

# The impact of the Perinatal Education Programme on cognitive knowledge in midwives

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**Objective.** To determine whether the Maternal Care and Newborn Care manuals from the Perinatal Education Programme significantly improves the cognitive knowledge of midwives.

**Design.** Assessment of cognitive knowledge by means of multiple-choice testing. These tests were conducted before and after each of the 30 units of the Programme. In addition, a multiple-choice examination was arranged on completion of each of the two manuals.

**Setting.** Level I, II and III hospitals and level I clinics in urban and rural areas of South Africa.

**Participants.** One hundred and fourteen midwives from hospitals and clinics.

**Intervention.** Maternal and Newborn Care manuals of the Perinatal Education Programme, studied at home and later discussed by the participants in groups every few weeks.

**Main outcomes measured.** Number of participants who completed a manual, mean results of the pretests and post-tests, mean results of the final examination, and percentage of participants achieving 80% or more in the pretests, post-tests and final examination.

**Results.** Mean pretest and post-test results for the Maternal Care manual were 65% and 85% respectively. Mean pretest and post-test results for the Newborn Care manual were 72% and 93% respectively. The mean result for the final examination for the Maternal Care manual was 90%, while the mean result for the Newborn Care manual was 95%. There was a significant improvement in cognitive knowledge when either manual was used.

**Conclusion.** The cognitive knowledge of both maternal and newborn care can be significantly improved when midwives use the Perinatal Education Programme in an outreach, co-operative learning course.

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The Perinatal Education Programme is a correspondence course for doctors and midwives, aimed at improving the care of mothers and newborn infants in all communities in Southern Africa.<sup>1</sup> Written by an editorial board of obstetricians, neonatologists and midwives, the Programme consists of a Maternal Care manual and a Newborn Care manual. Each manual has 15 theory units which address common or important problems in perinatal care. In addition, skill workshops teach the practical skills needed to apply the newly acquired knowledge. A problem-orientated and patient-based approach is used together with a question-and-answer method of teaching. The responsibility for learning is placed on the student and a formal tutor is not required, and the participant does not have to leave his or her place of employment. The principle of co-operative learning is used with groups of participants being managed by a co-ordinator. The Perinatal Education Programme is an innovative programme which is cheap, practical and appropriate to the perinatal health needs of southern Africa.

This study presents the results of a field trial designed to determine whether the two manuals of the Perinatal Education Programme are effective in improving the cognitive knowledge of midwives.

## Methods

One hundred and fourteen midwives from 9 different regions of South Africa volunteered to participate in the study. Seventy-eight participants started the Maternal Care manual in 8 regions. They consisted of a group from large level III hospitals and their related urban clinics (12 from the Peninsula Maternal and Newborn Service in Cape Town, 10 from Tygerberg Hospital in Parow, 11 from Kalafong Hospital in Pretoria and 12 from Cecilia Makiwane Hospital in Ciskei), a group from smaller level II hospitals (7 from George Hospital and other neighbouring hospitals, 9 from Frontier Hospital in Queenstown and nearby hospitals), a group from urban clinics (10 from Mamelodi in Pretoria) and a further group from rural clinics (7 from a tribal trust area near East London).

Thirty-six participants started the Newborn Care manual in 3 regions. They consisted of a group from large level III hospitals and their related clinics (13 from the Peninsula Maternal and Newborn Service in Cape Town and 10 from Cecilia Makiwane Hospital in Ciskei) and a group from level II hospitals (13 from the Boland of the Western Cape). Eight participants from the Peninsula Maternal and Neonatal Service completed both manuals. Except for the Tygerberg Hospital and George Hospital groups, who used the Afrikaans Maternal Care manual, all participants used English manuals. The content of the Afrikaans and English manuals was the same. Six participants did not complete the Maternal Care manual and 1 did not complete the Newborn Care manual, usually for domestic reasons. Most of these participants only completed 1 or 2 units.

The results from the post-tests and the final examinations identified problem areas in the course and this information was used in the final editing of the Programme. Financial constraints in the early phase of the field trial limited the number of participants in the assessment of the Newborn

Care manual, which was completed first. Few participants used the Afrikaans translation of the Programme, because these manuals were only printed at a later date.

