

AN EVALUATION OF AN EDUCATION PROGRAMME
ON NEONATAL CARE
FOR MIDWIVES

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A dissertation submitted to the Department of Paediatrics
and Child Health of the University of Cape Town in partial
fulfillment of the requirements for the degree M.Phil. in
Maternal and Child Health.

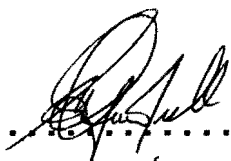
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DECLARATION

I, David H. Greenfield, declare that this dissertation embodies only my original work except where acknowledgement indicates otherwise and that no part of it has been, or is being submitted for a degree at this or any other university.


.....
date..... 21/9/01

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ABSTRACT

The education programme being evaluated was designed to improve the knowledge and practice of midwives working in Midwife Obstetric Units in the Southern Cape Peninsula.

The programme was started at the beginning of 1987 and consisted of a number of activities including 4 two week courses in January and February 1987.

In this evaluation only the knowledge and practice of the midwives were assessed. Knowledge was assessed by using a multiple choice question paper and this was done in 1987 and 1991. Practice was evaluated by means of chart review using a data collection sheet which was developed for this purpose. Specific criteria (observations, documentation, problem identification, management and overall score) were used to evaluate the records of babies transferred to hospital by the midwives. The change in practice over the periods 1983 to 1986, and 1986 to 1989 was assessed.

The results showed that the knowledge of the midwives improved significantly following the two week courses at the beginning of 1987. The mean test scores of the midwives in 1991 were significantly lower than those at the end of the courses, but in real terms, only 4%. (83% compared with 87%) There was a highly significant improvement in the midwives' practice. The proportion of records with scores of less than 33% for the criteria measured, decreased significantly,

while the proportion of records scoring more than 66% increased significantly. This trend was already present in the 1983 to 1986 period, but appeared to have accelerated in the 1986 to 1989 period.

The programme was able to improve and maintain the knowledge of the midwives at a significantly higher level than before the programme started. The practice of the midwives was also significantly better.

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1. INTRODUCTION

1.1. Historical Background

1.1.1. Establishment of Midwife Obstetric Units

The Midwife Obstetric Units were established in 1973, when the midwifery services provided by private midwives were brought together under the Day Hospital Organisation in primary care perinatal centres. (van Coeverden de Groot, 1978) This development was supported by the Department of Obstetrics of the University of Cape Town. The midwives were responsible for running the service under the supervision of medical officers and a specialist community obstetrician. Many of the private midwives joined the service. In the first years there was no specific paediatric input.

In 1980, the Peninsula Maternal and Neonatal Service was established as a regional perinatal service in the Southern Cape Peninsula (van Coeverden de Groot, 1982). It comprises the Departments of Obstetrics and the Neonatal section of the Department of Paediatrics of the University of Cape Town, the Groote Schuur Teaching Hospitals Group, and the Midwife Obstetric Units as the primary care centres. This has resulted in a sound regional perinatal service, involving all levels of care. Inherent in this type of health care service is the need for clear criteria for referral of patients, and protocols for patient care prior to being transported to hospital.

1.1.2. Appointment of Paediatric Staff

At the end of 1986, paediatric medical staff were appointed to work in the Midwife Obstetric Units. The reasons for the appointment of these doctors were:

1. To improve the quality of care given to the newborn infants.
2. To attempt to improve child health by, for example, improving breast feeding.
3. To provide a follow-up service for "high risk" infants, discharged from hospital, closer to their homes.
4. To help to establish community based health care projects such as breast feeding groups, and groups for bereaved parents.

The primary function of the medical personnel was seen to be that of teaching and supporting the nursing staff, and of being available to them for advice. The objective was not to take over their role as the providers of primary health care.

It soon became clear that the main task would be that of teaching the midwives both the knowledge and the skills needed to recognise problems in the newborn babies, and provide appropriate care for them. A number of educational activities were therefore set in motion in order to ensure that appropriate aspects of knowledge and skills could be

acquired by the midwives. These activities will for the purposes of this discussion be known as the education programme.

As a consequence of the teaching, particularly of skills, it also became clear that it would be necessary to ensure that certain basic equipment was available at each Midwife Obstetric Unit.

1.2. Education Programme

1.2.1. Objectives of the programme

1. To ensure that the midwives had the knowledge to recognise the problems which were likely to arise, to anticipate potential problems, and to manage their patients correctly.
2. To help the midwives to acquire the skills which they would need in order to diagnose and manage their patients correctly.
3. To help the midwives develop good communication skills. In particular, emphasis was laid on the writing of notes.
4. To reduce morbidity and mortality in the newborn babies born at the Midwife Obstetric Units.

1.2.2. Activities of the programme

1.2.2.1. Two-week courses Four such courses were held in January and February 1987 at Groote Schuur Hospital. (Delpont, 1989) These were attended by 31 midwives who were working at the Midwife Obstetric Units. Appendix 1 shows the course programme. A pre-course (Appendix 2.) and a post-course test (Appendix 3.) were administered to those attending the courses.

1.2.2.2. Weekly "teach-in" days, when one midwife from each Midwife Obstetric Unit was brought into Groote Schuur Hospital. The teaching was essentially hands-on training in:

- 1) establishing peripheral and umbilical intravenous lines.
- 2) resuscitation of the newborn, including endotracheal intubation.
- 3) the recognition, prevention and management of hypothermia and hypoglycaemia.
- 4) the care of the sick infant prior to transport to hospital.
- 5) the writing of problem orientated patient notes.

1.2.2.3. Weekly teaching sessions at the Midwife Obstetric Units. These were initially aimed at dealing with essential clinical skills and common neonatal problems about which the midwives wished to learn. Many of these were problems identified at postnatal clinics.

1.2.2.4. Periodic special teaching mornings, when important topics (usually requested by the staff) would be dealt with at a Midwife Obstetric Unit. At these sessions the nursing staff would be divided into groups of 5 or 6 people, and would rotate through several 10 to 15 minute discussion sessions on the topics to be dealt with.

1.2.2.5. Informal teaching took place at almost every doctor's visit to one of the Midwife Obstetric Units, particularly at follow-up clinics, when the staff were able to bring back babies about whom they were worried, and discuss the problem with the doctor. This "hands-on" clinical teaching was seen as possibly the most important area of learning for the midwives, as they were able to learn about the real problems with which they were faced.

1.2.2.6. Specific problems. When it was found that incorrect or inappropriate management had occurred, this was discussed with the midwife concerned, and also, where appropriate, anonymously at the monthly perinatal morbidity / mortality meeting. In both instances, this is done with the objective of providing a supportive learning environment. Similarly, good management and good outcomes were also fed back to the midwives. The formal paediatric input at perinatal morbidity and mortality meetings was a report back to the staff on the babies which they had referred to hospital during the previous month. If necessary, this was done in detail.

2. LITERATURE REVIEW

It would probably be true to say that the professional education of health workers has an important role in improving health care. However, in order to determine the truth of this statement, it is necessary to be able to measure such improvement.

There are two perinatal education programmes which have been instituted in the United States of America, and which have been carefully planned and evaluated.

Kattwinkel (1987) planned to evaluate his perinatal education programme by attempting to answer 4 questions.

1. How much did the participants like the programme?
(attitude)
2. How much did the participants learn from the programme?
(knowledge)
3. What behaviour changes had resulted from the programme?
(eg. in the way that the babies were cared for) (practice)
4. How much better care did the babies receive that could be attributed to the programme?

In actually evaluating this programme, he found that he was able to assess the attitudes of the health care providers, the effect on hospital facilities and health care

goals, cognitive knowledge, and patient care practices.
(Kattwinkel, 1979)

He assessed the attitudes of the health care providers by measuring their level of participation in the programme, and by administering a questionnaire. The latter was a 61 item attitude survey which was administered before and after the programme. The level of participation was assessed by looking at the number of inter-unit tests completed, by using evaluation forms, and by subjective comments made by the participants.

The effect on hospital facilities and patient care goals was assessed by doing a pre- and post-programme inventory of the facilities at the institution concerned, by seeing whether there were established patient care protocols, and noting any change which had occurred in these as the result of the programme.

Cognitive knowledge, both short and long term was evaluated by means of inter-unit tests, for short term knowledge and a comprehensive post-course test for long term knowledge.

Patient care practices were evaluated by using an in-depth retrospective chart review of sick and at-risk babies both before and after the programme, and by assessing patient stabilising activities prior to the transport of babies to a regional centre.

Nowacek (1983), in evaluating the transportability of this same programme, used participation in the programme, changes in cognitive knowledge, and changes in neonatal care practices as his criteria by which to evaluate the programme:

In all of these, the following features stand out as achievable, and measurable criteria for evaluation of their education programme:

1. the attitude of the participants, as measured by, particularly, participation in the programme.
2. the changes in the participants' cognitive knowledge.
3. the changes in neonatal care practices.
4. the effect on hospital facilities and patient care goals.

Harlan et al (1980), in evaluating a programme in perinatal care, used cognitive tests, chart reviews (for practice evaluation) and consultation and/or referral times for assessing the effectiveness of the programme. As in the case of Kattwinkel's programme, these criteria were evaluated both before and after the programme was used.

In all of these programmes, the evaluation of knowledge was done by administering some form of cognitive test. These tests were done on a before-and-after basis, and in Harlan's study, by also using a control group which had not been exposed to the educational material. In this case the test was administered to both groups at the end of the programme. Standardised tests were not used, but a suitable cognitive

test was devised for use in each programme. It is also evident from reading these papers that the test which is used needs to be applicable to the needs of each specific situation.

