food service many changes are occurring, including increased use of computer-based information processing and new technologies for food production and distribution. Yet there are few studies that have attempted to track these trends.

In 1986, the first extensive survey of the food service systems used in 276 hospitals in New South Wales (NSW), Australia was conducted (Williams & Brand 1988). Seven years later a repeat survey in 159 hospitals revealed that there had been a significant increase in the proportion of these hospitals using cook-chill food service systems, from 5% in 1986 to 18% in 1993 (Dunn & Williams 1994). Since then the trend to use centralised cook-chill food production units for multiple healthcare facilities has continued. This study was undertaken to resurvey NSW hospitals to collect information on the current food service systems being used. In particular the aims were:

- 1) to describe the current food service systems in use
- 2) to compare the efficiency of the different food service systems in terms of two ratios: beds per full time equivalent staff and number of meals served per full time equivalent staff, and
- 3) to establish the managers' level of satisfaction with their food service systems.

Methods

A postal survey was mailed in August 2001 to the food service managers in hospitals throughout New South Wales. NSW is the largest state in Australia, with approximately one third of the total national population. Names and addresses were obtained from the Australian Hospital Directory (Anonymous 2000). All types of public and private hospitals were surveyed (medical, surgical and psychiatric), excluding those that were solely day surgeries - where patients did not stay overnight - and those that were exclusively for pediatric patients. In total there were 189 public hospitals and 81 private hospitals included.

The 25-item survey questionnaire was based on that used in the 1993 survey (Dunn & Williams 1994) with some additional questions to measure the managers' satisfaction with the food service systems. Copies of the questionnaire are available from PW. Four weeks after the first mailing, a second questionnaire and follow-up letter were sent to hospitals not responding to the first mailing. The questionnaire sought the following information on hospital food service departments:

- Size, name and staffing of departments
- Food production and distribution systems
- Client type
- Meal times
- Menu type
- Department head's satisfaction with the system in use

The Statistical Package for the Social Sciences for Windows (version 10.0, SPSS, Chicago, Ill, 2000) was used for all data analysis. The satisfaction levels with current food production systems were rated using a 10-point scale (1= very dissatisfied to 10= very satisfied). Staffing ratios were expressed as numbers of meals served or numbers of hospital beds per full time equivalent (FTE) of food service staff (where one FTE works 38 hours per week). Unpaired two-sided Student t-tests were used to compare efficiency ratios and satisfaction levels between the food service systems. Chi-square analysis was used to indicate whether any significant differences existed between the proportions of hospitals using current foodservice systems and those reported in 1993 and between hospitals of different sizes. The study was approved by the University of Wollongong Human Ethics Research Committee.

Results

A total of 93 food service managers (34%) responded to the questionnaire, the majority (76%) of them being from public hospitals (Table 1). These responses covered 51% of the 26 075 hospital beds in NSW hospitals (56% of the public hospital beds and 33% of the private hospital beds).

Qualifications of the head of department

The reported qualifications of the person in charge of the hospital foodservice departments are listed in Table 2 along with the comparisons from the 1993 survey. There was no significant difference in the proportion of qualified staff reported in this survey compared to that reported in 1993 and still one quarter of food service managers have no formal qualifications. The majority (60%) of managers without any formal qualifications were found in the smaller hospitals with less than 100 beds. Department heads in 44% of the larger institutions (>100 beds) had qualifications in hotel and catering/hospitality management compared to only 16% in the smaller hospitals.

In this study, no food service department was headed by nursing staff, unlike in the 1993 survey where it was found that they managed 4.5% of the hospital departments. Dietitians were in charge of food service departments mainly in hospitals of more than 100 beds; they managed the food service in 9.4% of those hospitals.

Food service systems used

In 1993, the conventional cook-fresh food service system was the most prevalent, found in 81% of hospitals in NSW. As shown in Table 3, there has been a significant decline in the use of this system in the past eight years. At the same time, the use of cook-chill systems has increased significantly from only 17.8% hospitals in 1993 to 41.7% in 2001 ($p<0.001$).