Each group was managed by a co-ordinator who was a midwife, a newborn care nurse or a doctor. The groups met regularly, usually every 3 weeks, when they were given another unit of the manual to study at home. At these meetings the unit studied during the previous few weeks was discussed. The skills workshops were also studied at home and the skills demonstrated at the group meetings by the co-ordinator or an invited senior member of the medical or nursing staff.

Before each unit was given to the participants a multiple-choice test consisting of 20 questions was conducted. The same test was repeated at the next group meeting, after the participants had studied that unit. The answers were marked by the group co-ordinator. The results of each pretest indicated the participants' knowledge of the subject matter before studying that unit, while the post-test indicated their knowledge after studying it. The difference between the two results indicated the amount of knowledge learned in the interval. The participants were given the test results after they had been marked, and were urged to study the sections related to the incorrectly answered questions.

At the completion of the manual the participants were given a 75-question multiple-choice examination held under strict examination conditions. All the questions in the final examination were taken from questions used in the unit tests. Results from the unit tests did not contribute to the final examination mark.

Mean scores for the pooled pretests and the post-tests and also the mean score for the final examination were calculated for each individual, regional group and manual. The mean scores of the pretests and the post-tests were compared using Student's paired *t*-test, while the number of students achieving more than a mean of 80% in the post-tests and more than 80% in the final examination was compared using the  $\chi^2$ -test. A probability value of 5% was considered significant. The occasional participant did not complete all the unit tests.

## Results

Table I gives the mean pretest and post-test results for all the participants using the Maternal Care manual and the Newborn Care manual. There was a significant improvement ( $P < 0,001$ ) of 31% and 29% between the pretest and post-test results for the Maternal Care and Newborn Care manuals respectively. There was also a significant improvement ( $P < 0,001$ ) in each of the 30 units, with mean pretest results for 20 questions ranging from 10,4 to 15,6 and mean post-test results ranging from 13,9 to 19,2. The percentage improvement for each unit ranged from 16% to 47% for the Maternal Care manual and from 19% to 44% for the Newborn Care manual. Table II gives the mean pretest and post-test results for the two manuals in each region. For both manuals there was a significant improvement ( $P < 0,001$ ) in all regions.

**Table I. Mean ( $\pm$ SD) pretest and post-test results (out of a possible 20, and expressed as a percentage in brackets) for the Maternal Care and Newborn Care manuals**

	Pretest	Post-test	t-value
<b>Maternal Care manual</b>			
Mean (%)	13,0 (65%)	17,0 (85%)	30,7*
SD	3,4	2,6	
No.	1 046	1 046	
<b>Newborn Care manual</b>			
Mean (%)	14,4 (72%)	18,5 (93%)	29,3*
SD	2,8	2,3	
No.	518	518	

\*  $P < 0,001$ .

**Table II. Mean ( $\pm$ SD) pretest and post-test results (out of a possible 20) for each of the study regions**

Region	Manual	Pretest	Post-test	t-value
PMNS	M	13,7 $\pm$ 3,3	17,2 $\pm$ 4,6	11,4*
Tygerberg Hospital	M	14,8 $\pm$ 2,8	18,0 $\pm$ 1,7	11,3*
Kalafong Hospital	M	11,5 $\pm$ 3,1	16,6 $\pm$ 2,7	15,4*
Cecilia Makiwane Hospital	M	12,5 $\pm$ 3,4	17,1 $\pm$ 2,1	14,3*
George Hospital	M	14,3 $\pm$ 2,7	17,6 $\pm$ 2,9	8,4*
Frontier Hospital	M	13,9 $\pm$ 3,3	17,0 $\pm$ 2,4	9,0*
Trust Areas	M	11,8 $\pm$ 3,3	15,0 $\pm$ 3,3	6,4*
PMNS	N	14,8 $\pm$ 2,8	18,6 $\pm$ 1,6	16,1*
Cecilia Makiwane Hospital	N	13,0 $\pm$ 2,8	18,4 $\pm$ 1,4	20,6*
Boland Hospitals	N	15,1 $\pm$ 2,5	18,6 $\pm$ 2,3	16,7*

\*  $P < 0,001$ .

