



Exploring the work of nurses who administer chemotherapy

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Summary

There is little research exploring nurses' experiences of, and attitudes towards, the chemotherapy administration process. There is also limited work investigating practitioners' educational preparation for this aspect of cancer nursing. The aim of this study was to describe nurses' experiences, attitudes and educational preparation for the chemotherapy administration process. A postal survey was conducted across 26 London hospitals providing cancer services. A survey questionnaire was sent to all 526 nurses who administered chemotherapy in these hospitals, of whom 257 replied (response rate 49%). Nearly all nurses ($n = 244$, 95%) reported being frightened, scared and anxious when initially working with chemotherapy. Of these 221(86%) stated they became more confident with experience, when supported by knowledgeable role models and following chemotherapy education.

Over 80% ($n = 206$) of the sample had received some form of education, whilst 241 nurses (94%) thought they could benefit from more. Nurses reported they were often or always worried about extravasation ($n = 113$, 44%), anaphylactic reactions ($n = 95$, 37%), and other nurses' education and knowledge deficits ($n = 118$, 46%). Overall, nurses' attitudes towards chemotherapy were neither negative nor positive. Findings highlight the value of formal educational preparation in chemotherapy prior to undertaking this aspect of nursing. Positive role models for novice practitioners would appear important and role models themselves require continued professional development. Wide variations in educational preparation and practice exist and a co-ordinated education and training strategy for chemotherapy practice is warranted to underpin safe and effective practice in this area.

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Introduction

Demand for chemotherapy treatment is rising (Summerhayes, 2003) and regimes are becoming more complex. Nurses are primarily responsible for ensuring that patients receive chemotherapy safely and providing the support

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required enabling patients to cope both physically and psychologically with their treatments. Nurses must be confident about their knowledge, competence and technical skills in order to effectively function in relation to this aspect of care. Confidence develops with clinical experience and education. Whilst oncology nurses have appeared to embrace this role in Europe there has been little work to explore their experiences, attitudes and feelings in relation to the chemotherapy administration process. Moreover, little is known about the educational standards, needs and competence of practitioners in this area.

Background

Nurses' attitudes towards chemotherapy and cancer

Wherney-Tedder (1997) contends that nurses need to hold a positive approach towards treatment regimes to help patients effectively. Only one small scale study confined to the UK has explored nurses' attitudes towards chemotherapy (Verity, 2002). This revealed that nurses' typically hold a positive attitude towards chemotherapy and regard the role as satisfying yet challenging. However, it is difficult to generalise from these findings as the sample was drawn from a specialist cancer centre where nurses were generally experienced and well educated. Interestingly these findings are also in direct contrast to those from other studies investigating nurses' attitudes towards cancer. These have found that nurses generally have a negative attitude towards the disease and its treatments (Corner 1988, 1993; Corner and Wilson-Barnett, 1992; Elkind, 1982).

Nurses' concerns and feelings

Very few studies have investigated nurses' feelings towards caring for patients receiving chemotherapy. Fall and Rose (1999) qualitative study found that nurses felt that caring for this group of patients during treatments was both rewarding and stressful. Rewards came from the powerful relationships developed during the treatment process. Yet, administering drugs and then having to confront patients as they suffered side effects caused intense stress. A more recent phenomenological study undertaken by McIlpatrick et al (2006) found nurses reported both negative and positive dimensions to working with patients receiving chemotherapy. Positive aspects included the challenge of gaining new skills, whilst negative dimensions included a perceived decrease in their caring role. Other authors contend that one of the main reasons that oncology nurses might experience stress and burnout is related to their role in the delivery of cytotoxic drugs to patients (Barracough, 1994; Delvauz et al., 1988). Why this should be the case has not been clearly elucidated.

Cancer nurses have found factors such as chemotherapy-induced side effects, the uninformed patient and their own lack of knowledge regarding treatments as potentially stressful factors in their work (Wilkinson, 1991). Verity (2002) found that nurses had a number of significant concerns, including administering chemotherapy at night or when the clinical area was busy or short staffed.

Considering the potential 'stressful' nature of this role Fall and Rose (1999) suggest 'appropriate support systems at both the managerial level and the collegial level for nurses who administer chemotherapy should be explored' (p. 907). There is still however, very little to suggest what these systems might comprise.

