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**EDUCATIONAL PREPARATION FOR CHEMOTHERAPY
ADMINISTRATION: A SURVEY OF QUEENSLAND NURSES**

Abstract

Nurses caring for patients receiving chemotherapy require specialised knowledge and skills in order to ensure safety for both the patient and nurse. However, there is currently no agreed educational standard for nurses working in chemotherapy settings. The purpose of this study was to identify the educational level of nurses working in chemotherapy settings in Queensland, and to describe nurses' opinions of educational requirements for this role. A questionnaire was distributed to all 454 financial members of the Queensland Cancer Fund's Oncology Nurses' Group. A total of 128 (28%) nurses responded, with over 60% of these respondents being from regional and remote areas of Queensland. While the majority of nurses involved in administration of chemotherapy had received some education for this role, findings suggest there is considerable variation in the level and type of educational preparation for nurses working in chemotherapy settings in Queensland. Moreover, nurses identified many barriers to acquiring chemotherapy education, with the majority of respondents supporting the need for standardising education programmes related to chemotherapy administration and safe handling across the state.

Background

Chemotherapy is one of the most commonly prescribed cancer treatment modalities (Beil and Wein: 2001). Like other aspects of health care, the complexity of chemotherapy and advances in technology have made it imperative that nurses continually update their clinical and theoretical skills (Thurston: 1992). Furthermore, chemotherapy is now delivered in a range of inpatient and outpatient settings, in rural as well as metropolitan settings, and in small non-specialist as well as large specialist cancer centres (Optimising Cancer Care, 2003). As such, ensuring access to education for health care professionals involved in the delivery of chemotherapy services has become an important priority for nurses providing these services, as well as health service planners looking for more effective and efficient ways to deliver more flexible, consumer focused cancer services outside of specialist cancer centres. As in most States of Australia, Queensland's "Guide for Handling Cytotoxic (Anti neoplastic) Drugs and Related Waste" published by the Division of Workplace Health and Safety in 1997 recommends that an appropriate training program be provided to all health professionals working in this field (Workplace Health and Safety 1997). However, apart from general statements about the need for adequate training, there is currently no agreed minimum standard for chemotherapy education. Moreover, while a range of chemotherapy education programs are offered by hospitals, non-government organisations, and tertiary education facilities in Queensland, little is known about the extent to which these programmes meet the educational needs of nurses in this State.

The purpose of this study was to identify the level and type of chemotherapy education received by nurses working in Queensland, and to explore issues associated with delivering such education to nurses working in metropolitan as well as rural settings.

Literature Review

Defining knowledge and skills required for chemotherapy nursing practice

In the context of caring for a person receiving chemotherapy, nurses are required to have specialist knowledge and expertise to effectively provide information and education about a range of complex treatment regimens, and give support and advocate for patients who may be experiencing profound psychosocial and existential distress (Yates et al, 2000). This is in addition to the requirements that nurses working in chemotherapy settings have the technical expertise necessary to ensure safe administration of treatments which have side effects that can be life threatening, as well as demonstrate high level assessment and problem solving abilities to prevent and detect early any such adverse effects (Yates et al, 2001).

A number of guidelines have been developed that provide an outline of the areas to be addressed in chemotherapy education programs. These guidelines typically emphasise the safety aspects of chemotherapy administration, as illustrated in the 12 modules identified in Queensland's "Guide for Handling Cytotoxic (Anti neoplastic) Drugs and Related Waste" (see Table 1).

Table 1: Training Module for working with cytotoxic drugs and related waste

1. identification of those drugs which are mutagenic, teratogenic, and carcinogenic;
2. the safe use of cytotoxic drug preparation facility and related equipment;
3. aseptic preparation of a cytotoxic product;
4. safe administration powder techniques for cytotoxic drugs;
5. selection and use of personal protective equipment;
6. safe disposal methods for cytotoxic agents and equipment involved in administration;
7. management of cytotoxic drug spills
8. management of body substances from patients undergoing and following drug therapy
9. health surveillance for personnel working with cytotoxic drugs and health assessment of personnel after unprotected exposure to cytotoxic drugs
10. safe storage and transport of cytotoxic drugs in concentrated form
11. safe storage and transport of prepared doses of cytotoxic drugs
12. safe storage, packaging, consigning and transport of cytotoxic waste

There is, however, limited published information on the broader range of competencies that are required for nurses providing care for people receiving chemotherapy, and no agreed minimum standard for chemotherapy education in Queensland or nationally.

