Current topics

Special and intensive care baby units and nurse staffing in the UK

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SUMMARY A review of neonatal special and intensive care units in the UK in 1980-81 shows that although the number of cot/incubator units provided for special care conforms with current recommendations, there is a contrasting shortfall of 40% in cot/incubator units for intensive care. Admission policies are vague, vary considerably, and not all units are engaged in the type of care for which they are officially intended. Many units would admit fewer babies if the number and level of expertise of nursing staff in postnatal wards was improved. Rationalisation and redistribution of facilities seems advisable. The number of trained nurses falls far short of those recommended. Almost 21% of units had no formal staffing establishment, and of those that did less than half were filled. The total number of nurses of all ranks and experience failed to reach recommended levels, as did the ratio of trained staff to 'others'. Recruitment of nurses to this specialty is slow and the high turnover rate endangers maintenance of high standards and continuity of patient care.

Special and intensive care of the newborn requires highly skilled nursing, but inadequate numbers of trained nurses make optimum care virtually impossible. Despite clear recommendations¹⁻⁶ many units have undeclared or unfilled establishments, or establishments that seem inadequate for the special needs of modern neonatal care.

In a discussion document prepared by the Standing Committee of the British Paediatric Association and Royal College of Obstetricians and Gynaecologists⁶ (BPA/RCOG Standing Committee) it is suggested that 40% of all newborn infants require medical attention over and above purely routine care, that 7% require special care, and 3% intensive care. It is also suggested that the nursing provision for these babies is 37% less than that recommended in the Sheldon Report of 1971¹ (which itself requires revision by a factor of 25%).

The British Paediatric Association/British Association of Paediatric Surgeons Joint Standing Committee on Paediatric Nursing (BPA/BAPS, Nursing) initiated a study of the current numbers of special care baby units (SCBUs) and combined special and

intensive care units (ICUs) (Appendix), and their nurse staffing to find out whether they were seriously understaffed. For this survey the paediatricians reported the level of care that units actually provided, irrespective of their official designation.

Method

A questionnaire (copies available from the British Paediatric Association, 23 Queen Square, London WC1N 3AZ) was prepared. The first part yielded information on the type, size, and operational policy of the units, and the second part details of the nursing establishment, the number and previous training of nurses in post, and whether formal courses or other informal training were offered. All UK paediatricians were sent the questionnaire in December 1980, (88 returns) and again in August 1981, (52 returns). The forms were completed by paediatricians in consultation with their senior nursing colleagues and a 20% random sample of the earlier returns sent back to source for verification, confirmed the validity of the data.

The questionnaire was structured to establish staffing numbers and expertise at any one time, adjustments being made to the data received so that the ratio of wholtime equivalent staff in post to

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the number of cot/incubators could be calculated. All figures were rounded up so that the results would favour an increase in establishments.

Results

Study population. The returns were from 75 SCBUs in centres offering special care only and 65 ICUs in which both full intensive and special care were available. The SCBUs provided facilities for 196 452 births with 1240 cot/incubator units (6.3 per 1000) and the ICUs provided for 240 112 births with 1428 special care (5.9 per 1000) and 246 intensive care cot/incubator units (1.0 per 1000). This total of 436 564 amounts to 57.9% of the total births in 1981 in the UK. If the 246 ICU cot/incubator units are regarded as accommodating all the babies in the study requiring intensive care, the true ratio of cot/incubator units per 1000 births falls to 0.6 (Table 1). Henceforth, a cot/incubator unit will be called a 'cot'.

Size of clinical units. There was a wide range in the size of both kinds of unit, but on the whole the ICUs were larger. Twenty one per cent of SCBUs had 21–30 cots compared with 40% of ICUs; 28% of ICUs had over 30 cots, but no SCBUs had over 30. Most SCBUs (67%) contained 11–20 cots, while some units of both kinds had 10 cots or less. Some 68% of ICUs had 4 or fewer cots designated as 'intensive care cots', and only 11% had 7 or more.