Educational preparation and support for the role

There is evidence to suggest that there are wide variations in educational and clinical preparation for nurses administering chemotherapy (Verity, 2002; Grundy, 1999). Grundy (1999) Scottish audit of chemotherapy nurses' practice found that many nurses had been prepared for the role by 'learning on the job'. At the present time there is no national standard for chemotherapy training in the UK, and hospitals are compelled to draw up local policies and education packs, the standard and content of which varies widely (Goodman, 1998a, b). Since Goodman's work, national policy in England (DOH, 2002) has recognised a need to ensure nurses are appropriately prepared through education to deliver good care. In response to this there has been work undertaken to develop national core generic competencies for chemotherapy care (Skills for Health, 2005).

There is a dearth of research and audit evaluating nurses' roles and competence in the chemotherapy process. Evaluation could inform decision-making, influence educational programme development and ultimately impact on nursing practice (Kearney, 2000).

Aim

The aim of this study was to describe nurses' experiences of, attitudes towards and educational preparation for administering chemotherapy and determine factors that influence their perceptions.

Methodology

A postal survey was utilised as relatively little is known about nurses' perspectives of administering chemotherapy. This type of research design is invaluable for obtaining data to describe, compare or explain nurses' beliefs, knowledge, behaviour and attitudes (Fink, 2003).

Survey instrument

The survey instrument comprised the *Chemotherapy: Education, Worries and Attitudes Questionnaire-Hospital Version*. It was based on that developed by Verity (2002). This consists of 25-items, divided into seven sections: General Information about Chemotherapy Role, Educational Preparation, Feelings, Issues of Practice, Worries about Chemotherapy, Attitudes and Professional/Demographic Details. It incorporated a combination of closed and open questions (see Box 1 for examples of questions). The section of the questionnaire concerned with nurses' attitudes required an ordinal response via a 4-point Likert scale.

Box 1 Example questions and response formats.

Example question	Question type	Response format
Please state the three most important issues that should be included when educating nurses about chemotherapy administration?	Open	<i>Free text</i> 1. ----- 2. ----- 3. -----
In your current job do you administer chemotherapy to patients?	Closed	Nominal response choice Daily ☐ Weekly ☐ Several times a month ☐ Occasionally ☐ Never ☐
When presented with complications caused by chemotherapy I feel confident in my competency	Closed	4-Point Likert scale Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree ☐

Content and face validity of the original questionnaire were established through grounding the items in the literature and critical review by clinical experts (Verity, 2002). Revisions and additions were made to the original questionnaire for the purpose of this study. A pilot study confirmed the revised questionnaires acceptability, appropriateness and feasibility.

Sample and setting

The target population consisted of nurses administering chemotherapy across the London region. Twenty-eight hospitals across this region were identified as locations where chemotherapy was administered to adult cancer patients. Of these, two were omitted. One had already been involved in similar research undertaken by one of the authors (Verity, 2002), the other did not have a Research and Development department functioning at the time approval was sought. It was initially thought that some form of probability sampling would be utilised. However, it became apparent that the number of potential participants would not be vast and therefore a decision was made to access the total population through a multi-stage approach (see Figure 1).

Following best practice in relation to survey response rates, a reminder letter was sent to non-respondents 2–3 weeks after the initial questionnaire pack was sent out. After 4–6 weeks, a further reminder letter and copy of the questionnaire with a stamped addressed envelope was sent to those nurses who had not responded (Mccoll et al., 2001).

Statistical analysis

Analysis commenced with descriptive analyses conducted to describe the sample and frequency with which nurses responded to individual items within the questionnaire. Following this, responses to individual worry items and

attitude statements were cross-tabulated with the following variables: nursing grade (D/E versus F/G), education, location of work (centre/unit) and clinical area (haematology/oncology). Somer's *d*-test was used to determine associations. Next, individual attitude items were scored from 1 to 4 with 1 representing the most negative response and 4 the most positive. These scores were then summed to provide a total score depicting global attitude towards chemotherapy administration. The mean and range of global scores were calculated.

Responses to the open-ended questions were typed verbatim into the computer. These were then coded into themes and categories, and the frequency of responses was ascertained.