Special issues in delivering chemotherapy education in rural settings

Educational preparation for nurses working in non-specialist cancer settings, in particular in rural and remote practice, has been identified as being especially problematic. For example, available studies have reported that despite increased referrals to rural and remote regions, health care professionals may lack the necessary experience to administer chemotherapy competently (Gilbar 2000). Gilbar (2000) therefore suggests that metropolitan centres have a duty to ensure that adequate information and support is provided, since this lack of specialised knowledge and skills may increase the potential for chemotherapy related errors. Similarly, McCarthy and Hegney (2001) reviewed the chemotherapy educational needs of nurses in rural and remote areas of Queensland. Their study reported that while nurses recognised they have a responsibility to obtain the theoretical and clinical skills to administer chemotherapy, several barriers to accessing sound education programmes were identified. These barriers included financial burden, separation from family and friends due to distance from training centres, limited access to information seminars, libraries, technology and networking opportunities with peers, and insufficient nursing staff capable of relieving whilst others study. These findings are consistent with the growing body of literature on the barriers or obstacles for nurses in rural and remote

regions to participating in education, thus highlighting the special educational needs of these populations (Edwards, Hui and Zin: 2001; Beatty: 2000; Dowserll, Hewison and Hinds: 1998; Hogston: 1995; Pardee: 1994; Faulkenberry: 1986).

Purpose of the study

In response to these concerns a working party comprising members from the Queensland Cancer Fund Oncology Nurses Group was established to investigate chemotherapy education practices and experiences of nurses in Queensland. The specific objectives of the study were to:

- identify the type of education undertaken by nurses who administer chemotherapy
- identify nurses' perceptions of barriers to education regarding chemotherapy nursing
- determine nurses' opinions about the need for standardised education regarding chemotherapy administration.

METHOD

Study Design

The study involved cross sectional survey using a questionnaire developed by experienced oncology nurses to obtain information about the educational preparation of nurses currently working with people diagnosed with cancer, and assess nurses' opinions about issues related to chemotherapy education.

Sample

The questionnaire was mailed to all 454 financial members of the Queensland Cancer Fund Oncology Nurses Group. The Oncology Nurses Group of Queensland is a state based interest group comprising registered nurses and enrolled nurses with an interest in care of people diagnosed with cancer. As such, the membership comprises nurses working in a broad range of practice settings and roles in rural, remote and urban areas of Queensland. A total of 129 nurses responded to the survey, representing 28% of the total sample.

Instrument

The questionnaire was developed by members of the research team, all experienced oncology nurses working in clinical or educational roles in cancer care. It consisted of 5 fixed response questions, and 3 open ended questions and was designed to extract information relevant to the objectives of the study. Specifically, the questionnaire included items which assessed: the nurses' degree of involvement in chemotherapy administration; the type of educational preparation nurses received in order to administer chemotherapy; and what educational preparation nurses felt was required in order to practice in this area. In addition, two questions were included to assess the demographic profile of the sample, including geographical location, and employing institution. The questionnaire is included in Table 2.

**Table 2:
Chemotherapy Education Questionnaire**

1. Please indicate your postcode o o o o

2. I work in: Private Sector Public Sector

3. Do you administer or handle chemotherapy in your workplace?
(Please tick the response which best describes your practice)
 - (A) I administer chemotherapy o
 - (B) I care for patients who have received chemotherapy but
I do not administer the chemotherapy o
 - (C) I do not administer chemotherapy or care for people
receiving chemotherapy o

4. What education or training is required in your workplace for you to administer or handle chemotherapy
(Please tick the response which best describes your education or training programme)
 - Self-Directed Learning Package o
 - Completing a Course o
 - Competency Assessment o
 - Other o
(Please Describe)

