

# Educational input and patient outcomes: exploring the gap

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## Educational input and patient outcomes: exploring the gap

Over the last two decades, the health care professions in the United Kingdom have seen an unparalleled expansion of continuing professional education (CPE) and development (CPD) programmes; however, there is little empirical evidence that these enhance the care delivered to patients. Further research is also needed to demonstrate that these initiatives are linked to improved patient outcomes. If health care educators are to move towards an 'evidence-based curriculum', some restructuring of courses may be needed. Priorities should be set and decisions made, based on the results of reliable and valid research into the clinical outcomes of CPE. To evaluate courses and demonstrate educational effectiveness solely in terms of student satisfaction is not enough; to survive in the world of evidence-based care, educators must also demonstrate their contribution to clinical effectiveness. However, the neoteric field of impact evaluation lacks not only validated research methods, but also an agreed agenda for future research. Drawing on interviews undertaken with nurses who have participated in education evaluations and the relevant literature, this paper discusses the available data collection instruments and the development of viable research designs and methods, which are urgently needed to assess the outcomes of professional education programmes.

*Keywords:* continuing professional education, outcomes, research methods, comparator groups, academic diaries, health care, nursing, medicine, quality assurance

## INTRODUCTION

Publicly funded continuing professional education (CPE) should be judged by its impact on health care (Heick 1981, Oliver 1984, Kanouse & Jacoby 1988, Peden *et al.* 1992, Pryjmachuk 1996, Toon 1997, Grant & Stanton 1998). However, with few exceptions, courses have been introduced and perpetuated without evaluation of their impact on patients. For various reasons, including resource constraints, education researchers have generally regarded the welfare of patients as beyond their remit (Crotty & Bignall 1988, Hughes 1990, Hogston 1995). Although the sociological constructs surrounding

health care education and delivery have been thoroughly explored (for example, Becker *et al.* 1961, Bloor 1994), the transfer of knowledge into clinical situations remains a relatively unresearched field. Drawing on data from the author's work in the field and the literature, this paper argues the case for further research into the relationship (if any) between the health care curriculum and clinical outcomes.

## WHY EVALUATE?

Education programmes are not immune from audit (Welsh Office 1995). While some managers remain unconvinced

of their value to patients (Brown *et al.* 1987, Brennan 1992, Francke *et al.* 1995), others are already computing their 'cash value' (Nolan *et al.* 1995). Outcome data are essential for effective purchasing in education and health care alike (Long 1994). However, the empirical data necessary for informed decision-making in CPE do not exist (Hughes 1990, Barriball *et al.* 1992, Davis *et al.* 1992, 1995, Ferguson 1994).

Very few studies have demonstrated a link between post-registration courses and clinical outcomes. Only 118 out of 2000 papers on CPE for health care professionals assessed patient outcomes (Grant & Stanton 1998). In a systematic review of 102 trials of interventions designed to enhance the performance of health care professionals, Oxman (1994) was able to identify only 12 studies evaluating the impact of educational initiatives on professional performance.

Most nursing studies examining the clinical impact of CPE have emanated from the United States of America (USA) (Waddell 1991). By focusing on the application of knowledge to the minutiae of daily care, some authors have linked classroom input to practice output (Cox & Baker 1981, Foglesong *et al.* 1987, Meservy & Monson 1987, Alexander 1990, Brooker *et al.* 1994). However, not all CPE improves the care delivered (McClosky 1981, Hutton 1987, Dunn *et al.* 1988, de Burgh *et al.* 1995, Lima-Bastow 1995, Bradley 1998). Audit suggests that improved care is more likely to be attributable to financial incentives than education programmes (Kristiansen & Høltedahl 1993, Howie *et al.* 1994, Rittenhouse 1994, Robinson 1994, Stelfox *et al.* 1998).

### Towards an evidence-based curriculum

Outcome evaluations are needed to ensure that health care professionals' education programmes are designed so that patients, not just students, benefit from the resources expended. Accordingly, studies have been undertaken to assess the clinical impact of post-registration nursing pharmacology and physiology courses, using a variety of data collection methods, and involving both students and comparators (see Jordan 1998, Jordan *et al.* 1999a, 1999b). The term 'comparator' is used in preference to 'control'.