The evaluation of practice is more controversial, and also more difficult. The methods used to evaluate nursing practice appear to be mainly by means of observing the nurse at work. This is the method described by both Guinee (1966) and Pohl (1979). There is no mention by either of these authors of chart review as a method of evaluation. Huckabay (1980) in discussing evaluation tools, points out the need to identify the terms and/or units used to appraise the record of behaviour, and also that this should be done objectively, but does not give further guidelines as to how this can be done.

In the studies mentioned above (Kattwinkel, Nowacek, Harlan), some form of chart review was used as a means of evaluating patient care practices in the context of perinatal care. Reed et al (1973) used a chart review method to evaluate the care given to patients who had had a myocardial infarct. Similarly, Scott et al (1973) also used the medical records of newly admitted patients in order to evaluate problem identification, together with investigative and therapeutic plans for each patient.

Whenever chart reviews have been used, the investigators had to develop some form of data capturing sheet. In each

instance the criteria requiring evaluation had been identified in detail and a recording system devised which could be scored, usually as a percentage. Once a score could be given to the extracted data, suitable comparisons and statistical analyses were made.

In the broadest terms there seem to be five general areas in which an education programme in health care can be evaluated. These are:

- 1 The knowledge of the participants.
2. The practice and skills of the participants, and the care given to patients.
3. The morbidity and mortality in the patients who are cared for by the participants.
4. The participants' acceptability of, and attitude to the programme, and their feeling of confidence in dealing with patients as the result of the programme.
5. The perceptions of the relatives of the patients and the patients themselves about the care given to them by the participants. This was not mentioned in any of the references, but seems nevertheless to be important.

3. AIM OF THE STUDY

Hyothesis

It is postulated that the education programme, as used in the Midwife Obstetric Units, has improved significantly the knowledge and practice of neonatal care of midwives.

In order to evaluate the education programme, the following two parameters were selected:

1. knowledge of the midwives
2. practice of the midwives in caring for sick newborn infants prior to their transport to hospital.

In this study the attitudes of the participating staff and the morbidity and mortality in the newborn babies were not evaluated. These are complex issues to evaluate and would have taken up more time than was available to the investigator. They are nevertheless issues which need

METHODS

4.1. Study population

4.1.1. Knowledge Assessment

The study population consisted of midwives currently working in the Midwife Obstetric Units, who have been working there for a minimum of two years. The two year period of work in the Midwife Obstetric Units was chosen because it was considered that this time would have provided adequate exposure to the teaching programme.

4.1.2. Practice Evaluation

The practice of the midwives was assessed by doing chart reviews on newborn infants referred to hospital by them. These records did not always have the name of the referring midwife, and when this was present, it was not always legible. No differentiation was therefore made with regard to length of service of the midwife referring the baby. As there is no reason to suspect that there were significantly different rates of staff change over the three periods of time of the chart review, this should not result in a significant bias.

4.2. Evaluation of knowledge

Knowledge was assessed by using the same multiple-choice question paper (Appendix 3) that was used as the post-course assessment at the end of the two week courses at the beginning of 1987. It was administered to the following groups of midwives in 1991:

4.2.1. The midwives who attended the courses in 1987, and are still working in the Midwife Obstetric Units. The before and after course marks for these midwives are known, and can therefore be compared with their marks in the currently administered test. An evaluation can therefore be made of the extent to which the on-going education has affected the level of knowledge which they had achieved at the end of their courses.

4.2.2. The midwives who have been working in the Midwife Obstetric Units for at least two years, but who did not attend the courses in 1987. Their level of knowledge can be compared to that of the midwives who attended the courses in 1987.

4.2.3. A group of midwives who have completed a six month course in Neonatal Nursing Science, and are currently working in a nursery with neonatal intensive care facilities. This will give a "gold standard" of the level of knowledge which can be expected from a midwife who is an "expert" in the field of neonatal care.

The question papers were returned to all 1991 participants, after marking, with a schedule of correct answers. (Appendix 4)

4.2.4. Analysis of data

The following comparisons were made:

1. The differences between the pre-course and post-course marks of those attending the courses in early 1987 were assessed. This was done in order to show the degree of improvement in knowledge which was achieved at the end of the courses. This was analysed using a Student t - test.
2. The post-course marks (of the 1987 courses) of those midwives who were still working in the service in 1991 were compared to those of the midwives who attended the courses and who were no longer working in the service in 1991. This was done using a Student t - test.
3. The results of the test administered to all the midwives in 1991 were compared to the results of all the midwives in the post-course test given in 1987. This enabled an assessment to be made of the improvement, if any, which had occurred in the intervening 4 years. This was analysed using a Student t- test.

4. The 1991 results of those midwives who attended the courses in 1987 were compared with the results of those midwives who did not attend the courses in order to assess whether or not there was a significant difference between the knowledge of these two groups. This was done using a Student t - test.

5. The levels of knowledge (1991 test) of the midwives in the Midwife Obstetric Units were compared with that of midwives who have post-basic training in neonatal care and were working in a neonatal nursery / intensive care unit. This was done using a Student t - test.

4.3. Evaluation of practice

This was done by assessing the notes written by the midwives on neonates referred by them from the Midwife Obstetric Units to neonatal units in the referral hospitals. Infants referred to these specific hospitals were transferred with the records used in the Midwife Obstetric Units. (Appendix 5) These notes then continue to be used in the referral hospital. The babies were also transferred with a standard hospital "observations" sheet. It was therefore fairly easy to extract both pre- and post-transfer data from them. The hospital records of these neonates were scrutinised and the required information recorded on a data sheet. (Appendix 6) A scoring system based on the information on the data sheet had been devised and was used to evaluate the quality of the practice of the midwives. The evaluation of the infant

record charts and observation sheets, and the scoring of the data sheets was done by a single observer - the writer - in order to eliminate inter - observer variability.

The newborn infants who were referred to a hospital neonatal unit were identified from the labour ward register and the "transfer" book at each Midwife Obstetric Unit. Not all of these infants were referred by the midwives, some of them being referred by doctors. Only those who were referred by the midwives were included in this study.

The following 4 criteria were used to evaluate the practice of the midwives: (Greenfield, 1990)

1. Observations
2. Quality of documentation
3. Problem identification
4. Management of the patient

Each of these criteria individually was allocated a score as a percentage. In addition, a percentage score for the whole record was calculated. This was recorded as "total".

As can be seen from the data collecting sheet, allowance was made for the variations which occurred between patients, so that the scoring was done on a percentage of the maximum possible score for that patient. (use described in Appendix 7) In order to help with the scoring of the quality of documentation, which was the most subjective of these four criteria, a guide was drawn up for use when there was

uncertainty by the observer in allocating a score. (Appendix 8)

A pilot study showed that it was possible to provide a numerical evaluation of the practice of the midwives in these four criteria. (Greenfield, 1990) These criteria were chosen because:

1. Good observations will enable problems and changes in the condition of the patient to be detected at an early stage.

2. Good documentation helps the health care worker to identify the problems present in the patient, and to think clearly about the prevention of potential problems and the management of current problems. It is also an essential means of communication to other health team members, especially when the patient is being transferred to another hospital.

3. Problem identification is crucial to the correct management of sick neonates.

4. The correct management of the sick neonate is the ultimate objective of the medical and nursing care of these patients.

The primary objective of this part of the study was to compare the quality of the notes written by the midwives in the periods 1/7/1986 - 31/12/1986 and 1/7/1989 - 31/12/1989. The six month period in 1986 was chosen because it was the period immediately prior to the start of the education programme, and the 1989 period because it allowed for a reasonable amount of time to have elapsed before making an evaluation.

It could be claimed that any improvement was merely the result of the "normal" improvement in practice which should occur over time. In order to assess this, the notes of the neonates transferred to hospital during the period 1/7/1983 - 31/12/1983 were also scrutinised and scored in the same way as for those of 1986 and 1989.

4.3.1. Analysis of data

The distribution of the scores obtained from the data sheets was not a normal distribution - in some instances the mode was 0% and in others 100%. This meant that the mean could not be used in the statistical analysis of this data. Non-parametric methods were therefore used. For each year and for each of the criteria measured, the scores were divided into the lowest 1/3 of the marks (0 - 33%), the middle 1/3 of the marks (34 - 66%), and the highest 1/3 of the marks (67 - 100%). The differences between the years for each category of data were then calculated using the chi square test, and the significance expressed as a p value.

The level of improvement which had been achieved over these two periods of time was compared in order to assess whether or not the amount of change had been significant. This was done by comparing the change in the proportions of low scoring records and high scoring records between the two time periods by using the linear trend in proportions. From this a chi square value could be calculated and the significance expressed as a p value. (Fleiss, 1981)

5. LIMITATIONS

5.1. Knowledge testing

5.1.1. Before and after testing could not be done for the whole group. It could only be done on those who attended the initial courses, and are still working in the service. There are two ways in which this could be dealt with.

1. The knowledge of a representative sample of all those midwives in the service at the time of the courses in 1987 could be compared to that of a representative sample of the midwives working in the service in 1991.

There is however no evidence that the midwives who attended the courses in 1987 were in fact a true representative sample of all the midwives in the service at that time.

However, if it could be shown that the knowledge of the midwives who attended the courses and are still in the service was not significantly different from the other midwives who attended the courses (in 1987), and also those who were tested in 1991, they would be a representative sample of both groups. If this could be shown to be true, then the midwives who attended the courses in 1987 could be regarded as a sample group for before-and-after testing.

2. The knowledge of the midwives who had been exposed to the education programme could be compared to that of

midwives who worked in similar circumstances but had not been exposed to the programme.

