S A F E M O T H E R H O O D

Postpartum Care of the Mother and Newborn: a practical guide

MATERNAL AND NEWBORN HEALTH/
SAFE MOTHERHOOD UNIT
DIVISION OF REPRODUCTIVE HEALTH (TECHNICAL SUPPPORT)
WORLD HEALTH ORGANIZATION
GENEVA

P r a c t i c a l G u i d e

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Report of a Technical Working Group

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ABSTRACT

This document reports the outcomes of a technical consultation on the full range of issues relevant to the postpartum period for the mother and the newborn. The report takes a comprehensive view of maternal and newborn needs at a time which is decisive for the life and health both of the mother and her newborn. Taking women's own perceptions of their own needs during this period as its point of departure, the text examines the major maternal and neonatal health challenges, nutrition and breastfeeding, birth spacing, immunization and HIV/AIDS before concluding with a discussion of the crucial elements of care and service provision in the postpartum. The text ends with a series of recommendations for this critical but under-researched and under-served period of the life of the woman and her newborn, together with a classification of common practices in the postpartum into four categories: those which are useful, those which are harmful, those for which insufficient evidence exists and those which are frequently used inappropriately.

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Postpartum care presents a special challenge, not simply because it concerns at least two people with very distinct needs - the mother and her baby - but because of the wide range of disciplines which make a contribution to good quality care. To unify their contribution and ensure balance in their representation was no small challenge.

The Technical Working Group therefore wishes especially to acknowledge its debt of gratitude to Professor Pieter Treffers for his patient expertise in coordinating the many facets of this work on the postpartum, writing the Background Paper which provided the basis of the debates and drafting the present report of the meeting. Dr Soledad Diaz ensured that the many different perspectives on the postpartum represented among the participants were thoroughly explored. A full list of participants is given at the end of this report.

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EXECUTIVE SUMMARY

It is usually a joyful event when a woman gives birth to a baby she wants. Despite the pain and discomfort, birth is the long-awaited culmination of pregnancy and the start of a new life. However, birth is also a critical time for the health of the mother and her baby. Problems may arise that, if not treated promptly and effectively can lead to ill-health and even death for one or both of them. Nonetheless, the postpartum period is often neglected by maternity care. The lack of postpartum care ignores the fact that the majority of maternal deaths and disabilities occur during the postpartum period and that early neonatal mortality remains high.

Table 1 Needs of Women

In the postpartum period, women need:

- information/counselling on
  - care of the baby and breast feeding
  - what happens to their bodies - including signs of possible problems
  - self care - hygiene and healing
  - sexual life
  - contraception
  - nutrition
- support from
  - health care providers
  - partner and family: emotional, psychological
- health care for suspected or manifest complications
- time to care for the baby
- help with domestic tasks
- maternity leave
- social reintegration into her family and community
- protection from abuse/violence.

Women may fear:

- inadequacy
- loss of marital intimacy
- isolation
- constant responsibility of caring for the baby and others

The postpartum period, or puerperium, starts about an hour after the delivery of the placenta and includes the following six weeks. Postpartum care should respond to the special needs of the mother and baby during this special phase (see tables 1 and 2) and should include: the prevention and early detection and treatment of complications and disease, and the provision of advice and services on breastfeeding, birth spacing, immunization and maternal nutrition.

Postpartum haemorrhage is the single most important cause of maternal death. It kills 150 000 women each year and nearly nine out of ten of these deaths take place within four hours of delivery. A woman who is anaemic is usually less able to cope with blood loss than a woman who is well nourished. During the first hours after the birth, the care-giver has to make sure that the uterus remains well contracted and that there is no heavy loss of blood. If the bleeding is particularly severe blood transfusion may be the only way of saving a woman's life.

Puerperal infections such as sepsis are still major causes of maternal mortality in many developing countries. Fever is the main symptom and antibiotics the main treatment, though prevention by ensuring cleanliness and hygiene at delivery is obviously the best course of action.

Eclampsia is the third most important cause of maternal mortality worldwide. A woman suffering from eclampsia or severe preeclampsia the first days postpartum should be hospitalized. The treatment of choice is magnesium sulphate.

Table 2 Needs of newborn infants

In the postnatal period newborn infants need:

- easy access to the mother
- appropriate feeding
- adequate environmental temperature
- a safe environment
- parental care
- cleanliness
- observation of body signs by someone who cares and can take action if necessary
- access to health care for suspected or manifest complications
- nurturing, cuddling, stimulation
- protection from
  - disease
  - harmful practices
  - abuse/violence
- acceptance of
  - sex
  - appearance
  - size
- recognition by the state (vital registration system)

Other common postpartum complications include urinary tract problems such as infections, urine retention or incontinence. Many women also experience pain in the perineum and vulva for several weeks, especially if there was tissue damage or an episiotomy during the second stage of labour. The woman's perineum should be regularly inspected to make sure it is not infected.

Psychological problems in the postpartum period are also not uncommon. These problems can be lessened by adequate social support and support from trained care-givers during pregnancy, labour and postpartum period.

The nutritional status of the woman during adolescence, pregnancy and lactation has a direct impact on maternal and infant health in the puerperium. Women's intake postpartum should be increased to cover the energy cost of lactation. The three main vitamin or mineral nutritional deficiencies in the postpartum period are iodine deficiency disorders, vitamin A deficiency and iron deficiency anaemia. The main causes of micronutrient malnutrition are inadequate intake of foods providing these micronutrients and their impaired absorption or utilization. Preventive and treatment measures include ensuring regular intake of appropriate foods, food fortification, giving supplements to pregnant and lactating women and infants and children.

The newborn's health and well-being can also be affected by a variety of conditions. The most common causes of death and disability in the postnatal period include prematurity, neonatal sepsis, respiratory infections, neonatal tetanus and cord infections, congenital anomalies, and birth trauma or asphyxia. Babies that are preterm or have a low birth weight are more prone to low body temperature, more likely to succumb to infection, more often need to be resuscitated, and are more difficult to feed. Mothers and health workers can help avoid dangerous heat loss by making sure the room is warm and that the baby is kept next to its mother.

Infections are still a major threat to newborn infants in developing countries. Like puerperal sepsis in the mother, the extent can be reduced dramatically by making sure that the birth takes place in hygienic conditions and that those present observe basic rules of cleanliness such as hand washing.

Jaundice is quite common in newborns and usually clears up without treatment, but it can be especially dangerous in preterm or low birth weight babies. Ophthalmia neonatorum is a discharge from the eyes that occurs within the first two weeks of life but can be prevented by application of ointment or eye drops in the first hour after birth.

The establishment and maintenance of breastfeeding should be one of the major goals of postpartum care. Breast milk provides optimal nutrition for newborn infants, protects them against infections and allergies and promotes mother-infant bonding. The baby should be given to the mother to hold immediately after delivery, to provide skin-to-skin contact and for the baby to start suckling as soon as s/he shows signs of readiness - normally within ½-1 hour after birth. In institutions babies should be kept with their mother and unrestricted breastfeeding should be allowed. Mothers need help and advice on how to breastfeed. Supplementary feeds should be avoided.

During the postpartum period women need counselling on contraception. If the mother fully breastfeeds the baby she can, at least for the first six weeks, rely on the contraceptive effect of lactational amenorrhoea (LAM). If after 6 weeks an alternative contraceptive is required, methods include the progestin-only pill, a depot-medroxyprogesterone acetate (DMPA) injection, an intrauterine device (IUD), or barrier methods such as a diaphragm or condoms. Combined oral contraceptives should be avoided during the first months of lactation.

The postpartum period is an important opportunity to counsel women, their partners and their families about the decision to carry out an HIV test if the opportunity was missed during pregnancy. If a test is positive, counselling needs to be given on possible treatment or preventive measures. In many resource-poor settings, the risks of diarrhoeal disease or malnutrition due to improper or inadequate preparation of artificial milk outweigh the risk of contracting HIV through breastfeeding. Maternity services should take the necessary preventive measures to protect health care workers and mothers against infection.

All mothers should be immunized with at least two doses of tetanus toxoid to protect both themselves and their newborns. The third dose is given 6 months after the second and the last two doses are given after at least one year or during a subsequent pregnancy. Where there is a high risk of tuberculosis infection, BCG immunization should be given to infants soon after birth. Diphtheria-pertussis-tetanus vaccine is recommended for all children at 6, 10 and 14 weeks. A single dose of oral polio should be given at birth or within the first two weeks of life, and the normal polio immunization schedule should follow at 6, 10 and 14 weeks. Where perinatal transmission of hepatitis B is frequent, the first dose of hepatitis B vaccine should be given as soon as possible after birth and should be followed by further doses at 6 and 14 weeks.

Postpartum services should be based on the needs and health challenges outlined above, incorporate all the essential elements required for the health of the mother and her newborn, and should be provided in an integrated fashion. Skilled care and early identification of problems could reduce the incidence of death and disability, together with the access to functional referral services with effective blood transfusion and surgical capacity. With regard to timing of postnatal visits, there seem to be “crucial” moments when contact with the health system or caregiver could be instrumental in identifying and responding to needs and complications. These can be resumed in the formula (which should not be interpreted rigidly) of “6 hours, 6 days, 6 weeks and 6 months”. Table 3 below summarizes the broad lines of care that can be offered at each point of contact during the puerperium. More important than a rigid but unfeasible visiting schedule is the possibility for all women to have access to a health care provider when she needs it.

There is a need to provide a solid infrastructure for the provision of a service which is comprehensive, culturally sensitive and which responds to the needs of childbearing women and their families. Elements of this infrastructure include policy, service and care provision, tool development, training and human resource issues, health protection and promotion and research.

Table 3 Key elements of postpartum care

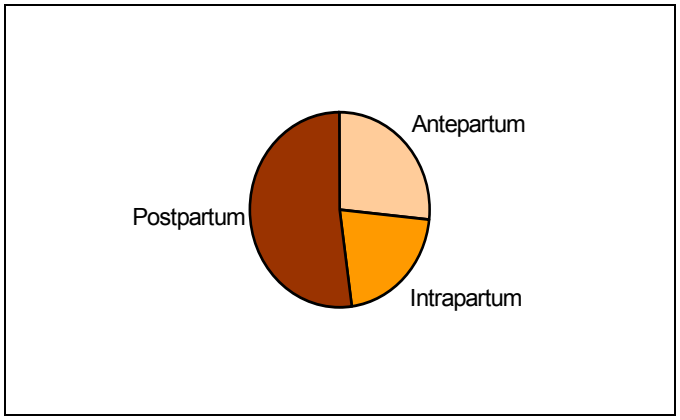
6-12 hours	3- 6 days	6 weeks	6 months
Baby: breathing warmth feeding cord immunization	feeding infection routine tests	weight/feeding immunization	development weaning
Mother: blood loss pain BP advice/ warning signs	breast care temperature/infection lochia mood	recovery anaemia contraception	general health contraception continuing morbidity

1 INTRODUCTION

1.1 Preamble

The postpartum period covers a critical transitional time for a woman, her newborn and her family, on a physiological, emotional and social level. Nonetheless, in both developing and developed countries women's needs during this period and those of their newborns have been all too often eclipsed by the attention given to pregnancy and birth. Such an eclipse ignores the fact that the majority of maternal deaths and disabilities occur during the postpartum period (see Figure 1 below) and that early neonatal mortality remains high. Driven frequently by economic considerations the skimpy, or even non-existent care offered to women and their newborns at home or in health facilities makes little contribution to their well-being and provides a frail basis for their future health. Poor quality care reduces opportunities for health promotion and for the early detection and adequate management of problems and disease.

Figure 1: When women die - time of maternal deaths in developing countries



This eclipse of care in the postpartum period finds its reflection in the lack of research evidence on effective interventions, in the extremely uneven provision (where there is not total absence) of care, and in poor economic or social infrastructures to facilitate care provision. A WHO symposium in Trieste in 1986 (WHO 1986) went part way to addressing some of these gaps, but, organized by the regional offices for Europe and the Americas, it was unrepresentative of conditions in many other regions. Since the publication of the *Mother-Baby Package* (WHO 1994d) there has been an urgent need to provide global practice guidelines for the different phases of childbearing. In May 1997 WHO convened a Technical Working Group (TWG) on Postpartum Care of the Mother and Newborn. The meeting and this report complete the cycle of technical consultations, which has included antenatal care, normal birth and essential care of the newborn. Its prime task was to review and analyse the available information and make clear recommendations about the delivery of postpartum care for both mother and newborn. The focus of the report is the needs of women

and their newborn during this critical period, followed by a description of the response of the health system to these needs, with special emphasis on the importance of a coordinated, integrated response.

1.2 Background

The postpartum period is a very special phase in the life of a woman and her newborn. For women experiencing childbirth for the first time it marks probably the most significant and life-changing event they have yet lived. It is marked by strong emotions, dramatic physical changes, new and altered relationships and the assumption of and adjustment to new roles. It is a time of profound transition, making great demands on the woman's resilience and capacity to adapt. For a young girl, this period marks a sometimes bewildering acceleration of the normal transition to a new identity as a women and as a mother. The postpartum period is a social as well as a personal event and has meaning well beyond the simple physiological events which mark it. For the most part it holds no great dramas and is a reason for celebration and a sense of achievement, although for some the loss of a child or its birth with severe abnormality brings grief and pain.

The postpartum period, however frequently it is experienced by a woman, forms part of the normal continuum of the reproductive cycle. This fact should be mirrored by services which respect that continuum: quality antenatal and intrapartum care can prepare a smoother postpartum; links between all levels and types of Reproductive Health and Child Health services are vital, although it is important not to medicalise this time unnecessarily. Quality postpartum services are a long-term investment in the future health of women and their newborn.