Admission policy. Only 16% of SCBUs and 35% of ICUs were able to exercise a strict selective admission policy and many babies were admitted to both types of unit for 'minor' care. Similarly, 69% of units declared that they would admit fewer babies if the numbers of nurses and nursing expertise in the post-natal wards were improved, and less than 20% of units considered their admission policy satisfactory.

In 3 returns a 'half way house' ward was described—that is babies and mothers were admitted to a special postnatal ward where they would receive some special care without the separation of baby and mother that admission to a SCBU entails.

Table 1 *No of infants in study population*

Type of unit	No of births	Special care cot/incubator units		Intensive care cot/incubator units	
		No	Per 1000 births	No	Per 1000 births
SCBUs	196 452	1240	6.3	—	—
ICUs	240 112	1428	5.9	246	1.0
Total	436 564	2668	6.1	246	0.6

Table 2 *Proportion of babies admitted to SCBUs and ICUs*

Percent of deliveries admitted	SCBU (n=75)		ICU (n=65)		Both (n=40)	
	No	%	No	%	No	%
Less than 10	13	17.3	20	30.8	33	23.6
10–15	30	40.0	23	35.4	53	37.9
16–20	15	20.0	11	16.9	26	18.6
21 and over	17	22.7	11	16.9	28	20.0

Proportion of babies admitted. Admissions (Table 2) ranged from <10% to >25% of births, with minimum extremes of 7.1% for SCBU and 3.8% for ICU, and a maximum of 33.2% for SCBU and 47% for ICU. Two thirds of SCBUs had <5% of their admissions referred from other hospitals and about one third admitted 6% or more from outside, whereas half of the ICUs admitted 6% or more from other hospitals. Again there were some extreme cases,—for example, 32% of admissions to 1 SCBU and 42% to 1 ICU were from other hospitals.

Transfers out. Some of the admissions from other hospitals—for example where babies were transferred from an SCBU to an ICU—may have led to a baby being recorded twice in this survey. Since it was not possible to identify the hospital to which babies were transferred and since the numbers were probably small, no attempt was made to adjust for this error. About two thirds of the SCBUs transferred 5% or less of their admissions and one third transferred 6% or more. Conversely, 77% of ICUs transferred 3% or less and 20% transferred 4% or more.

Transfers were divided into 2 groups, those babies needing further care because of preterm delivery and those transferred for other reasons. In 84% of SCBUs preterm babies were transferred, while only 26% of ICUs transferred preterm babies. The proportion of babies transferred for other reasons was similar for both SCBUs and ICUs, but the number was not great—80% of all units transferred 3% or less.

Nursing establishments. In 79% of units establishment numbers were given (Table 3). ICUs were the

Table 3 *Status of nursing establishment*

	SCBU (n=75)		ICU (n=65)		Both (n=140)	
	No	%	No	%	No	%
Full	27	36	21	32	48	34
Not full	30	40	33	51	63	45
Not stated	18	24	11	17	29	21

least well staffed and had most unfilled posts. Excluding those units in which establishments were not stated, 53% of SCBU and 61% of ICU establishments were unfilled, with a combined figure of 57%.

Initial training and the number of sisters and staff nurses with Joint Board additional certification. Fewer sisters and even fewer staff nurses with an initial sick children's training (RSCN) took additional Joint Board certification than those with initial midwifery training (SCM). The sisters who were state registered nurses only, more often added to their training with Joint Board courses than both RSCN and SCM sisters: 42% in SCBUs and 54% in ICUs. In the case of staff nurses, however, many more of those working in ICUs (20%) had Joint Board additional training than did those working in SCBUs (8%), though fewer staff nurses (15%) than sisters (36%) had taken special training.

The ratio of sisters and staff nurses to the number of cots. In only 9% of units was there a nurse to cot ratio of greater than 1:1 and none (except in small units of 4 cots) were greater than 2:1 (Table 4). Twenty four per cent of all units had a ratio of <0.5:1 and in general the nurse to cot ratio in ICUs was little better than in the SCBUs (61% of ICUs had a ratio of 0.6:1 or less, in contrast to 67% of SCBUs).

