

Antenatal care in primary health care centres in Medina, Saudi Arabia, 2009: a cross-sectional study

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الرعاية السابقة للولادة في مراكز الرعاية الصحية الأولية في المدينة المنورة في المملكة العربية السعودية، عام 2009: دراسة مُستعرضة

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الخلاصة: تقيّم هذه الدراسة خدمات الرعاية السابقة للولادة للنساء الحوامل اللاتي راجعن مراكز الرعاية الصحية الأولية في المدينة المنورة في المملكة العربية السعودية عام 2009. وقد جرى عن طريق مسح مُستعرض جمع المعطيات حول المهام التي أُدِّيت أثناء زيارات 394 حاملاً راجعاً سبغ عيادات. وجرى تقييم الرعاية السابقة للولادة من حيث ثلاثة مجالات: التقييم السريري (في الزيارة الأولى وفي زيارة المراجعة)، وتعزيز الصحة، وتقديم الرعاية. وكان متوسط مدة الزيارات الأولى 10.3 دقيقة (+ 2.3)، وزيارات المراجعة 9.1 دقيقة (+ 1.1). وكان مجمل الأداء في الرعاية السابقة للولادة مقبولاً. وكانت المنبئات التي يُعتدُّ بها لأداء مهام الرعاية السابقة للولادة هي: حجم السكان الذين يُخدمهم المركز؛ ووجود أكثر من طبيب يقومون بالرعاية السابقة للولادة في المركز؛ وعمر الطبيب، ولغته الأم، وجنسيته، ومؤهلاته؛ ووضعهُ الوظيفي. وقد دلّت الدراسة على أن زيادة عدد الأطباء الذين يقدمون الرعاية السابقة للولادة في مراكز الرعاية الصحية الأولية يمكن أن يحسّن من معايير الرعاية.

ABSTRACT This study evaluated antenatal care (ANC) services for pregnant women attending primary health care centres in Medina city, Saudi Arabia in 2009. A cross-sectional survey collected data on ANC tasks performed at visits by 394 pregnant women attending 7 clinics. ANC was assessed in 3 domains: clinical assessment (at the initial visit and return visit), health promotion and care provision. The mean duration of initial visits was 10.3 (SD 2.3) minutes and of return visits was 9.1 (SD 1.1) minutes. Overall performance on ANC tasks was fair. The significant predictors of ANC performance of tasks were: size of population served per centre; presence of more than 1 physician carrying out ANC at the centre; physician's age, mother tongue, nationality and qualifications; and woman's education and employment status. Having more physicians available for ANC in primary care centres could improve the standard of care.

Soins prénatals dans les centres de soins de santé primaires à Médine (Arabie saoudite) en 2009 : étude transversale

RÉSUMÉ La présente étude a évalué les services de soins prénatals destinés aux femmes enceintes consultant dans des centres de soins de santé primaires de la ville de Médine, en Arabie saoudite, en 2009. Dans le cadre d'une enquête transversale, des données ont été recueillies sur les actes de soins prénatals réalisés lors des visites de 394 femmes enceintes consultant dans sept centres. Les soins prénatals ont été évalués en fonction de trois axes : l'examen clinique (lors de la première et de la deuxième visite), la promotion de la santé et la prestation de soins. La durée moyenne des premières visites était de 10,3 minutes (E.T. 2,3) et de 9,1 minutes pour les deuxièmes visites (E.T. 1,1). La performance globale pour les actes de soins prénatals était acceptable. Les facteurs prédictifs importants pour la performance des actes de soins prénatals étaient les suivants : la taille de la population couverte par centre ; la présence de plus d'un médecin dispensateur de soins prénatals au centre ; l'âge du médecin, sa langue maternelle, sa nationalité et ses qualifications ; et le niveau d'instruction de la patiente et sa situation professionnelle. Le fait de disposer de davantage de médecins pour dispenser des soins prénatals dans des centres de soins de santé primaires pourrait améliorer la qualité des soins.