This was not possible as all the midwives in the Midwife Obstetric Units had been exposed to the programme, and it would not have been possible or desirable to have prevented exposure to the teaching.

5.1.2. There was not a 100% response rate to the testing of the midwives in 1991.

5.2. Practice assessment

5.2.1. Of necessity this was a retrospective chart review and suffered from the limitations of the design - mainly the problem of patient records which could not be traced. The principle reason for records being unavailable was that there was no record of the patient on the hospital computer system. In the case of one hospital the records were being destroyed three years after they were last used.

6. RESULTS

6.1. Knowledge

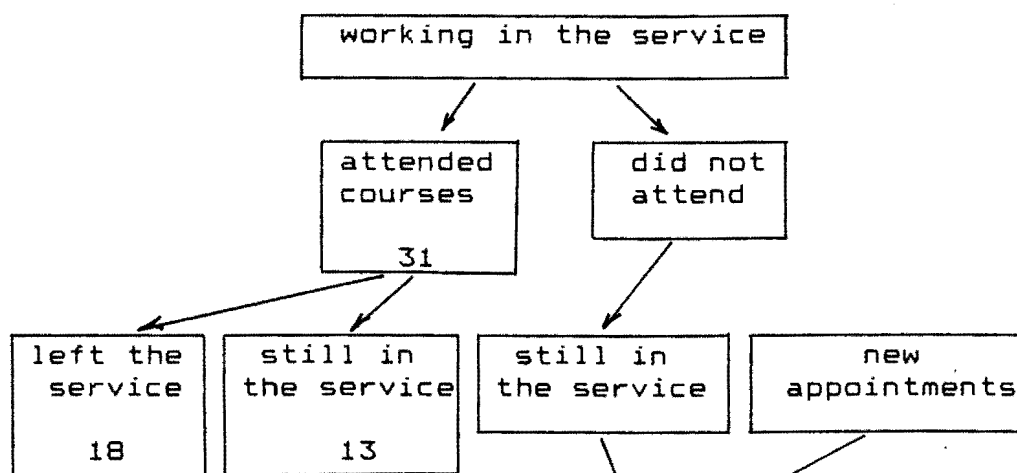
Not all the midwives working in the Midwife Obstetric Units in 1987 were able to attend the 2 week courses which were held. Only 31 of the midwives attended. Of these, 18 are no longer in the service while 13 are still working in the Midwife Obstetric Units. Of those who did not attend the courses some have also left the service, and new staff have joined. There are currently 44 midwives working in the Midwife Obstetric Units, of whom 13 attended the courses in 1987, and 31 did not attend.

All the midwives attending the courses were tested as part of the course in 1987. In 1991 all the midwives in the service were given the multiple choice question paper to do. All of the 13 who had attended the 1987 courses, completed the 1991 test. Of the 31 who had not attended the 1987 courses, 27 completed the 1991 test.

The test was also given to 29 midwives who have done a special course in neonatal care. The test was completed by 25 of the 29 midwives to whom it was sent.

table 1: Midwives tested

1987



1991

					total
in service > 2 years	13	+	31	=	44
tested	13	+	27	=	40

6.1.1. Scores obtained in tests.

6.1.1.1. Midwife Obstetric Unit Staff (1987)

table 2: Scores of midwives tested in 1987

	tested		mean score %	std. dev.	range %
	n	%			
pre-course	31	100	61,90	11,83	27 - 87
post- course	31	100	87,07	7,78	68 - 98
post-course still in service	13	100	87,08	8,66	72 - 97
post course left the service	18	100	87,06	7,34	68 - 98

6.1.1.2. Midwife Obstetric Unit and Neonatal Staff (1991)**table 3:** Scores of midwives tested in 1991

	total number	tested		mean score %	std. dev.	range %
		n	%			
all in service	44	40	91	82,88	8,20	59 - 96
attended courses	13	13	100	83,54	8,44	68 - 93
did not attend	31	27	87	82,56	8,23	59 - 96
neonatal training	29	25	86	90,00	4,74	77 - 96

6.1.1.3. Comparisons of groups**table 4:** The comparison of the pre- and post-course scores in 1987 for all those who attended.

	number tested	mean score %	std. dev.	t	p
before	31	61,90	11,83	15,97	<0,001
after	31	87,07	7,78		

There is a very significant improvement ($p < 0.001$) in the mean scores of the midwives before and after the courses.

table 5: The comparison of the post-course scores of those who are still working in the service, and those who have left the service.

	number tested	mean score %	std. dev.	t	p
in service	13	87,08	8,66	0,00671	>0,99
left service	18	87,06	7,34		

The mean scores of these two groups are almost identical and the difference is not statistically significant. ($p > 0,99$).

table 6: The comparison of the 1991 test scores of all of those who had attended the courses, and those who had not attended.

	number tested	mean score	std. dev.	t	p
attended	13	83,54	8,44	0,341	>0,70
not attended	27	82,56	8,23		

The difference between the mean scores of these two groups is not statistically significant ($p > 0,70$).

table 7: The comparison of the post-course scores (1987) and the 1991 scores of course attenders who are still in the service.

	number tested	mean score	std. dev.	t	p
1987	13	87,08	8,66	1.014	>0,30
1991	13	83,54	8,44		

There is no statistically significant difference between the mean scores obtained in 1987 and 1991. ($p > 0,30$)

table 8: The comparison of the scores of the all the midwives tested in 1991, and the post-test scores of all of those tested in 1987.

	number tested	mean score %	std. dev.	t	p
1987	31	87,07	7,78	2,153	<0,05
1991	40	82,88	8,20		

There is a statistically significant difference between the means of these two scores ($p < 0,05$).

table 9: The comparison of the scores of the Midwife
Obstetric Unit staff and neonatally trained staff.
(1991 test)

	number tested	mean score %	std. dev.	t	p
MOU	40	82,88	8,20		
neonatal training	25	90,00	4,74	3,887	<0,001

The neonatally trained staff scored significantly better in this test ($p < 0,001$).

6.2. Practice

6.2.1. Records reviewed

table 10: Number of records reviewed

	1983	1986	1989
infants referred	142	179	272
records obtained	130	155	242
% records assessed	92	87	89

For each of the years there is an adequate percentage of the records obtained in order to obtain a reliable statistical evaluation.

6.2.2. Observations

table 11: Scores of records in the three time periods

score (%)	1983		1986		1989	
	n	%	n	%	n	%
0 - 33	110	85	98	63	51	21
34 - 66	18	14	29	19	51	21
67 - 100	2	1	28	18	140	58
Total	130	100	155	100	242	100

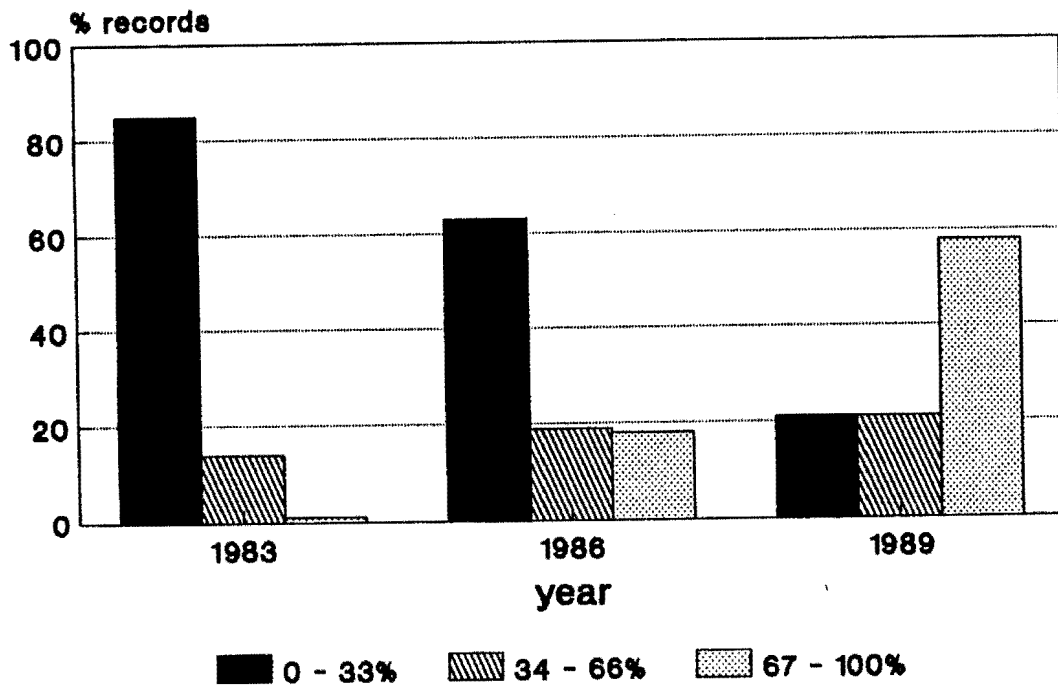


figure 1: scores of records (observ.)

Both table 11 and figure 1 show the decreasing proportion of records scoring in the lowest 1/3 and the

increasing proportion of records scoring in the highest 1/3 which has occurred over the three time periods.

table 12: Improvement 1983 - 1986 and 1986 - 1989

	'83 - '86	'86 - '89
chi square	23,79	80,33
p value	= 0,0000068	< 0,000000001

The improvement in the scores is highly significant over both these time periods. The p value is however lower in the 1986 - 1989 period.

table 13: Linear trend in proportions

	1983 n	1986 n	1989 n	chi square	p
0 - 33	110	98	51	149,17	<0,000001
34 - 100	20	57	191		
67 - 100	2	28	140	136,13	<0,000001
0 - 66	128	127	102		

This table shows that both the decreasing proportion of records scoring 0 - 33%, and the increasing proportion of records scoring 67 - 100% over the years is highly significant.

