MEDICAL EDUCATION

Teaching and learning in a neonatal intensive care unit

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In 1994, a team of four from the University of Cambridge School of Education was commissioned by the postgraduate dean at Addenbrooke's Hospital, Cambridge, to undertake a detailed examination of the training of doctors in hospitals in the Anglian Region. Their initial questionnaire and interview survey emphasised the crucial importance to trainees of on the job experience; training was mainly a matter of acquiring expertise through the practical service demands of the hospital. Interviews with junior doctors showed that much of this on the job training was implicit, opportunistic, and incidental and there was no clear understanding about the types of questioning or teaching strategies which could be employed. Trainees were also critical of the lack of feedback they received from senior doctors.¹

The 1994 survey gave rise to a research and development project to improve the effectiveness of training for doctors in hospitals in the region. This paper charts the work in 1996 of one of the project team in developing on the job training in a neonatal unit.

The work focused on two areas: (1) the ways in which consultant trainers could make more intentional and explicit teaching and learning before, during, and after ward rounds; (2) registrar/senior registrar involvement as teachers during service delivery.

Background to the development strategies

The neonatal unit operated in 1996 with three consultants, a senior registrar and registrar, and five senior house officers (SHOs). There was also some part time registrar support. There is a programme of formal teaching within the unit; staff are also informed of programmes within related specialties.

The unit runs a partial shift system, and the structures and routines of this often militate against continuity and the logic of structured teaching and learning. Trainees, for example, will do a week of nights. Senior trainees have a vital role here as they are to hand when juniors are on take and their support is seen as of crucial importance by the SHOs; the teaching role aspect of this is perhaps only now being articulated, recognised, and developed.

Initial contacts between the project team member and the unit focused on his getting an understanding of structures and routines and

establishing empathy with the medical team. Four observations were made which provided the basis for on the job development work:

- There is a deep commitment by the consultants in the unit to teaching and learning and the ways it can be grafted on to service delivery.

- Much on the job training, however, was implicit, opportunistic, and incidental²; trainees were not necessarily aware of the aims and objectives of a ward round (apart from patient management), or when teaching as against service delivery was taking place.

- There was no clear distinction between the types of questioning (open, closed, assessing, exploratory) or teaching (for skills, knowledge, understanding, and wider sources of information) that could be engaged in. The researcher also identified the need for structured appraisal of progress and the ways in which trainees could be encouraged to become more proactive—areas identified in the original pilot project.

- Explicit involvement of senior trainee grades in a training role had not been undertaken—although undoubtedly much implicit teaching and learning involved senior and junior trainees.

Identification of on the job training development strategies

The move towards development work was precipitated by the unit team agreeing to have a video recording made of a ward round. The aim was to enable the doctors to observe their own practice, to identify strengths and weaknesses with the help of a guide sheet, and to draw up an agenda for future training development. The viewing and feedback session identified the two areas which subsequently became the foci for development:

- Making the teaching/learning more explicit by moving from the accidental and incidental to the more planned and intentional;

- Enhancing the teaching role of the senior trainees.

Strategy and activity suggestion sheets developed by the project team were made available to the consultants; these focused on ways in which teaching and learning could be made more explicit.

The role of the project team member was to observe ward rounds, collect data both qualita-

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tively and quantitatively, and provide feedback to the doctors both informally through discussion and also through written reports.

On the job development work—the consultants

The first consultant with whom the project team member worked took as a broad brief the enhancement of teaching and learning during his ward rounds. He had been sent the strategies and tasks sheets referred to above. His ward rounds were described in the feedback report from the project team member as “lively, interactive, and profoundly helpful teaching and learning situations...”

There was evidence of a range of questions being asked, covering:

- Service delivery questions (asking for an update of the clinical story over the past 24 hours;
- Closed questions (“So what are you trying to do with sachets in EBM?”);
- More open ended questions where the consultant was inviting questions involving clinical judgement (“What’s your conclusion?”; “What would you use as a guide—how would you sort out real infection?”; “Ten is not significant? Would you accept that?”).

In the first development ward round attended, apart from service delivery questions, 43 questions were asked during the 77 minutes of the ward round which were clearly focused on teaching and learning; in the second round, 41 questions were asked in 71 minutes.

On several occasions, where a teaching question to assist learning or assess knowledge was asked, the consultant moved easily into direct teaching. For example, a question was asked about how many calories there are in 100 ml of expressed breast milk. This was then followed by a piece of clear teaching. There were one or two occasions where there was a direct reference to further sources of information. For example, after discussion and questioning about a particular baby, the consultant asked: “You don’t get taught this? Let’s look it up in [book cited] to get an authoritative view.”

There was evidence too of learning taking place. Not only were the trainees on task but they often intervened or questioned the explanations being given. For example, an SHO repeated part of an explanation the consultant had given in order to clarify this for herself. Overall it was apparent that the trainees had trust in and respect for the consultant; and throughout much of the ward round, there was a real sense of dialogue taking place rather than of vessels being filled with knowledge.

In the project team member’s feedback report, the suggestion was made that improvement could focus on a brief recap at the end of the ward round of the further sources of evidence cited and a summing up of the principal lessons of the ward round. The consultant’s departure from the team gave no opportunity to pursue this. However, the comments of the trainees and trainer suggested that trainer behaviour had been altered (or at least had become more focused) as a result of consciously pursuing the suggested strategies; the

impression of the project team member was that more questioning than before had been used and that this was welcomed by the trainees. The consultant himself was in no doubt that the feedback report was valuable.