The research proposal was submitted to, and approved by, a Multi-Research Ethics Committee (Ref no. 04/Q0603/51). In addition, approval was obtained from each participating Hospital's Research and Development Department.

Results

Sample characteristics

Five hundred and forty five nurses were working within London and providing chemotherapy to adults with cancer. Of these, 19 declined to participate when asked by their Lead Cancer Nurses. Five hundred and twenty-six agreed and of these 257 returned questionnaires (response rate 49%). The sample had worked on average 7 years 8 months in oncology (range 6 months–26 years) and their experience in chemotherapy administration ranged from 3 months to 25 years 3 months (mean 6 years, 5 months). One hundred and fifty nurses (59%) were qualified to degree level but only 43 nurses (17%) held degrees specifically in cancer or palliative care. Approximately two thirds of nurses ($n = 171$, 67%) were administering chemotherapy on a daily or weekly basis

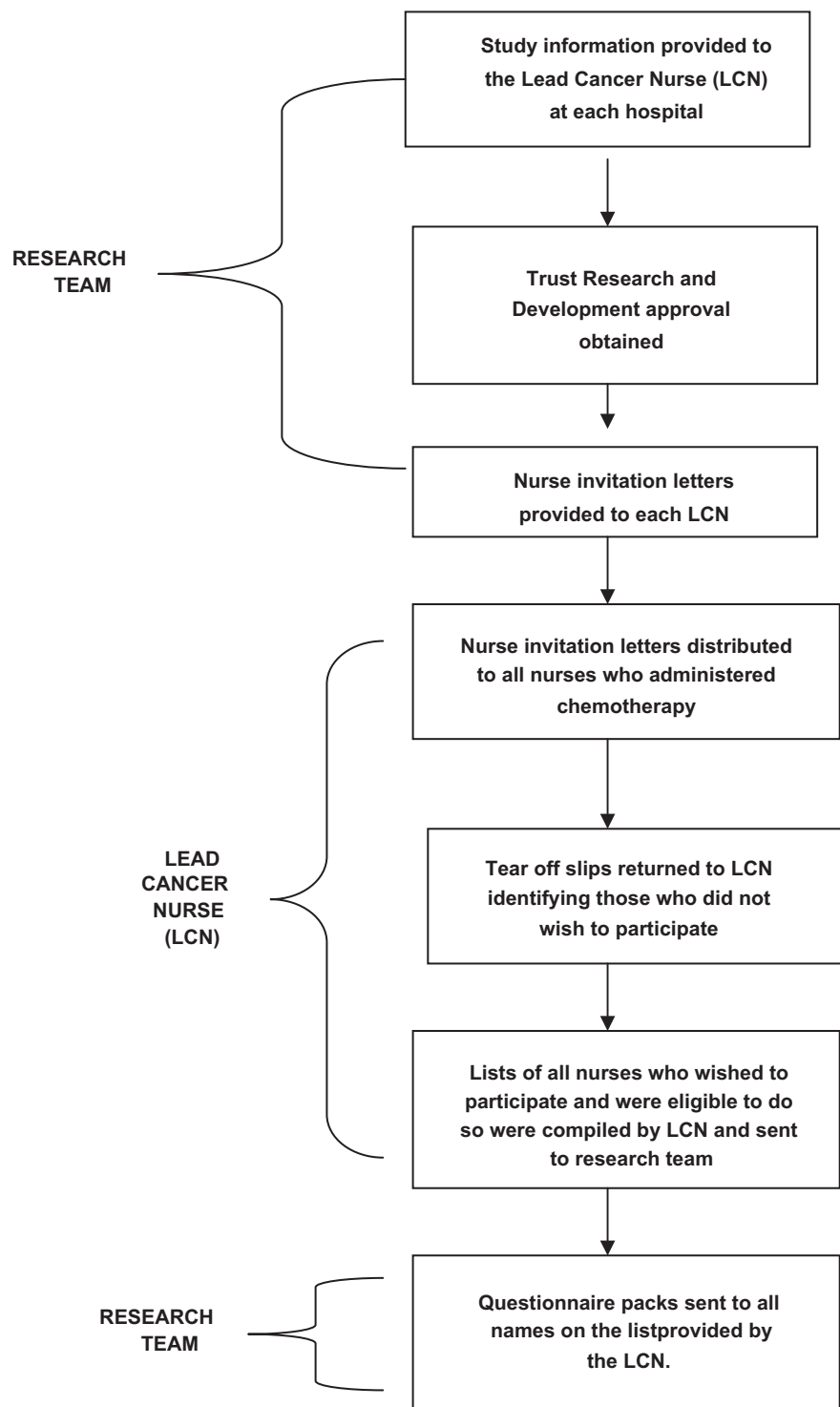


Figure 1 A flowchart illustrating multi-stage approach utilised for ascertaining and accessing sample.

at the time they completed the questionnaire. Further demographic details are shown in [Table 1](#).

Education

Only 68 (27%) nurses reported that their pre-registration training included education about chemotherapy. Chemotherapy teaching received during pre-registration training

was typically 1–5 h in duration ($n = 68$, 46%). When asked about post-registration training, 243 (96%) nurses stated that they had received some teaching on chemotherapy since qualifying and this typically amounted to over 10 hours ($n = 172$, 71%). Sixty-seven per cent ($n = 165$) stated that the teaching they received had been delivered informally in clinical practice.

The majority of nurses surveyed had received education in core topics such as extravasation ($n = 229$, 92%), practical

administration ($n = 226$, 91%), safety ($n = 235$, 95%) and managing side effects ($n = 236$, 95%). Nearly all reported that they would benefit from receiving more chemotherapy education in most areas relating to chemotherapy administration (Table 2).

Nurses' feelings about administering chemotherapy