Curriculum development in CPE is confounded by a dearth of evaluations which address issues of care delivered. If health care curricula are to be 'evidence based', they should be constructed with reference to studies demonstrating clinical effectiveness (NHS Executive 1996, Welsh Office 1996). However, some authors suggest that the curriculum may be vulnerable to the interests and scholarship of educators (Trnobranski 1997). In education evaluations undertaken by the author, some nurses have expressed concern that course content may be dictated by the availability of in-house expertise, rather than clinical needs:

My view on training is, they spend too much time giving us fire-drill lectures and first aid. I think it's all tied up with money. They're more inclined to give you something which costs them nothing than to provide you with something that may be useful for the role that you're doing at work, that you're doing for your clients, because of cost and time and resources. What I've learnt from doing the pharmacology module, is that everybody should do it, because — even if it only makes them stop at the end of the day and think, 'Should this be happening or should that be happening?' — it's raising people's awareness. (Student)

This poses the questions of 'useful knowledge' (Cox 1987) and who, in the absence of objective evidence, should arbitrate on the usefulness or value of course content. Health care professionals themselves are not always accurate when identifying their own knowledge deficits (Tracey *et al.* 1997). Professionals may only become aware of the limitations in their education when they are exposed to alternative programmes. This was exemplified by nurses who had undertaken a post-registration pharmacology course:

I have far more knowledge due to the [pharmacology] course, which I now use in my work. It concerns me greatly that prior to the course, I thought I knew enough about the drugs my clients are on. If I thought that, then so have many others. During our training, very little was done on medication. (Student)

Empirical examination of the knowledge underpinning practice will provide a more secure foundation for the health care curriculum than the opinions of professionals. There is no reason to suppose that the interests of the diverse stakeholders in CPE — academic institutions, pharmaceutical companies, managers, students' career advancement and patients' clinical needs — necessarily coincide. Therefore, studies are needed to define the knowledge required for safe and effective patient care. However, before large scale studies can be undertaken to explore the education–outcome link, effective research strategies must be established.

### IN SEARCH OF VALID METHODS

One of the tenets of evidence-based practice is that performance should be constantly evaluated (Evidence-Based Medicine (EBM) Working Group 1992). However, there are few methodological precedents for assessing educational effectiveness (Roberts 1998). The critical issue in research is the awareness of the pertinence of particular combinations of methods required to explore each research question (Bryman 1988); however, selection of methods is more difficult in emergent fields.

It is easier to assess the processes of education than the outcomes (Toon 1997, Grant & Stanton 1998). Course evaluations are an established feature of higher education, but these often focus on the knowledge, attitudes and

personal development of students, rather than practice and clinical outcomes (Rogers 1983, Department of Health, DoH 1998). By ignoring the purpose of CPE, these unidimensional evaluations distort the assessment procedure and may encourage unjustified complacency or engender a false sense of achievement.

### Beyond the satisfaction questionnaire

Course evaluations in professional education should not end with satisfaction questionnaires and 'happiness indices' (Gosnell 1984), or even with measurement of participants' learning achievements (Alexander 1990). Questionnaires may be conveniently and cheaply administered to large groups of students; however, data obtained in this way may be contaminated by copying or conferring. Positive ratings on such instruments may be related to light academic workloads (Gibbs & Haigh 1984).

It is suggested that practice, including education practice, must be tested against specified criteria (Welsh Office 1995). However, no consensus exists either on the performance criteria for the clinical effectiveness of CPE or on how these should be established. While some authors would require quantifiable data as evidence of educational effectiveness (Oliver 1984, DoH 1998), others argue that the constraints of the workplace make this an unachievable goal (Scheller 1993). The impact evaluations undertaken in the USA have largely focused on either single outcome measures (Davis *et al.* 1992, 1995) or 'chart audit' (Cox & Baker 1981, Meservy & Monson 1987, Waddell 1991). However, improvements in patients' records may not necessarily translate into improved care delivery. 'Proxy' data for educational effectiveness, such as prescribing patterns or laboratory test uptakes, are only relevant to certain aspects of care, and require extensive access to medical databases (Kanouse & Jacoby 1988). There is no guarantee that changes in these recorded parameters translate into improved clinical outcomes (Mashru & Lant 1997). Analysis of nursing notes presents problems of feasibility and reliability. Campbell & Jackson (1992) suggest that nurse education is developing documentation skills rather than clinical effectiveness, and question the validity of 'chart audit' as a measure of clinical impact.