The type of system used varied according to the size of the hospital. Cook-chill systems were found in hospitals of all sizes, although they were more common in hospitals with 100 beds or more (62.3%) compared to only 19.1% of those with less than 100 beds. The use of the chilled food production system was more evident in the public sector. Only 4.4% of the private hospitals used a cook-chill system.

Managers in 19.8% of hospitals reported that they had changed their meal service systems within the past five years while 8% reported they had the same system in operation for more than 20 years and 15% had never changed their system of operation.

Meal Plating / Food assembly

In 89.3% of the hospitals the patient meals were plated in a central location, i.e. in a main kitchen rather than at ward level (Table 4). This proportion has not changed significantly since the 1993 survey. Centralised meal plating was used in all private hospitals and in 85.7% of public hospitals. Decentralised plating was more common in larger hospitals, but not significantly so. A small percentage (2.6%) of the public hospitals plated their meals both in the kitchen and at ward level.

Meal Distribution

The different methods of maintaining food temperature during patient meal delivery are listed in Table 5. The most common system in use was the insulated cover and base (34.5% of all hospitals), followed by the heated pellet system (20.9%), though this proportion has dropped from the 29% reported in 1993.

Almost all managers from hospitals with less than 100 beds (91.4%) reported portioning hot food items for patient trays in the kitchen and delivering to patient floors, compared to 80% in hospitals with 100 beds or more. In 13.9% of the hospitals food items were portioned cold in the kitchen and reheated in patient ward areas.

Half of the hospitals with chilled meal service reheated their food using convection ovens, although smaller proportions used microwave ovens, infrared ovens and conduction heating systems (Table 5). The use of infrared ovens has decreased substantially on the past seven years and in this study 3.8% of the hospitals reported using microwave ovens, something not reported in the 1993 survey. In 78.2% of hospitals food was reheated on individual plates and 21.8% it was reheated in bulk.

Where meals are eaten

In 82% of hospitals patients ate their meals in or at their bedside. One percent of the public hospitals provided dining rooms or other areas away from the ward. This practice was not reported in any of the private hospitals. In 17% of hospitals, patients could have their meals at their bedside or in the dining area. There was no significant relationship between the place meals were eaten and the hospital size or the type food service system used.

Staffing levels

The overall ratio of staffing levels in the departments was 7.3 beds/FTE and varied from as low as 2.0 to a maximum of 33.8. This value was not significantly lower than the mean value of 7.7 beds/FTE reported in the 1993 survey. There was no correlation between staffing ratios and hospital size, but public hospitals with a mean (\pm SD) of 7.4 ± 4.3 beds/FTE reported a slightly higher ratio than private hospitals, with a mean of 6.9 ± 2.9 . This difference was not statistically significant. This shows a change from the previous two studies in 1986 and 1993, when the private hospitals, and especially those with less than 100 beds, were found to have a significantly higher bed/staff ratio than public hospitals.

Hospitals using a cook-chill food service system had a significantly higher ratio of beds/FTE compared to departments with traditional cook-fresh systems: 8.3 ± 5.2 vs 6.4 ± 2.4 beds/FTE ($p < 0.05$).

Only 74 hospitals (80% of the sample) provided information on the number of meals served to their various clients. The overall ratio was 566 ± 340 meals per month/FTE, varying from as low as 94 to a maximum of 1631. The ratio in the private hospitals was not significantly different to that in public hospitals. More meals/FTE were served by hospitals using the cook-chill system (655 ± 341) than those using the cook fresh system (545 ± 328), but not significantly so. In some hospitals, the food service department did not manage meal delivery staff. These hospitals were excluded in the analysis of the ratios of meals/FTE staff.

Client types

Table 6 sets out the proportion of patients requiring special diets in public and private hospitals of five size categories. Special diet meals made up a greater percentage of the meals in the larger hospitals especially in the public sector. However, unlike in the 1993 survey where this percentage was significantly higher in the public hospitals, in this study there was no significant difference in the proportion of special diets between the private sector and public hospitals. From 1993 to 2001 there was no significant change in the mean percentage of patients requiring special modified diets (16%). The range of the proportion of special diets was wide, from as low as 1% to as high as 65%. This may have been due in part to differing interpretations of what a special diet was, since this was not defined in the questionnaire.