Gender and power issues determine much of what happens to a woman and her newborn in the postpartum, particularly with regard to the resumption of sexual activity. Despite considerable local and regional differences, there is widespread acknowledgement by society, by the state and by health systems of the special status of the parturient woman and her newborn, their right to protection and their right to attention to their physiological, psycho-social and cultural-environmental needs. However, in some places, this "special status" may be withheld from the newborn until it is deemed to have a secure hold on life, or if it is of the "wrong" sex or has an abnormality. The woman, equally, in some cultures may be considered "contaminated" by the "dirty" process of childbirth and suffer exclusion as a result. The rights of both the infant and the woman must be safeguarded, and all forms of discrimination eliminated. Many traditional practices are beneficial or harmless; a few can be harmful: their status needs clarifying; changing practices is a long term, sensitive process.

1.3 Defining the postpartum period

The words "postpartum" and "postnatal" are sometimes used interchangeably. In this report we use the word "postpartum", except in sections exclusively dealing with the infant. In those sections the word "postnatal" is used. The postpartum period (also called the puerperium) according to Western textbook definitions starts shortly after the birth of the placenta. Usually an interval of about one hour after that moment is considered to be part of childbirth; during that time the immediate care of the mother (e.g. assessment of her

condition, suturing, control of blood loss) and the infant (assessment of its condition, maintaining body temperature, initiating breastfeeding, etc.) take place, as described in the WHO reports *Care in normal birth* (WHO 1996a) and *Essential newborn care* (WHO 1996b). There is a smooth transition between childbirth and the postpartum period. In this paper we resume and continue the discussions in the above-mentioned WHO reports.

Neither "postpartum period" nor "puerperium" (which are more or less synonymous) are officially defined. WHO has, however, formally designated the first 28 completed days after birth of the infant as the neonatal period. Although not officially sanctioned, traditionally the postpartum period is supposed to end 6 weeks after birth. The period of 6 weeks fits very well into cultural traditions in many countries, where often the first 40 days after birth are considered a time of convalescence for the mother and her newborn infant. In many countries at that time a routine postnatal visit and examination are planned. Six weeks after delivery the body of the woman has largely returned to the non-pregnant state. The uterus and vagina have regained their pre-pregnant proportions. Physiological changes during pregnancy, such as increased cardiac output and blood volume, increased extracellular fluid (oedema) and changes in the composition of the blood, have subsided. The sudden disappearance of placental hormones after delivery, and the start of lactation have caused drastic endocrinological changes in the first weeks, but after six weeks a steady state has been reached. The psychosocial adaptation of the mother, the baby and the family to the new situation usually has attained a new balance. However, this does not mean that the pre-pregnant state has completely returned: lactation usually continues, often the menstrual cycle has not yet normalized, and sexual activity may not have been resumed yet. Contraception, though an important need, may be problematic for many couples at this time. For the infant the age of six weeks is not a decisive turning point in his or her life, but the continuation or discontinuation of breastfeeding is directly related to the social and economic activities of the mother and her choice of contraceptive method. Although in this report attention is mainly focused on the first six weeks postpartum, it is fully recognized that the life of the woman and her baby is a continuum, and discussions will be extended to the following weeks and months where appropriate.

1.4 The needs of women and their newborns

A special phase involves special needs. Only scanty research data are available on the needs of women and babies in the postpartum period. Some research has been done on the attitudes and experiences of women of different ethnic descent who immigrated to developed countries (Woollet & Dosanj-Matwala 1990, Rossiter 1992). Generally these women experienced great differences between their cultural heritage and the care they received in hospitals. In Yemen women were interviewed about their encounters with modern antenatal, delivery and postpartum care in clinics (Kempe et al 1994). In Australia, in a population sample of women who gave birth in Victoria in a one-week period in 1989, a survey has been carried out of their experiences during pregnancy, birth and early motherhood (Brown et al 1994). Data were collected about depression, the social context of motherhood, work and family. Partly based on the scarce data in the literature, but mainly on personal experience of the members of the group, the TWG formulated the needs of women and infants as follows:

In the postpartum period women need:

- information/counselling on
  - care of the baby and breastfeeding
  - what happens with and in their bodies - including signs of possible problems
  - self care - hygiene and healing
  - sexual life
  - contraception
  - nutrition
- support from
  - health care providers
  - partner and family - emotional and psychological
- health care for suspected or manifest complications
- time to care for the baby
- help with domestic tasks
- maternity leave
- social reintegration into her family and community
- protection from abuse/violence.

Women may fear:

- inadequacy
- loss of marital intimacy
- isolation
- constant responsibility for care for the baby and others.

Newborn infants need:

- easy access to the mother
- appropriate feeding
- adequate environmental temperature
- a safe environment
- parental care
- cleanliness
- observation of body signs by somebody who cares and can take action if necessary
- access to health care for suspected or manifest complications
- nurturing, cuddling, stimulation
- protection from
  - disease
  - harmful practices
  - abuse/violence
- acceptance of
  - sex
  - appearance
  - size
- recognition by the state (vital registration system).

Some explanation is necessary on the items "protection from abuse/violence" and "acceptance of sex". Data on domestic violence show that violence against pregnant or recently delivered women is not unusual. A recent report from India indicated that some 15.9% of maternal deaths were due to violence (Ganatra et al 1996). In Britain this type of violence is reported by up to one in four women and the risk appears to be greatest in the postpartum period (Mezey & Bewley 1997). Mothers and babies may be the victims, and not only in Britain. In some countries a strong public preference for male infants involves a threat to newborn girls. A study in South India revealed an excess neonatal mortality among girls, constituting about one third of the total perinatal mortality rate. The risk was even more pronounced among girls born to multiparous women without living sons (Nielsen et al 1997).

1.5 The focus and content of this report

This report focuses on the needs of women and their newborn, the health challenges of the postpartum period and the response of the health care system to these needs and challenges. It attempts to bring together in a coherent manner the evidence and the arguments for good practice in this field and to lay the foundations for the provision of a truly integrated service.

The needs of women and their newborn provide the starting point. These needs offer the rationale for the care and services described here. In the first instance these services are designed to meet the needs of healthy women and their newborn, but, inevitably, they must also address the provision of services for those whose postpartum period is not uneventful. Other WHO documents address many of these issues in detail and this report does not intend to repeat what they have said, although reference is made to them where necessary. Care in the postpartum period varies greatly in various countries and regions. In many countries most deliveries are at home, others take place in a health centre, hospital or other institution. Sometimes a mother and her baby can stay in the health facility for a few days, but often she is discharged early, within a couple of days or even hours, with a long journey home with a new baby ahead of her. Care for these mothers and babies, apart from what the family traditionally provides in some settings, is sometimes exceedingly limited. This report reviews the care given in various settings, and focuses its recommendations mainly on the care after delivery by primary caregivers, often at the home or health centre level. Frequently these caregivers have to cope with difficult circumstances; however the recommendations of this report also extend to the care in more ideal circumstances.

While every effort has been taken to base the recommendations of the Technical Working Group on sound evidence and the outcome of research, in the absence of such information it was necessary to have recourse to accounts of good practice. It should be obvious throughout the text where this has happened and the recommendations for further research listed in section 11 identify many of the areas of postpartum care for which evidence remains scanty or non-existent.

Given the slender and scattered nature of postpartum data**,** it was important to provide an overview of the challenges which face the health care planner in terms of the health needs of the woman and her newborn during this period. The early sections of this report (2-9) therefore constitute a sort of situational analysis of the postpartum and provide the basis for

section 10, which describes the service response which should be in place. The discussion starts with the women's own account of the problems that they face in the postpartum period, in section 2. This is followed by the perspective of the health worker faced with the prevention and early detection of complications and disease, in section 3. Complications in the postpartum period may be either acute or become chronic, where they do not resolve spontaneously. The epidemiology of this chronic morbidity and the care of these problems is covered briefly in this section. The needs and problems of the newborn follow in section 5, with breastfeeding in section 6. While a certain number of clinical management and care issues are discussed in relation to particular problems, detail is necessarily limited in a text of this size, and the reader is referred to standard texts for management of specific problems. In the following sections (6-9) special issues and subjects of care are discussed: contraception, HIV-infection, immunization and maternal nutrition. All these sections provide the answer to the question: Why do we need to bother about postpartum care?

After this review of the issues which are or should be objects of care, section 10 gives an outline of the actual care. In this section patterns of care in several parts of the world are discussed, followed by comments on aims and standards of care. Consideration is given to the way postpartum care could be organized. Finally, in section 11 the recommendations of the Technical Working Group are given. These not only concern the care itself, but also the organisation, training and research that are needed to support such care.

A number of practices common in the conduct of postpartum care have been classified into four categories according to their usefulness, effectiveness and harmfulness and are included in Annex 1.

The reader who is not primarily interested in the specific problems discussed in sections 2-9, and would like to read more about the care in the postpartum period, is advised to move directly to section 10.

2 WOMEN'S PERCEPTION OF POSTPARTUM PROBLEMS

2.1 Epidemiological studies on maternal morbidity

Obtaining accurate information about the nature and extent of maternal morbidity is notoriously difficult, but in recent years there has been an increasing interest in this field. A review of maternal morbidity in developing countries is given by Liskin (1992). Extensive investigations into the subject have been performed in Bangladesh (Goodburn et al 1994), Pakistan (Maternity & Child Welfare Association of Pakistan), Egypt (Younis et al 1993, The Egyptian Fertility Care Society 1995) and India (Bathia 1995, Bathia & Cleland 1995, 1996). Family Health International published a study on maternal morbidity in four developing countries: Bangladesh, Egypt, India, and Indonesia (Fortney & Smith 1996). Asking women about their experiences is an important method for obtaining information about postpartum

morbidity and a critical step towards defining service needs. A number of recent epidemiological studies take this approach and have been instrumental in raising awareness of the hitherto unacknowledged dimensions of the problem of postpartum morbidity. In two large studies from the UK, in Birmingham and in Grampian, women were asked by questionnaire about their complaints and symptoms in the weeks and months post partum (MacArthur et al 1991, Glazener et al 1995). A smaller study in two regions in Sweden reports comparable complaints and problems (Blomquist & Söderman 1991). In this section an overview of maternal morbidity will be given based on these studies.

2.2 Frequency and nature of health problems

The number of health problems reported in the first months after delivery is high. In India 23% indicated problems, and in Bangladesh nearly 50% reported symptoms 6 weeks after delivery, while in England 47% of the women reported at least one symptom. Some symptoms are more typically present in the immediate postpartum period and usually resolve quickly, while others, once they occur, often become chronic. The most frequently reported postpartum problems are:

2.2.1 Infections

In the studies conducted in developing countries often a combination of symptoms is reported suggestive of genital infections: pain in the lower abdomen, high fever and foul discharge (see table 4).

Table 4 Percentage of women reporting symptoms of genital infections

Country	Lower Abdominal Pain	High fever	Foul discharge
India	4.4%	5.3%	0.5%
Egypt	21.9%	15.5%	9.8%
Bangladesh	19.0%	16.5%	10.2%
Indonesia	15.2%	13.4%	4.5%

In some countries correlations were found between the occurrence of these symptoms and the observance of delivery practices by traditional birth attendants (TBAs) attending the deliveries. Where HIV/AIDS prevalence is high, opportunistic infections among immunosuppressed women pose special problems for the management of infections.

2.2.2 Bladder problems

Urinary incontinence postpartum caused by vesicovaginal fistulae is a serious problem in many developing countries. In hospital studies in Nigeria less than 1% of all deliveries were complicated by fistula, but it is likely that in the general population the condition is much more prevalent. In Ethiopia an estimated 1000 cases occur every year, and a small hospital has been built exclusively for fistula repair. In Sudan 122 cases were treated at Khartoum hospital in 20 months, comprising 16% of all major gynaecological conditions (Liskin 1992). In India 0.3% of the women reported symptoms of a fistula, in Egypt 0.2%.

Stress incontinence, starting as a new symptom within three months of delivery, was reported by 8-11% of the women in the UK. It was associated with long second-stage labours and big babies, and in some instances with forceps delivery. Sleep (1984), in the West Berkshire perineal management trial, found 19% involuntary loss of urine three months after delivery in both groups of the trial, with a slightly higher incidence in multipara than in primipara. The differences between the outcomes of various investigations might have been caused by the way the questions in the questionnaires were worded, and the women's expectations of what constitutes a problem.

From the study of Sleep et al (1984, 1987) it became clear that the management of the perineum (frequent episiotomy or not) did not influence the incidence of urinary incontinence.

2.2.3 Backache

This is a frequent complaint in the weeks and months after delivery; in Birmingham 14% of all women reported backache and in Grampian more than 20%. There were associations with caesarean section, with a long second stage of labour and with epidural analgesia during labour (MacArthur et al 1992, Russell et al 1993).

2.2.4 Frequent headaches

Frequent headaches were reported by 3.6% of the Birmingham sample. A relation between headaches and epidural analgesia was found, especially after an accidental dural puncture during epidural analgesia (MacArthur et al 1993). This association found in an observational retrospective study is no proof of causality, but indicates the need for further study.

2.2.5 Pelvic pains

As early as 1940 Young published an extensive article about “pelvic arthropathy of pregnancy”. He estimates the incidence at 0.75% of all deliveries. The complaint is also known as symphysiolysis or as pelvic instability. It may start during the second half of pregnancy, immediately post partum or later in the postpartum period. The woman complains of backache and pains in the symphysis and the legs, together with walking difficulties. The syndrome is related to the relaxation of the pelvic joints during pregnancy. In the first weeks post partum it can cause much discomfort and disablement, but usually the symptoms gradually improve and disappear within a few weeks or months. Sometimes the complaints are longer-lasting, and occasionally a woman claims that chronic pains in back, pelvis and legs are caused by the delivery of her baby long ago. Such a causal relation is doubtful, and difficult to prove. In the Birmingham and the Grampian studies apparently there were no women who mentioned pelvic pains in the postpartum periods. Possibly they were included in the group reporting backache or in the additional musculo-skeletal problems.