Multicentre randomized controlled trials in educational effectiveness face operational difficulties. While enrolling two student groups from the same clinical area may cause data contamination (Kitchens & Pfeifer 1989, de Vries *et al.* 1996), using respondents from different settings introduces numerous confounding variables (Bennett *et al.* 1987, Williams *et al.* 1997). Although comparison groups are essential, randomized trials are not necessarily the optimum method for investigating behavioural change (Grimshaw & Russell 1993).

Time series designs offer increased insight into the impact of educational programmes. Impact is usually assessed immediately after the course and then at 6 months or 1 year later (Warmuth 1987, Soumerai *et al.* 1990, Dalton *et al.* 1996, de Vries *et al.* 1996). This allows any transient 'feel-good' factor to lapse and gives respondents time to either implement or forget their new knowledge (Shin & Haynes 1991, Corner & Wilson-Barnett 1992, Punnonen 1995, Grant & Stanton 1998). However, in all research, delay increases the numbers lost to follow-up.

Data triangulation is an important strategy to strengthen the internal validity of any study (Denzin 1970, Burgess 1984, Bryman 1988, Cox 1998). Therefore, nursing impact evaluations often combine methods of data collection (Cox & Baker 1981, Meservy & Monson 1987, Warmuth 1987, Jordan & Reid 1997). Although correlations between observed and reported data add depth and 'richness' to the findings, multiple data sets can produce dissonance. Discrepancies in the data collected by different investigators and research methods, particularly where qualitative and quantitative data are juxtaposed, demand careful consideration and extensive situational knowledge (Bryman & Burgess 1994). Costs suggest that large scale studies will rely on questionnaires, rather than observations and interviews. However, these questionnaires should be validated by comparison with interview and observational data.

### Saying is not synonymous with doing

Although respondents' accounts reflect the perceptual set of informants, some authors consider them to be as valid and meaningful a measure of learning as observational data (Rogers 1986, Fleck & Fyffe 1997). UK health service social research, including nursing CPE outcome evaluations, is heavily reliant on interviews (Hogston 1995, Silverman 1998) and surveys (Akinsanya 1987, Nolan *et al.* 1995). Reviews indicate that 73% of respondents in the US (Waddell 1991) and 68% of respondents in the UK (Shepherd 1995) affirm that CPE improves nursing practice; however, these reports are not substantiated by further evidence. Clinicians' reports of practice are not always congruent with recorded events: although obstetricians report that they perform fewer Caesarean sections in response to education initiatives, data from hospital records indicate otherwise (Lomas *et al.* 1989, Wyatt *et al.* 1998). In the absence of a central database of all hospital activities and outcomes (Burr & Johnson 1998), reports corroborated by observations of practice changes or health gains to individuals may be the best available indicators of educational effectiveness (Grossman 1995).

Concern with scientific rigour has led ethnographers to rely on direct observations of interactions and marginalize informants' statements (Holy 1984). Observation overcomes

the potential discrepancy between reported and actual behaviours. However, few studies have used clinical observation as a means to assess education impact (Wilson 1975, del Bueno 1977, Oliver 1984, Akinsanya 1986, Bircumshaw & Chapman 1988, Lima-Bastow 1995).

Observation studies are expensive and vulnerable to external forces. Researchers ascribe meaning to interactions by reference to methodological or practice theory, subjecting the data to their personal interpretations and biases (Moser & Kalton 1971, Goward 1984). For the author's respondents, being observed, knowing their practice would be scrutinized, not only by researchers, but also by a wider audience, produced mixed reactions. It is likely that the data were coloured by the subjects' concern to be (justly) acknowledged as expert practitioners:

I was thinking about today last night. I was thinking about things I wanted to say that were important, so the research has definitely made a difference. It was scary in the beginning, because you feel it's a test and you think, 'What if I say the wrong things?', and people think I'm really dull or I'm really dangerous at my job. (...) I know it's not a test, it's about looking at practice and improving practice in general. It's about me, but it's about other people as well. When you can recognize that, then you stop worrying about somebody trying to catch you out. (Student)

Although data obtained in these circumstances are authentic, there can be no guarantee that they are representative of daily practice. The presence of researchers tends to increase professional motivation in areas where routine care is being delivered, regardless of study design (Roethlisberger & Dickson 1939, Drug and Therapeutics Bulletin 1994, Mays & Pope 1995).