5. If you have a chemotherapy education or training programme in your workplace, please indicate the
areas which the programme addresses:
 - Patient education about chemotherapy o
 - Pre-chemotherapy administration assessment o
 - Chemotherapy administration including safety issues o
 - Chemotherapy disposal o
 - Chemotherapy spills o
 - Other areas (Please describe) o

6. Do you believe there are barriers to education about chemotherapy administration and handling in
the workplace.
 - Yes No
 - If you have answered Yes, please describe the barriers

7. Do you believe that education about chemotherapy administration and handling should be
standardised across Queensland?
 - Yes No
 - Comments.....
 -

8. Do you believe there are the barriers to **standardising** education about chemotherapy
administration and handling across Queensland.
 - Yes No
 - If you have answered Yes, please describe the barriers
 -

Results

Demographic Profile of the Sample

Demographic characteristics of the sample are presented in Table 3. Respondents from the Brisbane, Gold Coast and Sunshine Coast regions were categorised as living in metropolitan areas, while respondents from other areas of Queensland were categorised as living in regional/rural/remote areas of Queensland. The majority of respondents resided outside the South East Queensland area, with approximately equal numbers working in private and public settings.

TABLE 3: Demographic Characteristics of the Sample (n=129) *

<i>WORKPLACE*</i>	<i>% (n)</i>
Private Sector	43% (58)
Public Sector	55% (74)
Both	2% (3)
Not Specified	0.7% (1)
<i>RESIDENCE</i>	<i>% (n)</i>
Metropolitan (SE QLD)	37% (49)
Regional / Rural/Remote	60% (80)

*Percentages do not add up to 100 as some respondents indicated more than one workplace. All mentions are listed in the table.

Educational Preparation for Chemotherapy Administration

Around two-thirds of respondents from metropolitan areas (63%) and 25% of respondents from other areas of Queensland indicated that they were

involved in administration of cancer chemotherapy. Table 4 presents a summary of the proportion of metropolitan and rural/regional/remote nurses involved in administering chemotherapy who report they have received education regarding chemotherapy administration.

Table 4: Chemotherapy administration and educational preparation

	Metropolitan (n=49)	Rural, regional & remote (n=80)	Total (n=129)
Administers Chemotherapy	n=31	n=20	n=51
	% (n)	% (n)	% (n)
Education provided	94 (29)	95 (19)	94 (48)
No education provided	6 (2)	5 (1)	6 (3)
Does not administer chemotherapy but cares for patients receiving chemotherapy	n=15	n=42	n=57
	% (n)	% (n)	% (n)
Education provided	67 (10)	88 (37)	82 (47)
No education provided	33 (5)	12 (5)	18 (10)
Does not administer chemotherapy or care for patients receiving chemotherapy	n=2	n=16	n=18
	% (n)	% (n)	% (n)
Education provided	0 (0)	44 (7)	39 (7)
No education provided	100 (2)	56 (9)	61 (11)
No response	n=1	n=2	n=3

Moreover, ?? respondents indicated that there was a requirement for some type of education prior to administering chemotherapy. These results indicate that the majority of nurses involved in administering chemotherapy, or caring for patients receiving chemotherapy received some educational preparation. However, of particular note three administering chemotherapy reported they had had no educational preparation for this procedure.

Table 5 presents nurses' reports of the type of education or training that is available for nurses who administer chemotherapy in their workplace.

Table 5: Available education for chemotherapy administration and handling *

	Metropolitan (n=49) % (n)	Regional / Rural Remote (n=80) % (n)	Total (n=129) % (n)
Self-directed learning package	28 (14)	35 (28)	33 (42)
Completing Course	41 (20)	26 (21)	32 (41)
Competency Based Assessment	55 (27)	31 (25)	40 (52)
Other	8(5)	19 (15)	16 (20)
<i>No response?</i>	<i>n=9</i>	<i>n=15</i>	<i>n=24</i>

* Totals will not add up to 100%. Several respondents have indicated more than 1 response.

Nurses reports of the areas addressed by workplace chemotherapy education programs are described in Table 6.