2.2.6 Haemorrhoids

In Pakistan 12% of the respondents reported haemorrhoids. In Birmingham 5.3% of the women reported haemorrhoids starting within three months of delivery, and still unresolved. In Grampian more women reported haemorrhoids: 15% at 2-18 months. About 50% of these women received treatment for the complaint. The risk of new symptoms decreased with increasing parity. Deliveries with a long second stage of labour, with heavier babies, and forceps deliveries resulted in higher rates of haemorrhoids.

2.2.7 Constipation

In the Grampian study this complaint was reported in 20% of the women during the first 8 weeks, and in 7% thereafter. About 50% of the women were treated for this discomfort. Several randomized trials have studied the routine use of laxatives to reduce postpartum constipation (Zuspan 1960, Diamond et al 1968, Shelton 1980). In these trials the routine use of laxatives was not proven to be effective, and was associated with significant maternal discomfort (abdominal cramps, nausea, diarrhoea).

2.2.8 Depression, anxiety and extreme tiredness

In India 2.3% of the respondents reported symptoms of depression. In the UK depression and/or anxiety was reported as a new symptom by a considerable number of women (in Birmingham 9.1% of the sample) and 12.2% reported extreme fatigue. The main predictors of depression and fatigue were located within the domestic environment. Depression was more common among young mothers, and less common among Asians. Fatigue was more common among older mothers, especially after a first birth. The unmarried state appeared to be predictive of depression and fatigue.

2.2.9 Perineal pain

In Egypt 2.1% of the women reported dyspareunia after childbirth. Sleep & Grant (1987) also found that 15% of women experienced dyspareunia up to three years after a normal delivery. In the Grampian study perineal pain was reported in 22% after 8 weeks, and in 10% after 2-18 months. This long-term complaint after >2 months was present in 4% of multiparae and in 16% of primiparae; in only 7% after a spontaneous vaginal delivery, and in 30% after assisted vaginal deliveries. Sleep (1984) found that 8% of women experienced perineal pain 12 weeks after a normal delivery (compared with 7% after >2 months in the Grampian study).

Research is needed to find ways of reducing this morbidity. For instance, replacing non-absorbable by absorbable suture material for the perineum has been shown to be effective in reducing short-term perineal complaints (Isager-Sally et al 1986, Mahomed et al 1989, Johanson 1995). It is most important to avoid unnecessary episiotomies (WHO 1996a).

2.2.10 Breast problems

In the Grampian study 33% of all women experienced breast problems in the first 2 weeks post partum, and 28% in the weeks thereafter. This may be an underestimation, because some of the women may have considered these problems as baby feeding problems. Apart from overt mastitis, a relatively rare condition, these problems may have comprised engorgement, and sore, cracked, bleeding or inverted nipples. Breast problems are often cited as the reason for stopping breastfeeding, and breastfeeding rates might improve if effective care could be given for these problems. The majority of such problems can be prevented by routines and practices which support breastfeeding, and skilled help to establish breastfeeding in the early postpartum period.

2.2.11 Anaemia

In Bangladesh 2 weeks postpartum nearly 50% of all women were anaemic, in Egypt 63% in a representative sample of rural women had anaemia. In the Grampian study 25% of all women reported anaemia in the first 8 weeks post partum; more primiparae than multiparae, and more after complicated deliveries. A high proportion of women (93%) were treated for this complaint. Most epidemiological studies discussed in this section do not provide exact figures about the prevalence of anaemia in the postpartum period in developing countries, but it is certain that in many of these countries the prevalence is extremely high.

This limited overview of data from a number of large studies gives some indication of the extent of postpartum problems as they are experienced by women. It does not, however, give a sense of the effect of these problems on the lives of women as they adapt to the demands of their families and a new baby.

2.3 Sexual relations in the postpartum period

Among the needs of women in the postpartum period are information and counselling on sexual life and contraception. To answer these needs we should be informed about sexual behaviour postpartum. It is known that in the course of pregnancy many women are less inclined to intercourse but more to other kinds of intimacy, and that this inclination might differ from the desires of their partners. Fatigue and disturbed sleep patterns are among the most commonly reported characteristics of this time and inevitably have an effect on the libido. In the majority of women there is only a slow return to pre-pregnancy behaviour.

By eight weeks postpartum 71% of respondents had resumed intercourse, and by 10 weeks 90% of the women who had partners had resumed intercourse (Glazener 1997). Breastfeeding has an influence on sexual activity. During the first months postpartum breastfeeding women show less sexual desire than those who use artificial feeding and they experience more pain during intercourse. By 6 months these differences have largely disappeared, except for the occurrence of pain which is still significantly more frequent in breast feeders (Alder & Bancroft 1988, Alder 1989). It is likely that the pain is caused by the hypo-oestrogenized and hence poorly lubricating vagina. Another factor influencing sexual behaviour postpartum is pain related to perineal damage and sutures, such as that caused by assisted vaginal deliveries and episiotomies (Glazener 1997).

2.4 Conclusion

Only a few of the many data collected in the studies mentioned in section 2.1 could be mentioned in this report. Nevertheless, the inventory of maternal morbidity of greater or lesser severity in the preceding sections is impressive, and confirms that women experience

many problems in the postpartum period. Sometimes exact data are missing, for instance those on long-term morbidity. More research on several of these issues is needed, especially the relation between complaints in the postpartum period and events during labour. Associations found in these retrospective observational studies are no proof of a causal relation, although they should stimulate further research. Some of the complaints are probably of minor importance, and the differences in frequency between the various studies may in part be caused by the fact that the woman did not consider her complaint important enough to mention it. However, the magnitude of reported problems justifies serious consideration of the care for the woman during this important and sometimes crucial phase of her life.

3 MAJOR MATERNAL HEALTH CHALLENGES IN THE POSTPARTUM PERIOD

A number of serious complications and the majority of maternal deaths occur in the postpartum period, especially in developing countries. This section describes the main life threatening and other major complications in the postpartum period. This is followed by a description of the task of the caregiver in the early detection of problems and the measures to be taken to provide adequate care. “Caregiver” is not understood to mean the caregiver in a well-equipped hospital, but the skilled birth attendant: midwife, physician or nurse working in primary care: in the community, in a birth centre or maternity clinic. In the home the primary caregiver may be a TBA, trained or untrained. Her role can complement that of the skilled personnel within the health system. The woman may be at home or in the birth centre. If necessary, the care should include transport to a place where appropriate treatment can be provided.

3.1 Postpartum haemorrhage

This is the most important single cause of maternal death in the world; it is estimated to claim 150 000 maternal lives annually, mainly in developing countries (WHO 1990, Kwast 1991, Li et al 1996). The majority of these deaths (88%) occur within 4 hours of delivery (Kane et al 1992), indicating that they are a consequence of events in the third stage of labour. Postpartum haemorrhage is a complication which occurs at the transition between labour and the postpartum period. The predisposing factors, of which anaemia, given its prevalence in developing countries, has to be one of the most significant, are discussed in previous WHO reports (WHO 1990, 1996a). The causes of haemorrhage are uterine atony and retained placenta in the majority of cases; vaginal or cervical lacerations and (occasionally) uterine rupture or inversion also play a role (Kwast 1991). The management of the third stage of labour in the prevention of postpartum haemorrhage has been discussed comprehensively in the WHO report on care in normal birth (WHO 1996a).

The first hours post partum are especially critical in the diagnosis and management of abnormal bleeding.

If the placenta is still *in utero* or apparently incomplete one hour after birth, measures should be taken to remove it or the remaining parts manually whether or not there is bleeding. This should only be done by a properly qualified person with appropriate facilities. During manual removal the vagina and cervix can be assessed for lacerations. If the placenta has already been delivered completely but the woman keeps bleeding abnormally, first administer oxytocin, then perform gentle abdominal massage until the uterus contracts. The condition of the woman should be evaluated (blood pressure, pulse, general well-being). Emptying the bladder may sometimes be useful, especially in case of an overextended bladder that cannot be emptied spontaneously. If the bleeding does not stop soon, or if there is persistent trickling of fresh bright red blood at the vulva, and if the condition of the woman deteriorates, intravenous fluids should be administered and transportation to a referral centre organized if effective treatment can not be given locally.

Although haemorrhage usually starts in the third stage of labour or shortly thereafter, sometimes the first signs of abnormal bleeding occur in the days following birth or even in the second week (secondary postpartum haemorrhage). This condition is often due to retained parts of the placenta that escaped the attention of the birth attendant at the time of delivery of the placenta. Sometimes no placental tissue is found, and the haemorrhage is then ascribed to subinvolution, an ill-defined entity possibly related to infection. The bleeding may be quite excessive, and the woman should be transported to a hospital or referral centre, where adequate therapy can be provided. This consists of intravenous fluids and/or blood transfusion if necessary, and of exploration of the uterine cavity, either manually or by curettage. As several days after birth the uterine cavity is always heavily contaminated with bacteria and possibly infected, this should be performed under antibiotic protection.

Sometimes oral ergometrine is given to postpartum women prophylactically, with the intention of reducing the blood loss. A randomized trial studied the effect of prophylactic ergometrine during four weeks and found no effect on uterine involution. A trend towards increased infection, blood loss and primary lactation failure was observed in the treated group (Arabin et al 1986). There is no indication for the use of oral ergometrine for newly-delivered women, either as prophylaxis or in the treatment of haemorrhage (WHO, Hogerzeil 1995).

A special manifestation of haemorrhage is the vulval haematoma. It is not very common, and is sometimes caused by incomplete haemostasis during an episiotomy repair. It may occur after a forceps delivery or vacuum extraction, but also after a normal vaginal delivery, and is then caused by a tear in vessels without any break in the vaginal epithelium. The haematoma usually occurs in the subcutaneous tissues of the labia majora, but may also form at a higher level, occluding the vagina. Because the bleeding is quite insidious the haematoma may not manifest itself until the day after delivery. The woman complains of severe pain in the vulvar or perineal region, and of giddiness. As the amount of blood in the haematoma is often considerable, she may show signs of haemorrhagic shock. She should be transferred to a hospital or referral centre where appropriate therapy can be provided: intravenous fluids and/or blood transfusion, and surgical therapy.

In serious cases of postpartum haemorrhage transfusion of blood or blood products is the key life-saving intervention. The organisation of reliable blood transfusion services in hospitals/referral centres is essential for safe motherhood. This includes considering the risk of transmitting diseases (HIV, hepatitis) (WHO 1995c).

3.2 (Pre)eclampsia

This is the third most important cause of maternal mortality worldwide. Hypertensive disorders of pregnancy may start after 20 weeks gestation, but they are more common toward the end of pregnancy.

In developing countries eclampsia is estimated to occur in about 1 in 100-1700 deliveries (Crowther 1985). In Europe and other developed countries, where the incidence decreased in this century, eclampsia is now estimated to occur around 1 in 2000 deliveries (Douglas & Redman 1992). A substantial part of cases of eclampsia occur in the first days post partum. Pritchard (1975) reported 28 of 154 (18%), and Lubarsky et al (1994) 97 of 334 (29%). Eclampsia occurring more than 48 hours post partum has traditionally been considered as exceptional but a recent study (Lubarsky et al 1994) reports that more than 50% of their postpartum cases initially presented 3 or more days postpartum. Apparently regional differences in the incidence and manifestation of eclampsia exist.

The symptoms may aggravate during the first postpartum days and occasionally the first symptoms are only recognized post partum. The most serious complication is intracerebral haemorrhage. A woman suffering from eclampsia or severe preeclampsia the first days post partum should be hospitalized. The treatment of choice in hospital is magnesium sulphate (The Eclampsia Trial Collaborative Group 1995). During transportation sedation will be needed if it has not been possible to administer magnesium sulphate. Stabilisation, support and adequate nursing care are critical during transfer and health care providers must be trained in the initial management (obstetric first aid) for eclamptic women. Antihypertensive treatment may be necessary, but the symptoms of preeclampsia and eclampsia usually subside within a few days after delivery. The main tasks of the caregiver who attends the postpartum period is to measure and record blood pressure after delivery, to swiftly identify symptoms that could be indicative of preeclampsia (headache, visual disturbances, epigastric pain), to protect the woman from damage during fits, and to arrange transport to a hospital or referral centre in case of a serious rise of blood pressure combined with these symptoms.

3.3 Puerperal genital infection

In the 19th century the notorious childbed fever took many victims. Today puerperal infections are still a major cause of maternal mortality in developing countries and, to a lesser degree, in developed countries.

Predisposing factors for puerperal genital infections are prolonged labour, prelabour rupture of the membranes, frequent vaginal examination, internal (vaginal) electronic fetal monitoring and caesarean section (Gibbs 1980). Although caesarean section is the most important risk factor the role of poorly observed rules of cleanliness and an unhygienic environment (lack of gloves, clean water, soap etc) should not be overlooked. In Caesarean section the risk of genital infection is clearly increased compared to vaginal delivery (Gibbs 1980, Simpson 1988). The most important causative agents of genital infections are *E.coli,* streptococci, anaerobic microorganisms like *Bacteroides*, and gonococci. *Chlamydia trachomatis* often causes a genital infection with relatively mild symptoms, but later a localized peritonitis may occur, with perihepatitis and obstructed fallopian tubes. The clinical picture of genital infections is fairly uniform. Fever (temperature >38.0°C) is the main clinical symptom. Often no other symptoms are present, and a source of infection cannot be found. Sometimes the uterus is tender. Elevated temperature (>38°C) during labour ("chorioamnionitis") is always an alarming sign and is often followed by serious postpartum infections. In the literature fever after exclusion of other causes is generally considered to be the most important criterion of endometritis, or probably more correctly, metritis (Cunningham et al 1997). The treatment of (endo)metritis recommended in the literature and by WHO is antibiotics and, if required by the general condition, referral to the first referral level (WHO 1995d).