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Introduction

Promotion of maternal and fetal health necessitates proper antenatal care (ANC) that includes health education, such as parenthood and family life education, counselling, screening and treatment [1,2]. Many health problems that threaten pregnant women's health can be managed through improved ANC in which proper discussions, taking account of the intellectual, emotional, social and cultural needs of women, infants and families, will be accompanied by appropriate decisions for individual pregnancy care [3–5]. The components of an ANC package should be designed to be effective, acceptable and of high quality together with proper selection of clinical examinations and laboratory tests.

The World Summit for Children in 1990, the International Conference on Population and Development in 1994 and the Fourth World Conference on Women in 1995 all promoted the goal of ANC being available to all pregnant women, with childbirth by trained birth attendants and proper referral systems for high-risk pregnancies [6]. The model of ANC from developed countries has been adopted by most developing countries albeit with slight modifications [7,8]. The World Health Organization (WHO) has recommended that ANC for normal pregnancies should involve 4 antenatal visits and has outlined the key elements and timing of visits [9]. The components of ANC for a normal pregnancy have been described under 3 main categories: assessment (history, examination and laboratory tests), health promotion and care provision.

Most currently used models of ANC have not been subjected to evaluation. In developing countries, there is poor implementation of ANC programmes, with irregular visits, long waiting time and poor feedback to women [10]. Due to the scarcity of research about the quality of ANC in Saudi Arabia, a study

was carried out to evaluate the ANC services given for pregnant women attending primary health care centres (PHCCs) in Medina city. The aim of the study was to analyse the pattern of consultations at the health centres and the characteristics of the physicians and the women and to determine the predictors of good ANC performance.

Methods

A cross-sectional survey was conducted during March to July 2009.

Sample and setting

The study population was pregnant women attending PHCCs in Medina, Saudi Arabia for ANC over the study period. Simple random selection of 7 major PHCCs in Medina was done. The total number of pregnant women included in the study was calculated using the following equation: $n = (z^2 \times p \times q) / D^2$, where $z = 1.96$, $p = 0.16$, $q = 0.84$, $d = 0.05$. The sample size was thus estimated to be 394 pregnant women. The populations served by the centres ranged from 10 000 to 35 000 and the number of women were proportionally allocated based on the number of pregnant women served by each centre (range of women per health centre from 32 to 90). Each centre selected was visited twice a week and all pregnant women who visited the centre on that day were included until the required sample size was reached. None of the women refused to participate.

Data collection

A structured data collection form was specially designed for the study using WHO criteria for ANC [11]. The researcher visited each centre and completed the checklist during observations of observed ANC visits without any discussions with the attending physicians or women or any review of records.

The form was used to collect data about the education and work status

of the pregnant woman, and some sociodemographic data about of the physician (nationality, mother tongue, qualifications and age). The time spent for each ANC visit was documented and then data were collected in 3 domains: clinical assessment (at the initial visit and return visit); health promotion; and care provision. Each of the items of antenatal tasks was scored 0 (if not performed) or 1 (if performed) as follows:

- Assessment (initial visit): wantedness of pregnancy, social history and support, history of female genital mutilation (FGM), general appearance, clinical signs of anaemia, signs of physical abuse, breast examination, thyroid examination; varicose veins examination. Score ranges: history taking: 0–21; examination: 0–12; laboratory investigations: 0–11.
- Assessment (return visit): social, family and community support, general appearance, clinical signs of anaemia, signs of physical abuse. Score ranges: history taking: 0–3; examination: 0–9.
- Health promotion: nutritional advice; rest; hygiene; safe sex; planning for delivery; counselling on referral hospital transportation and blood transfusion; counselling on newborn care including breastfeeding; family planning and child spacing; smoking. Score range: 0–10.
- Care provision: development of an individualized delivery plan; psychosocial support. Score range: 0–6.

The total performance score was calculated for each task at each centre and the mean percentage score was calculated.

