Review

The antenatal care debate

M.H. Baldo[1]

SUMMARY The antenatal care debate has focused on the frequency of antenatal care, its content, continuity, quality, organization, effectiveness and impact on morbidity and mortality. Established antenatal care schedules have been called into question. Randomized controlled trials comparing reduced schedules with routine antenatal care have shown similar or better outcomes for the reduced protocols. Furthermore, midwives, with or without physicians, can provide continuous maternity care comparable to obstetrician-led care. Some women disliked the new protocol, but a reduced protocol of high quality provided by competent midwives is cost-effective, spares scarce physicians and ensures women's satisfaction. It is recommended globally.

Introduction

Antenatal care (ANC), first promoted in the early twentieth century, has prompted constant debate as regards its frequency, content, continuity, quality and effectiveness in reducing maternal and neonatal mortality and morbidity. This debate has intensified over the last two decades, coinciding with the advent of primary health care (PHC) and global concern over safe motherhood [1]. The debate has focused on:

- reducing the number of ANC visits to an effective and efficient minimum;
- ensuring improved continuity of care by the same provider or a smaller group of providers throughout pregnancy and the postpartum period;
- ensuring satisfaction of providers and receivers of the new style of ANC provision;
- clarifying the appropriate policy, decision-making and programmatic implications of adopting and implementing the new ANC protocol.

As a result of the ANC debate, a few randomized controlled trials comparing the new protocol (fewer ANC visits) to the traditional one have been carried out in the United Kingdom (UK) [2,3] and Zimbabwe [4], and on an interregional scale by the World Health Organization [5].

The debate has also aroused the interest and concern of health authorities and scientific circles in re-thinking aspects of ANC and giving greater priority to women's concerns [6]. The objectives of this paper are:

- To introduce the ANC debate.
- To summarize the results and conclusions of the four selected trials on the frequency, continuity and quality of ANC.
- To review available data on the prevailing ANC patterns in Arab countries.
- To discuss the policy, decision-making, and programme implications of adopting and implementing the new ANC schedule.

[1]*Directorate of Health Centres, Ministry of Health, Riyadh, Saudi Arabia.*
Received: 14/11/00; accepted: 28/03/01

- To disseminate information on the reduced schedule in order to enrich the debate.

Methods

Sources of materials included:

- Reports of two UK studies on ANC and one from Zimbabwe [2–4]
- Report on the World Health Organization (WHO) ANC randomized controlled trial [5] WHO other documents on safe motherhood and reproductive health (WHO safe motherhood newsletters and WHO antenatal care trial newsletters)
- Two Cochrane reviews [7,8]
- Other relevant research and documents in the last 10 years
- Related local [9,10] and external scientific activities
- Selected data on ANC in Arab countries [11–15].

Results

The British study [2]

The objective of this study was to compare traditional patterns of ANC with a reduced schedule of visits for women with low-risk pregnancies, by means of clinical data, and to assess the psychosocial effectiveness of and maternal and professional satisfaction with the care given. The schedule followed in this study required seven visits for primiparous and six visits for multiparous women. Its key messages were:

- Evaluation of changes in maternity services should include measures of psychosocial, organizational and clinical effectiveness.
- Both the traditional and reduced ANC groups had a similar rate of caesarean section for pregnancy-related hypertension.
- Fewer ANC visits resulted in fewer scans and ANC admissions.
- Fewer ANC visits led to poorer psychosocial outcomes and greater maternal dissatisfaction.
- If the number of ANC visits is reduced, more psychosocial support and assurance of fetal well-being are needed.

The Scottish study [3]

The objective of this study was to compare routine ANC provided by general practitioners and midwives with obstetrician-led care. The conclusion was that routine specialist visits for women at low risk of pregnancy complications offer little or no consumer benefit.

The Harare study [4]

The objective was to evaluate the effectiveness of a reduced goal-oriented ANC programme. Three clinics were to provide 14 visits and four clinics to provide 6 visits per pregnancy. In practice, however, the median number of visits in the traditional schedule was 6 and in the reduced schedule, it was 4. The conclusions on clinical outcomes were similar to those of the UK studies. More goal-oriented visits had no adverse effects on perinatal or maternal mortality, with fewer referrals to a high-risk unit and few preterm births In both groups the average gestation time at which booking took place was 28 weeks. An expert commentary on the Harare study cautioned that ANC should not be standardized across the globe and research results should not be extrapolated [16] The commentary also noted that the study showed

that high-quality trials could successfully be conducted in developing countries.