Metritis may proceed to salpingitis and to pelvic peritonitis, or to the most serious infection originating from the genital tract: sepsis. Sepsis may start from intra-uterine infection during labour or in the early postpartum period. Shortly after delivery or during the first days post partum the temperature rises and the patient is seriously ill, sometimes in septic shock with low blood pressure and signs of disseminated intravascular coagulation (Swingler et al 1988). Diarrhoea and myalgia may be early symptoms. Antibiotic therapy is urgently needed, preferably after taking blood cultures, and the patient should be transported

to a hospital as soon as possible. Elevation of the temperature during labour or in the first days thereafter, to or close to 38.0°C, should raise suspicion and is an indication for antibiotic therapy. At times sepsis may occur without these warning signs, but where they are present they deserve attention.

One of the most dangerous causative agents of puerperal sepsis and the concomitant maternal mortality is the Group A Streptococcus (GAS) or Streptococcus pyogenes. It was the main cause of childbed fever in Europe in the 19th century. Since then the virulence of GAS seems to have diminished, but in recent years a new period of increased virulence has arrived (Gaworzewska & Colman 1988, Swingler et al 1988). Concurrently a new syndrome was introduced, the Streptococcal Toxic Shock Syndrome (Strep TSS), caused by endotoxin producing GAS (Hoge et al 1993).

The choice of antibiotics will differ from country to country, due to local availability, patterns of causal agents and antibiotic susceptibility. Caregivers should be attentive of early signs of puerperal sepsis and promptly institute adequate treatment, including transport to a hospital. For the prevention of puerperal sepsis and other puerperal infections strict hygienic measures during labour (clean delivery) are important (WHO 1994d, 1996a).

There is little literature about differentiating the seriousness of the infection by assessment of the clinical picture and the time of onset. Nonetheless, the impression exists that a rise of temperature during labour or in the first hours or days after delivery is a danger sign and can lead to grave disease. On the other hand, a rise of temperature on the 3rd or 4th day, after an uneventful vaginal delivery and with a normal temperature during labour and the first days postpartum, could indicate a less serious type of infection. This area needs more research.

3.4 Thromboembolic disease

In developed countries thromboembolic disease (TED) is a major cause of maternal mortality. In developing countries it is relatively less frequent than other causes like haemorrhage and infections. Pulmonary embolism is the most serious manifestation of TED, and largely accounts for the mortality caused by it. Pulmonary embolism in the puerperium very often comes unexpectedly, without preceding clinical signs of deep venous thrombosis. The clinical symptoms are varied from embolism which may be clinically silent but may still cause sudden death to severe cardiovascular and respiratory symptoms: dyspnoea, chest pain and cyanosis, depending on the size of the embolus. A patient suspected of embolism should urgently be transported to a hospital for further diagnosis and treatment with anticoagulants, primarily heparin.

In the puerperium the incidence of clinically diagnosed deep venous thrombosis in the legs is about 0.19%. The incidence is lowest after uncomplicated vaginal deliveries (0.12%). Increasing incidences are found after instrumental deliveries (0.35%), manual removal of the placenta (0.65%), and especially after caesarean section (4.41%). The last figure was obtained before introduction of prophylactic anticoagulant therapy with heparin or coumarin for caesarean section; after this introduction the incidence decreased to 0.97% (Treffers et al 1983). The incidence of TED diagnosed by modern laboratory methods (e.g. Doppler flow measuring) is somewhat lower.

Early mobilisation after delivery is the major prophylactic against TED. Few women these days, either in developed or developing countries, have a prolonged period of bed-rest after birth, unless they are sick. Causal factors for TED are anaemia, sickle cell disease and congenital deficiencies of anticoagulant factors (antithrombin III, protein C and S); the risk of TED is increased if the woman had TED earlier in her life.

The first clinical signs of deep venous thrombosis in the leg are pain, sometimes a slight rise of temperature and pulse are present, later the leg may become swollen, oedematous, initially warm and subsequently, with progression of the disease, cold and pale ("phlegmasia alba dolens"). In those institutions where modern diagnostic equipment is available, early diagnosis can be made by Doppler flow measuring or comparable methods. Treatment is by anticoagulants, preferably started in a hospital and supervised with laboratory methods. If the mother is treated with cumarin the infant should receive vitamin K, because cumarin is excreted in breast milk. Late sequelae of deep venous thrombosis, especially if not treated adequately, are manifestations of the post-thrombotic syndrome, with oedema and trophic disturbances of the skin, eventually ulceration. Cerebral thrombosis, manifesting itself with symptoms sometimes resembling eclampsia is rare and requires immediate hospital care.

A serious disease which may be confused with infection or TED is puerperal sickle cell crisis in women suffering from homozygotic sickle cell disease or sickle C. During pregnancy and postpartum a serious crisis may manifest itself by pain in bones, fever and general illness. These women usually are of African or Mediterranean descent and have a history of recurrent crises. Treatment includes (intravenous) hydration, morphine or meperidine for pain relief and sometimes oxygen. The patient is better transported to a hospital for treatment.

3.5 Complications of the urinary tract

3.5.1 Retention of urine

During the first days postpartum retention of urine with bladder distension is a frequent phenomenon. It is caused by several factors: during the second stage of labour the presenting part of the fetus, usually the head, presses against the urethra and the bladder and may cause oedema. Lacerations and pain in the vulvar region may also inhibit the voiding of urine. The changed anatomy in the lower abdomen after birth may reduce the sensation of the bladder. Once overdistension occurs, bladder sensation and detrusor muscle function are further impaired. In the first days after delivery the production of urine is increased, because the extracellular fluid is excreted. During the first 12-24 hours after delivery bladder distension may gradually occur. The woman complains of increasing pain in the lower abdomen, and subsequently of the involuntary loss of small amounts of urine ("overflow incontinence").

Examination of the abdomen reveals upward displacement of the contracted uterine body, and a large painful cystic swelling in the lower abdomen. The therapy is catheterization, sometimes repeatedly; an indwelling catheter may be necessary. Preventive measures to be taken by the caregiver include careful supervision of the urine production during labour and the first 8-12 hours post partum. If no urine has been produced the woman should be

encouraged by conservative measures to void urine: e.g. walking to the toilet or at least trying to urinate in the sitting position.

3.5.2 Incontinence

The opposite of urinary retention is incontinence of urine (for figures see section 2.2). Many women experience some kind of stress incontinence in the postpartum period, but serious incontinence apparent early in the puerperium raises suspicion of a vesicovaginal fistula. It is caused by long-lasting pressure of the fetal head against the bladder and the urethra, especially in protracted and obstructed labour. Vesico-vaginal fistula can also be caused by traumatic instrumental delivery. This is a very serious complication, causing important morbidity of the woman and, if untreated, it condemns the woman to a life of misery. In developed countries it is extremely rare, but in developing countries, especially in Africa, it occurs more often. The prevention is timely treatment of prolonged and obstructed labour. In case of a postpartum vesicovaginal fistula surgical therapy is indicated, several months after delivery.

3.5.3 Infection

Urinary tract infections frequently occur during the postpartum period. During pregnancy stasis in the urinary tract and asymptomatic bacteriuria contribute to the occurrence of infections, during labour the bladder is sometimes catheterized, and finally urinary retention post partum predisposes to infection. Cystitis and pyelonephritis occur in the puerperium, and should be treated adequately by antibiotics. The task of the caregiver is to diagnose and treat a urinary tract infection in time. One of the diagnostic tools is measuring the body temperature: fever is often a sign of genital infection, but sometimes it indicates the onset of pyelonephritis.

3.6 Complaints about the perineum and the vulva

In the first days and weeks post partum pain in the perineum and the vulva is an important problem for many mothers, especially if trauma occurred during the second stage of labour (perineal tears, episiotomy, labial tears).

The very scanty research findings on this issue mean that the recommendations for practice are based on empirical rather than scientific evidence and have not been systematically evaluated. In the perineal management trial more than 20% of the women still experienced pain 10 days post partum, and after 3 months 7.5% still had complaints (Sleep et al 1984).

Care consists of administration of mild analgesics, e.g. paracetamol. Sometimes a bath brings relief. Regular inspection of the perineum is recommended; infection of the perineal wound may occur with pain and a raised temperature. In that case the sutures are better removed, and the wound cleaned. For the prevention of these complaints WHO recommends that the use of episiotomies be restricted (WHO 1996a)

3.7 Puerperal mastitis

In the early stages mastitis is probably mainly due to poor drainage of milk from part or all of the breast, due to poor suckling technique, and thus antibiotics are not indicated at this stage. Breastfeeding technique should be corrected, with improved attachment of the infant to the breast to improve milk removal from the affected area, and breastfeeding should continue (Inch & Renfrew 1989). Antibiotics can be given if the condition does not improve within 12-24 hours or if the initial condition is very acute. In a minority of cases a breast abscess develops. The therapy of choice for a breast abscess is surgical. Breastfeeding can continue if there is not too much pain, or milk can be removed by expression. Breastfeeding should be resumed as soon as possible. Antibiotics of choice are flucloxacillin, erythromycin or cephalosporins to which *S. aureus* is sensitive. Many of the more commonly used antibiotics are likely to be ineffective. Improved milk removal is often adequate treatment.

3.8 Psychological problems in the postpartum period

Although the days after birth are generally considered a period of intense happiness, this period has its dark sides too. During some of these days or even during several weeks many mothers do not feel happy at all; the postpartum period should be considered as a vulnerable time for the development of emotional and psychological disorders. The last part of pregnancy and childbirth can be troublesome; the body goes through rapid changes, especially hormonal. In the first days post partum the body often feels painful and uncomfortable. The regular care of the baby involves new tasks and uncertainties, and disturbs the night's rest; the relationship to the partner changes, especially after the birth of a first child. In many countries women have occupations outside their homes; with the birth of her child the woman assumes her two- or even threefold duties: motherhood, external occupation and household activities. In the nuclear families of modern societies in developed countries these problems may be different from those in developing countries, where support from family and neighbours is more commonly available. However, the rapidly growing phenomenon of urbanisation is changing the potential for postpartum support in many places.

Three different types of postpartum psychological disorders have been described (Pop 1991b).

Postpartum blues is characterised by mild mood disturbances, marked by emotional instability (crying spells apparently without cause, insomnia, exaggerated cheerfulness, anxious tension, headache, irritability, etc.). Usually the complaints develop within the first week postpartum, continue for several hours to a maximum of ten days and then disappear spontaneously. Because of their frequency (30-70%) postpartum blues are sometimes considered a normal physiological event. It is assumed that biological changes in the first week post partum are responsible.

Postpartum depression, often also called postnatal depression is a more protracted depressive mood with complaints of affective nature: the woman is gloomy, depressed, irritable, sad. She may have complaints of cognitive and vital nature: insomnia, lack of appetite, disturbance of concentration, loss of libido. These complaints are not unique to the postpartum period, and postpartum depression is not a special kind of depression. It is true that the postpartum period is a vulnerable time for some women; circumstances associated with motherhood play a role (availability of social support, changes in life style). Postpartum thyroid dysfunction may contribute (Pop et al 1991a). The incidence of severe postpartum depression has been reported as 6%,

and the most vulnerable period is between 8 and 20 weeks postpartum. Depression occurring later is more protracted and more serious than in the early postpartum period. Depression has an important influence on maternal-infant interaction during the first year, because the infant experiences inadequate stimulation (Beck 1995).

There is no evidence that treatment with hormones (progesterone or its derivatives) is effective, although such treatment has often been advocated, based on uncontrolled studies. Nevertheless in severe cases treatment and support are necessary. Treatment may consist of psychotherapy and antidepressants, and is not different from the treatment of depression in general. The support from caregivers for distressed postpartum women/couples has been investigated in two randomized trials (Forrest et al 1982, Holden et al 1989). This support was associated with a decreased incidence of women's distress six months later. It is not yet clear if such support is best provided by highly trained caregivers, or if support by lay women or self-help groups is sufficient. For the prevention of depression the labour environment also seems important: a randomized trial of companionship during labour showed that depression and anxiety ratings 6 weeks after delivery were lower in the group that received support during labour (Wolman et al 1993).

Puerperal psychosis is a much more serious disturbance, that should be distinguished from both other depressive mood disorders. It occurs in 0.1-0.2% of all postpartum women; symptoms usually start at the end of the first week, sometimes in the second week, seldom later. The woman is anxious, restless, sometimes manic with paranoid thoughts or delusions. She reacts abnormally towards her family members. Gradually it becomes clear that a psychotic disturbance of her personality exists that may become dangerous for herself and for the baby. Admission to a psychiatric department or clinic is necessary; preferably with her baby. The psychotic disease as such cannot be distinguished from other psychoses, nevertheless the moment the disease manifests itself is apparently not coincidental. This can be concluded from the fact that the same woman after a subsequent pregnancy has a clearly increased chance of recurrence of the puerperal psychosis. These women also have an increased risk of psychotic disorder in other stressful circumstances.

The task of the primary caregiver is to be watchful and to diagnose the disease in time; a past history of psychotic illness should alert caregivers to potential problems. Where there are clear signs of psychosis the patient should accompanied to a hospital or clinic where she can receive appropriate treatment and support.