Collection of data from the selected centres was done after obtaining official permission. The ethics review committee at the University of Alexandria, Faculty of Medicine reviewed and approved the proposal. The survey tool was pre-tested on a random sample of 35 participants obtained from 2 centres

to ensure the practicability, validity and interpretation of responses. The reliability of the questionnaire was assessed using Cronbach alpha ($\alpha = 0.81$).

Analysis

SPSS, version 10 was used for analysis. Frequencies, percentages and arithmetic mean and standard deviation (SD) were calculated. Statistical analyses were done using chi-squared tests and Student *t*-test. Correlation coefficients (linear regression) were used to determine the predictors of good ANC performance. *P*-value < 0.05 was considered statistically significant.

Results

Description of the practices and physicians

A total of 7 PHCCs were included in the study and 394 pregnant women attending for ANC consultation were recruited. More than half of the physicians (57.1%) were Egyptian, 28.7% were Pakistani and 14.2% Bangladeshi. Their mean age was 45.7 (SD 4.7) years.

Characteristics of the sample of pregnant women

A minority of the pregnant women studied were illiterate (0.8%) (Table 1), while 41.4% had completed secondary education and 33.2% had university education. Only 14.0% of women were working ($P < 0.001$). Regarding duration of pregnancy, 34.4% were in the 1st trimester, 36.3% in the 2nd trimester and 29.4% in the 3rd trimester. Around half (51.5%) were visiting the centre for the first time. The mean duration of initial visits was 10.3 (SD 2.3) min and of return visits was 9.1 (SD 1.1) min.

Performance of ANC tasks

Table 2 shows the % scores of ANC tasks performed at visits. The lowest percentage coverage was for social history and support, history of FGM, examination of general appearance,

breast examination, examination for signs of physical abuse, planning for delivery and development of individualized delivery plan, smoking history and psychosocial support.

Assessment of ANC services

At the initial visits the mean percentage score for history taking at the PHCCs [93.4% (SD 1.5%)] was higher than at the return visit [83.0% (SD 5.4%)] (Table 3). Clinical examinations, however, were performed better at the return visit than the initial visit [mean scores 86.1% (SD 7.7%) and 75.6% (SD 11.7%) respectively]. Health promotion had the worst score [64.9% (SD 12.7%)]. The overall total mean percentage score for ANC services was 77.1% (SD 1.1%).

Predictors of ANC performance

Table 4 shows that younger, Arabic speaking, better qualified physicians attained better ANC performance scores, especially for health care promotion.

The significant predictors of performance of ANC tasks were: size of population served per centre; presence of more than 1 physician carrying out ANC at the centre; physician's age,

mother tongue, nationality and qualifications; and woman's education and employment status (Table 5).

Discussion

Our results show that three-quarters of the pregnant women attending for ANC had secondary (41.4%) or university (33.2%) education. It has been noted that in developing countries as a whole, women with secondary or higher education are more likely to attend for ANC than women with no education [12]. We also found that the educational level and work status of the attending pregnant women correlated positively with ANC performance at the studied centre.

Around one-third of the studied pregnant women were attending the PHCC during the first trimester. The early initiation of ANC is important to prevent and treat anaemia and to identify and manage women with medical complications. Early care also allows for the development of interpersonal relationships between the health care

Table 1 Sociodemographic characteristics of the studied pregnant women

Variable	No. of women	% (<i>n</i> = 394)
Educational level		
Illiterate/read and write	3	0.8
Primary	33	8.4
Preparatory	64	16.2
Secondary	163	41.4
University	131	33.2
Employment status		
Not working	320	81.2
Working	55	14.0
Student	19	4.9
Order of the visit		
Initial	203	51.5
Return	191	48.5
Trimester of pregnancy		
1st	135	34.3
2nd	143	36.3
3rd	116	29.4