The WHO trial [5]

This is the first large-scale randomized controlled trial to evaluate the impact of an improved and rational programme of care in pregnancy on the health of mothers and their newborns. The new schedule consisted of four visits during pregnancy, the first one early in pregnancy, then subsequent visits at 26, 32 and 36 weeks and a fifth visit at six weeks postpartum. A schedule of tasks to be carried out at each visit was prepared. The study was implemented in four countries: Argentina, Cuba, Saudi Arabia and Thailand. A pilot study and baseline survey were carried out and recruitment started on 1 May 1996. The study has a steering committee and a safety and data-monitoring committee (SDMC). Study materials include a protocol, manual of operations, manual of clinic activities and ANC content survey. Continuous monitoring has been performed. Adverse events such as maternal death, perinatal death or eclampsia have been recorded and ethical and safety issues reviewed. The economics of ANC, and women's satisfaction with and acceptance of the new protocol, have also been assessed. By October 1998, 24 703 women had been recruited and 87% of the study forms had been received for cleaning of data and interim analysis. The detailed methodology of the WHO trial and its complementary substudies were published in a special supplement of *Pediatric and perinatal epidemiology* [5] which contains eight scientific papers and two commentaries on the status of ANC in industrialized and developing countries. The final results are awaited.

Cochrane reviews

One review assessed the pattern of routine ANC for low-risk pregnancies [7]. The review concluded that an apparently moderate reduction in visits, with increased emphasis on content, particularly goal-oriented activities, could be implemented without any adverse perinatal outcomes. Most women were satisfied, although some felt that their expectations of ANC were not fulfilled. In the other review, continuity of care was assessed ands it was concluded the clinical effectiveness of midwife/general practitioner-managed care was similar to that of obstetrician/gynaecologist-led shared care, with fewer salary costs and enhanced satisfaction of the pregnant women [8].

Situation in Arab countries

Table 1 shows a case–control distribution of risk factors in Dammam city, Saudi Arabia [11]. Table 2 gives patterns of ANC in nine Arab countries [12], while Table 3 gives ANC data for Jordan for 1990 and 1997 [13]. Table 4 (final survey data, November 2000) shows the percentage of pregnant women in the member states of the Gulf Cooperation Council who had five antenatal visits or more [14]. Table 5 shows data from a hospital case–control study conducted in Jeddah [15], Saudi Arabia in 1992 comparing the ANC attendance of women who experienced perinatal mortality (PNM) with controls (controls were selected as the two successive live births following each PNM case).

Discussion

There is an extensive amount of literature from industrialized and developing coun-

Table 1 **Major risk factors in the current pregnancy in referred mothers and controls, Saudi Arabia**

Risk factor	Cases (n = 135) No.	%	Controls (n = 135) No.	%	P-value
Parity 5 or more	38	28.1	36	26.7	0.785
Age 35 years or more	17	12.6	12	8.9	0.432
Sickle-cell disease	8	5.9	7	5.2	0.791
Anaemia	7	5.2	6	4.4	0.776
Toxoplasmosis	5	3.7	15	11.1	0.200
Other	60	44.4	59	43.7	–

Source: [13].

trics on patterns of ANC and its association with perinatal and maternal outcomes. The aim of these studies is to learn from worldwide experience, and where appropriate to replicate it: the UK and the Zimbabwe trials are examples.

National birth surveys of ANC conducted in the UK from the 1940s to 1970s showed that perinatal mortality rates were inversely related to the number of antenatal check-ups [*6*]. Similar associations have been reported from Africa [*17*], South America [*18*] and Asia [*19*]. The latter results were not, however, classified according to frequency of visits *per se*, their quality, or the number of visits with optimal effectiveness.