Open-ended responses to the question 'Think back to when you first started to administer chemotherapy, describe how you felt' revealed that 243 nurses (95%) had felt 'nervous', 'scared', 'anxious' and 'frightened'. The remaining 14 (5%) described feeling 'comfortable, well supported or excited'

about their new role. Examples of typical feelings reported can be seen in Table 3. These initial feelings changed with time. Factors that made them feel less nervous included having more clinical experience and exposure to the chemotherapy process ($n = 117$, 56%), increased knowledge of chemotherapy ($n = 87$, 41%) and support from more experienced nurses.

Support

Respondents were asked to report on 'who they got support from when they had queries or concerns when administering chemotherapy'. One hundred and thirty nurses (53%) reported that they received support from the medical team, 133 (53%) from pharmacy, and 36% ($n = 87$) from nursing colleagues.

Seventy-two per cent reported that there had been occasions when they had not wanted to administer chemotherapy. Less than half reported that they were always supported in their decision to not give chemotherapy. This support was received from senior nurses ($n = 79$, 32%), the medical team ($n = 72$, 29%), and nursing colleagues ($n = 71$, 29%).

Worries

Responses to the individual worry items were explored and revealed that respondents often worried about various aspects of their chemotherapy role. Just under half were always or often worried about the education/knowledge deficits of other nursing staff, 109 (44%) were always or often worried about extravasation whilst 92 (37%) were always or often worried about anaphylactic reactions. Respondents were occasionally worried about understanding chemotherapy prescriptions ($n = 182$, 71%) and accidental spillage of cytotoxic drugs ($n = 152$, 59%). Time pressures

Table 1 Characteristics of the sample.

	<i>n</i>	%
<i>Frequency of chemotherapy administration (n = 252)</i>		
Daily	121	47.8
Weekly	50	19.8
Several times a month	53	20.9
Occasionally	28	11.1
<i>Nursing grade (n = 244)</i>		
D	6	2.5
E	69	28.3
F	82	33.6
G	56	23.0
H	31	12.7
<i>Clinical speciality (n = 245)</i>		
Haematology outpatients	55	21.7
Haematology inpatients	76	30.0
Oncology outpatients	43	17.0
Oncology inpatients	36	14.2
HIV and other	35	13.8

Table 2 Formal chemotherapy education received and required.