Total number of 'trained' nurses to the number of cots. Since this number included all sisters, staff nurses, state enrolled nurses, nursery nurses, and auxiliary nurses, the ratio of nurses to cots improved considerably. But even so, only 8% of all units had a nurse to cot ratio of greater than 1.8:1; just under half of the units had a nurse to cot ratio between 1.8:1 and 1:1; and some were as poorly covered as 0.6:1. The ratio was marginally less satisfactory in the ICUs.

Almost all units (94%) employed nursery nurses and three quarters employed state enrolled nurses. There were more pupil midwives and auxiliary nurses and fewer trainees in the ICUs, but the differences were insignificant. Most units employed <5 state enrolled nurses and <10 nursery nurses,

Table 4 *Ratio of sisters and staff nurses to cots*

Ratio of nurses to no of cots	SCBU (n=74)*		ICU (n=65)		Total (n=139)*	
	No	%	No	%	No	%
>1.0:1	5	7	7	11	12	9
0.9-0.7:1	20	27	18	28	38	27
0.6-0.5:1	31	42	24	37	55	40
0.4-0.3:1	16	22	15	23	31	22
<0.29:1	2	3	1	1	3	2

*Information not available for 1 unit

Table 5 *Minimum on duty nursing staff**

Ratio of babies per nurse	SCBU (n=75)		ICU (n=65)		Total (n=140)	
	No	%	No	%	No	%
<3	9	12	6	9	15	11
4-5	33	44	24	37	57	41
6-10	21	28	32	49	53	38
11+	11	15	2	3	13	9
Not stated	1	1	1	2	2	1

*Assuming 75% occupancy of cots

though the total number was skewed in respect of nursery nurses because 3 units seemed to employ very large numbers, suggesting that they ran special training courses. Only 29 (21%) of units—16 (21%) SCBUs and 13 (20%) ICUs—employed agency nurses, but none did so to any great extent; 6 had 4 whole time equivalents or more and the remainder, 3 or less.

Minimum number of staff on duty. For this analysis a 75% cot occupancy was assumed and the number of cots (babies) per nurse was calculated. This was done to give a clearer idea of the nurses' responsibility and allowed for periods when the ward was not fully occupied. The minimum number on duty at any one time is shown in Table 5. Only 11% of units had a satisfactory ratio of 3 or fewer cots per nurse. Nearly 80% of the units had ratios between 4 and 10 cots per nurse, and 9% even had 11 or more cots per nurse, most of these being SCBUs. But at times 52% of ICUs had minimum nurse coverage of 6 to 10 cots per nurse, or worse.

Only 20% of SCBUs and 22% of ICUs had a ratio of sisters and staff nurses to others (including pupils and trainees) of 1.5:1 or better. At the other end of the scale about 46% of units had a ratio of less than 1:1.

Nurse teaching. None of the SCBUs offered a Joint Board course, while 25 (39%) of the ICUs ran one. There were, however, 27 (36%) SCBUs in which tutors offered in service training of from 1 to 10 hours per week. In the ICUs, 57 (88%) offered either a course or in service training. Many of the returns indicated that there was unstructured teaching by in service staff, though this could not be estimated. Of the 137 nurses completing a formal Joint Board course just before the study, there was a minimum of 3 and a maximum of 12 (average 5) per training centre. Only 40 of these (29%; range 17-66%) intended to stay on as a staff nurse in the unit after the course was completed.