Table 2 Performance of antenatal care (ANC) tasks

Domain/task	% of ANC visits where task performed		
	All health centres (n = 7)	Range Min. Max.	
Assessment: initial visit			
Clinical signs of anaemia	42.9	0.0	100.0
Thyroid examination	34.5	0.0	100.0
Signs of physical abuse	24.1	0.0	96.8
Varicose veins examination	24.1	0.0	100.0
Wantedness of pregnancy	10.3	0.0	61.3
Breast examination	8.9	0.0	100.0
Social history and support	9.9	0.0	61.3
General appearance	3.9	0.0	100.0
History of FGM	0.0	0.0	0.0
Assessment: return visit			
General appearance	42.9	0.0	100.0
Clinical signs of anaemia	35.6	0.0	100.0
Signs of physical abuse	8.4	0.0	51.6
Social, family and community support	2.1	0.0	12.5
Health promotion			
Nutritional advice	63.7	15.6	100.0
Rest	43.1	14.5	100.0
Counselling on newborn care including breastfeeding	39.8	4.4	100.0
Counselling on referral hospital transportation and blood transfusion	23.4	0.0	100.0
Family planning and child spacing	18.8	0.0	90.3
Hygiene	15.5	0.0	62.9
Safer sex	10.4	0.0	53.2
Planning for delivery	5.8	0.0	7.3
Smoking	5.3	0.0	21.9
Care provision			
Psychosocial support	2.0	0.0	14.5
Development of individualized delivery plan	0.5	0.0	3.6

FGM = female genital mutilation.

provider and the pregnant woman [13,14].

Scores on tasks performed at the ANC visit ranged widely across different health centres, from zero to 100% of ANC visits. The best performed tasks overall were in the health promotion domain: nutritional advice (performed at 63.7% of ANC visits at all health centres), rest (43.1%) and counselling on newborn care including breastfeeding (39.8%). Health promotion for a woman can improve her own health and that of her child and the risks of maternal and perinatal complications can

Table 3 Mean percentage score for the 3 domains of antenatal care services assessed

Domain/service	Mean (SD) performance scores		
	All health centres (n = 7)	Range Min. Max.	
Assessment: initial visit			
History	93.4 (1.5)	92.9 (0.0)	95.8 (2.4)
Examination	75.6 (11.7)	66.0 (5.3)	95.8 (4.3)
Investigation	95.0 (1.4)	91.3 (1.3)	95.5 (0.0)
Assessment: return visit			
History	83.0 (5.4)	73.1 (16.1)	85.4 (5.6)
Examination	86.1 (7.7)	80.8 (9.0)	92.9 (5.0)
Health promotion	64.9 (12.7)	53.8 (7.6)	83.5 (5.3)
Care provision	83.0 (3.6)	77.9 (9.7)	84.8 (3.2)
Total	77.1 (1.1)	68.6 (3.2)	88.6 (1.3)

SD = standard deviation.

Table 4 Mean scores of the 3 domains of antenatal care (ANC) performed by characteristics of the practice, physician and woman