However, not all professionals are willing for their practice to be scrutinized by outsiders. Some respondents spoke overtly about 'feeling threatened' by researchers:

I think the relationship between academics and clinicians needs to be worked out more. It can be too separate, and can make clinicians feel threatened. To have an academic come in and say: 'What you are doing should be done this way', is not going to help anybody. (Student)

If researchers do not aim to work with clinicians in reviewing practice, they could come to be regarded as instruments of audit. If clinicians feel threatened, those that perceive themselves to be vulnerable to adverse criticism will deny access to researchers, thereby creating selection bias. To obtain three comparators for one section of a project, the author had to approach six nurses. Only professionals who felt confident in their practice participated. This may explain why the author witnessed only excellent interpersonal relationships between nurses and clients. Any studies examining this area of practice would be particularly vulnerable to such selection biases.

Observational data go some way to 'telling it as it is', but they need to be supported by other data sources and other perspectives if they are to address the real-life problems of health care delivery. Where observation is impossible, due to practical difficulties (Bircumshaw & Chapman 1988), ethical considerations (Mills *et al.* 1994) or costs (Bourque & Back 1982), researchers are forced to rely on reported data. In these situations, diaries probably offer the best feasible approximation to observation, particularly when combined with interviews (Zimmerman & Wieder 1977, Zelditch 1982).

### More than 'soundbites': the diary in education research

A diary suggests a chronological written record, which may vary in depth and detail (Burgess 1981). Diaries are useful in capturing a period of transition in life, such as recovery from illness (Verbrugge & Balban 1989), the diagnosis of cancer (Mages & Mendelsohn 1979), or learning (Fulwiler & Young 1982). They have been variously employed in education research as documentation (Lacey 1970, Hammersley 1990), reflective journals (Cameron & Mitchell 1993, Morgan 1994), therapy (Craig 1983) and academic journals (Fulwiler 1987, Carswell 1988). Academic journals serve a multitude of purposes, not necessarily mutually exclusive, including comprehension, learning, record keeping and the development of literary skills in all disciplines. Such data provide more than instantaneous soundbites, snapshots or reflex responses to interviews or questionnaires, making diaries and journals among the most dependable and reliable data collection instruments (Rohmann & Haggerty 1972, Verbrugge 1980, Richardson 1994). However, diaries are costly and difficult to administer and analyse, particularly if confined to free-text writing (Sudman 1974, Carswell 1988, Read & George 1994, Phillips *et al.* 1996).

Academic diaries or journals may be incorporated into course assessments to develop scholarship and academic writing skills, whilst simultaneously highlighting cases where students have applied the substance of lectures to patient care (Jordan 1998). This allows a personal emphasis in the selection of cases and feedback designed to develop scholarship by individualizing instruction in the material most relevant to each student's workplace (Fulwiler 1987, Carswell 1988, Jordan 1997). The act of keeping a diary may modify the behaviour being documented (Zelditch 1982, Wykle & Morris 1988); however, behaviour change is often the goal of CPE.

Academic diaries as course assignments may be effective strategies for learning and applying classroom theory, but they carry inherent dangers. The pedagogical interpretation of any 'case study' may inadvertently reify patients into units of assessment or 'cases' (Hunter 1991, Jordan 1997). Although the aim of all CPE is to modify practice,

the use of case studies for assignments might modify practice in an overly selective manner, at the expense of clinical needs unrelated to the course. By combining a detailed account of practice with the reflections of respondents, the diary/interview method allows these important issues to emerge:

Knowledge is all very well, but it's more trouble than the worth of it. The wards take no notice. Managers and charge nurses won't discuss things. They are more likely to do something if you say its for your project, rather than just for 'the good of the patient' (...) They're still bandaging [lower leg ulcers] from the top down. They aren't even certain whether the ulcer is venous or arterial. (...) We are not getting knowledge for our patients' benefit, but for our own promotion. (Comparator)

The 'good' of the patient is secondary to your assessment at the time. (Student)