Discussion

Special and intensive care units. It is possible that the

centres from which the data are derived serve a greater number of babies than stated, since the doctors who completed the questionnaire may not have known the total number of newborn babies for which their units act as a referral centre. Although the grouped returns from SCBUs and ICUs are unlikely to cover exactly the same geographical areas, they have been combined to obtain an approximate ratio of cots in ICUs to the total number of births. This calculation does not take into account the siting and numerical distribution of units in relation to population density, but the findings are supported indirectly by data obtained from the National Perinatal Epidemiology Unit, Oxford. Comparing the cot numbers and the distribution in the 14 English regional health authorities shows the relation of the number of cots in SCBUs to the number of babies of birthweight below 2501 g to be very consistent, but there is no relation between the number of cots in ICUs and the number of babies of birthweight 1001–1500 g.

The ratio of SCBUs to ICUs is 1.15:1, which suggests an imbalance. This is especially so in the case of intensive care cots—for example, in 39% of ICUs there were 2 or fewer cots designated for intensive care, which suggests either inappropriate planning or a failure to implement a more appropriate arrangement for patient management. Clinical expertise is very hard to maintain in such units and to equip fully, staff, and establish laboratory services to maintain units of this size is unlikely to be cost effective. These data may, on the other hand, represent more closely the number of cots officially designated, but in practice more will be used unofficially for intensive care. Thus staffing and ancillary support are likely to be inadequate since funding is never available for something that does not exist officially!

Admission policies varied from centre to centre and changed from time to time within a centre. A sense of 'making do' was quite common. With few exceptions there were lower admission rates in units with higher total numbers of births (over 3500 per year) and higher admission rates in the units with <2000 births a year. The ICUs generally admitted a smaller percentage of births than the SCBUs, which suggests that the larger centres were better able to staff the postnatal wards adequately and needed to admit fewer babies to the SCBU or ICU. This is perhaps fortunate since it appears that the nursing establishments of larger SCBUs and ICUs are less satisfactory than those in the smaller units. The fact that 39% (54/140) of units admitted 16% or more of their own births suggests, however, that observation and even basic additional care is not available in many postnatal wards. Clearly policies

within health regions as well as admission policies within hospitals vary greatly.

Nurse staffing. There were frequent comments that no fixed nursing establishment existed, and in fact 21% of units did not give one on their returns. Many nurses were on short term rotation from the midwifery service and the nursing cover was often stated to be very insecure. The nursing officer in charge did not always work in the baby unit or have expertise in this field, senior cover being provided by the midwifery nursing officer on duty at the time. On the other hand, nursing officers occasionally were sufficiently experienced to 'act down', doing practical work in the baby unit if necessary. In some units extra staff could be obtained on request from the midwifery service but occasionally a sister, required to 'act up' in the general maternity service, had to work outside the unit.

The Royal College of Midwives recommended in 1980⁷ that there should be 1.5 nurses per cot in SCBUs and 5 per cot in ICUs—a considerable increase on the numbers suggested in the Sheldon report.¹ As a realistic compromise, the BPA/RCOG Standing Committee⁸ reduced these numbers to 1.25 and 4 respectively. It has also been recommended that there should be a minimum of 1 nurse per 5 babies on duty in SCBUs and 1 per 2 babies on duty in ICUs.³ The results of this survey indicate how many units in Britain fall far short of these recommendations, despite official exhortations for improvement.^{3,4} The differences in staffing between daytime and nights and weekends seem to ignore the fact that babies, especially ill babies, require the same quality and quantity of care at all times, and they obviously do not get it. Perhaps the number of nurses should be based, not in the time honoured way on number of cots, but on the number of births, assuming 7% need special care and 3% need intensive care. Nevertheless, all units should have the basic recommended establishment, the ratio of sisters and staff nurses to others should be no less than 1.5:1⁴ and should be inviolate.

The number of senior staff with additional Joint Board certification is low in both SCBUs and ICUs, but most senior staff still in post had finished their training before the special courses started. Fifty five units offer the course 402 and 5 course 400 of the Joint Board courses, but each can only attract a few recruits. Economies could be achieved if there were fewer and larger classes, though this obviously poses further problems. More important, however, is that a very small number of nurses remain in post after certification. This, together with the poor recruitment to posts (as reflected in the large number of unfilled establishments) and the

frequent rotation of midwives from the postnatal wards, makes continuity of care and the maintenance of high standards in a settled environment virtually impossible.