Variable	Assessment			Health promotion		Care provision	
	Initial visit Mean (SD) score	P	Return visit Mean (SD) score	P	Mean (SD) score	P	
Population served							
10 000–20 000	30.0 (5.16)	< 0.001*	25.9 (5.32)	< 0.001*	23.0 (11.48)	< 0.001*	28.2 (7.99)
20 000–30 000	30.2 (5.32)		27.9 (3.44)		27.9 (12.35)		35.6 (9.21)
30 000+	29.3 (2.87)		23.9 (2.31)		14.9 (5.82)		33.3 (2.01)
Physician's age (years)							
40–45 years	35.0 (2.09)	< 0.001*	29.8 (3.23)	< 0.001*	18.4 (6.98)	< 0.001*	35.3 (8.64)
45–50 years	28.0 (3.52)		25.3 (2.89)		13.4 (6.70)		18.4 (6.09)
50+ years	23.8 (1.58)		20.0 (3.86)		25.3 (11.29)		32.3 (1.91)
Physician's mother tongue							
Arabic	31.9 (5.33)	< 0.001*	27.9 (4.85)	< 0.001*	29.5 (13.97)	< 0.001*	31.8 (11.04)
Other	28.1 (3.50)		25.3 (2.92)		18.6 (7.07)		34.1 (4.78)
Official presence of more than 1 physician for ANC							
No	24.5 (2.45)	< 0.001*	26.3 (4.19)	0.746	24.7 (12.59)	< 0.001*	31.7 (5.08)
Yes	30.6 (4.65)		26.6 (3.49)		16.9 (3.84)		41.4 (16.13)
Physician nationality							
Egyptian	31.9 (5.33)	< 0.001*	27.9 (4.85)	< 0.001*	29.5 (13.97)	< 0.001*	31.8 (11.04)
Pakistani	27.3 (3.67)		26.4 (2.89)		21.3 (6.72)		34.7 (6.23)
Bangladeshi	29.3 (2.87)		23.9 (2.31)		14.9 (5.82)		30.3 (5.71)
Qualification of physician							
GP	28.8 (3.45)	0.064	26.5 (4.43)	0.547	23.5 (13.13)	0.904	33.0 (9.44)
Specialist (Ob/Gyn)	30.3 (5.23)		26.0 (2.04)		23.7 (7.31)		31.2 (8.67)
Woman's education level							
Illiterate & read and write	–		17.1 (5.37)		21.7 (2.89)		25.0 (7.22)
Primary	29.0 (3.93)		26.5 (4.02)		24.1 (10.84)		33.6 (12.97)
Preparatory	29.8 (5.00)	< 0.001*	29.2 (3.93)	< 0.001*	28.9 (13.74)	0.001*	35.7 (9.76)
Secondary	28.1 (4.80)		26.5 (2.76)		22.8 (12.11)		32.0 (6.75)
University & above	32.3 (4.07)		25.2 (4.42)		22.1 (10.79)		(7.59)

*Statistically significant.

GP = general practitioner; Ob/Gyn = obstetrics and gynaecology; SD = standard deviation.

Table 5 Significant predictors for performance of the 3 domains of antenatal care (ANC) performed

Variable	SE	Beta	t-value
Assessment: initial visit (history/examination)			
Size of served population	0.0	0.3	4.3
Physician's age	0.3	1.1	12.1
Physician's mother tongue	0.9	0.7	2.5
Presence of more than 1 physician for ANC	2.4	0.2	2.3
$R^2 = 0.580; F = 45.085$			
Assessment: return visit (history/examination)			
Physician's qualifications	0.1	-1.3	-9.5
Physician's mother tongue	0.1	-1.5	-5.6
Presence of more than 1 physician for ANC	0.3	-0.9	-10.3
$R^2 = 0.593; F = 40.644$			
Health promotion			
Population served	0.0	-0.3	-2.7
Woman's education level	0.0	0.1	2.4
Physician's age	0.0	0.4	2.9
Physician's mother tongue	0.0	1.3	4.2
Presence of more than 1 physician for ANC	0.0	1.3	10.4
$R^2 = 0.604; F = 22.642$			
Care provision			
Woman's employment status	0.3	0.2	2.8
Physician's age	0.1	-1.6	-10.6
Physician's nationality	0.8	-0.6	-2.8
Physician's mother tongue	0.2	-0.8	-2.7
Presence of more than 1 physician for ANC	0.4	-0.8	-7.2
$R^2 = 0.628; F = 25.028$			

SE = standard error.

be reduced. Yet in developing countries ANC is often poorly implemented [15–22]. In terms of assessment at the initial visit, the tasks most commonly performed were clinical signs of anaemia (performed at 42.9% of ANC visits overall) and thyroid examination (34.5%), while in the assessment at the return visit the highest scores were for general appearance (42.9%) and clinical signs of anaemia (35.6%). Some items were just recorded as NAS [no abnormal signs], even without conducting an examination, even though these are listed on the maternal record cards used in the PHCCs: general appearance (done for 3.9% of initial ANC visits) and breast examination (done for 8.9%). Social history and support, history of FGM, examination of general

appearance, breast examination, examination for signs of physical abuse, planning for delivery and development of individualized delivery plan, smoking history and psychosocial support were the tasks least often performed.