6.2.3. Documentation

table 14: Scores of records in the three time periods.

score (%)	1983		1986		1989	
	n	%	n	%	n	%
0 - 33	125	96	114	73	56	23
34 - 66	5	4	38	25	99	41
67 - 100	0	0	3	2	87	36
Total	130	100	155	100	242	100

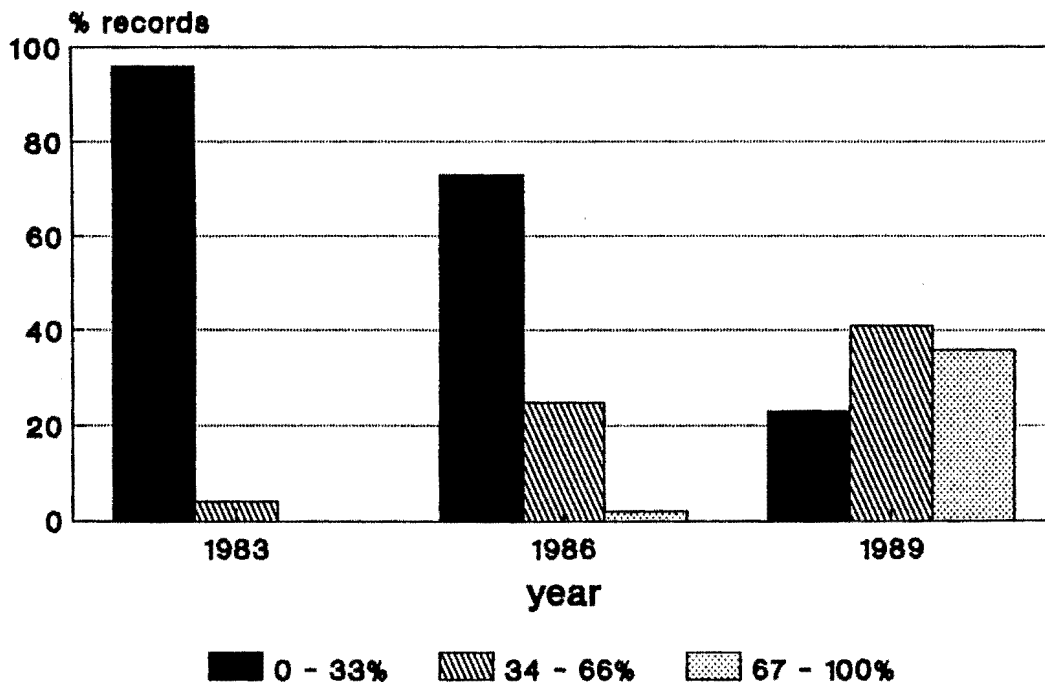


figure 2: scores of records (document.)

The decrease in the proportion of low scoring records and the increase in the proportion of high scoring records over the years is illustrated in both table 14 and figure 2.

table 15: Improvement 1983 - 1986 and 1986 - 1989

	'83 - '86	'86 - '89
chi square	26,82	114,64
p value	= 0.00000148	< 0.000000001

The improvement in documentation over both these time periods is highly significant. The significance seems to be greater over the 1986 - 1989 period than over the 1983 - 1986 period, as the p value is considerably lower for the 1986 - 1989 period.

table 16: Linear trend in proportions

	1983 n	1986 n	1989 n	chi square	p
0 - 33	125	114	56	201,74	<0,000001
34 - 100	5	41	186		
67 - 100	0	3	87	93,25	<0,000001
0 - 66	130	152	155		

As in the case of the observations, there is a very highly significant trend both in the decrease in the low scoring category and in the increase in the high scoring category.

6.2.4. Problem identification

table 17: Scores of the records over the three time periods.

score (%)	1983		1986		1989	
	n	%	n	%	n	%
0 - 33	47	36	47	30	26	11
34 - 66	44	34	43	28	66	27
67 - 100	39	30	65	42	150	62
total	130	100	155	100	242	100

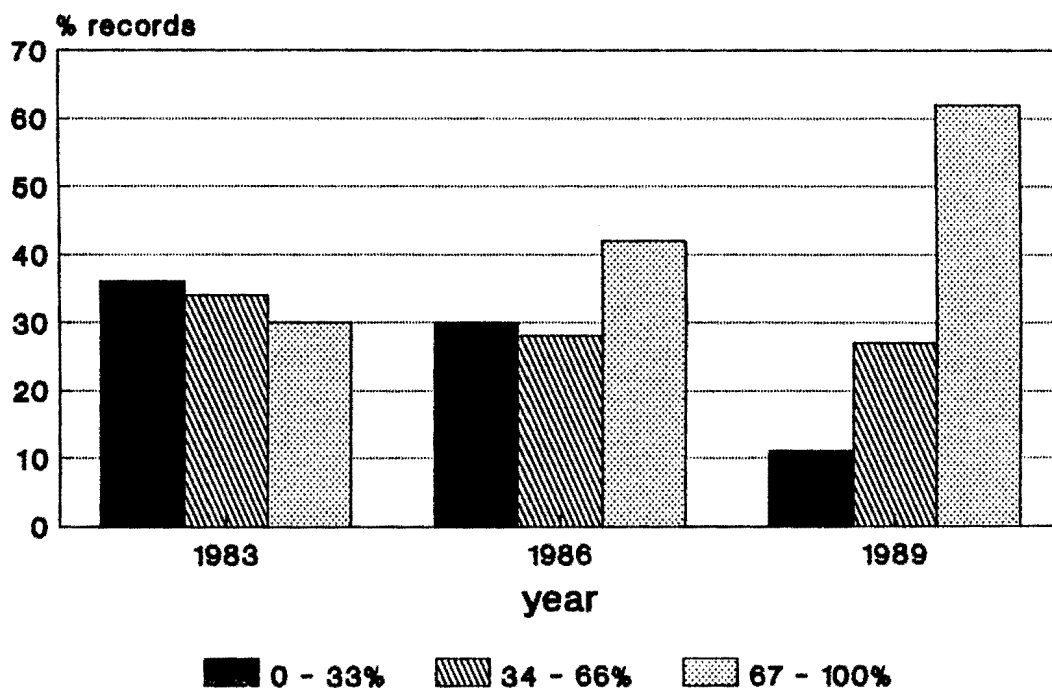


figure 3: scores of records (problem ID)

Both figure 3 and table 17 show the changes which have taken place. There is relatively little change from 1983 to

1986, but the change is evident over the 1986 to 1989 period.

table 18: Improvement 1983 - 1986 and 1986 - 1989

	'83 - '86	'86 - '89
chi square	4,35	26,72
p value	= 0,113	= 0.00000158

Table 18 confirms the impression gained from table 17 and figure 3 by showing that the change occurring between 1983 and 1986 is not statistically significant, whereas the change between 1986 and 1989 is significant. Even this change, however, is not as great as for the other criteria which were evaluated.

table 19: Linear trend in proportions

	1983 n	1986 n	1989 n	chi square	p
0 - 33	47	47	26	35,25	<0,000001
34 - 100	83	108	216		
67 - 100	39	65	150	37,326	<0,000001
0 - 66	91	90	92		

As in the previous categories, there is once again a highly significant trend in the proportions.

6.2.5. Management

table 20: Scores of records over the three time periods.

score (%)	1983		1986		1989	
	n	%	n	%	n	%
0 - 33	94	72	71	46	21	9
34 - 66	32	25	54	35	68	28
67 - 100	4	3	30	19	153	63
total	130	100	155	100	242	100

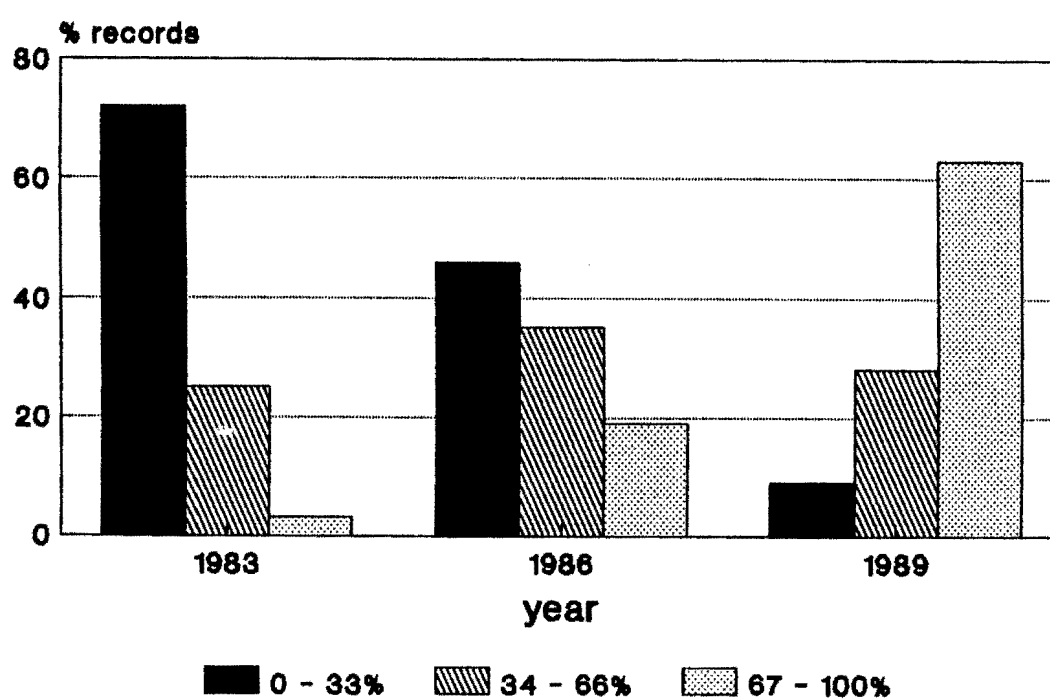


figure 4: scores of records (manage.)