Development work with the other two consultants followed on, with a focus on *assessing* and *facilitating learning* having been agreed. With both, there was a clear perception by the project team member that, compared with earlier evaluations, greater use had been made of assessment questions. These were of a wide variety and often led to direct teaching or feedback on trainee performance.

In all of this, as with the first consultant, the respect for and trust in the consultants was evident among the trainees.

Member testimony reinforced the impression that improvement had taken place. One consultant commented that it made a difference and felt that the researcher’s presence helped the medical team focus on teaching and learning.

All the doctors concerned were also clear that they had found the filming of their ward round (the starting point for the development strategies) had been valuable. A viewing had been arranged shortly after the round. The video provided detailed feedback (the researcher was there to facilitate discussion and highlight key issues), and it allowed rapid assessment of interactions between doctors, both verbal and non-verbal. This is seen as an important area for future development and evaluation.

Three SHOs, one registrar, one senior registrar, and one consultant also returned a simple *evaluation questionnaire* which asked for an assessment as to whether the teaching and questioning had been *high*, *medium*, or *low* and whether this had been *more than*, *same as*, or *less than usual*. Five noted increased levels of questioning by both trainers and trainees; the sixth said she had not been with the unit long enough to make comparative judgment, though she noted that questioning and teaching by the trainer had been *high*; learning by the trainees had been *high*, questioning *medium*.

On the job development work—the senior trainees

The underutilisation of the senior registrar/registrar had been identified by the consultants and they had taken the decision to give the registrars, on a regular basis, a more focused lead teaching role on ward rounds—a good example of the unit team taking the initiative. Of the two observed, the registrar was conducting her first lead ward round and clearly (and understandably) was more concerned with getting to grips with the situation on the wards than in teaching. The project team member recorded during each of 23 five minute intervals of the ward round the number of *teaching events*, *questioning by the trainer* (other than those relating purely to service delivery), and *questioning by trainees*. Out of these 23 intervals, only eight involved registrar teaching and three involved registrar questioning.

With her second ward round, at the suggestion of the project team member she made explicit to the trainees the teaching and learning foci that she intended. There was also evidence of assertion of control when on two occasions she rebuked trainees for not paying attention. There was evidence too of a range of questioning, which led on occasions to teaching, covering some of the categories referred to above. Teaching, however, did seem to be incidental²; teaching moments were seized opportunistically rather than being something which was jointly planned before the ward round.

The senior registrar was observed on a number of occasions. Following the first, she agreed to make her role as teacher more explicit. Significantly, she asked the consultant not to attend on this occasion. In comparison with an earlier ward round, there was a clear increase in the number of teaching incidents and questioning (both open and closed), other than exchanges that were concerned purely with service delivery—something commented on afterwards by the trainees to the project team member. Of the 14 patients seen, 12 gave rise to teaching and questioning of the former kind.

Recommendations

The development work with this unit gives rise to several broader issues which may have resonances with other specialties or departments:

- Teaching and learning in on the job training is most effective when it is made *intentional* so that both trainers and trainees are aware of the teaching aims of the ward round, enabling teaching and learning to move from the accidental or incidental to something which is collaboratively planned.

- Trainees need to become *sensitively proactive*. A close knit team such as that of the neonatal unit clearly is conducive to this.

- Trainers need to be more aware of the trainees' learning needs. Again, a well organised, coherent unit is more likely to address this issue but in other departments, though there may be implicit understanding by trainers, often there is little evidence that it is explicitly addressed.³

- *Informal feedback* from trainer to trainee should be given a high priority. This was an issue identified in the 1994 survey cited above and emphasised in the *BMJ* article by Baldwin *et al.*³

- *Structures/procedures* may need to be altered to facilitate teaching and learning—for example, by starting each ward round with a brief statement of aims or teaching foci and ending with (or giving at intervals during the ward round) a brief summary of the major teaching/learning points.

- *Evidence of improvement* should be collected. This could be in the form of a simple questionnaire described above; a more systematic procedure is to employ a content analysis system which quantifies and categorises interactions made between trainee and trainee.⁴ For the future, video also seems a promising development, providing rapid and graphic feedback.

- The team, as in the neonatal unit, must take *ownership of teaching and learning*, deciding on foci and critically evaluating the teaching and learning that has occurred. In this way, a culture of training⁵ can be embedded in the team. In this respect, the researcher acted as a catalyst. Further development with doctors, with a member of the medical team assuming a particular training assessment role, would facilitate ongoing enthusiasm.

The last point is the crux of the matter. Ownership of the development of teaching and learning which goes beyond the provision of formal programmes focusing on job training must be established in specialties, and a culture of training enhanced, if the new demands which the chief medical officer has instigated are to be met.⁶

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1 Booth M, Bradley H, Hargreaves DH, Southworth G. *Pilot project on the training of doctors in hospital*. Cambridge: University of Cambridge Department of Education and Institute of Education, 1994.

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3 Baldwin PJ, Newton RW, Buckley G, *et al.* Senior house officers in medicine: postal survey of training and work experience *BMJ* 1997;314:740–3.

4 Booth M. The quantitative and qualitative analysis of the teaching role of registrars. *Medical Teacher* (in press).

5 Hargreaves DH. A training culture in surgery. *BMJ* 1996;313:1635–9.

6 Committee on Medical Education. *CMO Update* 13, February 1997.