As well as attending to the women's medical needs, ANC provision should address the psychosocial needs of the woman and the development of an individualized delivery plan [11,23–27]. Our study showed that the aspects of ANC that were poorly implemented were psychosocial support (performed in 2.1% of ANC visits overall), planning for delivery (5.8%) and development of an individualized delivery plan (0.5%). This poor implementation could be attributed to the fact that these items are not included in the maternal record card

that is used in these PHCCs. The fact that deliveries are not allowed outside hospitals in Saudi Arabia, and therefore all pregnant women are referred to maternity hospitals for delivery, means that physicians are less likely to initiate a discussion of the delivery plan.

The physician is the crucial person in the process of ANC. Availability of more than 1 physician to carry out ANC in the PHCC was a determinant of good ANC in this study. Having only 1 physician for ANC services in a large PHCC is unlikely to meet the recommended time for ANC which is supposed to be given for each woman to discuss her personal needs and for the physician to respond appropriately, especially on the first visit when a full history has to be taken and an individualized birth plan started. It was found that the mean duration of the initial visit was 10.3 (SD 2.3) minutes. If an appropriate number of physicians were available, longer durations of initial visits can be achieved even in areas with high birth rates such as Saudi Arabia [28,29]. Good performance of ANC at the studied centres also correlated with the age, language and qualifications of the physician. Younger, Arabic speaking, better qualified physicians attained better ANC performance scores, especially for health care promotion.

The study has some limitations that should be recognized. It was conducted only for 7 PHCCs, and inclusion of a greater number of centres or comparisons of urban and rural centres was not feasible. The women's age and parity were not recorded so we were not able to determine whether these were associated with the performance of ANC. More in-depth study of the sociodemographic aspects and job satisfaction of the health care providers would also be useful to give a more accurate measure of overall performance. Inclusion of a more detailed obstetric history is also needed to determine the correlation with the pattern of ANC. In addition, observer

bias (both that of the researchers who observed the physicians and that of the physicians who may change their behaviour in front of an observer) may have affected the results, particularly the latter which may have led to an overestimation of the completeness of their ANC care.

Conclusion

This is the first study assessing the ANC performance of physicians in PHCCs in Medina. Overall performance was fair to low, although it varied greatly across different tasks and different health centres. Having more physicians available

for ANC in PHCCs could improve the standard of care. Further studies could take a more in-depth look at physicians' and nurses' characteristics and opinions to examine factors such as obstacles they face in their work place, their suggestions for improving ANC and their job satisfaction.