4 MATERNAL NUTRITION

4.1 Introduction

The nutritional status of the woman during adolescence, pregnancy and lactation has a direct impact on maternal and child health in the puerperium. Selected interventions and dietary advice can affect a woman's nutritional status, whether or not she is breastfeeding.

4.2 The outcome of pregnancy, childbirth and postnatal period, related to the nutritional status of the woman

In many developing countries the nutritional status of large segments of the population, especially of women, is inadequate. Undernutrition of women can be attributed to discrimination in terms of food allocation, to the heavy burden of physical labour, and to

reproduction (McGuire & Popkin 1989). Women start their reproductive function at an early age, and the sequence of pregnancy followed by about 2 years of lactation until a new pregnancy occurs, will be repeated many times if no effective family planning method is available. A major requirement for safe motherhood is therefore the prevention of high-risk and unplanned pregnancies (WHO 1994d), together with adequate birth spacing.

Fetal growth and breast milk production are remarkably well protected in women with low energy intakes and reserves. In an investigation in Madura, East Java, Indonesia, mean birth weight was related to maternal body mass index (BMI)[1], but it was only at BMI <16.0 that the incidence of low birth weight (LBW) increased exponentially from 10% or less to over 20%, indicating that there is an energy threshold below which fetal growth is dangerously impaired (Kusin et al 1994). In a survey of the literature Prentice et al (1994) found that during lactation the volume of milk production was not affected by maternal undernutrition. However, some studies showed a weak, but significant correlation between maternal BMI and milk fat. The Indonesian study found that during lactation the nutritional status and dietary intake of Madurese mothers were only just adequate. Compared with pregnant women they spent more time on child care, less on domestic work and less on productive activities. This lifestyle probably contributed to the fact that even in undernourished women the quantity of breast milk remained comparable with that of well-nourished mothers. Nonetheless, maternal undernutrition was reflected in the composition of breast milk which had a reduced fat content (Van Steenbergen et al 1994). It is clear that women need an increased caloric intake throughout the period of lactation.

4.3 Diet during pregnancy and postpartum

4.3.1 Interventions by nutritional supplementation

Kramer (1997) published a review of available evidence from controlled trials on the effects of energy and protein supplementation during gestation on the outcome of pregnancy. He concluded that balanced energy/protein supplementation modestly improves fetal growth but is unlikely to be of long-term benefit to pregnant women or their infants.

Positive effects of energy supplementation for pregnant women on birth weight in famine conditions have been shown in a study in Gambia (Prentice et al 1983, 1987). This study has not been included in the review by Kramer, because it was not randomized; it had a historical control group. Positive effects of energy supplementation were also found in the Madura (East Java) randomized trial, in which pregnant women received a high (or low) energy supplement in the last trimester of pregnancy. The majority of women had a BMI below 18.5 and could be considered chronically energy deficient (Kusin et al 1992, 1994). Birth weight was higher in the children whose mothers received high energy supplementation, but the difference was not statistically significant. However, up to the age of 24 months, these children were significantly heavier and taller than the children of the control group.

4.3.2 General diet postpartum

Women's intake should be increased to cover the energy cost of lactation: by about 10% if the woman is not physically active, but 20% or more if she is moderately or very active. The need for this increase is generally not realised. Eating more of the staple food (cereal or tuber) is a simple, healthy and low-cost way of doing this; or greater consumption of non-saturated fats e.g. foods containing vegetable oil. Virtually all dietary restrictions should be avoided. Access to adequate foods is essential; if necessary (e.g. in emergency situations, or very poor populations) through food supplements providing about 500 kcal/day. This could come, for instance, from 100 g of cereal + 50 g of pulse, or 500 g of tuber, 55 g oil, or 100 g peanuts.

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[1] BMI= weight in kg/(height in metres)^2

In conclusion, supplementation with protein and energy during the third trimester of pregnancy may be worthwhile in case of serious undernutrition. There are indications of a positive effect on the outcome of pregnancy and the health of the children postnatally, but conclusive evidence has not been established. However, the diet and dietary supplementation of undernourished women should not only be considered because it might produce more healthy children; promotion of maternal health has a value in its own. It is important to ensure that women's nutritional status is not undermined by failure to compensate for the demands of lactation. The effect of cultural norms, beliefs and restrictions on the nutritional status of women should not be underestimated.

4.4 Prevention of micronutrient deficiencies

Micronutrient malnutrition is the term commonly used when referring to deficiency of micronutrients (vitamins or minerals). The three main vitamin or mineral nutritional deficiencies of public health significance in the postpartum period are:

- iodine deficiency disorders (IDD)
- vitamin A deficiency
- iron deficiency anaemia.

The main causes of micronutrient malnutrition are inadequate intake of foods providing these micronutrients and their impaired absorption or utilization. In this section the analyses and recommendations are presented as given by the International Conference on Nutrition (FAO and WHO 1992).

4.4.1 Iodine deficiency

Iodine deficiency is a major risk factor for both the physical and mental development of an estimated 1600 million people living in iodine deficient environments around the world. Iodine deficiency during pregnancy causes brain damage to the fetus; in childhood it can cause mental retardation and neurological disorders. The severest form is cretinism, a combination of these disorders with severe growth retardation.

Iodine deficiency is entirely preventable and should be corrected at the earliest possible moment in life, preferably before conception but if not, early in pregnancy. Failing that, the deficiency must be corrected early in infancy. Iodination of salt has been shown to be a low-cost, highly effective means of preventing the deficiency. In some countries of the industrialized world, and also in some developing countries the problem has been eliminated by this method. Iodized oil by mouth or by injection can be used as an interim measure in endemic regions where provision of iodized salt may not be feasible. Among the target populations for iodized oil are women of childbearing age, including pregnant women, infants and preschool children. The recommended oral dose for fertile women is 400-600 mg (2 or 3 capsules). Infants of 0-1 year receive 200 mg orally (1 capsule), or 240 mg injected (0.5 ml Lipiodol). It is recommended that administration of iodized oil be effected before pregnancy or as early in pregnancy as possible, because otherwise it will miss the critical stage of fetal brain development. Unless the administration was done in the last trimester of pregnancy, a dose of iodized oil should be given to the mother early after delivery.

4.4.2 Vitamin A deficiency

Vitamin A deficiency is the most common cause of preventable childhood blindness, but its effects on the parturient woman are less well known. Insufficient dietary intake and absorption of vitamin A results in nearly 13 million pre-school age children suffering from severe forms of eye damage: night blindness and eventual blinding xerophthalmia. It is also associated with increased severity of illness, especially measles, diarrhoeal and respiratory infections. Vitamin A deficiency is a major public health problem in Africa, Southeast Asia and the Western Pacific.

Prevention of vitamin A (and C) deficiency can be aimed for by ensuring regular intake of orange-coloured fruits and vegetables, and dark green leafy vegetables. In many countries it is also attained by fortification of foods such as dairy products, margarine and other fat products. In Central America sugar is widely and successfully used as the vehicle for fortification; in Indonesia and the Philippines monosodium glutamate (MSG) has been used. Use of four to six monthly oral doses of 200 000 IU of oil miscible vitamin A has been adopted in a number of developing countries. In other countries a targeted delivery system is followed, including prophylactic supplementation of groups with a high risk of vitamin A deficiency: preschool children and lactating mothers. The recommended dose for lactating mothers is 200 000 IU once, only during the first month after delivery. It is important not to give this dose of vitamin A to women of childbearing age in general, or to lactating women more than two months after delivery, because high doses may be teratogenic in early pregnancy (Martinez-Frias & Salvador 1990, Werler et al 1990, Rothman et al 1995).

4.4.3 Iron and folate deficiency

Iron and folate deficiency are responsible for anaemia in approximately 2000 million people worldwide, due to diets with insufficient iron and folate content, to reduced bio-availability of dietary iron and losses due to parasitic infections and repeated attacks of malaria. The regions with the highest prevalence are Africa, Asia and Latin America. Pregnant women and pre-school children are the most affected. Parasitic infestations causing iron deficiency are hookworm (Ancylostoma and Necator) and Schistosoma, but bacterial and viral infections can also cause play a role, particularly in young children. Anaemia in pregnant women aggravates the effects of maternal blood loss and infections at childbirth, and is thereby a major contributor to maternal mortality in the postpartum period.

Prevention and treatment of iron deficiency anaemia is possible by encouraging foods rich in iron (e.g. liver, dark green leafy vegetables) and foods which enhance iron absorption (foods of animal origin, fruits and vegetables rich in vitamin C). Substances which inhibit iron absorption such as tea or coffee, and calcium supplements, should be avoided or taken 2 hours after meals. Prevention at a population basis is possible by fortification with iron of salt and other food products (bread, curry powder or sugar, dependent on the consumption pattern). Another approach is supplementation with iron and folate of high-risk groups such as pregnant and lactating women, infants and pre-school children. In areas of high prevalence of iron deficiency anaemia, 400 mg ferrous sulphate (2 tablets) per day or once a week, with 250 μg folate for 4 months is recommended for pregnant and lactating women. In areas of low prevalence 1 tablet of ferrous sulphate daily may be sufficient, but in these areas another approach is to give iron therapy only if anaemia is diagnosed or suspected. Which of the two

possibilities is chosen depends on the prevailing pattern of prenatal care. Maternal folate deficiency is also responsible for an increased incidence in neural tube defects. In areas of high endemicity prophylactic anti-malarial and anti-helminth management is advised.

A possible contribution to the prevention of iron deficiency anaemia in infants is late clamping of the cord which permits a supplementary amount of blood to flow to the newborn from the placenta. The erythrocytes in this volume of blood will soon be destroyed by haemolysis, but this provides about 50 mg of iron to the infant's reserve and reduces the frequency of iron-deficiency anaemia later in infancy (Michaelsen et al 1995, Pisacane 1996). Late clamping can be recommended in normal birth. In abnormal cases, for instance in rhesus sensitization or preterm birth, late clamping may cause complications, but in normal birth there is no valid reason to interfere with the natural procedure (WHO 1996a).

5 INFANT HEALTH CHALLENGES IN THE POSTNATAL PERIOD

5.1 General considerations

In this section a brief outline of infant morbidity will be given, from the standpoint of the caregiver in primary care. Disabilities and diseases that can be treated only in well-equipped hospitals will be mentioned, but the treatment will not be discussed in detail. The emphasis will be laid on early diagnosis and prevention by the caregiver, and on the indications for referral.

5.2 Life threatening infant morbidity

5.2.1 Preterm birth

Birth at a gestational age of <37 weeks occurs in 5-9% of all pregnancies, with regional differences. In developed countries it is the main cause of perinatal mortality; in these countries as many as 85% of neonatal deaths occurring in structurally normal infants can be attributed to preterm birth (Rush et al 1976). It is also an important cause of disability and handicap: of all infants born <32 weeks and surviving the neonatal period 6-7% have a major handicap and another 8% a minor handicap (Veen et al 1991). Adequate treatment aimed at survival without handicap, especially of very preterm infants (<32 weeks) requires care (preferably also birth in) at well-equipped hospitals.

The rate in developing countries has been estimated to be higher due to different reasons. Survival of preterm infants, especially very preterm, is lower too since special care, that is required for their survival, is not available. Neonatal intensive care units (NICUs) for the treatment of very preterm infants are extremely expensive and require sophisticated technological equipment as well as skilled personnel.

5.2.2 Smallness for gestational age

Low birth weight (LBW, <2500 g, as defined by WHO) may be due to preterm delivery or smallness for gestational age (intra-uterine growth retardation), or to a combination of both. A very high proportion of infants in less developed countries are born with low birth weight.

There is no ideal definition that would identify newborns who are truly growth retarded and at increased risk of increased morbidity and mortality and that would exclude those who have reached growth potential and are not at increased risk. Birth weight charts indicating birth weight centiles are all based on weights recorded in developed countries, largely in infants of white Caucasian mothers. Infants of African or Asian descent often have lower mean birth weights and a higher percentage is <2500 g. Nevertheless, these infants may often be appropriate for gestational age (AGA), and therefore not at substantially increased risk (Doornbos et al 1991). Small for gestational age (SGA) infants may be small from genetic causes, but the majority is growth retarded because of maternal malnutrition and/or ill health, maternal behaviour problems such as smoking and alcohol abuse and factors not yet well understood. True intra-uterine fetal growth retardation is a major cause of perinatal mortality, both intra-uterine and neonatal mortality.

Regardless of the cause all small newborns need frequent feeding, thermal protection and growth monitoring.

5.2.3 Congenital anomalies

Congenital anomalies or malformations are an important cause of perinatal and neonatal deaths. Among the most severe malformations are neural tube defects and other defects of the central nervous system, chromosomal disorders, malformations of the gastrointestinal tract, congenital heart disease, malformations of the urogenital system like bilateral renal agenesis and musculoskeletal anomalies. Some of the malformations may have been caused by infectious diseases acquired during pregnancy (rubella, cytomegalovirus infection, toxoplasmosis). Nutritional factors may sometimes be involved (iodine or folic acid deficiency). Consanguinity, which prevails in numerous communities, is an important predisposing factor.

In developed countries lethal malformations constitute 20-25% of total perinatal mortality (Treffers 1995). In developing countries this percentage will be lower, because more infants die by other causes. However, the incidence of malformations in less developed countries is probably higher due to several factors: deficiency of several micronutrients, advanced maternal age, infections (rubella) and consanguinity in some parts.

Often therapy for the malformation is impossible, and sometimes care for the dying is the only possible action. But always the care for the parents is important; the birth of a severely malformed infant is a serious shock.