Topics	Education received		Further education perceived as beneficial for practice	
	<i>n</i>	%	<i>n</i>	%
Safety issues concerning chemotherapy	235	94.8	142	61.2
Managing chemotherapy related side effects	236	94.8	155	67.1
Extravasation	229	92	148	64.3
Practical administration of chemotherapy	226	91.1	109	47.6
Managing anaphylactic/allergic reactions to chemotherapy	215	87.0	161	70.6
How to inform patients about their chemotherapy treatment	211	84.7	137	59.6
Handling excreta from chemotherapy patients	208	84.2	113	50
Long-term consequences of chemotherapy treatments	206	83.1	189	79.4
Managing emotional/psychological consequences of chemotherapy treatment	203	82.2	170	72.6
Appropriate use of pumps/equipment	201	80.7	114	50.2
Developments in chemotherapy treatment	180	73.2	229	93.9

and high workload were additional concerns reported by them ($n = 51$, 20%) (Table 4).

Somer's d tests revealed that there were few associations between the worry items and the nurses' grade, education, location of work or clinical area. However, statistically significant associations were found between clinical area and worries about risk of exposure. Nurses working in haematology were more concerned about risk of exposure ($d = -0.136$, $p = 0.011$) and disposal of cytotoxics ($d = -0.116$, $p = 0.027$). Further, nursing grade appeared associated with certain worry items. Nurses of higher grades

reported worrying less about understanding chemotherapy protocols ($d = -0.186$, $p = 0.001$) and handling cytotoxics ($d = -0.228$, $p < 0.001$).

Attitudes

The survey recorded nurses' responses to 21 attitude statements about their chemotherapy practice. Responses to a number of attitude statements were of particular interest. The majority of nurses ($n = 241$, 96.4%) agreed with the statement, '*when presented with complications caused by chemotherapy I feel confident in my competency*' and 211 nurses (84%) felt that '*chemotherapy administration was a satisfying part of their role*'. Conversely, most nurses ($n = 237$, 94%) disagreed with the statement '*Giving chemotherapy to patients makes me feel guilty*' and 222 nurses (90%) strongly disagreed that '*chemotherapy does more harm than good*' (Table 5).

Somer's d tests were conducted to explore associations between individual attitude items and the nurses' grade, education, location of work or clinical area. Once again these revealed few statistically significant associations. There was some association between nurses' grade and the ability to focus on handling chemotherapy. Nurses of higher grade reported more interruptions whilst handling chemotherapy ($d = -0.185$, $p < 0.001$) and being less able to focus entirely on the practical aspects of the task ($d = 0.257$, $p < 0.001$). There was also some association between attitudes and location of work. More respondents working in large specialist centres reported knowing enough about chemotherapy to answer patients questions ($d = 0.147$, $p = 0.026$), knowing precautions to take to minimise personal risk ($d = 0.152$, $p = 0.022$) and feeling that they supported patients during chemotherapy ($d = 0.229$, $p = 0.001$) than nurses working in smaller more generalised units.

Table 3 Feelings about administering chemotherapy.

Feelings described when first started to handle/ administer chemotherapy	
Negative feelings ($n = 234$)	Positive feelings ($n = 13$)
'Very anxious and unsure I kept watching out for any untoward events such as extravasation as I kept thinking that if it occurred I was not confident I would manage'	'Having had over 3 months of supervised practice I felt safe and confident and quite privileged to be able to administer chemo'
'It was quite frightening you were always worried about what could go wrong and worried whether you would be able to answer all the patients' questions'	'Excited at prospect of giving drugs designed to kill tumours and about patients being cured'
'Quite terrified-bit like working in Chernobyl'	

Table 4 Worries.

	n (%)		
	Always/often	Occasionally	Never
Understanding of chemotherapy prescriptions/protocols	25 (10)	182 (71)	51 (20)
Handling cytotoxic drugs	32 (12)	113 (44)	111 (43)
Reconstituting chemotherapy on the ward	64 (25)	31 (12)	162 (63)
The risk of exposure to self	74 (29)	145 (57)	37 (14)
Extravasation	113 (44)	121 (47)	22 (8)
Treatment side effects	85 (33)	124 (48)	47 (18)
Patient allergic reactions	85 (33)	143 (56)	29 (11)
Patient anaphylactic reactions	95 (37)	137 (53)	25 (10)
Accidental spillage	54 (21)	152 (59)	51 (20)
Disposal of cytotoxics	43 (17)	83 (32)	130 (51)
Giving information about treatments	38 (15)	111 (43)	107 (42)
Giving information about side effects of treatment	36 (15)	109 (42)	110 (43)
Supporting the patient emotionally	54 (21)	110 (43)	92 (36)
Supporting relatives emotionally	51 (20)	117 (45)	90 (35)
Patient distress about their treatment	71 (27)	123 (48)	62 (24)
Education/knowledge deficits of other nursing staff	119 (46)	112 (44)	26 (10)

Table 5 Attitudes towards chemotherapy administration.