Table 6: Areas addressed by Chemotherapy Education Programs

	Metropolitan (n=39) % (n)	Regional / Rural/ Remote (n=49) % (n)	Total (n=129) % (n)
Patient Education about Chemotherapy	46 (18)	57 (28)	37 (46)
Pre-chemotherapy administration assessment	67 (26)	49 (24)	38 (50)
Chemotherapy administration including safety issues	85 (33)	57 (28)	47 (61)
Chemotherapy disposal	92 (36)	61 (30)	36 (46)
Chemotherapy spills	90 (35)	61 (30)	50 (65)

Other	8 (3)	10(5)	6 (8)
No response			

*Totals will not add up to 100%. Several respondents have indicated more than 1 response.

These responses indicate that safety issues associated with chemotherapy are commonly addressed in educational programs, although this is more likely to be included in education for metropolitan nurses, than programs for rural nurses. Only 37% of the sample reported that education programs in their workplace addressed issues associated with patient education.

Importantly, in response to an open-ended question, 63% of metropolitan and 53% of rural/regional/remote respondents agreed that there were barriers to education about chemotherapy administration in their workplace. Table 7 summarises respondents' perceptions of the types of barriers that exist.

Table 7: Barriers to Education about Chemotherapy Administration

Barrier	Metropolitan n	Non- metropolitan n	Total n
Resources/Workforce Issues:			
• Time/workloads	8	10	18
• Financial resources (employer)	3	8	11
• Financial Resources (self)			

<ul style="list-style-type: none"> Staff turnover/casual staff 	0	2	2
	2	0	2
Expertise: <ul style="list-style-type: none"> Lack of resource people/oncology educators/specialist staff 	6	6	11
Education Standards <ul style="list-style-type: none"> Lack of guidelines Lack of information/ standards No regular assessments Risks not assessed 	1	0	1
	0	2	2
	1	0	1
	1	0	1
Attitudes <ul style="list-style-type: none"> Fear/ignorance Not emphasised Unwillingness to share information 	1	0	1
	1	0	1
	1	0	1
Access to Education <ul style="list-style-type: none"> Distance barriers Not working in specialist unit Lack of access for other health professionals Lack of information on courses 	0	12	12
	2	0	2
	0	2	2
	0	1	1

Despite these barriers, when asked if standardisation of chemotherapy education should be established, 96% of metropolitan and 89% of rural/regional/remote respondents agreed. This support for standardising educational levels was underscored in response to an open ended question, where several respondents (n=17) commented that there was a need to standardise practice across the state, and five respondents commented that standardised education would allow nurses to move more easily between hospitals.

However, 57% of metropolitan and 44% of rural/regional/remote respondents agreed that there were barriers to standardising education regarding chemotherapy administration. A summary of these perceived barriers is presented in Table 8.

Table 8: Barriers to standardising education about chemotherapy administration and handling across Queensland

Barrier	Metro n	Non- Metro n	Total
Resource/workforce issues			
• Costs	6	9	15
• Staff shortages		3	3

• Time	1	2	3
• Movement of staff		1	1
Expertise			
• Lack of educators/access to education/requires standard uni education		3	3
Standards			
• No set standard/competencies/not able to identify best practice	1	1	2
• Different policies	1	2	3
Attitudes			
• Inability to get agreement/ centre jealousies and politics/resistance/power struggles	6	3	9
• Unwillingness to share/ lack of sharing	4		4
• Political/bureaucratic reasons	3		3
• Administrators not wanting to know	1		1
• Doctors resistance/compliance	2	3	5
Differing Needs			
• Different needs (smaller vs larger, private vs public, pt population)	3	4	7
• Distance/isolation issues		5	5
• Education can be standardised through uni, but admin depends on centre	1		1

Discussion

Chemotherapy nursing practice is widely promoted as a specialised area of nursing practice, requiring specific and knowledge and skills to ensure safe and competent care for both patient and nurse. The purpose of this study was to explore issues associated with chemotherapy education in Queensland, in particular the current practices relating to educational preparation of nurses practising in this field, as well as any perceived barriers to participating in chemotherapy education. Before discussing the implications of the findings from this study, it should be noted that a 28% response rate only was received for this survey. Moreover, the survey tool was limited to a few specific items of interest to the study, and did not include validated measures. These limitations mean that the extent to which the findings of this study can be generalised to the general population is not clear, and that caution should be exercised in interpreting the study findings. Despite these limitations, the findings from this study provide the first reported account of practices in an area which is likely to have important implications for patient safety. As such, the results are presented as a preliminary investigation only, to provide a basis for further more comprehensive studies that can contribute to the development of policy, and provide direction for service providers in this area.