Table 20 and figure 4 show the change in proportions which have occurred over the three time periods. In

particular there has been a decrease in the proportion of records scoring 0 - 33%, and an increase in the proportion of records scoring 67 - 100%.

table 21: Improvement 1983 - 1986 and 1986 - 1989

	'83 - '86	'86 - '89
chi square	26,73	97,05
p value	= 0,00000157	< 0,000000001

This table shows that the improvement in management is highly significant, and more so over the 1986 - 1989 period than over the 1983 - 1986 period.

table 22: Linear trend in proportions

	1983 n	1986 n	1989 n	chi square	p
0 - 33	94	71	21	158,941	<0,000001
34 - 100	36	84	221		
67 - 100	4	30	153	149,471	< 0.000001
0 - 66	126	125	89		

Table 22 shows that both the decrease in proportions of scores 0 - 33%, and the increase in proportions of scores 67 - 100% are highly significant.

6.2.6. Total

table 23: Scores of records over the three time periods.

score (%)	1983		1986		1989	
	n	%	n	%	n	%
0 - 33	91	70	56	36	15	6
34 - 66	38	29	85	55	77	32
67 - 100	1	1	14	9	150	62
total	130	100	155	100	242	100

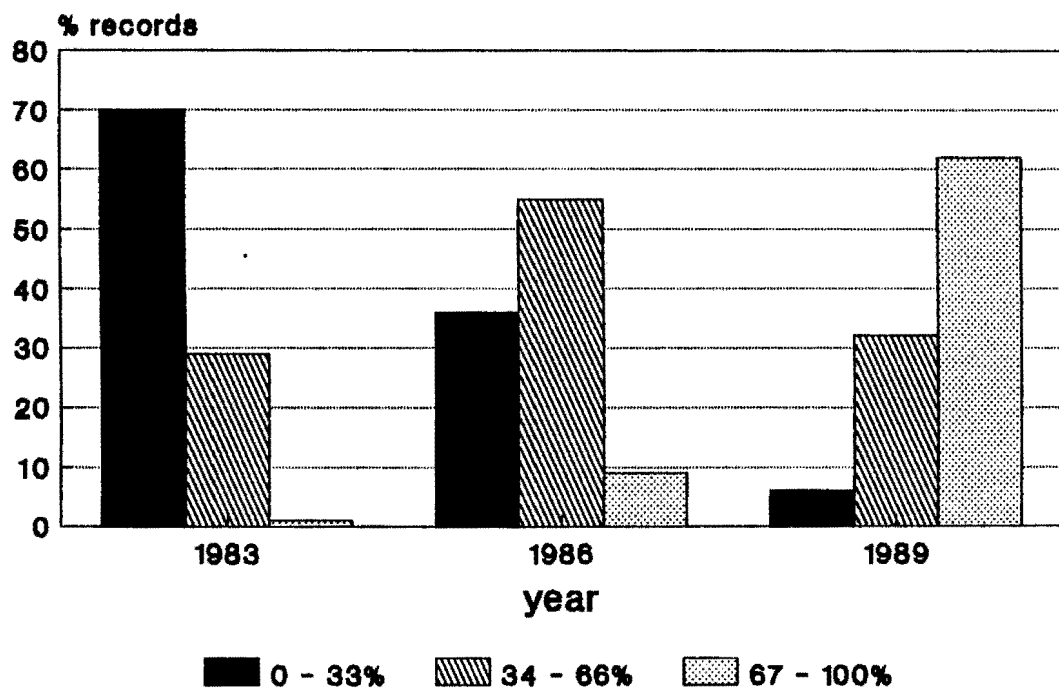


figure 5: scores of records (total)

Table 23 and figure 5 show the changes which have occurred over the three periods of time for the overall

scores of the practice evaluation. This shows quite strikingly the decrease in low scoring records and the increase in high scoring records over time.

Table 24: Improvement 1983 - 1986 and 1986 - 1989

	'83 - '86	'86 - '89
chi square	35,64	123,73
p value	= 0,00000002	< 0,000000001

The improvement is once again well demonstrated, with highly significant changes. Judging by the p values the improvement over the 1986 - 1989 period is greater than over the 1983 - 1986 period.

table 25: Linear trend in proportions

	1983 n	1986 n	1989 n	chi square	p
0 - 33	91	56	15	164,18	<0,000001
34 - 100	39	99	227		
67 - 100	1	14	150	173,01	<0.000001
0 - 66	129	141	92		

As in the individual criteria, the trend in improvement is highly significant for both the decrease in low scoring records and for the increase in high scoring records.

7. DISCUSSION

7.1. Epidemiological and statistical considerations.

This study would be described as a historic prospective study (Yach et al, 1987 {1}). He describes the design as a follow up study starting at some point in the past using information on a specific group which is available. The major source of bias with this type of study is loss from the original cohort, which affects the internal validity of the study. It is therefore important to develop techniques for dealing with problems of staggered entry and variable follow up.

Yach, (1987 {2}) describes biases which need to be considered when evaluating the results of an investigation. They are discussed below.

7.1.1 Validity of the results

1. Sampling Bias. In this study the aim was to test all the midwives (knowledge) and evaluate all the patient records (practice) relevant to the study. Problems which were encountered were:

i) loss from the service of a relatively large number (18/31) of the original group of midwives tested. This made a true before and after assessment difficult. An attempt to overcome this problem was to see whether the test scores of those still in the service differed in any way from the scores of all those who attended the courses and of all

those who are currently in the service. It was found that this was not the case.

ii) non-responders to the multiple choice question paper administered in 1991. The high response rate for all the groups tested (see table 2) minimises this bias.

iii) missing patient records. 90% of the records of patients who fitted the criteria for admission to the study were found. Although 100% would have been ideal, this is regarded as a good representative sample.

2. Measurement bias. In both knowledge and practice it has been possible to establish an absolute standard, viz. a percentage scale. In the case of knowledge assessment it has also been possible to compare the study population with an "expert" group, which have been tested in the same way.

7.1.2. Repeatability of the results

1. Random sampling error has been eliminated by setting out to measure all the available participants or records fulfilling the inclusion criteria.

2. Random measurement error.

Inter-observer error has been excluded by having a single observer.

Repeat scoring of a sample of the records by the same observer was not done.

7.2. Knowledge

7.2.1. The majority of the midwives participated enthusiastically, and it was a very useful teaching opportunity. It was also a valuable learning experience for them. ninety one percent of the midwives working in the Midwife Obstetric Units who qualified for the evaluation completed the question paper.

7.2.2. A problem which arises in an evaluation of this kind is that it is advisable to test the same people both before and after the intervention. In this study, the only group in whom this could be done was that group of midwives who attended the courses at the beginning of 1987 and were still working in the Midwife Obstetric Units in 1991. Two questions therefore arise:

1. Did these midwives' knowledge differ significantly from that of the other midwives who attended the initial courses? If not, then their level of knowledge would be representative of the whole group of midwives at the beginning of 1987.
2. Did these midwives' knowledge differ significantly from that of the other midwives working in the Midwife Obstetric Units when retested in 1991?

If these two groups are comparable, then the midwives who attended the courses in 1987 are no different to those midwives currently working in the Midwife Obstetric Units.

If these hypotheses are correct, then it can be assumed that the level of knowledge of the midwives who had not attended the courses and who had joined the service since 1987 must be due to some intervention since the onset of the programme, and that it has affected all the midwives.

7.2.3. There was a highly significant improvement in the scores in a multiple choice question paper of the midwives as the result of the courses held in 1987 ($p < 0.001$ table 4). It needs to be borne in mind that the pre- and post-course tests were different (Appendices 2 and 3). The pre-course test was easier and shorter than the post-course test. All the questions in the pre-course test were included in the post-course test.

7.2.4. There was no significant difference between the the mean scores in the post-course test of the midwives still in the service and those who had left ($p > 0.99$, table 5). The knowledge of those midwives still in the service, as assessed by the post-course test, was therefore representative of all those who attended the courses.

7.2.5. An equivalent level of knowledge to those who attended the courses has also been achieved by the other midwives in the service who did not attend the courses.

There is no significant statistical difference in the 1991 test results of those who attended the courses and those who did not. ($p > 0,40$, table 6) It therefore seems probable that this level of attainment was attributable to the education programme.

7.2.6. The improvement gained on the courses by those who attended them has been maintained, accepting the fall off of 3.54% in the mean scores. This was not statistically significant. ($p > 0.50$, table 7)

7.2.7. Comparing the results of all those midwives who have been in the service for more than 2 years, and were tested in 1991, with the post-course results of all those who attended the courses in 1987, there was a statistically significant difference between their mean scores. ($p < 0,05$) (table 8) The mean scores in 1991 are 4,19% lower than at the end of the courses, and although this is statistically significant it may not be of practical importance.

The mean score of 83% in 1991 compared with the mean score of 87% in 1987 does suggest that the courses achieved a higher score but in service education for midwives produced only a slightly lower score (87% compared with 83%).