Attitude statements	Number of respondents, <i>n</i> (%)			
	Strongly agree	Agree	Disagree	Strongly disagree
When presented with complications caused by chemotherapy I feel confident in my competency (P)	79 (31)	162 (63)	8 (3)	1 (0.4)
It causes me distress when I see patients affected by chemotherapy I have given them (N)	31 (12)	117 (45)	87 (34)	13 (5)
I know enough about chemotherapy to answer patients' questions adequately (P)	50 (19)	165 (64)	34 (13)	3 (1)
When presented with emergencies caused by chemotherapy I do NOT feel confident in my competency (N)	2 (0.8)	28 (11)	159 (62)	60 (23)
Chemotherapy causes more harm than good (N)	2 (0.8)	22 (9)	160 (62)	62 (24)
I handle and administer chemotherapy without hurrying (P)	90 (35)	122 (47)	34 (13)	4 (2)
I handle and administer chemotherapy without interruptions (P)	46 (18)	85 (33)	103 (40)	16 (6)
Giving chemotherapy to patients makes me feel guilty (N)	2 (0.8)	12 (5)	125 (49)	112 (44)
I know that all precautions are taken to ensure that I am not at risk from chemotherapy (P)	56 (22)	136 (53)	48 (19)	9 (3)
Patients should always be informed about their treatment (N)	214 (83)	35 (14)	0	2 (0.8)
I know that when I administer chemotherapy patients have understood as much as they wish to about their treatment (P)	99 (38)	131 (51)	21 (8)	1 (0.4)
I always feel that I have supported patients during their chemotherapy treatment (P)	95 (37)	144 (56)	13 (5)	0
Giving chemotherapy impedes communication with patients (N)	6 (2)	17 (7)	122 (47)	96 (37)
It is easy to inform patients about their treatment but harder to help them emotionally (N)	31 (12)	150 (58)	63 (24)	6 (2)
I focus entirely on the practical aspects of the task when giving/handling chemotherapy (N)	19 (7)	52 (20)	143 (56)	36 (14)
I try to avoid patients that are experiencing bad side effects from chemotherapy I have given them (N)	6 (2)	5 (2)	112 (44)	129 (50)
Administering/handling chemotherapy is no different than administering/handling intravenous antibiotics (N)	10 (4)	8 (3)	100 (39)	131 (51)
Talking with patients about their treatments is stressful (N)	8 (3)	77 (30)	133 (52)	30 (12)
Patients know more about their chemotherapy than I do (N)	3 (1)	23 (9)	164 (64)	57 (22)
Administering/handling chemotherapy is a satisfying part of my role (P)	49 (19)	162 (63)	35 (14)	4 (2)
I do not find administering/handling chemotherapy a challenging part of my role (P)	10 (4)	42 (16)	154 (60)	44 (17)

(P) = positive statements.

(N) = negative statements.

Finally, responses to the 21 individual attitude items were summed to provide a potential range of scores from 21 to 84. Overall, nurses' attitudes towards chemotherapy were midway between the two thereby suggesting they were neither strongly positive nor negative (mean score 63, range 47–79).

Discussion

Nurses' attitudes and feelings towards chemotherapy

The survey revealed that many nurses felt nervous or frightened when first caring for patients receiving che-

motherapy. These initial fears are not dissimilar to the feelings observed by [Corner and Wilson-Barnett \(1992\)](#) in a study of newly registered nurses. But in contrast to [Corner \(1993\)](#) assertion that professional experiences then continue to have a scaring and negative effect on nurses' attitudes towards cancer the current study determined that experience, gaining more knowledge about chemotherapy and having support from more experienced practitioners had a positive effect. Few admitted to feelings of guilt, but many did admit to feeling distressed when they saw patients affected by the chemotherapy they had administered. More research is needed to investigate the reasons for this. Many respondents seemed confident in supporting patients' psychological needs. However, the analysis determined that those with less experience of chemotherapy

tended to worry more about providing emotional support to their patients.