The Saudi study on perinatal mortality [*16*] unexpectedly showed no relationship between ANC and perinatal mortality. Although caesarean sections were excluded, the results must be considered with caution and cannot be extrapolated, as a more in-depth comparison of cases and controls for the common risk factors is been required. Confounding factors cannot be excluded; e.g. extra care following a perinatal mortality event, or inaccessibility or delays in reaching care. It is anticipated that the WHO trial, also conducted in Jeddah, Saudi Arabia, will show that good ANC leads to reduced perinatal mortality [*5*].

In the 1980s and 1990s the debate focused on the cost–effectiveness of ANC in reducing maternal mortality, a neglected tragedy [*1,20*]. Established ANC interventions were revised [*21*]. Risk assessment was described as ineffective [22] and traditional birth attendant (TBA) training received less support.

Content, frequency and continuity were questioned by the UK Short report [*23*] which stated, "while we unhesitatingly accept the often reiterated aim of antenatal care as a means of reducing perinatal and neonatal mortality, what antenatal care consists of and how it works is not clear to us." Fourteen ANC visits per pregnancy have been found to be remarkably unproductive, inconvenient to all concerned and costly to both the health service and the mother, arousing unnecessary anxiety [*6*]; women sometimes attended solely for socialization. Fewer visits, with more time for pregnant women to feel at ease and ask questions, would thus be an improvement.

Table 2 **Antenatal check-ups received by mothers during the 5 years preceding the PAPCHILD surveys in 9 Arab countries**

Antenatal check-ups	Algeria	Egypt	Lebanon	Libyan Arab Jamahiriya	Mauri-tania	Sudan	Syrian Arab Republic	Tunisia	Republic of Yemen	Mean ± standard deviation
% of women having check-up in first trimester	60.6	63.3	83.2	55.2	67.0	43.0	66.3	60.8	48.3	61.4
Mean no. of check-ups	3.6	4.5	6.8	5.6	2.8	5.[illegible]	4.8	4.0	3.6	4.6 ± 3.3
Mean no. months at first check-up	3.3	3.3	2.3	3.5	3.6	4.[illegible]	3.1	3.3	4.3	3.5 ± 2.0
% of women having no check-up[a]	58.4	85.8	58.5	79.5	39.6	49.[illegible]	74.9	53.1	37.1	59.6 ± 17.2

Source: [14].
[a]Because there were no problem in the previous pregnancy.

The "gather" concept summarizes the need to greet, ask, tell, help, explain and return the patient for the next visit. Privacy and confidentiality must be ensured. An appointment system should be established. At least four visits may then be achieved, bearing in mind the desired global target of one visit per pregnancy by a trained person, excluding TBAs [*24*].

In the United States (US), however, 10 visits are recommended for a nulliparous and 8 visits for a multiparous woman, preferably with a preconception visit in the year before the start of pregnancy [*25*]. The preconception visit may also be advocated for developing countries, where it could help avoid many problems. Generally a first visit in early pregnancy is recommended; but in Zimbabwe the median gestation at booking was about 28 weeks, in both case and control groups, even though efforts were made to encourage early attendance. In Tanzania, the average number of ANC visits was 6.4 [*26*] while in Zambia it was 5 [*27*]. The situation in most Arab countries is shown in Tables 2, 3 and 4. Four visits seem to be the norm, with an above average number of early pregnancy visits, and a mean first attendance in the middle of the fourth month. Data on the frequency of visits *per se*, however, do not indicate the true health status of mothers and their babies. In addition, the erroneous belief of some women that if they feel well, they do not need to come for ANC deserves special scrutiny.

Continuity of care by the same provider or by a smaller group has been emphasized by the trials. A woman should be referred elsewhere only if necessary and feedback must be en-

Table 3 **Percentage of children born during the 5 years before the PAPCHILD survey whose mothers had antenatal check-ups: Jordan, 1990 and 1997**

No. of antenatal check-ups	1990	1997
None	19.8	4.1
1	3.4	2.5
2–4	9.4	7.0
4	67.1	86.2
Not available	0.3	0.2
Total%	100.0	100.0
Median	7.5	8.0

Source: [15].