In summary, the mean test scores of those midwives who attended the courses and are still in the service did not differ significantly in their 1987 post-course test and

their 1991 test. These scores were also not significantly different from:

1. the mean scores of those who attended the courses and had left the service. (1987 test)
2. the mean scores of the other midwives who are in the service. (1991 test)

Kattwinkel (1979) showed similar results, in that there was a significant improvement in knowledge immediately after the completion of the programme, with some decrease in scores occurring over time.

7.2.8. The scores of the midwives who have done special neonatal training were about 7% better than the scores of the midwives in the Midwife Obstetric Units. This difference was statistically significant. ($p < 0,001$, table 9) This was expected, although the actual difference was smaller than anticipated.

7.3. Practice

7.3.1. The skewed distribution of scores derived from the data sheets evaluating the midwives' notes meant that parametric statistics could not be used for evaluating this data. For each of the criteria being evaluated, and for each time period, the scores were divided into the lowest, middle and highest thirds. The proportions of the scores falling into these groups were then compared.

7.3.2. There was a very clearly demonstrated improvement in the trend in the scores for the recording of observations, documentation, management, and the total. This trend demonstrated a decline in the proportion of low scores and an increase in the proportion of high scores. Although there was improvement in the identification of problems, this was not as striking as in the other criteria examined. A possible reason for this was the fact that the majority of referrals from the Midwife Obstetric Units to hospitals were because of the problems of low birth weight and respiratory distress (personal observation). These problems were easily identified. Even when the documentation was poor, it was usually easy to see that the midwife concerned had recognised the problem.

7.3.3. The improvement in scores had improved significantly over the 1986 to 1989 period compared with the 1983 to 1986 period. The evaluation of linear trend in proportions confirmed this, as the p value was highly significant ($p < 0,000001$) for all the criteria measured. However, the improvement over the 1983 - 1986 period was also highly significant, except in the case of problem identification. It is arguable whether this was due to the educational input, or whether the curve of improvement in practice is an exponential curve anyway. There was however no particular reason to believe that this was the case, so that it was far more likely that the improvement was due to the educational input.

7.3.4. It could be argued that there were other possible reasons for improvement in practice. These were:

1. "Learning by diffusion". New staff coming into the service could have learned skills and management protocols from the other staff who were working in the service. This undoubtedly occurred. Nevertheless it is contended that this was in fact a spin-off of the educational programme, because it was as a direct result of the programme that these protocols had been established and the skills acquired.

2. Establishing norms for practice. Many of these norms had arisen out of the knowledge and skills gained as the result of the education programme.

3. There had been an improvement in the facilities for the care of newborn babies at the Midwife Obstetric Units. The improvement in the facilities had been due in part to the education programme. Expertise had been developed which had necessitated new equipment. The presence of paediatric medical staff had also necessitated, to a lesser degree, the need for better equipment. Once the equipment was there, people acquired the skills needed to use it and this led to improved patient care.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1. Conclusions

8.1.1. Since 1986 there has been an improvement in both the knowledge and practice of neonatal care of the midwives working in the Midwife Obstetric Units. This was a statistically significant improvement. It is suggested that the activities of the education programme had at least a part, if not the major part, in this improvement. The improvement in practice, as assessed in this study, was highly significant over the 1986 - 1989 period.

8.1.2. It was possible to develop a simple and practical system to evaluate patients' hospital records. It was useful and workable in evaluating patient care practices for newborn babies as recorded in the patients' hospital records.

8.1.3. The feasibility of this type of education programme was greatly enhanced by the integrated regional organisation of the service. There was reasonably good communication between, and working together of, the staff of the hospitals and the Midwife Obstetric Units. This was particularly so in the case of the Paediatric medical staff and between the Paediatric staff and nursing staff. Having access to the resources of both an academic department and

the teaching hospital, which are an integral part of the same service, was beneficial both to teachers and learners.

8.1.4. The two week courses held in 1987 were effective in raising the levels of knowledge and improving the skills of the midwives. The knowledge and skills acquired on the courses formed a useful platform on which to base ongoing teaching.

8.2. Recommendations

8.2.1. This study has only evaluated the improvement in knowledge and practice of the midwives. There is a need to assess the effectiveness of the programme in reducing the morbidity and mortality of infants born at the Midwife Obstetric Units. It could be that the pattern of deaths and morbidity has changed - babies are now better resuscitated, so that they survive long enough to reach a hospital where they subsequently die, for example.

8.2.2. New nursing staff coming into the service, particularly if they are to work in the Midwife Obstetric Units, should be enabled to attend courses such as those held early in 1987. This study has shown that the courses were effective in rapidly increasing knowledge. From personal observation it was evident that there was also improvement in the practical skills needed. This facility should be available to new staff as soon as possible after

appointment, but certainly within six months of starting work.

8.2.3. It was possible to identify areas of knowledge (from the multiple choice questions) and practice (from the data collection from patient records) which were deficient. These need to be carefully evaluated, and special attention given to these areas in future teaching. Particular problems noted were the poor recognition of asphyxia neonatorum, and the lack of the provision of a source of energy to sick infants.

8.2.4. Competent and interested midwives in the Midwife Obstetric Units should be identified and given special training to be teachers/trainers in the working situation. They should not be taken out of the working situation, but be given the communication skills needed to be more effective as teachers in their daily work.

8.2.5. Activities such as the courses could be made available to "up-country" nurses, either as up dating, or to acquire the special knowledge and skills needed. Of particular value would be skills training. This could be valuable if used in conjunction with the Perinatal Education Programme (Woods DL)

8.2.6. This programme was aimed mainly at Registered Midwives. Much of the regular teaching did however include Enrolled Nurses and Enrolled Nursing Assistants. There is an

urgent need for a similar type of programme geared specifically to the needs of these nurses. This has in fact been requested by these nurses, as the result of the test papers sent to the midwives, and needs immediate attention.

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IN - SERVICE TRAINING PROGRAMME - JANUARY 4th - 15th , 1987

WEEK1

P. 54

TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
07.00	Introduction to the Programme Orientation to the Neonatal Unit	LABOUR GRAPH	Oxygen therapy Mrs S Carolus	Naso. gastric tubes - gastric aspirate -stomach washout	Dextrostix Examination Sen Sr M E Dann
08.00	Mrs S Carolus Dr S Delpont Dr D Greenfield TEST		Asphyxia Neonatorum Apgar Score Dr D Greenfield	Respiratory distress Dr S Delpont	Hypoglycaemia Dr Greenfield
09.00	The Normal Baby Dr S Delpont				
09.30 - 10.00	TEA	TEA	TEA	TEA	TEA
10.00	Examination of the Newborn Dr D Greenfield		Resuscitation of the Newborn Dr D Greenfield	Assessment of Gestational Age Dr S Delpont	Jaundice Dr S Delpont
					(i) TSB/PCV - blood taking Mrs S Carolus (ii) Use of Bili-rubinometer Mrs N Mallick
12.00				Low Birthweight Babies Dr S Delpont	Phototherapy Sen Sr HC Hurter
13.00 - 14.00	L	U	N	C	H
14.00	Patient identification Sen Sr M C Linnet				Practical work
15.00	Minor Disorders of the Newborn Dr. D Greenfield				

Appendix 1

GROOTE SCHUUR MATERNITY CENTRE

IN-SERVICE TRAINING PROGRAMME - JANUARY 4th - 15th , 1987

WEEK2
P55

TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
07.00	Practical - TSB/PCV	ANTE-NATAL CARE	Practical	Practical	Transfer of patients to hosp.
08.00	Neonatal Records Mrs S Carolus		Common Birth Injuries Dr S Delport	Infections Dr S Delport	- criteria for adm - communication - Transportation
09.00					Mrs S Carolus
09.30 - 10.00	TEA	TEA	TEA	TEA	TEA
10.00	Recording + Interpretation of observation Sen. Sr. M E Dann	Infant feeding	Surgical Emergencies Dr S Delport	Terminology	Test
11.00	Temperature Control Dr S Delport		IV Therapy Dr S Delport	Road-to-Health Chart	
12.00		Apnoea Dr D Greenfield	Primary of Buretrol Miss J Spooner		Evaluation of Course
13.00	L	U	N	C	H
14.00	Temperature recording Use of Telethermometer Sen. Sr. M. Linnet	Convulsion Dr S Delport			
15.00	Function & Care of Incubators				

APPENDIX 2

Please answer all the questions.

SECTION A

Circle the correct answer to the following questions.