PMNS = Peninsula Maternal and Neonatal Service; M = Maternal Care manual; N = Newborn Care manual.

The mean score ( $\pm$ SD) out of a possible 75 in the final examinations was 67,2  $\pm$  7,3 for the Maternal Care manual and 71,3  $\pm$  5,1 for the Newborn Care manual. These results gave mean percentages of 90% and 95% respectively for the two manuals. Twenty-five per cent of participants achieved 80% or more in their mean pretest score, while 80% achieved 80% or more in their mean post-test score for the Maternal Care manual. The respective results for the Newborn Care manual were 40% and 95%. In the final examination 80% was used as the pass mark. The success rate in the final examination was 83% for the Maternal Care manual and 97% for the Newborn Care manual. The percentages of participants who achieved 80% or more for the post-tests and the final examination were very similar for the two manuals. There was no significant difference ( $P > 0,05$ ) in the percentage of participants who achieved a mean of 80% or more in the post-tests and the number who achieved 80% or more in the final examination for the Maternal Care manual ( $\chi^2 = 0,987$ ) and the Newborn Care manual ( $\chi^2 = 0,068$ ).

## Discussion

The results of this study indicate that the Perinatal Education Programme significantly increased the participants' cognitive knowledge of maternal and infant care as assessed by multiple-choice testing. The average improvement in knowledge was approximately 30% for both the Maternal Care and the Newborn Care manuals. This compares favourably with the improvement of 25% in cognitive knowledge reported by Kattwinkel *et al.*<sup>2</sup> in the assessment of their self-directed newborn care programme. Similarly, Harlan *et al.*<sup>3</sup> achieved a 20% improvement in cognitive knowledge with a self-instruction perinatal education programme. The Perinatal Education Programme successfully improved cognitive knowledge among midwives in primary, secondary and tertiary care units as well as in both urban and rural situations. There was a significant improvement in the cognitive knowledge for all 30 units of the Programme.

Volunteers were invited to participate in the present study, and the results therefore cannot be directly extrapolated to all midwives. With many thousands of midwives using the Programme at present, the final examination results currently being received suggest that a similar outcome can be expected in most regions of South Africa.

Changes in practical skills, attitudes, level of care provided or perinatal health status of the patients were not measured. These variables and others are currently being extensively assessed in a prospective study of the Programme in the Eastern Cape.

In contrast to perinatal courses offered within teaching hospitals, nursing colleges and universities, one of the weaknesses of an outreach education programme is that it cannot provide participants with 'hands-on' clinical experience. Unfortunately, financial and staffing limitations, as well as the practical problems of moving large numbers of medical and nursing staff away from their homes and place of employment, preclude the option of providing all perinatal personnel with regular training in regional centres. It is also impractical to send large numbers of highly skilled teaching staff to rural areas for extended periods of time.

However, a great advantage of moving the education base to the outlying hospitals and clinics is that the training of staff at their place of work influences the management protocols of the local service. This was seen repeatedly during the field trial of the Programme, where conflict between the content of the educational material and the current hospitals protocols led to discussions between the participants and the hospital authorities with resultant improvements in patient care practices. By placing the responsibility for the course squarely on the shoulders of the participants and the group co-ordinators, personal involvement in the management of the course and satisfaction in its eventual success were very strong motivating forces. This is essential, since co-operative learning requires both enthusiasm and mutual support to be effective. A formal examination with the issuing of certificates to successful candidates generated personal pride and resulted in the reward of peer recognition. In future the regional health authorities will have to consider incentives to encourage as many staff as possible to improve their own level of professional competence.

The role of self-directed perinatal education with undergraduate students is unexplored, but a number of medical schools and nursing colleges in South Africa are at present using the Perinatal Education Programme as part of their curricula.

If the Perinatal Education Programme can be used by local authorities, hospitals, nursing colleges, medical schools and individuals to improve the knowledge of perinatal care among both undergraduate and postgraduate nursing and medical students, the provision of care to mothers and infants could be standardised and improved throughout large areas of southern Africa. Success with this project could encourage the development of similar learning programmes aimed at improving other fields in nursing and medical care.

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