5.2.4 Severe bacterial infection

Infections are significant causes of mortality and morbidity in newborn infants, both preterm and term. The two principal sources of neonatal infection are the mother and the environment, including the delivery place, the nursery or home. Infections manifesting in the first days of life are usually the result of exposure to microorganisms of maternal origin, infections presenting later have more often an environmental source though they could

manifest around birth. However, poor practices around birth should always be examined as a potential cause of infections, as learned from the experience with neonatal tetanus and epidemics of staphylococcal infections in nurseries. The outcome of neonatal infection can be improved if the disease is recognized early and treated promptly and appropriately.

In developed countries the incidence is between 1-10/1000 in term infants and more frequent in preterm infants. It is estimated that the incidence in developing countries in both groups is higher.

Causative organisms are primarily *Escherichia coli*, but other bacteria may also play a role: in more developed countries group B streptococci, in Nigeria salmonella and *Streptococcus pneumoniae* have been found (Barclay 1971), elsewhere *Listeria monocytogenes*. Infections with *Staphylococcus aureus* are mostly acquired from caregivers.

A task of the caregiver is to recognize early symptoms of neonatal sepsis and to guard against nosocomial infection. Infection control in the newborn care is among the most effective preventive measures for newborns.

The symptoms of the disease are non-specific. There may be no elevation of the temperature, often the infant is hypothermic. It may be lethargic, cyanotic (blue discolouration of the skin), and may have difficulty breathing. The general condition of the infant can deteriorate rapidly. If during the first days after birth an infant is suspected of having sepsis, it should be referred to a hospital as soon as possible. Antibiotics will usually include penicillin or ampicillin, in combination with an aminoglycoside.

5.2.5 Neonatal tetanus

This very serious infection only occurs in regions where basic hygienic measures during and after delivery are neglected or unknown, and where the immunization coverage of young women is still inadequate. The total global estimate of deaths from neonatal tetanus is 550 000; more than 50% of these deaths occur in Africa and South-Central Asia (WHO 1994d). The infected umbilical stump is usually the point of entrance of the bacteria, especially if the umbilicus has been treated with dung, which is sometimes done by traditional birth attendants. Symptoms of the disease are cramps, especially in the facial muscles, suckling becomes impossible, later convulsions occur with general spasms (opisthotonus). The infant showing early signs of tetanus requires expert nursing care, although the prognosis is extremely poor. Tetanus is often associated with sepsis. The main strategy in the fight against neonatal tetanus is clean delivery, together with immunization of pregnant women and women of childbearing age, at least in regions where adolescents are inadequately immunized (see section 9.2). The tasks of skilled personnel are primarily to teach families and traditional birth attendants principles of clean delivery and cord care, and also to recognize early symptoms of neonatal tetanus.

5.2.6 Newborns suffering from birth trauma

Perinatal trauma (birth injuries) may be mechanical, by difficult deliveries. It includes fractures, subcutaneous haematomas, damage to the central nervous system like intracranial haemorrhage and spinal cord injuries, and damage to peripheral nerves like brachial plexus injury. The best prevention of birth injuries is appropriate management of labour and

delivery. Little treatment is available although the diagnosis is usually not difficult; at least it will be evident that something serious occurred. After a major trauma the infant needs referral to a centre where it can receive special care.

There is no agreed definition of birth asphyxia. It is defined simply as the failure to initiate and sustain breathing at birth. Although birth asphyxia and trauma are often combined, hypoxic injury can occur without visible trauma. A newborn that has suffered asphyxia has difficulty to initiate breathing spontaneously, is hypotonic after birth, may have convulsions.

The lifesaving procedure for newborn infants with asphyxia is resuscitation (WHO 1996b). Those who were successfully resuscitated at birth do not necessarily have problems in their early neonatal period or later. Severe asphyxia combined with poor or no resuscitation is the worst possible start in life. There is little specific treatment available for those infants even with unlimited resources besides loving care and continuous psycho-social stimulation.

5.3 Other serious infant morbidity

5.3.1 Disturbance of thermoregulation

A newborn infant is dependent on his/her environment for the maintenance of body temperature, much more so than later in life.

Hypothermia is harmful to the newborn. The baby's body cools down rapidly, unless measures are taken such as keeping them dry and in a warm environment. A fall in body temperature can be reduced by skin-to-skin contact between baby and mother. Hypothermia should be prevented, and if it occurs, it should be corrected immediately by adequate measures. It should be kept in mind that hypothermia in a newborn may be one of the first symptoms of (infectious) disease.

Hyperthermia is usually caused by a too warm environment, e.g. by exposure to sun or hot-water bottles, especially if the baby is well swaddled. It can be harmful and the environment should be adjusted adequately. Clinically hyperthermia cannot be distinguished from fever and an infection should always be considered and ruled out as a potential cause of increased body temperature.

5.3.2 Jaundice

It is both normal and common for healthy newborn infants to become jaundiced. In term infants this occurs in about 15% and more frequently in preterm. Jaundice is a sign not a disease as long as the level of bilirubin does not go over values considered to be safe. The most common jaundice in term newborn infants is physiological and it seldom reaches severity that might be harmful.

In a small proportion of infants jaundice is a sign of serious disease. In those cases it usually appears early and/or it becomes severe. The most common causes of severe jaundice are haemolytic diseases of different etiologies and infections. In countries with no prevention

of Rh-iso-immunization or with other specific problems such as glucose-6-phosphate dehydrogenase deficiency severe forms of jaundice are more frequent than elsewhere. Jaundice in preterm infants can be a combination of the immature organism not being able to metabolize bilirubin, and diseases. It should be considered a more serious problem than in term infants. Poor clinical practices can contribute significantly to the level of jaundice.

Phototherapy is an effective treatment for most newborns with moderately severe jaundice. Phototherapy is considered a safe intervention without known side-effects. However, it usually involves hospital admission of the infant with separation from the mother, and negative consequences for breastfeeding and mother-infant relation. Interventions aimed at lowering serum bilirubin values are performed too often in term infants (Newman & Maisels 1990, 1992). When the values of bilirubin exceed levels considered safe exchange transfusion is indicated - at what exact values will dependent on the age of the infant, gestational age and other problems (Provisional committee for quality improvement and subcommittee on hyperbilirubinaemia 1994). It has never been proven that bilirubin values <340 μmol/l are harmful for term infants not suffering from haemolytic disease (Scheidt et al 1990, Newman & Klebanoff 1993, Seidman et al 1994). However, all these recommendations are based on observations and studies in developed countries.

5.3.3 Ophthalmia neonatorum

This is a purulent discharge from the eyes occurring within the first month of birth (WHO 1994d). It is a common disease of the newborn. In countries where STDs are prevalent, the most frequent cause of purulent conjunctivitis in the first month of life is *Chlamydia trachomatis*. More dangerous is gonococcal conjunctivitis which may lead to keratitis and blindness. Treatment is by intramuscular antibiotics. Routine prophylaxis by applying an antiseptic solution within 1 hour of birth is recommended in many countries; it reduces the transmission rate from mother to newborn considerably. In some developed countries where sexually transmitted diseases are rare the method has been abandoned and replaced by frequent inspection of the eyes. In those countries and regions, where prevalence of sexually transmitted diseases is higher eye prophylaxis is still considered as a cost-effective intervention that will prevent blindness (WHO 1994d).

5.3.4 Neonatal herpes infection

This is a serious but relatively rare infection of the newborn. In recent decades the importance of the disease has been somewhat overestimated in scientific literature and publicity in developed countries.

The reported incidence varies geographically: in the USA figures up to 28 per 100 000 are given (Sullivan-Bolyai et al 1983); in the Netherlands in a national survey during 1981-1985 an incidence of about 5 cases per year was found, or about 3 per 100 000 live births (Van der Meijden & Dumas 1987). The number of pregnant women with known chronic genital herpes is much larger, which implies that the risk of neonatal herpes in infants of women with recurrent genital herpes is relatively low (Prober et al 1987). Some of the cases of herpes neonatorum are caused by herpes virus type I, which is the primary causative agent of *herpes labialis*.

5.3.5 Hepatitis B

If the mother is a carrier of the hepatitis B virus (HBV), there is a high risk of vertical transmission from the mother to the baby during and after birth. Affected infants usually become asymptomatic chronic carriers, and will be at risk later in life of chronic liver disease and hepatoma. Only occasionally does a newborn develop fulminant hepatitis. Prevention of vertical transmission of HBV will be discussed in section 8.2

5.3.6 Human immunodeficiency virus (HIV) infection

This disease and its special problems postpartum will be discussed in section 7.

5.4 Conclusion

The health challenges faced by the newborn are impressive; their extent is greater than in any other relatively short period of human life. This justifies a well-organized care system, designed to check the health of the infant, to support the parents in their task, and to take measures whenever necessary to prevent or combat disease. This subject will be discussed in section 10.

6 BREASTFEEDING

6.1 The importance of breastfeeding

The establishment and maintenance of breastfeeding should be one of the major goals of good postpartum care. Human breast milk is the optimal food for newborn infants. Through the ages the human species has been dependent on it for its reproduction, animal milk being used only as an emergency measure if no human milk was available, usually with disastrous consequences. Only in the second half of the 20th century have modified cow's milk preparations or "formula" become readily available which are closer to human milk in nutrient quantity, but still very different in quality, and lacking in immune factors. In developed countries, differences in mortality between breastfed and artificially fed infants are small, but there is an abundance of literature on the advantages of breastfeeding for the prevention of infant and later morbidity (Howie 1990). In developing countries artificial feeding is associated with a much higher infant morbidity and mortality than breastfeeding, primarily caused by infections and malnutrition (Habicht 1986, Victora 1986, Feacham and Koblinsky 1984).

The immunological properties of breast milk are unique (Welsh & May 1979). Immunoglobulin A (IgA) is of major importance, and is present in particularly high concentration in the colostrum produced during the first few days. IgA probably acts by preventing bacterial adherence to epithelial cell surfaces in the gut and upper respiratory tract (Cravioto et al 1991). Human milk contains both T and B lymphocytes, another mechanism by which the neonate benefits from maternal immunological experience (Bertotto et al 1990). Apart from its immunological qualities, breast milk also contains essential amino acids, and long chain polyunsaturated fatty acids which are not present in animal milks and which may be of great importance for the developing brain (Van Biervliet et al 1992).

6.2 Initiation of breastfeeding

6.2.1 Early suckling

It is recommended that the baby is given to the mother to hold immediately after delivery, to provide skin-to-skin contact and for the baby to start suckling as soon as s/he shows signs of readiness - normally within ½-1 hour after birth (WHO/UNICEF 1989). Early

skin-to-skin contact and early suckling is associated with more affectionate behaviour of mothers towards their infants; mothers who start to breastfeed early have fewer problems with breastfeeding.

A number of studies have demonstrated that early contact, often combined with early suckling, has beneficial effects on breastfeeding and on other outcomes (Illingworth et al 1952, Johnson 1976, De Chateau et al 1977, Thomson et al 1979, Taylor et al 1985, Inch & Garforth 1989, Widstrom 1990). As little as 15-20 minutes of contact in the first hour may be beneficial. Spontaneous suckling may not occur until from 45 minutes to 2 hours after birth, but skin-to-skin contact can start earlier. Restricted mother-infant contact after delivery resulted in a significantly more frequent discontinuation of breastfeeding at 1-3 months.

Early suckling might also influence uterine contractions and thus reduce postpartum blood loss. The only controlled clinical trial on the subject thus far was published by Bullough et al (1989). They could not find a decrease in the frequency of post partum haemorrhage after early suckling. However, this trial was carried out using traditional birth attendants; it would seem appropriate to repeat it with trained birth attendants. Another study demonstrated a significant increase in uterine activity with breastfeeding (Chua 1994).

6.2.2 Positioning and attaching the baby to the breast

Inaccurate and inconsistent guidance from health staff has been recognised as a major obstacle to breastfeeding (Winikoff et al 1987, Garforth & Garcia 1989, Rajan 1993). Woolridge (1986) suggested that the ability of a woman to attach her baby correctly to her breast seems likely to be a learned, and predominantly manual skill, which the mother must acquire from observation and practice. In industrialized societies, women may not have the opportunity to observe breastfeeding before they breastfeed themselves, and there may be few experienced breastfeeding mothers in the woman's immediate social circle. One of the important tasks of the caregiver in the postpartum period is to help and teach women to correctly attach their babies (Inch & Garforth 1989).

When a baby is properly attached, the nipple, together with some of the surrounding breast tissue, is drawn out into a teat by the suction within the baby's mouth. A peristaltic wave passing along the tongue of the baby applies pressure to the teat and removes the milk. If the baby is incorrectly attached milk is not effectively removed and the nipple may be damaged by friction as the teat is drawn in and out of the mouth. If the attachment is not corrected, sore nipples and engorgement are more common, the baby may get insufficient milk and the mother is more likely to stop breastfeeding (Righard & Alade 1992, Enkin et al 1995).

In developing countries young women more often have the opportunity to learn from more experienced women, because breastfeeding in these cultures is more of a social event than in Western societies. Nevertheless, a young primipara in these countries needs support too.

6.2.3 The need to avoid supplementary feeds

In some hospitals it is common practice to give breastfed babies supplements of formula or glucose water while lactation is becoming established. This practice is unnecessary because a healthy baby does not need extra fluids or feeds before breastfeeding is established, and it is harmful because bottle feeding may interfere with the initiation and continuation of breastfeeding. Babies who have had their appetite satisfied with an artificial feed may lose interest in trying to breastfeed.