Table 5 **Percentage distribution of antenatal care visits in a case–control study of perinatal mortality, Saudi Arabia**

No. of antenatal care visits	% cases (n = 222)	% controls (n = 482)
0	36.5	36.5
2–8	47.3	42.1
>8	16.2	21.4
Total	100	100

Source: [17].
P = 0.23.

sured. In Finland public maternity centres run by general practitioners and nurses have been the main sources of maternity care, while 86% of women visited a gynaecologist for contraception [*28*]. ANC has become a PHC activity, while simultaneously hospital delivery is being encouraged. As a result, continuity of care may not be achieved. In Aberdeen [*29*], hospital ANC was less liked by women; in 62% of consultations the women asked no questions, while in 64% of consultations there was no education, health promotion or explanation. Women's satisfaction with the reduced ANC schedule has been investigated [*2,5*]. Exit questionnaires, focus group discussions or mini-surveys are simpler approaches that can be performed using the WHO Safe Motherhood Needs Assessment document [*30*]. The unwarranted dislike of some pregnant women for the reduced ANC schedule [*31*] must be averted by appropriate education and psychosocial support. Literacy is the most important determinant of compliance with the set ANC; thus while literate women attended public hospitals, illiterate ones bypassed them to see their TBA 15 kilometres away [*32*]. Community and home-based care, however, face cultural and logistical problems, although tracing defaulters has been facilitated by improved communication facilities.

Reducing the number of ANC visits means that the quality of the visit must be assured. In 1980 McIlwaine in the Short report said [*23*] wrote that he was amazed that women came for prenatal care at all.

Table 4 **Percentage of births for which the mother received five or more antenatal check-ups in Gulf Cooperation Council countries**

Country	%
Bahrain	57.4
Kuwait	76.5
Oman	57.9
Qatar	52.6
Saudi Arabia	65.9
United Arab Emirates	50.3

Source: [16].

They sat there in clinics for two hours to be seen for two minutes with someone laying his hands on them and then they left. He believed that the fact that they came at all should be investigated Thus ANC standards and the corresponding indicators should be defined, disseminated, monitored, audited and evaluated. Training in the ANC protocol, supportive supervision and further on-the-job training are prerequisites for success [*9*]. In the case of poor compliance by healthcare workers, materials must be revised in collaboration with hospital consultants [*33*].

Female health workers are better providers of ANC and can ensure continuity. The contribution of male workers may be limited by cultural factors or legal implications. However, there is a general shortage of female physicians. Sri Lanka is an exception where 80% of health workers and 50% of physicians are women [*34*]. Carefully controlled trials have not shown any differences in pregnancy outcome after care by either midwives or physicians [*35*]. Care for low-risk pregnancies by midwives in midwifery clinics has proved economical and acceptable [*36*]. General practitioners may be ready to deliver maternity services [*37*], but midwifery services should also receive due attention.

The importance of organization for the successful implementation of ANC was emphasized in a study from Finland that stressed the need for a division of labour between primary and secondary care [*28*]; PHC centres may need to be upgraded to provide continuous maternity care. The contribution of optimal ANC organization to the decline in perinatal mortality has been reported from France [*38*]. In developing countries, adopting the district health system for essential obstetric care will improve ANC accessibility. Other structural standards to be met include appropriate reception and clinic facilities, and support services such as laboratory services. Ultrasound scanning attracts women to early ANC in addition to its other benefits, such as reducing the number of induced births [*6*]; its usefulness has nevertheless been questioned [*39*]. The results of the controlled trials cited here revealed no major differences in maternal and baby outcomes as regards the use of ultrasound scans. The association between the frequency of ANC visits and reduced maternal mortality was rarely assessed, especially since maternal mortality is relatively uncommon. The effect of reduced ANC visits on the magnitude of maternal mortality can however be assessed in retrospect, as 24% of maternal deaths occur during pregnancy, 16% during labour and 60% in the postpartum period [*40*]. A national Saudi maternal mortality study [*41*] showed that in 61% of 155 maternal deaths, the patient had no ANC. As mortality is the extreme tip of the iceberg, measuring morbidity could be more informative. However, national morbidity data may be inadequate, invalid and unreliable, and therefore are often not used. A more useful assessment of maternal morbidity may come from studying "near-miss" cases [*42*]. For infants, postneonatal mortality is less closely related to ANC than is neonatal mortality, while perinatal mortality is a better measure of the association between ANC and outcome. It is not however easy to obtain reliable data on perinatal mortality, as mothers and newborns may leave hospital within a few hours of the birth, may not attend postnatal care, and may not be seen until the next pregnancy. Routine reporting is unreliable while surveys are costly and require special expertise.