Practice changes solely for the purpose of course assignments are problematic. Where the clinical care of individual patients is involved, the ethical dilemma is intensified. Failure to confront practice as described here is likely to harm the patient, in this case by seriously restricting the blood supply to the ulcerated lower leg (Thomas 1990, James 1995). Had the diaries not been supplemented by interviews, it is unlikely that these disturbing questions would have arisen. These respondents suggest that senior nurses and managers are more willing to introduce change if it is associated with the academic pursuits of staff than if patients' well-being is at stake: that the involvement of outsiders, not clinical exigency, is the crucial catalyst for change. Therefore, to impact on care, CPE must not only deliver useful knowledge, but implement strategies to follow-up the application of the knowledge in practice (Wensing & Grol 1994). The clinical involvement of teachers or researchers is an important determinant of the outcomes of CPE (Greco & Eisenberg 1993). Therefore, the impact of the research itself should be considered when assessing educational effectiveness.

### **The comparator group: raised awareness and new directions**

The sensitization of respondents is almost inevitable in naturalistic settings, particularly in longitudinal studies (Goward 1984). The impact of an educational intervention may be indistinguishable from that of the media (Maclure *et al.* 1998, Wyatt *et al.* 1998). Without comparator groups, measurements of educational outcomes are likely to over-estimate the impact of courses or educational materials (Campbell & Stanley 1963, Cook & Campbell 1979). Well-controlled studies report positive outcomes from educational interventions significantly less often than studies where external factors receive inadequate attention (Soumerai *et al.* 1990). However, for a variety of

reasons, including resources and practical difficulties, many education evaluations do not include even non-equivalent controls or comparators, and randomization is rarely attempted (Wensing & Grol 1994). Of the 102 trials reviewed by Oxman (1994), only nine studies were designed with a control group.

The purpose of CPE is to bring about improvement in clinical practice, and one component of this is the teacher, acting as an agent for change (Francke *et al.* 1995, Jordan 1998). That teacher-researchers undertaking fieldwork should act as catalysts for practice review is not surprising, since they are trained and experienced professional educators (Rogers 1986, Holm 1998). Teacher-researchers may motivate all respondents, students and comparators alike, to seek further knowledge and examine their own practice:

For the period you are here, you think more deeply about the patients you are seeing and their medications. And next week I could take out one of your students and it would be exactly the same, because they would be asking me in depth about medication, which either jogs your memory or you think, well, I must go and sit down and look at my pharmacology. It's always useful when people from outside come in and look at service deficits, as well as the cases. (Comparator)

This project (Jordan *et al.* 1999a, 1999b) stimulated an interest in nursing pharmacology, encouraging both students and comparators to monitor clients for side-effects with increased vigilance:

Since the research, I have been definitely more aware of these issues. I definitely use pharmacy more and ask people things, whereas I wouldn't have done that before. I might have thought it, but I didn't do it (...) For people who have been on the research, like myself, it has made me more aware, and more likely to challenge things in future. This is going to have a big effect on the way nurses are and the way doctors prescribe. That, in turn, has got to improve patient care. (Comparator)

The comparators felt that they and their clients had benefited from the research, in some cases, as much as the students. By the end of this project, five of the seven comparators reported that their views on pharmacology in nursing had changed, and in three cases this was directly attributed to the research. Three of the seven stated that the project had also changed their practice in medication monitoring. Evidently, the research had influenced practice — the act of assessment had impacted on the variables observed (Roethlisberger & Dickson 1939). All respondents spoke positively about: 'someone taking an interest', or 'being part of a research project'. For the students, the teaching and the research synergistically motivated the nurses to deliver improved care:

I was apprehensive in the beginning, but I am glad I have been part of it. The bottom line for me is that it definitely raised my

awareness, participating in the project and the course. It's given me some new direction really (...) Thank you for letting me be part of it. (Student)

Immediate clinical benefits can emanate from the reactivity of respondents; however, this reactivity is usually censured by conventional researchers. The possibility that any practice changes will cease on completion of the research should not be discounted (Gerrard *et al.* 1993). Small scale projects may be a means to update and improve clinical practice, a fact which should not be overlooked by funding bodies.