Sucking on an artificial teat is physiologically different from suckling at the breast, and may condition an infant to different oral movements than are appropriate for breastfeeding and they may suckle ineffectively, or refuse the breast (Ardran et al 1958, Weber et al 1986, Akre 1989, Newman 1990, Stephens & Kotowski 1994).

Women whose babies receive routine supplements are up to five times more likely to give up breastfeeding in the first week and twice as likely to abandon it during the second week as women who are encouraged to feel that their own colostrum and milk are adequate without supplements (Enkin et al 1995).

6.3 The practice of breastfeeding

6.3.1 Rooming-in and unrestricted feeding

It has been common practice in many hospitals to separate mothers and babies and to put the babies in a nursery, to allow the mothers to rest and the babies to be observed. No advantages have been proven and outbreaks of infection in nurseries are associated with this practice. Keeping babies with their mothers in the same room or the same bed from birth prevents infections and increases the success of breastfeeding, especially when it is combined breastfeeding guidance (Pérez-Escamilla 1994). Breastfeeding was less and bottle feeding more frequent in the group of mothers who delivered in institutions (Kempe et al 1994).

In developed countries it is still common to advise women to limit suckling time and to feed at fixed intervals. One of the reasons given is to prevent sore nipples. However, in 1952 Illingworth et al found that mothers who had fed their babies without restriction of feeding intervals or duration were less likely to experience breast engorgement and sore nipples. Their babies were more likely to have regained their birth weight by the time they were discharged home from the maternity, and more likely to be fully breastfed one month after delivery. Similar conclusions were drawn from studies of Salber (1956), Slaven & Harvey (1981) and by Carvalho et al (1984).

6.4 Promotion of breastfeeding

6.4.1 Commercial discharge packs

In a number of trials the effects of giving free formula samples, bottles and teats to breastfeeding mothers have been investigated (Bergevin et al 1983, Feinstein et al 1986, Evans et al 1986, Frank et al 1987). The results indicate that giving free formula samples to breastfeeding women increases the likelihood of discontinuation or supplementation of breastfeeding at 4-6 weeks and of the introduction of solids by 8 weeks post partum.

In one trial (Frank et al 1987) rehospitalization within 4 months was more likely in infants of mothers who received free samples of bottles, teats and water. Pérez-Escamilla et al (1994) in a meta-analysis concluded that commercial discharge packs have an adverse effect on lactational performance.

6.4.2 Ten steps to successful breastfeeding

The practices which support and promote breastfeeding have been described in the WHO/UNICEF Joint Statement “Promoting, Protecting and Supporting Breastfeeding - the special role of the maternity services” (WHO/UNICEF 1989, 1993).They were summarised as the Ten Steps to Successful Breastfeeding which form the basis of the Baby Friendly Hospital Initiative (BFHI). The Initiative has enabled thousands of maternity units worldwide

to put into practice the "ten steps" and provide a strongly supportive environment for the newly breastfeeding woman and her baby.

WHO recommends that infants should be fed exclusively on breast milk from birth to at least 4 and if possible 6 months of age. Breastfeeding should be given as often as the child desires, day and night, at least eight times in 24 hours. Often a sharp decline in breastfeeding occurs in the weeks after delivery. Continuing support to sustain breastfeeding can be provided in a number of ways, including that offered by support groups such as La Leche League.

One of the greatest difficulties in the continuation of breastfeeding is the employment of women outside their homes. Women should be entitled to paid maternity leave. After the resumption of work they need flexible working hours, part time or shorter shifts, and nursing breaks to breastfeed or express their milk. For this purpose they need easy access to a comfortable room with privacy. Health care providers together with public health officers, governments, employers and women's organizations should make a joint effort for the achievement of these goals.

6.5 Lactation suppression

If a baby dies or a woman chooses not to breastfeed her infant, there may be a need to suppress lactation. Pharmacological methods that are sometimes used include:

1. Oestrogens (sometimes combined with testosterone), the effect of which is doubtful and in the postpartum period there is a risk of thromboembolic disease.

2. Bromocriptine inhibits prolactin release, and is effective in the suppression of lactation. However, in the USA serious side effects have occasionally been reported: hypertension, seizures, stroke and myocardial infarction (Katz et al 1985, Watson et al 1989, Ruch & Duhring 1989, Bell 1993, McCarthy 1994, Morgans 1995) and bromocryptine is no longer recommended for this purpose.

Although the reported serious side effects are rare, it seems inappropriate to prescribe a drug with potential harmful consequences for this indication. The preferred method is to let the milk dry up naturally by not breastfeeding. If necessary, small amounts of milk can be expressed to relieve engorgement. In the meantime a well-fitting bra and an analgesic will be useful.

6.6 Obstacles to breastfeeding

Another obstacle is the marketing practice of the commercial baby food companies, who offer artificial feeds to mothers through the medium of health care workers, and who offer financial support to hospitals and medical organizations. In developing countries this marketing practice has caused disasters. In 1981 the International Code of marketing of breast milk substitutes was adopted by the World Health Assembly. This is a powerful tool which health workers can use to effectively promote and protect breastfeeding

7 BIRTH SPACING

7.1 Introduction

It is often stated that in the postpartum period one of the major concerns of the woman (and her partner) is contraception. The fact that she has given birth to a child for whose care and upbringing they are now responsible, should prompt them to realize that another child will soon be there if they do not take steps to prevent or postpone the next birth. WHO has offered detailed and comprehensive guidance for service providers which describes the range of available contraceptive options and the criteria by which they should be selected (WHO 1996). In the case of the parturient woman and her partner a number of different factors affect the decision about contraceptive method. These include the physiological processes of the puerperium, when fertility returns and ovulation is re-established, whether or not the women is exclusively breastfeeding, and what the couples wishes are with regard to the resumption of sexual activity. Couples are frequently unaware of the implications of these different factors and this is a major argument for providing the opportunity to discuss family planning options at the earliest opportunity after birth. Couples may be unaware of the range of family planning methods (short term, long-acting, hormonal, barrier, temporary or permanent) available to suit their varying goals, choices and needs. Such counselling, advice and the provision of services which accompanies it, must form an integral part of any postpartum service.

Glasier et al (1996) in a study performed in Scotland showed that the immediate postpartum days in hospital, when women are anxious to establish infant feeding and to learn to care for the new baby, are a wholly ineffective setting for contraception to be discussed or delivered. What then is the best time and setting? In this respect it seems appropriate to consider the breastfeeding status of the woman (Winikoff & Mensch 1991) and to give combined advice on breastfeeding and contraception.

The following section is simply a brief résumé of some of the salient points in postpartum family planning. The reader requiring more detailed information is referred to the text mentioned above, " Improving Access to Quality Care in Family Planning", which offers comprehensive coverage of the issues related to the needs of couples during the postpartum, as well as throughout the reproductive life cycle.

7.2 Lactational amenorrhoea method (LAM)

It is well-known that lactation causes amenorrhoea by inhibition of ovulation, but in industrialized countries this knowledge is seldom turned into official medical advice to rely on breastfeeding as a contraceptive method after birth. This is apparently related to the fact that many women in these countries, if they breastfeed their infants, do so for relatively limited periods and soon add supplementary fluids or formula (a method of infant feeding that, despite being widespread, is not recommended before four months after birth, see section 6). Developing countries, where breastfeeding is more common, and lasts longer, and

where the spacing of births is often largely dependent on lactational amenorrhoea, showed more interest in the subject.

In 1988 an international group of scientists gathered in Bellagio, Italy, and reviewed the scientific evidence related to the effect of breastfeeding on fertility. They concluded that women who are not using family planning methods, but who are fully or nearly fully breastfeeding and amenorrhoeic, are likely to experience a risk of pregnancy of less than 2% in the first six months after delivery (Consensus Statement 1988, Kennedy et al 1989). Subsequent to the 1988 consensus meeting, several studies designed to test the consensus were conducted. In Chile a breastfeeding support intervention study was started in 1988. A total of 422 women took part in the study. The cumulative 6-month pregnancy rate was 0.45% among the 221 women (56%) who relied on LAM as the only family planning method during 6 months (1 pregnancy in the 6th month), 3 other pregnancies occurred in women who had stopped the LAM-method (Pérez et al 1992). Other observations of pregnancy in breastfeeding mothers were done in Egypt (Hefnawi et al 1977), and in Bangladesh (Weis 1993), Ecuador (Wade et al 1994), and Rwanda (Cooney et al 1996). These studies supported the idea of LAM effectiveness, but did not measure it.

The most accurate assessment of LAM as a contraceptive method has been done in three clinical studies. The study by Perez et al (1992) has been mentioned earlier. Kazi et al (1995) in Pakistan and Ramos et al (1996) in the Philippines recorded pregnancy rates per 100 women during 6 months of correct use of the method (in Pakistan 0.58 and in the Philippines 0.97), but also during correct plus incorrect use (in Pakistan 1.65 and in the Philippines 1.52). These studies produce convincing arguments that LAM is indeed an effective method of contraception, provided that the three criteria mentioned below are followed.

The method has not only been studied in developing countries. In a large group of Australian women breastfeeding for an extended period of time, ovarian activity was determined by measuring salivary progesterone, and the excretion of oestrogens and pregnanediol (Lewis et al 1991, Short et al 1991). They concluded that LAM apparently provided good protection against pregnancy in the first 6 months post partum, even in well-nourished women in a developed country. Diaz et al (1992) in Chile evaluated the contribution of anovulation and luteal phase defects to lactational infertility. It was concluded that, even if ovulation occurs, the abnormal endocrine profile of the first luteal phase offers effective protection to women during lactational amenorrhoea within the first 6 months after delivery. Later luteal phases are improved, and then women are at risk of pregnancy.

7.2.1 Criteria for LAM use

Based on the above mentioned data, it can be concluded that LAM is an effective and reliable method of birth control, provided that the following conditions are met (Labbok et al 1994):

- The mother is fully, or nearly fully, breastfeeding the baby. Feeding must be on demand, both day and night, with no intervals greater than about six hours between breastfeeds. Less than full breastfeeding is associated with a gradual increase in the occurrence of ovulation prior to menses and with a decreased duration of amenorrhoea.
- If after more than 8 weeks postpartum menstruation has returned, the mother's chance of pregnancy is increased. For continuous protection, she is advised to use a complementary family planning method (while continuing breastfeeding for the child's health). However, it is unlikely that vaginal bleeding in fully breastfeeding women in the first 8 weeks postpartum represents a return to fertility (Visness et al 1997a,b).
- If the baby is more than six months old, the chance of pregnancy is increased, even if the mother continues to breastfeed. The mother is then also advised to use a complementary method. There have been some observations of LAM extended beyond 6 months, but this is not generally recommended.

The method is well adapted to cultures where breastfeeding is practised for long periods, and for women and couples who wish to avoid or postpone a subsequent pregnancy without using other family planning methods.

In industrialized countries LAM as a contraceptive method is virtually unknown. In the USA only half of the parturients breastfeed at all, and those who do wean very soon. In other developed countries where breastfeeding is more successful, LAM has not been marketed, since there is no product associated with it, no corporate sponsor or possibility of monetary profit. Glasier et al (1996) found that midwives in a Scottish hospital who gave advice to mothers on contraception universally denied the contraceptive effects of breastfeeding. In other countries counselling on contraception also ignores LAM.

In 1995 a second Bellagio conference was held on the subject (Kennedy et al 1996, Van Look 1996). The conclusions of the first conference were confirmed. Support of women by the promotion of LAM and breastfeeding practices were recommended. The guidelines for use of LAM include the promotion of other methods of family planning as soon as the six month period of protection has ended, or as soon as one of the conditions of LAM are no longer met. It is therefore conceivable that using LAM may stimulate subsequent use of other methods of contraception.

7.3 Hormonal contraceptives

7.3.1 Combined oral contraceptives

In 1981 a report of a WHO scientific group summarized the available information on the effect of female sex hormones on fetal development and infant health. The report concluded that most studies at the time indicated that the combined oral contraceptives (OCs) were associated with decreased levels of breast milk and that the effects appeared to be related to the timing of initiating hormonal contraception: the earlier OCs were started, the lower the continuation rate of breastfeeding at 12 weeks (Miller & Hughes 1970).

There appeared to be a clear indication that combined OCs should not be used during the first weeks or months after birth (Kaern 1967, Koetsawang et al 1972). However, at that time no studies had examined the use of low-dose oral preparations of ethinylestradiol with a progestin. Diaz et al (1983) published the first randomized trial of a low-dose combined OC versus placebo during lactation, starting at day 30. They found that women who used OCs had a lower percentage of exclusive breastfeeding at day 91, and their infants weighed significantly less at days 61 and 91.

In the eighties WHO launched an extensive investigation into the effects of hormonal contraceptives on breast milk composition and infant growth (WHO 1984, 1988). Breast milk volume and composition, and infant growth were measured at three- and four-week intervals, up to six months, in a multicentre randomized double-blind trial comparing a low-dose combined OC (30 μg ethinylestradiol and 150 μg levonorgestrel) with a progestogen-only OC (75 μg levonorgestrel). The study was performed in three centres, one in Hungary and two in Thailand. In the Thai centres a group using depot-medroxyprogesterone acetate (DMPA, an injectable progestogen) was included. All hormonal preparations in the three centres were initiated at 6 weeks post partum. Combined OCs caused a significant decrease in milk output and total energy content as well as widespread changes in milk constituents. In the DMPA group and the group using the progestogen-only OC, no significant changes were observed in milk volume, and only minor shifts occurred in milk composition. No differences were found between the progestogen-only pill and DMPA. No hormonal contraceptive was associated with any significant difference in infant weight or fat fold, nor in the rate of discontinuation of breastfeeding for failure to gain weight. The apparent discrepancy between the changes in milk volume and composition during combined OC use, and the fact that no harm to the infants was detected, could not be explained. The most plausible explanation is that in case of decreased milk volume the number of supplement feeds was increased (only the number of infants receiving supplements was registered).