Conclusion

The results of the cited trials provide good scientific evidence that reduced visits do

not have an untoward effect on the outcome of pregnancy, compared to the traditional number of visits. In practice while the frequency of visits is less, the new schedule emphasizes quality of care. Women's dissatisfaction with reduced visits can be averted by appropriate education and clarification. The economic benefit of reduced visits is being studied and is expected to show cost savings [*43*] in addition to reductions in time and effort. Competent midwives in midwifery clinics, with or without physicians, can provide economical and acceptable maternity services; midwifery care should therefore be strengthened. Thus, the reduced protocol is recommended for universal adoption and may put an end to the long debate on ANC.

Acknowledgements

Thanks are extended to Dr Yagoub Y. Al-Mazrou, Deputy Minister of Preventive Medicine, Saudi Arabia and Dr Tawfik A. Khoja, Executive Director, Gulf Cooperation Council Office, Riyadh, Saudi Arabia for providing me with relevant material.

References

1. Hafez G. Maternal mortality: a neglected and socially unjustifiable tragedy. Why WHO selected "safe motherhood" as the slogan for the World Health Day 1998. *Eastern Mediterranean health journal*, 1998, 4:7–10.

2. Sikorski J et al. A randomised controlled trial comparing two schedules of antenatal care visits: the antenatal care project. *British medical journal*, 1996, 312:546–53.

3. Tucker JS et al. Should obstetricians see women with normal pregnancies? A multicentre randomised controlled trial of routine antenatal care by general physicians and midwives compared with shared care led by obstetricians. *British medical journal*, 1996, 312:554–9.

4. Munjanja SP, Lindmark G, Nystrom L. Randomised controlled trial of a reduced-visits programme of antenatal care in Harare, Zimbabwe. *Lancet*, 1996, 348:364–9.

5. Villar J et al. The WHO antenatal care randomised controlled trial: rationale and study design. *Paediatrics and perinatal epidemiology*, 1998, 12(suppl. 2): 27–58.

6. Young G. Symposium: controversies in pregnancy and the puerperium. *The practitioner* Eastern Mediterranean Edition, 1992, 3:519–23.

7. Villar J, Khan-Neelofur D. Patterns of routine antenatal care for low-risk pregnancy. *Cochrane database of systematic reviews*, 2000 (2):CD000934.

8. Hodnett ED. Continuity of caregivers for care during pregnancy and childbirth. *Cochrane database of systematic reviews*, 2000 (2):CD000062.

9. Baldo MH et al. Augmenting hospital support of maternal and child health care, Saudi Arabia. *Eastern Mediterranean health journal*, 1998, 4:11–20.

10. Baldo MH et al. Antenatal care, attitudes, and practices. *Journal of tropical paediatrics*, 1995, 41:21–9.

11. Al-Sowailem L, Mangoud AM. Evaluation of the antenatal care referrals from health centres to the Maternity and Children Hospital in Dammam City, Saudi

Arabia. *Journal of family and community medicine*, 1996, 3:22–6.

12. Moussa EA. *Modeling Maternal Health Care: a comparative multivariate analysis of PAPCHILD.* Paper presented at the Arab Conference on Maternal and Child Health, Cairo, Egypt 7–10 June 1999.

13. El-Kharabsha AH. *Health situation in Jordan.* Paper presented at the Arab Conference on Maternal and Child Health, Cairo, Egypt 7–10 June 1999.

14. Khoja TA, Farid S. *Final Report of the Gulf Family Health Survey.* Presented at the Gulf Symposium, Riyadh 12–14 November 2000 (Executive Board. Council of Health Ministers of Gulf Cooperation Council States.

15. Milaat WA, Florey CD. Perinatal mortality in Jeddah, Saudi Arabia. *International journal of epidemiology*, 1992, 21:82–90.

16. Fewer antenatal care visits reduced high-risk referrals and preterm births in Zimbabwe [Commentary] *Evidence-based medicine*, March/April 1997.

17. Harrison KA. Child-bearing, health and social priorities. A survey of 22 774 consecutive hospital births in Zaria, Northern Nigeria. *British journal of obstetrics and gynaecology*. 1985. 92(suppl. 5):1–119.