A number of key issues have emerged from this preliminary exploratory study which are worthy of note. Firstly, it is encouraging to note that most respondents to this survey had received some form of education regarding chemotherapy administration, suggesting that health care professionals and employers recognise that this area of practice requires specialist training. However, findings also suggest there does appear to be considerable

variation in chemotherapy education practices in terms of the mode of delivery, as well as the content. Indeed, while issues related to safe handling are commonly addressed in available education programs, this survey suggests that other key aspects of nursing practice, such as patient education, are much less likely to be addressed.

Further study of the specific educational objectives and outcomes from these educational programs would be required before definitive conclusions can be drawn regarding the adequacy of current approaches to preparing nurses for chemotherapy practice. However, it is possible that the variations identified by respondents to this survey, especially in terms of program content, will have implications for level and type learning outcomes for nurses undertaking these programs, and that some core skills may be neglected. Indeed, nurses in this study were overwhelming of the opinion that education regarding chemotherapy administration should be standardised, despite the barriers that existed to standardisation.

It is also of some note that about one third of metropolitan respondents and almost one half of rural/remote respondents agreed that there were barriers to education. The most commonly reported barriers to education related to resource issues, and for non-metropolitan nurses, access to education. In addition, the most commonly reported barriers to standardising education related to resourcing issues, lack of expert staff, and the unique needs of centres of different sizes and in different locations. Some concern

regarding cultural attitudes such as willingness to cooperate on such ventures were also noted.

These comments highlight the difficulties that will inevitably be inherent in achieving standardisation in the area of chemotherapy education, given the variety of contexts and resources that exist in different practice settings. Indeed, the current emphasis on flexibility and variety in educational approaches in continuing professional education to improve accessibility and responsiveness to individual contexts and needs is supported by the comments from nurses in this study. Such comments suggest that efforts to secure one specific course or one particular method for providing chemotherapy education may fail to achieve desired goals of improved accessibility and quality of care for people receiving chemotherapy. Instead, strategies which may be more effective in addressing the concerns of nurses in this study may be the specification of minimum competencies required for holistic and safe professional chemotherapy nursing practice, and the achievement of consensus regarding minimum educational standards and best practice approaches to teaching and learning in this particular context. However, in addition to these types of nurse-led strategies for achieving improved cancer services, it is likely that additional regulatory controls may be required to gain the support required for implementation of these service improvements. The current variation in educational practice suggests that it may be necessary for legislative or other incentives to be implemented to ensure that organisations involved in the delivery of chemotherapy services comply with education requirements considered to be the minimum.

Recommendations in the recently published “Optimising Cancer Care in Australia” report which emphasise the need for developing an accreditation system for cancer services in Australia may provide one mechanism through which the goals of nurses who responded to this survey may be achieved.

Conclusion:

The findings of this preliminary study into the nature of educational preparation undertaken by nurses working in chemotherapy practice highlight some issues which are worthy further consideration. While it is generally accepted that education is required to be able to practice safely and competently in this field, it is difficult to make definitive conclusions about the adequacy the educational preparation described by nurses in this study as no recognised standard for such education currently exists. As such, several questions are worthy of further investigation, including:

- What are the core competencies required for nurses who work in chemotherapy settings?
- Do these competencies differ according to the size/location/types of treatments offered by the centre?
- Given that the administration of these drugs is not a regular occurrence in some centres, is a high level of education about the administration of cancer chemotherapy required by rural and remote nurses How do we identify cost effective and accessible methods for providing education and overcoming barriers to participation in education programs?

The study has identified a need for further examination of chemotherapy education practices in Queensland, but how this should be provided and who

should be responsible for the implementation to overcome some of the identified barriers remains a major concern. Attention to such issues is likely bring many benefits for the health system, including safer practice in regards to the administration of chemotherapy, enhanced portability of qualifications across settings, and enhanced work satisfaction for nurses working in this field.

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