1. The neonatal period is defined as:
 - a. the first seven days of life
 - b. the period from birth up to 28 days of age
 - c. the period from birth to six months

2. "Perinatal" means:
 - a. the time just before birth
 - b. the first month after birth
 - c. the time surrounding a baby's birth - before and after

3. Preterm infants are those whose gestational age is less than:
 - a. 35 weeks
 - b. 37 weeks
 - c. 40 weeks
 - d. 42 weeks

4. Match the following terms:

a. Hypothermia	1. low blood sugar
b. Hypocalcaemia	2. low blood oxygen
c. Hypoxia	3. high body temperature
d. Hyperbilirubinaemia	4. jaundice
e. Hypoglycaemia	5. low body temperature
f. Hyperthermia	6. low blood calcium

a. _____	b. _____	c. _____
d. _____	e. _____	f. _____

5. The normal range for a term infant's weight is:
 - a. 2,0 Kg - 3,5 Kg
 - b. 2,5 Kg - 4,2 Kg
 - c. 3,5 Kg - 4,5 Kg
 - d. 2,8 Kg - 3,8 Kg

6. A baby weighs 2100 grams and by dates and physical examination is estimated to be 40 weeks gestational age:
1. Is this baby
 - a. preterm?
 - b. term?
 - c. post-term?
 2. Is this baby
 - a. small for gestational age?
 - b. appropriate for gestational age?
 - c. large for gestational age?
7. List the 5 physical signs examined in the Apgar score.
- a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
8. The Apgar score should be assessed at 1 and 5 minutes after birth on:
- a. low birth weight infants only
 - b. all newborn infants
 - c. infants regarded as "at risk"
 - d. infants which appear to be abnormal
9. Which of the following conditions that may develop DURING LABOUR would warn you to get ready to resuscitate a baby at birth?
- a. meconium staining of the amniotic fluid
 - b. vaginal bleeding
 - c. prolonged labour
 - d. diminished fetal activity
 - e. all of the above
10. If a baby does not begin to breathe spontaneously following delivery, which of the following would you do FIRST?
- a. cardiac massage
 - b. stimulate (eg. drying the baby)
 - c. assist ventilation
 - d. administer sodium bicarbonate

11. Which of the following is the most appropriate rate to provide assisted ventilation to a newborn baby?
 - a. 20 breaths per minute
 - b. 40 breaths per minute
 - c. 100 breaths per minute
 - d. 1 breath every 5 seconds
12. At what rate would you give cardiac massage?
 - a. 100 - 120 compressions per minute
 - b. 10 compressions per minute
 - c. 60 compressions per minute
 - d. 1 compression every 5 seconds
13. The normal concentration of glucose in the blood of a newborn infant ranges from:
 - a. 0 - 25mg / 100ml
 - b. 175 - 250mg / 100ml
 - c. 45 - 130mg / 100ml
 - d. 25 - 45mg / 100ml
14. Which one of the following TERM babies is at HIGHEST risk for developing hypoglycaemia?
 - a. infant whose mother last ate 10 hours prior to delivery.
 - b. infant with intra-uterine growth retardation.
 - c. breast fed infant
 - d. infant who was delivered by elective caesarian section.
15. Which of the following infants is least at risk of becoming hypoglycaemic?
 - a. a 4,6 Kg infant born to a 30 year old diabetic mother.
 - b. A 2950 gm infant born to a 25 year old primigravida.
 - c. a 2,0 Kg infant born at 34 weeks gestation.
 - d. a 1800 gm infant born at term to a 35 year old alcoholic mother.
16. When infants become hypothermic, they increase their metabolic rates. As a consequence they may become:
 - a. hypoglycaemic
 - b. acidotic
 - c. hypoxaemic
 - d. all of the above

17. Which of the following babies is at highest risk of becoming hypothermic?
- 35 week appropriate for gestational age
 - 40 week appropriate for gestational age
 - 42 week appropriate for gestational age
 - 40 week large for gestational age
18. A 2000 gram appropriate for gestational age baby, born at home, arrives at your MOU at 6 hours of age with a body temperature of 33°C. What would your immediate management be?
- arrange urgent transfer to hospital
 - place the infant in an incubator, commence IV fluids, administer oxygen and monitor blood sugar
 - put infant to mother's breast
 - place the infant in a incubator and wait for "Flying Squad"
19. Which of the following situations places the baby at increased risk for neonatal sepsis? (Choose as many as applicable)
- mother in active labour for 22 hours
 - rupture of membranes 26 hours prior to delivery; clear odourless amniotic fluid
 - maternal temperature of 38,8°C
 - rupture of membranes 30 minutes prior to delivery; cloudy, foul-smelling amniotic fluid
20. An infant's respiratory rate is 75 breaths per minute. This breathing would be called:
- normal
 - tachypnoea
 - grunting
 - flaring

SECTION B

Answer TRUE or FALSE of the following statements:

- ___1. Meconium aspiration syndrome is preventable.
- ___2. All low birth weight infants (ie. below 2,5 Kg) are preterm.
- ___3. A baby who is hypoglycaemic may have a seizure.
- ___4. If a baby develops hypoglycaemia and is not treated, the baby might become mentally retarded because of the hypoglycaemia.

- _____5. Respiratory distress may be a sign of low body temperature.
- _____6. A baby whose temperature is 35°C should have a blood sugar test done.
- _____7. Hypoglycaemia cannot be prevented.
- _____8. Bilirubin is formed from the breakdown of haemoglobin.
- _____9. Jaundice appearing within 24 hours of birth is usually physiological.
- _____10. A convulsion in the newborn period may present as an apnoeic spell.

Name _____

Date _____

APPENDIX 3THE NEWBORN INFANTAnswer all the questions.

1. Match the following terms :

- | | |
|------------------------|--------------------------|
| a. Hypothermia | 1. Low blood sugar |
| b. Hypocalcaemia | 2. Low blood oxygen |
| c. Hypoxia | 3. High body temperature |
| d. Hyperbilirubinaemia | 4. Jaundice |
| e. Hypoglycaemia | 5. Low body temperature |
| f. hyperthermia | 6. Low blood calcium |
| a. | d. |
| b. | e. |
| c. | f. |

2. List the 5 physical signs examined in the Apgar score

- a. _____
 b. _____
 c. _____
 d. _____
 e. _____

Circle the correct answer in the following questions.

A baby weighs 2100 grams and by dates and physical examination is estimated to be 40 weeks gestational age.

3. This baby is

- a. preterm.
 b. term.
 c. post-term.

4. This baby is

- a. small for gestational age.
 b. appropriate for gestational age.
 c. large for gestational age.

5. The neonatal period is defined as:

- a. the first 7 days of life
 b. the period from birth to 28 days of life
 c. the period from birth to 6 months
 d. the period from birth to weaning

6. "Perinatal" means:
- the time just before birth
 - the first 7 days after birth
 - the first month of life
 - the time surrounding a baby's birth - before and after
7. Preterm infants are those whose gestational age is less than:
- 35 weeks
 - 37 weeks
 - 40 weeks
 - 42 weeks
8. The normal range for a term infant's weight is:
- 2,0 Kg - 3,5 Kg
 - 2,5 Kg - 4,2 Kg
 - 3,5 Kg - 4,5 Kg
 - 2,8 Kg - 3,8 Kg
9. The Apgar score should be assessed at 1 and 5 minutes after birth on:
- low birthweight infants only
 - infants regarded as "high risk"
 - all newborn infants
 - infants which appear to be abnormal
10. Which of the following conditions that may develop DURING LABOUR would warn you to get ready to resuscitate a baby at birth?
- meconium staining of the amniotic fluid
 - vaginal bleeding
 - prolonged labour
 - diminished fetal activity
 - all of the above
11. If the baby does not begin to breathe spontaneously following delivery, which of the following would you do FIRST?
- cardiac massage
 - stimulate eg. drying the baby
 - assist ventilation
 - administer sodium bicarbonate

12. Which of the following is the most appropriate rate to provide assisted ventilation to a newborn baby?
- 20 breaths per minute
 - 40 breaths per minute
 - 100 breaths per minute
 - 1 breath every 5 seconds
13. At what rate would you give cardiac massage?
- 100 - 120 compressions per minute
 - 10 compressions per minute
 - 60 compressions per minute
 - 1 compression every 5 seconds
14. The normal concentration of glucose in the blood of a newborn infant ranges from:
- 0 - 25 mg%
 - 175 - 250 mg%
 - 45 - 130 mg%
 - 25 - 45 mg%
15. Which of the following TERM babies is at HIGHEST risk for developing hypoglycaemia?
- infant whose mother last ate 10 hours before delivery
 - infant with intra-uterine growth retardation
 - breast fed infant
 - infant who was delivered by elective caesarean section
16. Which of the following infants is at LEAST risk of becoming hypoglycaemic?
- a 4,6 Kg infant born to a 30 year old diabetic mother
 - a 2,950 Kg term infant born to a 25 year old primigravida
 - a 2,0 Kg infant born at 34 weeks gestation
 - a 1800 gram infant born at term to a 35 year old alcoholic mother
17. When infants become hypothermic, they increase their metabolic rates. As a consequence they may become:
- hypoglycaemic
 - acidotic
 - hypoxaemic
 - all of the above

- 18. Which of the following babies is at highest risk of becoming hypothermic?
 - a. 35 weeks, appropriate for gestational age
 - b. 40 weeks, appropriate for gestational age
 - c. 42 weeks, appropriate for gestational age
 - d. 40 weeks, large for gestational age

- 19. A 2000 gram, appropriate for gestational age baby, born at home, arrives at your MOU at 6 hours of age with a body temperature of 33°C. Your management would be to:
 - a. arrange urgent transfer to hospital
 - b. place the infant in an incubator, commence IV fluids, administer oxygen and monitor blood sugar.
 - c. put infant to mother's breast to feed
 - d. place the infant in an incubator and wait for "Flying Squad".