Many participants reported worries related to patients having adverse reactions to treatment, extravasation and cytotoxic spillage. Although nearly all the respondents reported they had received education in these areas, it did not seem to lessen these concerns. Arguably worrying about extravasation and safety issues should be considered a positive, inevitable consequence of administering cytotoxic drugs. Nurses need to be constantly vigilant of these adverse effects so they can either be avoided or managed effectively (Verity, 2002). However, it is also known that policies and guidelines related to the management of adverse effects such as extravasation are not universally agreed and differ from hospital to hospital (Dougherty, 2005; Holmes, 1997). Confusion about the appropriate management of such events will inevitably lead to increased anxiety for nurses who administer chemotherapy and could potentially lead to error or suboptimal management.

The nature and extent of educational preparation

Nearly all of the nurses in the survey did not have confidence in their knowledge and skills when they first administered chemotherapy. Consequently, they felt nervous or frightened when starting this role. Very few had received education during their pre-registration training. This finding is consistent with the overall conclusions from Corner and Wilson-Barnett's (1992) study. They found nurses were inadequately prepared to care for cancer patients and consequentially held negative views about the disease and its treatment. Student nurses need to be made aware of the value of cancer therapy not just in terms of survival but also in terms of the quality of survival that can be achieved. This awareness must also come from clinical experience and working with experienced practitioners.

While this study's intention was not to investigate nurses' actual knowledge deficits, the results do suggest that there are wide variations in training and education for this area of practice. This was particularly evident when comparing the attitudes of those working in specialist cancer centres versus smaller general units. Similar to other studies (Grundy, 1999; Verity, 2002) it appears that many nurses had gained knowledge in practice vicariously in the absence of formal education. Given the potential harmful effects of chemotherapy drugs, this must be cause for concern. Interestingly, 76% of survey participants were at times worried about colleagues' knowledge and education deficits. It is not clear whether these nurses are worried about the knowledge deficits of staff new to the oncology arena or staff who have worked in this area for some time, or whether these concerns were justified. Arguably, these cognitions may not reflect the skills within the team but rather reflect general feelings of stress within the clinical setting.

The challenges of chemotherapy administration

Nurses' main challenge appeared to be related to time. Many stated that it could be inappropriate to handle or administer chemotherapy at night and other times when the ward was busy, short staffed or lacking trained staff to

administer it. It is vital that consideration be given to the recruitment and retention of a competent chemotherapy workforce when it has been identified that a lack of trained staff and time pressures are major causes for chemotherapy and medication administration errors (O'Shea, 1999; Goodman, 1998b). The majority of nurses in this study appeared supported either by other colleagues or more senior nursing staff and when they had concerns about treatment were able to seek support and information. They also appeared well supported by the medical team and to lesser extent pharmacists. However, for some of the sample administering chemotherapy did cause conflict with doctors, but only when nurses felt the patient was too unwell to receive treatment or when other ethical issues arose, such as a perceived lack of informed consent.

Interestingly, nurses of higher grade recognised that they were impacted more by interruptions when handling or giving chemotherapy than more junior staff. The reason for this is not clear, but it does suggest that methods for dealing with such interruptions warrant further exploration as this has implications for safety of both the nurse and patient.

Limitations

Recruitment of participants from a single region in England along with a moderate response rate to the survey (49%) mean findings should be interpreted with some caution. This limitation might be overcome by undertaking a larger study in the future over a wider geographic area and making greater efforts to improve response rates. Senior nurses (often managing the nurses sampled) facilitated access to the sample. This may have influenced responses and generated a degree of selection bias. It is impossible to ascertain whether participants' answers portrayed ideal practice rather than their actual feelings and attitudes, although assurances about anonymity and confidentiality were provided. Finally, the survey instrument had not undergone any formal reliability and validity testing, beyond assurances over its face and content validity. If used again the survey should be subjected to psychometric testing.