References

- Di Mario S et al. *What is the effectiveness of antenatal care? (Supplement)*. Copenhagen, World Health Organization Regional Office for Europe, 2005 (Health Evidence Network Report).
- Reduction of maternal mortality: a joint WHO/UNFPA/UNICEF/World Bank statement*. Geneva, World Health Organization, 1999.
- Essential antenatal, perinatal and postpartum care. Training modules*. Copenhagen, World Health Organization Regional Office for Europe, 2002.
- Chalmers B, Mangiaterra V, Porter R. WHO principles of perinatal care: the essential antenatal, perinatal, and postpartum care course. *Birth (Berkeley, Calif.)*, 2001, 28:202-207.
- 3rd Task Force Making Pregnancy Safer/Promoting Effective Perinatal Care. From evidence to practice. Verona, Italy, 22-24 October 2003*. Copenhagen, World Health Organization Regional Office for Europe, 2004.
- United Nations General Assembly. *A world fit for children. Outcome document of the Special Session on Children*. New York, United Nations, 2002 (A/S-27/19/Rev.1).
- Rooney C. *Antenatal care and maternal health: how effective is it? A review of the evidence*. Geneva, World Health Organization, 1992 (WHO/MSM/92.4).
- Carroli G, Rooney C, Villar J. How effective is antenatal care in preventing maternal mortality and serious morbidity? An overview of the evidence. *Paediatric and Perinatal Epidemiology*, 2001, 15(Suppl. 1):1-42.
- WHO antenatal care randomized trial: manual for the implementation of the new model*. Geneva, World Health Organization, 2001 (WHO/RHR/01.30).
- Byrne DL, Asmussen T, Freeman JM. Descriptive terms for women attending antenatal clinics: mother knows best? *British Journal of Obstetrics and Gynaecology*, 2000, 107:1233-1236.
- Antenatal care. Report of a technical working group. Geneva, 31 October-4 November 1994*. Geneva, World Health Organization, 1994 (WHO/FRH/MSM/96.8).
- Villar J et al.; WHO Antenatal Care Trial Research Group. WHO antenatal care randomised trial for the evaluation of a new model of routine antenatal care. *Lancet*, 2001, 357:1551-1564.
- Villar J et al. The WHO antenatal care randomised controlled trial: rationale and study design. *Paediatric and Perinatal Epidemiology*, 1998, 12(Suppl. 2):27-58.
- Byrne DL, Asmussen T, Freeman JM. Descriptive terms for women attending antenatal clinics: mother knows best? *British Journal of Obstetrics and Gynaecology*, 2000, 107:1233-1236.
- Villar J, Bergsjø P. Scientific basis for the content of routine antenatal care. I. Philosophy, recent studies, and power to eliminate or alleviate adverse maternal outcomes. *Acta Obstetrica et Gynecologica Scandinavica*, 1997, 76:1-14.
- Bergsjø P, Villar J. Scientific basis for the content of routine antenatal care. II. Power to eliminate or alleviate adverse newborn outcomes; some special conditions and examinations. *Acta Obstetrica et Gynecologica Scandinavica*, 1997, 76:15-25.
- Carroli G, Rooney C, Villar J. How effective is antenatal care in preventing maternal mortality and serious morbidity? An overview of the evidence. *Paediatric and Perinatal Epidemiology*, 2001, 15(Suppl. 1):1-42.
- Stanton CK. Methodological issues in the measurement of birth preparedness in support of safe motherhood. *Evaluation Review*, 2004, 28:179-200.
- Manandhar DS et al. Members of the MIRA Makwanpur trial team. Effect of a participatory intervention with women's groups on birth outcomes in Nepal: cluster-randomised controlled trial. *Lancet*, 2004, 364:970-979.
- Kramer MS, Kakuma R. Energy and protein intake in pregnancy. *Cochrane Database of Systematic Reviews*, 2003, 4:CD000032.
- Lumley J et al. Periconceptional supplementation with folate and/or multivitamins for preventing neural tube defects. *Cochrane Database of Systematic Reviews*, 2001, 3:CD001056.
- Mahomed K, Gülmezoglu AM. Maternal iodine supplements in areas of deficiency. *Cochrane Database of Systematic Reviews*, 1997, 4:CD000135.
- Atallah AN, Hofmeyr GJ, Duley L. Calcium supplementation during pregnancy for preventing hypertensive disorders and related problems. *Cochrane Database of Systematic Reviews*, 2002, 1:CD001059.
- Chalmers I. Evaluating the effects of care during pregnancy and childbirth. In: Chalmers I, Enkin M, Keirse M, eds. *Effective care in pregnancy and childbirth*. Oxford, Oxford University Press, 1989:3-38.
- Banta D. *What is the efficacy/effectiveness of antenatal care?* Copenhagen, World Health Organization Regional Office for Europe, 2003 (Health Evidence Network Report).
- Higgins JR, de Swiet M. Blood-pressure measurement and classification in pregnancy. *Lancet*, 2001, 357:131-135.
- Hodnett ED et al. Home-like versus conventional institutional settings for birth. *Cochrane Database of Systematic Reviews*, 2005, 1:CD000012.
- Carroli G et al.; WHO Antenatal Care Trial Research Group. WHO systematic review of randomised controlled trials of routine antenatal care. *Lancet*, 2001, 357:1565-1570.
- Villar J et al. *Patterns of routine antenatal care for low-risk pregnancy. The Cochrane Library, Issue No. 2*. Oxford, Update Software, 2002.