- 20. Which of the following situations places the baby at increased risk for neonatal sepsis? (Choose as many as applicable)
 - a. mother in active labour for 22 hours
 - b. rupture of the membranes 26 hours before delivery; clear odourless amniotic fluid.
 - c. maternal temperature of 38.8°C
 - d. rupture of membranes 30 minutes before delivery; cloudy, foul-smelling amniotic fluid

- 21. An infant's respiratory rate is 75 breaths per minute. This breathing pattern is called:
 - a. normal
 - b. tachypnoea
 - c. grunting
 - d. flaring

- 22. Which one of the following babies need NOT have its temperature taken more often than the normal routine?
 - a. a normal term baby who has hypoglycaemia
 - b. a 32 week AGA baby
 - c. a 40 week SGA baby
 - d. a 40 week AGA baby

- 23. Delayed drying of the newborn baby causes heat loss by:
 - a. convection
 - b. evapoation
 - c. conduction
 - d. radiation

24. A baby in the delivery room has, at 1 minute, a heart rate of 90/min., makes weak irregular respiratory efforts, has a blue tongue, does not react when suctioned and has limp arms and legs. He would receive an Apgar score of:
- 1
 - 2
 - 3
 - 4
25. In the above situation (Q 24), what would be the best management?
- administer face mask oxygen
 - intubate and ventilate
 - stimulate by flicking the feet
 - observe and reassess in 5 minutes
26. Which of the following infants would NOT require intravenous fluids?
- a 1500 gram baby born at 36 weeks gestation
 - a 3000gram septic baby with abdominal distension
 - a 3200 gram baby with Apgar score of 7/10 at 1 min. and 9/10 at 5 min.
 - a 2100 gram infant with hyaline membrane disease
27. How much fluid does a baby need during the first 24 hours of life?
- 100 :
 - 60 : (ml/Kg body wt./24 hours)
 - 160 :
 - 20 :
28. What are the dangers of intravenous therapy?
- Infection
 - Tissue damage
 - Overhydration
 - All of the above
29. Bile stained vomiting in the newborn period is associated with:
- overfeeding
 - jaundice
 - intestinal obstruction
 - asphyxia

30. Which of the following babies are at risk of developing hypoglycaemia?
- a 32 week preterm baby
 - a 40 week baby weighing 2,1 Kg
 - a term baby with Apgar scores of 1/10 at 1min. and 3/10 at 5 min.
 - all of the above
31. A swelling of the head in a newborn baby, located on one side of the skull bones is likely to be:
- subaponeurotic haemorrhage
 - caput
 - cephalhaematoma
 - intracranial haemorrhage
32. To calibrate the oxygen monitor in room air, you ^{set} ~~ste~~ it at:
- 40%
 - 54%
 - 21%
 - 100%
33. When a baby is noticed to be jaundiced, what is the FIRST action you should take?
- start antibiotic treatment
 - obtain a blood sample for TSB and PCV
 - restrict the baby's fluid intake
 - perform an exchange transfusion
34. All of the following conditions may cause an unconjugated hyperbilirubinaemia, EXCEPT:
- ABO incompatibility
 - biliary atresia
 - decreased conjugation of bilirubin due to a reduction in the activity of the liver enzymes
 - Rhesus disease
35. A term AGA infant is found to be jaundiced at 12 hours of age. His TSB is 180 mmol/l. What is the most appropriate action for this baby?
- investigate the cause of the jaundice and start phototherapy
 - perform an exchange transfusion
 - investigate the cause; no further action
 - observe the baby; no further action

36. Apnoea is NOT caused by:

- a. intracranial haemorrhage
- b. hypoglycaemia
- c. erythema toxicum
- d. aspiration of a feed

Answer TRUE or FALSE to the following statements.

- 37. Meconium aspiration syndrome is preventable.
- 38. All low birth weight infants are preterm.
- 39. A baby who is hypoglycaemic may have a convulsion.
- 40. If a baby develops hypoglycaemia and is not treated, the baby might become mentally retarded because of the hypoglycaemia.
- 41. Respiratory distress may be a sign of low body temperature.
- 42. A baby whose temperature is 35°C should have a blood sugar test done.
- 43. Hypoglycaemia cannot be prevented
- 44. Bilirubin is formed from the breakdown of haemoglobin.
- 45. Jaundice appearing in the first 24 hours of life is usually physiological.
- 46. A convulsion in the newborn period may present as an apnoeic spell.
- 47. Delayed drying of the baby after delivery promotes evaporative heat loss.
- 48. Babies use oxygen and energy to produce heat.
- 49. Neonates keep warm by shivering.
- 50. When you are treating a baby with phototherapy, you should restrict the baby's feeds.
- 51. All jaundiced babies require phototherapy.
- 52. The Coombs test determines the presence of antibodies in blood or on red blood cells.
- 53. All babies receiving phototherapy should have their eyes covered.
- 54. A newborn baby with congenital dislocation of the hip usually looks abnormal.

55. A baby with a single umbilical artery must be investigated for congenital abnormalities.
56. The "strength" of uterine contractions is measured by feeling the hardness of the abdomen during a contraction
57. A newborn baby responds to hypoxia by developing a bradycardia.
58. The Apgar score at 1 minute is a good indicator of future hypoxic brain damage.
59. Hypoxic babies may become hypoglycaemic.
60. Hypoglycaemia always causes symptoms.
61. A baby with a tracheo-oesophageal fistula should be given early breast feeds.

NAME _____ (Please print)

DATE _____

APPENDIX 4

CORRECT ANSWERS

- 1. a. 5
b. 6
c. 2
d. 4
e. 1
f. 3
- 2. a. heart rate b. respiration c. colour d. tone
e. activity / response to stimulation
- 3. b
- 4. a
- 5. b
- 6. d
- 7. b
- 8. b
- 9. c
- 10. e
- 11. b
- 12. b
- 13. a
- 14. c
- 15. b
- 16. b
- 17. d
- 18. a
- 19. b
- 20. a, b, c, & d
- 21. b
- 22. d
- 23. b
- 24. b
- 25. b
- 26. c
- 27. b
- 28. d
- 29. c
- 30. d
- 31. c
- 32. c
- 33. b
- 34. b
- 35. a
- 36. c
- 37. T
- 38. F
- 39. T
- 40. T
- 41. T
- 42. T
- 43. F
- 44. T
- 45. F
- 46. T
- 47. T
- 48. T
- 49. F
- 50. F
- 51. F
- 52. T
- 53. T
- 54. F
- 55. T
- 56. F
- 57. T
- 58. F
- 59. T
- 60. F
- 61. F

*Thank you for doing these questions.
Any feedback or comments will be
welcome.*

David Greenfield

Neonatal Care Evaluation.

Referring Sr. _____

Ref. letter
Obs. sheet.

			1	0	-	Score	
			Y	N	N/A	Max Pos	Act. %
OBSERVATIONS							
	Initial		Ongoing			Frequency	
	1	0	1	0	1	0	
	Y	N	Y	N	Y	N	N/A
Temp							
H. Rate							
R. Rate							
Colour							
Grunting							
Recessing							
Dx							
Pcv							
TSB							
DOCUMENTATION							
			3	2	1	0	
			Excellent	Good	Poor	Absent	
Systematic							
Clear							
Adequate							
Follow-up notes							
PROBLEM IDENTIFICATION							
			6	4	2	0	
			All	Most	Some	None	
Problems identif.							
Problems named							
					-2	-1	
					Major	Minor	
Missed problems							
Gastric Aspirate taken							
					1min	5min	
Apgar Recorded.							
Probably correct							
MANAGEMENT							
<u>Resuscitation</u>							
			3	2	0	0	
			Corr.	Poss. Corr.	Incorr.	Not Stated	
No resuscitation							
Suctioned							
O ₂ only							
Mask ventilation							
Intubation							
Other (eg drugs)							
<u>Temp.</u>							
<u>Resp. Distress</u>							
Management							
O ₂ given							
% (or flow rate)							
Adjust. to %age							
<u>Feeding</u>							
Breast							
Bottle							
N/G tube							
I.V. line							
rate							
I.V. line failed → tube feed							
TOTAL							

APPENDIX 7

USE OF DATA CAPTURE SHEET

Documents required:

1. Infant record chart
2. Observation sheet
3. Referral letter

If 2 & 3 are present, "yes" scores 1 point.

All these records, or whatever records were available, were scrutinised by the recorder, and the problems present were identified. The recorder then decided what, in the context of what the midwives had been taught, was necessary in each category.

Observations.

Were they done initially when the problem was detected, and/or were the routine observations done before the baby became ill?

Were the appropriate observations continued?

Were they done at the appropriate intervals?

Any of the specific observations could have been "not applicable", in which case no score would be allocated but the maximum score would also not be affected.

Thus, the maximum score was determined by the condition and requirements of each specific patient.

Documentation.

The guide to the recording of documentation is Appendix B

Problem identification.

Any problem which materially affected the condition or management of the baby was categorised as a major problem. For example, "preterm" would be a major problem, but "low birth weight" in the same patient would have been recorded as a minor problem, if "preterm" had been recorded. If in the same infant the midwife had recorded: "low birth weight" and not "preterm" then preterm would have been recorded as a missed minor problem, as the management should be almost the same for both of these conditions.

"Problem identified" vs "problem named" It was often possible to know that the problem had been identified. The staff were expected to be able to name the most important and common problems, so that they were penalised if this was not done.

Management.

The same principles apply.

Correct means that the management was the ideal.

"Poss. corr." means that the particular item was not wrong, but was not the best method available.

APPENDIX 8

DOCUMENTATION

Systematic

- Excellent: .SOAP system used
.Information accurately placed in the correct categories.
- Good: .SOAP system partially used
.Information generally accurately placed
- Poor: .SOAP system not used / spacificied
.Information disorganised, but some indication of the problem and management
- Absent: Insufficient information for comment

Clear

- Excellent: .Reader knows exactly what are the problems and management, and the progress of the patient.
- Good: .Reader has to assume some information in order to get a clear picture. Major problems clear.
- Poor: Reader not clear about what is happening to the patient.
- Absent: .Reader has no idea about the patient's problems and management.

Adequate

- Excellent: .All the necessary information is recorded.
- Good: .Most of the information is recorded. (all the important information must be present.
- Poor: .Minimum vital information only.
- Absent: .Insufficient information to comment.

Follow-up notes

- Excellent: .Regular notes on each problem at the appropriate times.
- Good: .Notes sufficient to give an idea of what is happening to the patient's condition.
- Poor: .Few notes
.Notes not useful in assessing the change in the patient's condition
- Absent: .No notes.