When asked whether the facility provided food to other food service establishments, the managers' responses showed that this activity was more common in the public hospitals. Only 9% of the private hospitals supplied Meals-on-Wheels (MOW). By contrast, 55.7% of the public hospitals did so, but this represented a 15% decrease from the value reported in 1993. 84.6% of public hospitals with less than 50 beds supplied food to MOW compared to 63.6% of those with 50-99 beds and 32.1% of those with 100 beds or more. This pattern is quite similar to that reported in 1993.

Menus

Table 7 compares the length of cycle menus used in hospitals in 1993 and 2001. All hospitals that responded reported using a fixed cycle menu; none reported using a restaurant-style or other menu type. There was a 6% non-response rate to this question.

The most significant change is that the use of shorter menu cycles (<14 days) has become more common (16.2% of hospitals in 2001). This is opposite to the trend that was reported between the previous two surveys: in 1986 the value was 14% and fell to 6.5% in 1993. In 2001 the 14-day cycle was the most common, found in half of all hospitals. The 21-day cycle was found in 16% of the hospitals and 13.9% used a 7-day cycle period. Few hospitals (5.1%) used cycles based on lengths other than multiples of one week e.g. 8, 10 or 15 days.

In 91% of the hospitals, patients selected their own menus. In the remaining 9% the patients were helped to select their meals by staff, mainly the nursing personnel or diet aides. A paper menu selection system was used in 88.4% of the hospitals but 5.8% hospitals used the bedside computer entry and another 5.8% used other systems such as computer selection of menu choices made on behalf of patients, based on their food preferences and diet requirements.

Managers were asked how far in advance patients were required to make their menu selections. In both public and private hospitals, 70.6% patients selected their meals 12-24 hours in advance. The next most common response was 24-48 hours, found in 20% of the public hospitals (mainly those with over 100 beds), compared to only 4.5% in the private hospitals. The second most common response from the private hospitals was less than 12 hours, found in 18% of these hospitals. In only 8.6% of the public hospitals was it reported that patients selected their meals less than 12 hours in advance, mainly in the smaller hospitals.

Meal times

Table 8 shows the median serving times of meals and the range of times at which they are served. Where meal service in a hospital extended over a period of time the midpoint was chosen for the purpose of analysis. There was no significant difference between public and private hospitals in the times at which meals were served.

Only 19% of the hospitals provided an early morning beverage, the majority of them being the smaller hospitals (those with less than 100 beds). Most hospitals regularly provided patients with other mid-meals: 98% serve morning tea, 99% serve afternoon tea, and 95% serve supper.

Most hospitals began serving the breakfast meal between 7am and 8 am. The midday meal in a majority of the hospitals was served between 12.00 noon to 12.30pm. The evening meal serving times were spread over two and a half hours from 3.30pm to 6.00pm with most meal service being between 5.00pm and 5.30pm. The median time between the evening meal and breakfast was 14.25hours.

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Managers' level of satisfaction with food service system

Table 9 provides information on the managers' level of satisfaction with the foodservice system. Satisfaction was rated using a 10-point scale. Ratings of 7-10 indicated that the managers were satisfied with the system while ratings of 1-4 indicated low levels of satisfaction. Overall, there was a significantly lower level of satisfaction reported by managers using the cook-chill system compared to those using the cook-fresh system ($p<0.001$). The lowest level of satisfaction was found amongst managers in hospitals of 100-249 beds using the cook-chill system (rating of 5.6 ± 2.1).

Discussion

Qualifications of management

In the US, it has been recommended that a bachelor degree should be a minimum qualification for managers of hospital food and nutrition services (Dowling *et al.* 1990). In Australia, the Australian Council on Healthcare Standards requires that services should be directed by a person appropriately qualified by education, training and experience and that sufficient numbers of qualified personnel and support staff are employed to allow for the efficient operation of the service (Australian Council on Healthcare Standards 1992). Catering or food service management qualifications are desirable (Institute of Hospital Catering NSW 1997) but are not mandated. Compared to results from the 1986 NSW hospital survey, when it was found that almost half of the managers of food service departments had no formal qualifications, there has been a significant improvement in the proportion of appropriately qualified food service managers. This could be due to an increase in the overall level of training among departmental heads now employed but may also be due to a reduction in the number of smaller hospitals in NSW, which have the highest proportion of unqualified food service managers. However, the proportion of unqualified managers has not declined since the 1993 survey and remains unacceptably high at around 25%.