Conclusion

The findings from this study raise some important issues with regard to nurses' experiences of caring for patients who are receiving chemotherapy. Nurses' new to chemotherapy administration are initially daunted by the task, but education and supportive role models would appear to positively affect feelings and attitudes towards chemotherapy. It is vital that nurses are adequately prepared prior to administering chemotherapy through educational programmes that incorporate many of the aspects raised by the survey participants. It is also imperative managers ensure suitable systems to support practice are developed and put in place. Further research and audit are warranted to evaluate this aspect of nursing care and further enhance understanding of nurses' experience, knowledge and competence.

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References

- Barracough, J., 1994. *Cancer and Emotion*. Wiley, Chichester.
- Corner, J.L., 1988. Assessment of nurses attitudes towards cancer: a critical review of research methods. *Journal of Advanced Nursing* 13, 640–648.
- Corner, J.L., 1993. The impact of nurses encounters with cancer on their attitudes towards the disease. *Journal of Clinical Nursing* 2 (6), 272–363.
- Corner, J., Wilson-Barnett, J., 1992. The newly registered nurse and the cancer patient: an educational evaluation. *International Journal of Nursing Studies* 29 (2), 177–190.
- Department Of Health 2002 *The Nursing Contribution to Cancer Care*. The Stationary Office, London.
- Delvauz, N., Razavi, D., Farvacques, C., 1988. Cancer care—a stress for health professionals. *Social Science & Medicine* 27 (2), 159–166.
- Dougherty, L., 2005. Intravenous management. In: Brighton, D., Wood, M. (Eds.), *The Royal Marsden Hospital Handbook of Cancer Chemotherapy*. Elsevier Churchill Livingstone, Edinburgh.
- Elkind, A.K., 1982. Nurses views about cancer. *Journal of Advanced Nursing* 7, 43–45.
- Fall, J.M., Rose, L., 1999. Caring for patients who experience chemotherapy-induced side effects: the meaning for oncology nurses. *Oncology Nursing Forum* 26 (5), 901–907.
- Fink, A., 2003. *The Survey Handbook*. Sage, London.
- Goodman, I., 1998a. The administration of cytotoxic chemotherapy—Recommendations. Royal College of Nursing, London.
- Goodman, I., 1998b. The administration of cytotoxic chemotherapy—Technical Report. Royal College of Nursing, London.
- Grundy, M., 1999. *Chemotherapy administration by nurses: An audit of practice and educational preparation*. National Board for Nursing, Midwifery and Health Visiting for Scotland, Edinburgh.
- Holmes, S., 1997. *Cancer Chemotherapy: A guide for Practice*. Asset Books, Dorking.
- Kearney, N., 2000. Nursing education in cancer care. In: Kearney, N., Richardson, A., Di Giulio, P. (Eds.), *Cancer Nursing Practice: a Textbook for the Specialist Nurse*. Churchill Livingstone, London.
- McColl, E., Jacoby, A., Thomas, L., Soutter, J., Bamford, C., Steen, N., et al., 2001. Design and use of questionnaires: a review of best practice applicable to surveys of health service staff and patients. *Health Technology Assessment* 5 (31).
- McIlpatrick, S., Sullivan, K., McKenna, H., 2006. Nursing the clinic vs nursing the patient: nurses experience of a day hospital chemotherapy service. *Journal of Clinical Nursing* 15 (9), 1170–1178.
- O'Shea, E., 1999. Factors contributing to medication errors: a literature review. *Journal of Clinical Nursing* 8, 496–504.
- Skills for Health, 2005 <<http://www.skillsforhealth.org.uk>>, accessed 28th November 2005.
- Summerhayes, M., 2003. The impact of workload changes and staff availability on IV chemotherapy services. *Journal of Oncology Pharmacy Practice* 9 (4), 123–128.
- Verity, R., 2002. *Administering Cytotoxic Chemotherapy: The Nurses Perspective*. Unpublished M.Sc. Dissertation, University of Surrey.
- Wherney-Tedder, M., 1997. A positive approach to chemotherapy. *Nursing Times* 93 (23), 52–53.
- Wilkinson, S., 1991. Factors which influence how nurses communicate with cancer patients. *Journal of Advanced Nursing* 16, 677–688.