Many nurses leave intensive care entirely, and a few go to other SCBUs or ICUs, or to adult ICUs, perhaps reflecting the stressful nature of this work.⁸ This wastage of training requires careful rethinking about the suitability of applicants for intensive care nursing, the number of hours on duty, the periods of rest and relief, and perhaps, the pay.

Conclusions

1. The number of cots has been calculated separately for SCBUs and for ICUs. In both SCBUs and ICUs the recommended ratio of 6 cots per 1000 births for special care³⁻⁶ has virtually been achieved. In the ICUs, however, in which the recommended number of cots designated for intensive care is 1/1000 births, there is a shortfall of 40 per cent. The ratio of SCBUs to ICUs suggests an excess of the latter and the numbers of cots in some wards of both types raise questions about the justification for their existence.

2. Rationalisation and redeployment are necessary in some areas so as to make more efficient and effective use of limited facilities. Each health region needs to reassess its own needs and resources. The service might be improved with fewer, larger, and strategically sited units. On the other hand, since the important fact is how a cot is used, those not designated as such, but having to be used for intensive care, should be redesignated and staffed and equipped accordingly. Short term 'intensive' life sustaining facilities should be available wherever babies are born.

3. Admission policies for both types of unit seem to be vague and determined largely on the grounds of expediency, units practising the type of care the local circumstances demand. As far as possible, locally determined admission policies should be adhered to, and it is suggested that these follow the recommendations of the BPA/RCOG Standing Committee and Scottish Home and Health Department reports.^{3,4}

4. Many participants commented upon the wish to be able to admit fewer babies to SCBUs and ICUs and the combined postnatal/special care baby ward may offer an alternative to the SCBU. Carefully considered admission to the postnatal ward of those babies requiring special care could ease the nursing problem, but would necessitate considerably improved staffing in many hospitals.

5. 'Transfer out' information suggests that units are not all engaged in the type of care for which they are officially intended. Sixteen per cent of

SCBUs have no transfers, indicating that they almost certainly practice intensive care, and conversely 26% of ICUs transferred preterm babies, which indicates that they had insufficient facilities to care for their patient load, despite their designation as intensive care units.

6. The number of sisters and staff nurses falls far short of recent recommendations. Almost 21% of units had no formal establishment and of those that did, only 43% were filled. Too few trained nurses (only 36% sisters and 15% staff nurses) have had additional formal training in special and intensive baby care.

7. The total number of nurses, (including state enrolled, nursery, and auxiliary nurses, and assuming them all to be trained) does not meet the latest BPA/RCOG recommendations, ie 1.25 nurses for each SCBU and 4 nurses for each ICU cot/incubator unit. Each unit should have such an inviolable establishment. The survey shows that only about 30% of SCBUs and less than 10% of ICUs meet these recommended figures.

8. The ratio of sisters and staff nurses to others is also below recommended levels. Only 21% of units had the ratio recommended in the Scottish report of 1.5:1 or better.

9. There is a disappointing wastage of trained personnel and only about 30% of nurses completing intensive baby care courses intend to remain in the units. The reasons for understaffing—inadequate establishments, lack of funds, inability to attract recruits, and the stress effects on staff of intensive care nursing require study.

10. The high turnover of nurses in these units makes maintenance of high standards and continuity of care very difficult.

11. Plans for improvement in facilities and staffing were reported from a few centres, though delays were also recorded.

Appendix

While there are as yet no official definitions of 'special' or 'intensive' care, most paediatricians would accept that the former provides observation and treatment in addition to routine care (eg monitoring, phototherapy, temperature, and blood glucose control) but exclusive of intensive care. The latter provides special investigation, close supervision, and intensive treatment including continuous monitoring, cardiopulmonary support (in addition to that required for initial resuscitation), intravenous nutrition, and pre- and postoperative care.

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Detailed data may be obtained from the author.

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