### **Teacher-researchers: no matter how small, we make an impact**

Many education evaluations have been undertaken by teachers, as 'case studies', confined to one course, one cohort or one institution (Stenhouse 1975, Simons 1980). In naturalistic settings, several of these small quasi-experiments are likely to offer greater external validity than a single large study with representative sampling (Yin 1994). Inferences drawn from field studies in naturalistic settings may have greater theoretical sensitivity, and clinical relevance, than those derived from statistical techniques alone (Mitchell 1983, Strauss & Corbin 1990). Case studies prioritize the clinical importance, or the 'effect size', of the results over confidence in the findings, demonstrated statistically (Anthony 1999).

While the teacher-researcher, by bringing insight and sensitivity into the field, is in a unique position to originate theory, the proximity to the data means that true objectivity is probably impossible (Borg & Gall 1989). Although bias may be mitigated by data and researcher triangulation, questions of reliability/dependability and validity/credibility remain. If data are collected by teachers, respondents may not be totally honest, due to (misplaced) fears of reprisals, or intentions to please (or appease):

You know their handwriting, you know their styles. If somebody is teaching me and they give me a study and I know their specific interests, and I know that they are marking the [exam] paper for me, then I am going to be more careful to do what they would want — it's human nature. (Comparator)

The fact that the researcher is the teacher may stimulate respondents to modify practice, hopefully to the benefit of clients, for various reasons, including a social desirability response set bias. As in all research, biases and conflicts of interest can never be eliminated, therefore they must be declared (Skrabanek & McCormick 1992, Smith 1994).

Small scale teacher-researcher projects foster collaboration between academic and clinical worlds, and take academics into clinical areas, at a time when clinical

teaching is becoming increasingly limited, due to external pressures (Kirk *et al.* 1996). If educators are to equip professionals with relevant knowledge, they will need to liaise with clinicians (Welsh Office 1996). The rapidity of therapeutic advance implies that such collaboration will be increasingly important for the delivery of evidence-based care and an evidence-based curriculum. Teacher-researcher projects have affinities to action research, where inquiry is undertaken by participants in social situations to enhance practice (Carr & Kemmis 1986). Small scale studies by practitioners are likely to impact on the practice of participants, and those in similar settings, who can identify with the situations described (Stenhouse 1975). In contrast, health care professionals have been notoriously reluctant to adopt the findings of large randomized controlled trials (see Jordan & Hughes 1996).

Under the prevailing orthodoxy, the impact of research projects on practice is undesirable, and viewed as 'contamination'. However, in action research or case studies, one aim of the research is to devise strategies to improve the practice under investigation (Hitchcock & Hughes 1989, Bassey 1992). During fieldwork, researchers may be asked for information relating to a clinical situation, such as drug side-effects. To withhold this information would not only have a negative effect on respondents' co-operation, but would also run counter to the principles of action research (McNiff 1988, Reason 1988, Elliott 1991, Meyer 1993). Fieldwork is an opportunity for academics to return to clinical work, and, by linking theoretical knowledge to real-life situations, to contribute to care. This is valued in medically under-served areas:

If somebody has a particular depth of knowledge about a subject, it's useful. There have been a couple of times when I nearly 'phoned you. I think they [academics] bring a lot of knowledge that can be used to develop clinical practice. But you could come and bring all your expertise, but if people don't want you there, you would be of no use to anyone. (Student)

The author's research took academics into rural and economically deprived areas, geographically distant from teaching hospitals and 'questionnaire fatigue'. The incidents described in Figure 1 illustrate the clinical value of diverting public moneys away from 'centres of excellence', into medically under-served locations. Respondents valued this opportunity to contribute to the debate surrounding health care delivery, and the opportunity to bring the needs of the service to a wider audience:

I think that research is the way forward. People should be prepared to take part in things like this. It's the only way that problems can be highlighted. (Comparator)

The fact that you were out with me makes all my team realize that, no matter how small, we make an impact into how things change. (Student)

**Review of analgesia**

For the last 2 months, a client aged 70 had been prescribed Coproxamol® (dextropropoxyphene plus paracetamol) by his general practitioner for severe leg pain. Since then, symptoms of lethargy had intensified; also, the client had been seen crossing the road in a dazed manner, only narrowly escaping an accident. The choice of Coproxamol would appear unusual for a client prescribed a tricyclic antidepressant, and known to drink appreciable quantities of alcohol, as these drug interactions inhibit central nervous system functioning, causing lethargy and daytime sedation (Stockley 1996 p. 794). The British National Formulary (1999 p. 22) warns of the dangers of Coproxamol in overdose, particularly in those with a history of depression. Also, the client's feet were becoming progressively swollen and this could have been due to dextropropoxyphene-induced vasodilatation. Paracetamol alone or ibuprofen would have been wiser choices of analgesic, in these circumstances. When this issue was raised, the nurse resolved to contact the prescriber to review the prescription and involve the occupational therapist.