18. Barros FC, Victoria CG, Vaughn. Perinatal mortality in Brazil. *Bulletin of the World Health Organization*, 1987, 65: 95–104.

19. Pereira T, Khing ML. Perinatal mortality including low birth weight: a South-East Asia regional profile. New Delhi, Regional Office for South-East Asia, 1984 (SEARO Regional Health Paper, No. 3).

20. Maine D. What is special about maternal mortality? In. *The Safe Motherhood Agenda: priorities for the next decade. Report from the Technical Consultation, Sri Lanka.* New York, Family Care International, 1998.

21. Rooney C. *Antenatal care and maternal health: how effective is it? A review of evidence.* Geneva, World Health Organization, 1992.

22. Wendy G. Every pregnancy faces risk. In: *The Safe Motherhood Agenda: priorities for the next decade. Report from the Technical Consultation, Sri Lanka.* New York, Family Care International, 1998.

23. Short Report. Second Report from the Social Services Committee. Perinatal and neonatal mortality. London, Her Majesty's Stationery Office, 1980.

24. *Reproductive health indicators for global monitoring. Report of an interagency technical meeting, 9–11 April 1997.* Geneva, World Health Organization, 1997.

25. Rozen MG, Merkatz IR, Hill JG. Caring for our future: a report by the expert panel on the content of prenatal care. *Obstetrics and gynecology*, 1991, 77:782–7.

26. Moller B et al. A study of antenatal care at village level in rural Tanzania. *International journal of gynaecology and obstetrics*, 1989, 30:123–31.

27. Ransjoy-Arvidson AB et al, Maternity care routine in a teaching hospital in Zambia. *East African medical journal*, 1989, 66:427–36.

28. Hemminki E et al. The role of gynecologists in women's health care — women's views. *International journal of quality in health care*, 1997, 9:B3.

29. Hall M, Macintyre S, Porter M. *Effective care in pregnancy and childbirth.* Aberdeen, Aberdeen University Press, 1985.

30. *Safe Motherhood Needs Assessment.* Geneva, World Health Organization, 1998.

31. Neilson J. Antenatal care on trial. *British medical journal*, 1996, 312:524–5.

32. Al-Nahedh NNA. Factors affecting the choice of maternal and child health services in a rural area of Saudi Arabia. *Eastern Mediterranean health journal*, 1995, 1:261–9.

33. Yoong A et al. An investigation of awareness of antenatal care protocols. *Quality assurance in health care*, 1993, 5:119–22.

34. Wejemanne H. *Role of women in the achievement of PHC.* Sri Lanka, Asian Parasite Control Organization. 1986: 66–7.

35. Fink A, Yano EM, Goya D. Prenatal programs, what the literature reveals. *Obstetrics and gynecology*, 1992, 80:867–72.

36. Giles W et al. Antenatal care of low risk obstetric patients by midwives. A randomised controlled trial. *Medical journal of Australia*, 1992, 157:158–61.

37. Fenwick N et al. General practitioners' attitudes to the development of midwifery group practices. *British journal of general practice*, 1998, 48:1395–8.

38. Millies J. Antenatal care in industrialized countries. In: Baum D, ed. *Birth risks.* New York, Raven Press, 1993 (Nestlé Workshop Series, Vol. 31):127.

39. LeFevre ML. A randomized trial of prenatal ultrasonographic screening: impact on maternal management and outcome. RADIUS (Routine Antenatal Diagnostic Imaging with Ultrasound) Study Group. *American journal of obstetrics and gynecology*, 1993, 169:483–9.

40. Abou-Zahr CL. Lessons on safe motherhood. *World health forum*, 1995, 19: 253–60.

41. Al-Meshari AA et al. Epidemiology of maternal mortality in Saudi Arabia. *Annals of Saudi medicine*, 1995, 15:317–23.

42. Nasrat HA et al. "Near-miss" obstetric morbidity in an inner-city hospital in Saudi Arabia. *Eastern Mediterranean health journal*, 1999, 5:717–26.

43. Mugford M et al. Economics of antenatal care. *WHO Antenatal Care Trial Newsletter*, April 1998.