Food service systems

Over the past eight years, there has been a significant 23.9% increase in the proportion of hospitals using the cook-chill food service system, most of which occurred over the past five years. Cook-chill is not a new system. Its use has been widespread in Europe and in North America (Greathouse & Gregoire 1988) (Fusco 1988). The findings in this survey that the majority of conventional food service systems are used in hospitals with fewer than 100 beds are consistent with those of Greathouse & Gregoire (1988). They also reported that as hospital size increased, the use of conventional systems seemed to decrease and the use of cook-chill systems increased. The conventional cook fresh system remained the primary choice for hospital foodservice in the USA in the early 1990s, although an increasing number of food services were converting to cook-chill.

Meal assembly and plating

Up until the 1950s the great majority of Australian hospitals employed a conventional production system with a decentralised hot bulk service system (using either mobile bairnaries or insulated containers) and nursing staff served the food to patients in the ward (McDonald 1984). Since then there has been a growing trend to centralise services and to experiment with alternative meal production systems such as cook-chill and cook-freeze which can utilise fewer staff for the cooking and plating of patient meals. Central plating permits better control of food quality, portion size and diet modifications (Hysen & Harrison 1982). This study confirms the continued use of centralised meal service in the great majority of hospitals of all sizes.

There are potential problems with the trend to centralised plating. In at least one hospital food waste was reported to be higher with a plated system compared to a bulk system of meal provision (Kelly 1999) and a few recent studies have suggested that patient care by nurses may be better when they are involved with ward level food service (Carr & Mitchell 1991; Kelly 1999). However attempts to compare patient satisfaction with different delivery systems has not found any consistent relationship (Lambert *et al.* 1999).

Meal delivery systems

There were no significant changes between 1993 and 2001 in the types of hot food delivery in hospitals using the conventional cook-fresh food service system. More significant changes have occurred with the systems used to reheat chilled meals. There is no evidence that these trends relate to the performance characteristics of the technologies. The first cook-chill systems marketed in Australia used infra-red reheating, and this system dominated in the hospital sector in previous surveys. With an increase in the number of equipment suppliers now offering alternative systems, a greater range of reheating systems is employed, and convection heating systems are now the most common. Few hospitals use microwave ovens; they have been reported to have substantial problems of reliability and uneven performance in large institutions (Ollsson & Thorsell 1984).

Menu type

The trend in Australian hospitals over the past decade has been to develop a single cycle menu that accommodates as many special diet requirements as possible. Paper menu selections remain the most common system used, although with a move to the general introduction of the CBORD suite of computerised food service management systems in NSW (under a Department of Health contract) there are more examples of alternative systems such as bedside order entry - where diet aides record patient selections into palm top computers (Golley 1999) - or doing away with menus and providing a choice of plated meals at point of service, like airline meals (Kokkinakos & Ravens 1999).

Meal times

There has been little change since 1986 in the times at which patient meals are served. Evening meals are still served earlier than the times most people normally consume this meal at home, and if anything there is a trend to earlier evening meals. In 1996, 12 percent of hospitals served the evening meal after 5.30pm. In 1993 this proportion was 9.5 per cent and in this latest survey it had dropped again to only 8.1%. The median time between the evening meal and breakfast (14.25 hours) exceeds the recommended maximum of fourteen hours (Institute of Hospital Catering NSW 1997).