**Measuring lithium concentrations**

In several 'lithium clinics', the blood samples were not collected for several hours, and were not analysed in the laboratory until the next working day. Due to the movement of lithium ions into red cells, all lithium samples should be processed within 1–2 hours of venepuncture (Byrne *et al.* 1986, Aronson & Reynolds 1992). The time of the last lithium dose should be noted on the forms to assist in interpretation of results (Aronson & Reynolds 1992). King (1995) suggests that 'lithium clinics' could use a portable analyser, possibly operated by a community pharmacist. This would overcome the problems of delay in analysing venous blood samples and provide clients with immediate feedback, obviating any need for recall. When this was discussed during fieldwork, nurses decided to take the samples to the laboratory on completion of the clinic, and approach management for funding for a portable analyser.

**Figure 1** The impact of fieldwork on practice — extracts from fieldnotes.

In assessing educational effectiveness, the impact of the research and the course may be indistinguishable. However, research, like education provision, is usually publicly funded. This raises the question of the purpose and utility of research. Although the clinical impact of papers in academic and professional journals should not be disregarded, if health service money is spent on research, is there any expectation that projects should be clinically effective and benefit patients?

**DISCUSSION AND IMPLICATIONS**

'All well founded curriculum research and development rests on the work of teachers' (Stenhouse 1975 p. 143).

However, some commentators argue that teachers are trained as classroom control technicians, to act on others' directions, not to initiate (Hopkins 1987, Martin 1987). For nurse teachers, professional autonomy, even survival, depends on their clinical effectiveness. By developing a research agenda for educational effectiveness, teacher-researchers can empower themselves to monitor the curriculum, and demonstrate their contributions to patient care.

It is argued (Glaser & Strauss 1967), that professionals working in an area are better placed than academic social scientists to undertake fieldwork, and develop relevant data categories and hypotheses. One inherent problem facing education researchers is the 'dual accreditation' needed to investigate the 'use of knowledge'. The discrepancy between subject knowledge and the knowledge needed to undertake education research may present undue difficulties for teachers of natural science. The qualitative education researcher is confronted with the dichotomy which exists between the positivist approach required for teaching the natural sciences and symbolic interactionism, which underpins much of the social science tradition (Blumer 1969). Wright-Mills (1959) describes a conflict, rather than a Hegelian dialectic, between the natural and social sciences. This underlying epistemological paradox may generate an unacceptable degree of tension not only for researchers, but also in the interpretation and validation of data. Combined with the eclectic cognisance required, this may be deterring investigators from the field of educational effectiveness.

Nurse teachers need to establish a research agenda to explore the links between their classroom theory and their students' clinical practice. Patients' physical health and safety must feature on this agenda. However, developments are thwarted by an unstated confusion as to the purpose of CPE in nursing. While a consensus exists on the need for clinical updates via CPE (Waddell 1991, Francke *et al.* 1995, Hogston 1995, Nolan *et al.* 1995, Sheperd 1995), it is unclear whether these initiatives are aimed at physician substitution or improving standards of care by meeting unmet clinical needs (Cahill 1996). If nursing CPE is aiming to rectify deficits in health care (Department of Health 1998, Grant & Stanton 1998), it is important to know if these are due to medical manpower shortages or skill deficits. Only when the objectives of CPE are clearly defined can evaluation criteria be established.

**CONCLUSION**

Provision of publicly funded professional education should be directed by the defined needs of clinical roles, rather than the career advancement or scholarly interests of individuals and academic departments. The

impact of education on service users should be elucidated and evaluated using clinical criteria rather than participants' opinions. Unless effective research strategies and audit mechanisms are established, education evaluations may fail to look beyond 'satisfaction questionnaires' and soundbites. Without clinically and methodologically valid designs to explore the links (if any) between education inputs and clinical outcomes, developments in professional education could lose sight of the patients.

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