Efficiency

Comparisons of the staffing levels in food service operations between hospitals can be notoriously difficult, since in many instances basic tasks (such as food purchasing or meal delivery) may be carried out by staff from other departments. It would therefore be unwise to draw too many conclusions from the self reported data on staffing levels presented here. Nonetheless, it appears that there has not been a significant change in the food service staffing ratios from those reported in 1993. In this current study, hospitals with cook-chill systems had significantly higher ratios of beds/FTE than those with conventional cook fresh systems. However, this is only a crude indicator of efficiency, because it does not take into account bed occupancy rates, proportions of day-only patients, diet types or differences in the ratio of staff to patient meals. The number of meals served per FTE may be a better indication of efficiency and is one of the most commonly used performance benchmarks (Johnson and

Chambers 2000). In hospitals using the cook-chill system this ratio was slightly greater than in those using the cook-fresh system but not significantly so.

Several investigators have suggested that changing from a conventional to a cook-chill or cook-freeze system allows cost savings because food production and service are separated and thus all cooked food items can be produced in an 8-hour day, 5 days a week, allowing for more effective employee scheduling (Herz & Souder 1979; Barnett & Murray 1983; Sobelman 1986; King 1991). However, our results on meals served per FTE are consistent with those from a study by Greathouse & Gregoire (1988) which found that, in general, managers of conventional and cook-chill systems are employing similar resources to achieve their objectives. The lack of significant differences those authors reported between systems with regard to critical variables such as FTE, turnover rate, absenteeism rate and salaries, suggest that food service directors expecting savings in personnel costs by installing cook-chill systems need to be certain that reductions in those areas can be realised. In the UK Cook-Chill Survey nearly one third of those organisations who introduced cook-chill to reduce overall costs failed to achieve that aim (Light & Walker 1990).

Managers' satisfaction with the food service system

Operational differences between conventional and alternate food service systems have been studied in the past but only limited attention has been devoted to the satisfaction of managers with the systems they use. In this study it was noteworthy that despite increasing use of cook-chill systems, lower levels of satisfaction were reported by managers with these systems compared to those using cook-fresh systems. Although the survey did not attempt a quantitative investigation of the reasons for the satisfaction ratings, some of the issues raised in comments about the cook-chill system from the respondents give an insight into their concerns:

- High capital costs
- Higher ongoing maintenance costs
- Increased requirement for rigorous and complex quality assurance procedures
- Reduced flexibility (because of plating further ahead of meal times)
- Communication problems between central production units and remote meal distribution sites

- Poor food quality

This study did not collect data on patient reactions to meals from the different food service systems. However, a comment by one of the managers in this study raised the question of patient satisfaction with the cook-chill system:

“Cook-chill is a costly unprofessional system. Whoever thought of it knows absolutely nothing about food service and does not care about customer satisfaction.”

This comment may also reflect frustration about a lack of control that many food service managers feel regarding decisions to introduce new catering technologies such as cook-chill, which are often driven by senior hospital managers who are solely concerned with economic considerations. A US survey of 126 food service directors that found that managers of cook-chill systems reported lower production costs but also lower patient satisfaction, compared to directors of conventional food services (Nettles & Gregoire 1996). King (1991) also reported a 71% favourable score for patient satisfaction with the cook-fresh systems compared to only 50% with the cook-chill systems. These results suggest that cook-chill systems need to be managed carefully in order to match the positive perception among patients that the cook-fresh system has.

Not all managers in our survey expressed negative opinions. Those working in hospitals in more remote rural areas were concerned about the lack of availability of quality produce and would prefer to change to a cook-chill system, believing that it could be more flexible and provide a more consistent service to their clients.

The cook-fresh system is still considered most effective where the labour supply is adequate and of relatively low cost, where sources of food supplies are readily available, and when adequate space is allocated for food service equipment and activities (Payne-Palacio & Theis 2001). From a nutritional point of view it is also superior in most settings, unless food has to be held hot for very long periods of time (Williams 1996).

Conclusion

The technologies used in hospital food services in NSW continue to change rapidly and there has been a major shift to the greater use of cook-chill systems over the past eight years. Data from this survey do not provide support for the belief that hospitals using cook-chill are necessarily operating more efficiently, and there is some evidence that managers of cook-chill services are less satisfied with the system than those managing conventional cook-fresh operations. There is still further room to increase the proportion of food service managers with appropriate qualifications and to review the times at which meals are served, particularly to reduce the length of time of the overnight gap between meals.

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