The conclusion of the WHO task force was, that combined OCs should be avoided during the first few weeks or months of lactation. Progestogen-only pills and DMPA-injections appeared to be safe for use.

Apart from the influence of combined OC's on milk quantity and composition, there are two other objections against the use of oestrogen-containing preparations in the early postpartum period. The first is the thrombogenic influence of oestrogens in the first weeks

postpartum, which is a small but not negligible risk. The second objection is the possible influence of sex hormones, particularly oestrogens, on the early development of the infant, especially of the brain.

A pre- and early postnatal influence of sex hormones on the sexual differentiation of the brain has been found in animal experiments and hypothesized in man (Harlap 1987, Swaab et al 1995). It is difficult to prove, and as yet by no means certain. Sex hormones are excreted in breast milk, but only in very limited quantities (American Academy of Pediatrics 1981). However, any long-term effect on progeny that were to result from exposures to breast milk would potentially be of great importance, since very large numbers of infants may be involved.

In February 1996 the IPPF (International Planned Parenthood Federation) convened an International Medical Advisory Panel on breastfeeding, fertility and postpartum contraception. Based on the available information, the panel stated that, as far is practicable, women should be advised and encouraged to fully breastfeed. Combined hormonal contraceptives should be generally withheld until six months after delivery or until the infant is weaned, whichever is the earlier. Where they are the only available or acceptable form of contraception, and if women do not want to rely on lactational amenorrhoea, low-dose combined OCs may have to be started earlier, but after the first six weeks post partum.

7.3.2 Progestogen-only contraceptives

These methods (pills, injectables and more recently implants) have been extensively investigated during the postpartum period.

In 1991 Fraser published a review of the available data on their use during lactation. He concluded that the methods were widely used for postpartum contraception, and appeared to have particular advantages in this situation. Apart from the comparative investigation by WHO (1984, 1988) already mentioned in the section on combined OCs (7.3.1), a large investigation on progestogen-only contraceptives has been conducted by WHO (1994a,b). The growth, development and health of infants whose mothers used progestogen-only contraceptives during lactation were examined in a prospective, non-randomized study carried out in seven centres in five countries (Egypt, Thailand, Kenya, Chile and Hungary). Breastfeeding women requesting contraception were admitted to the study at six weeks post partum. Infants of acceptors of progestogen-only methods (pill, injectables or implants) and non-hormonal methods (IUD, barrier methods or sterilization) formed the study groups. The follow-up was at monthly intervals until the end of the first postpartum year. A number of anthropometric measures and developmental tests were carried out. In total 2466 mother-infant pairs participated in the study.

The conclusion of the study was, that the progestogen-only contraceptives used from 6 weeks post partum during lactation did not adversely affect growth and development of the infants, compared with the infants of mothers who used non-hormonal methods.

7.4 Other contraceptive methods

7.4.1 Intra-uterine devices

Intra-uterine devices (IUDs) are reliable contraceptives with a one-year pregnancy rate per 100 women of 2.8 (non-medicated IUD), and lower rates for the copper-medicated IUDs: 0.5-2.5. The lowest pregnancy rate is achieved by the progesterone (levonorgestrel)-releasing IUD: 0.2 (WHO 1994c). It can normally be introduced from 4 to 6 weeks post partum; in the case of the progestogen-releasing IUD it is advised to introduce it

from 6 weeks on (WHO1996c). It is possible to introduce an IUD within 48 hours post partum, but there is an increased risk of expulsion.

7.4.2 Barrier methods

Barrier methods are condoms and diaphragms, cervical caps and sponges, supplemented by spermicides. Condoms can be used from early in the postpartum period on, and are reliable contraceptives. They take on additional importance from the fact that they protect against sexually transmitted diseases, including HIV-infection. As with other barrier methods, the effectiveness of the condom depends on the experience of the user and the consistency of use. The correct and consistent use of condoms is recommended for the prevention of STDs and HIV. They can be obtained through non-medical suppliers. Diaphragms and cervical caps are unsuitable until uterine involution is complete, 4-6 weeks after delivery. The diaphragm requires an initial examination and fitting by an experienced provider.

7.4.3 Female sterilization

Female sterilization in the postpartum situation is usually accomplished by minilaparotomy and surgical ligation of the fallopian tubes. Other methods like Filshie clips are also used (Graf et al 1996), but the oedematous and more friable fallopian tubes postpartum make their use more difficult. Tubal ligation is a minor operation, which can be performed under general or local anaesthesia, on one of the first days post partum. Especially in countries and regions with long distances to hospitals, and for multiparous women who have great difficulties in returning to the hospital and leave their families, a post partum tubal ligation may be a good way to guarantee reliable contraception where no further pregnancies are desired. Sterilization has the benefit that it is permanent, highly effective and relatively safe; it does not require continuing conscious involvement on the part of the user (WHO 1994c). On the other hand it is important that the woman and her husband are thoroughly counselled beforehand, preferably during pregnancy, and know that the procedure is only appropriate for people who are certain that they do not want any more children. The counsellor should provide information about available alternative contraceptives.

7.4.4 Male sterilization

Male sterilization (vasectomy) should also be considered a solution in case of a completed family. The operation is simple and can be performed under local anaesthesia as an outpatient procedure. Complications are rare, and there are no proven long-term health effects (WHO 1994c). The postpartum period may be suitable for a vasectomy, because generally after the operation a period of some weeks is necessary as waiting time until a test shows that there are no sperms in the ejaculate. Good counselling is as important here as in the case of female sterilization, particularly given that male acceptance of sterilisation is far less than that of tubal ligation by females.

7.5 Conclusion

In the immediate postpartum period it is of prime importance for the caregiver to help the woman initiate breastfeeding and to support her to continue it. If the mother fully breastfeeds the baby she can, at least for the first 6 weeks, rely on the contraceptive effect of lactational amenorrhoea. If she is breastfeeding she is advised not to take any hormonal preparation during this period.

After 6 weeks the decision has to be taken whether the mother plans to continue full breastfeeding in the next months. If so, she may decide to rely on LAM as a contraceptive method, strictly adhering to the rules that an alternative method is required as soon as menstruation returns or when she is giving the baby more than occasional supplements.

If 6 weeks or more after birth an alternative contraceptive is required, during lactation the first choice of a hormonal method is the progestogen-only pill. Combined OCs are generally not advised, but may be given if other methods are not available or acceptable to the woman. Combined OCs should be avoided until 6 months after birth, or until the baby is weaned, whatever comes first. Other methods of choice are: the introduction of an IUD, and barrier methods (condoms or the diaphragm), which are good alternatives.

If the mother decides not to breastfeed immediately after birth, she will need the protection of a contraceptive at an earlier date, because ovulation is to be expected earlier. The only objection against the immediate start with combined OCs is the risk of thrombosis. If she wishes to use combined OCs, the WHO Report on contraceptive methods (WHO 1996c) advises to start with a low-dose preparation 3 weeks after delivery, based on a study of coagulation factors in the postpartum period (Dahlman et al 1985). However, as blood coagulation and fibrinolysis are close to normal at 2 weeks postpartum and as the first ovulation may occur as early as 25 days post partum (Gray et al 1987), women may begin COCs after the second week after delivery.

These recommendations are meant for healthy women with a healthy baby. In case of maternal disease, obstetric complications, caesarean section, preterm or ill infants specific advice should be given dependent on the situation.

8 HIV/AIDS INFECTION

8.1 Introduction

The worldwide pandemic of this relatively new, fatal, sexually transmitted disease casts its shadows on childbirth, especially in developing countries. In regions in East and Central Africa 20-30% of all pregnant women are infected. The infection is spreading rapidly in South East Asia, while many developed countries still have a relatively low prevalence. The main concern with respect to childbirth is the vertical transmission from mother to infant during pregnancy, labour and postnatally. This section deals with this vertical transmission, especially during the postnatal period, with HIV-related complications in the postpartum period, with the problems encountered in HIV testing, and with the care of the HIV-positive

mother and her baby. Because the postpartum period is not an isolated episode, sometimes events and decisions during pregnancy and labour will be considered.

8.2 Vertical transmission

8.2.1 Transmission during pregnancy and labour

The estimated rate of vertical transmission in Europe and the USA is 15-30%, in Africa higher rates are reported, even up to over 40% (Newell & Peckham 1993, Boer & Godfried 1997). Of the infants infected during the perinatal period about 30% will contract AIDS within one year after birth, and the others will also have AIDS at an early age. Part of the transmission takes place during pregnancy and labour, mainly during delivery.

The rate of vertical transmission can be successfully reduced by treatment with zidovudine during pregnancy as shown in a randomized trial in the USA and France (Connor et al 1994). There is no evidence of important risk to the fetus by this treatment, but the possibility of long-term side-effects on the infants has not yet been excluded. There have been indications for a reduction of vertical transmission by elective caesarean section (European Collaborative Study 1994), but other studies have not confirmed this result (Dunn et al 1994, Mayaux et al 1995, Peckham & Gibb 1995, Landesman et al 1996). Other measures to prevent vertical transmission during labour may be the avoidance of scalp-electrodes for fetal monitoring, and avoidance, if possible, of artificial rupture of the membranes, episiotomies and routine aspiration of the newborn. If instrumental delivery is necessary, this should be done carefully and vacuum extraction should preferably use a rubber cup to prevent abrasions of the fetal head (Verkuyl 1995).

8.2.2 Postnatal transmission

It is estimated that breastfeeding may be responsible for infection of an additional 14% of infants, more than one-third of all cases of infected infants (Dunn et al 1992, Boer & Godfried 1997). In developed countries, where the mortality associated with formula feeding is extremely low, it may be appropriate to advise HIV-positive women not to breastfeed their babies (Johnstone 1996). However, in many developing countries such advice to all HIV positive pregnant women is not appropriate. The cost of infant formula milk in these countries is often more than the minimum wage, and many women would not be prepared to follow such advice, because bottle feeding would stigmatise them (Verkuyl 1995, 1996). The risks of diarrhoeal disease or malnutrition due to improper or inadequate preparation of artificial milk may outweigh the additional HIV infection risk in many resource-poor settings.

The presence of HIV-infected cells in breast milk predicts the mother-to child transmission rate (Van de Perre et al 1993, 1995). Since colostrum and early breast milk contain many more cells than later milk, the risk of infection might be higher in the early phase of lactation (Boer & Godfried 1997). Maternal vitamin A deficiency may contribute to the vertical transmission rate: the lower the maternal serum vitamin A level, the greater the apparent transmission rate (Semba et al 1994).

In May 1997, UNAIDS issued a statement putting the matter in the context of human rights, requiring that families be empowered to make a fully informed choice about the best method of feeding for their infants. The Statement reads

"as a general principle, in all populations, irrespective of HIV infection rates, breastfeeding should continue to be protected, promoted and supported. Access to voluntary and confidential HIV counselling and testing should be facilitated for women and men"..."Mothers and fathers should be encouraged to reach a decision together on the matter of infant feeding. However, it is mothers who are in the best position to decide whether to breastfeed, particularly when they alone may know their HIV status and wish to exercise their right to keep that information confidential. It is therefore important that women be empowered to make fully informed decisions about infant feeding, and that they be suitably supported in carrying them out"...."When children born to women living with HIV can be ensured uninterrupted access to nutritionally adequate breast milk substitutes that are safely prepared and fed to them, they are at less risk of illness and death if they are not breastfed. However, when these conditions are not fulfilled, in particular in an environment where infectious diseases and malnutrition are the primary causes of death during infancy, artificial feeding substantially increases children's risk of illness and death".

Ideally, in order to facilitate crucial, timely and appropriate decisions regarding breastfeeding, a woman's serostatus should be known before she goes into labour. This, however, is generally not the case, even in high prevalence countries, and counselling has to take this reality, as well as local conditions, into account.

8.3 Maternal morbidity post partum related to HIV/AIDS infection

In HIV-infected mothers there is an increase in puerperal sepsis, massive condylomata acuminata, and fever related to tuberculosis or of unknown origin. The postpartum period is perhaps one of the most vulnerable times for immunosuppressed women as far as TB is concerned, and signs such as persistent productive cough should be followed up. Unusual infections are encountered e.g. peritonitis after a routine postpartum tubal ligation or pubic osteomyelitis after spontaneous labour. Retention of urine may occur caused by HIV-related damage to the nervous system. It is difficult to differentiate clinically between puerperal psychosis, cerebral malaria, and HIV-related cerebral complications such as toxoplasmosis, cytomegalovirus infection and lymphoma (Verkuyl 1995).

In the treatment of maternal complications it is important to realize that infectious diseases and complications in HIV-positive patients should be treated more aggressively with antibiotics than in other patients. A general rule in developing and developed countries is, that transfusion of blood and blood products is a treatment with a substantial risk. It should be reserved for life-threatening complications and not be misused for the treatment of, for instance, moderate anaemia in the postpartum period. In the first weeks post partum, when the woman is still having bloody discharge and wounds in vulva and vagina have not healed yet, sexual intercourse with an HIV-positive husband may easily infect her, if she has not been infected before. Equally, an HIV-positive woman may easily infect a man during intercourse.

Women with HIV/AIDS may experience particular psychological problems. They include fear of stigmatization by the community, victimization by relatives and neglect by health workers. Uncertainty about her baby's well-being hangs over the woman constantly and the slightest illness rekindles her sense of guilt that she may be responsible for having infected her baby. If these feelings become overwhelming they may manifest themselves as

mental illness which is hard to distinguish from puerperal psychosis or infective cerebral complications.

8.4 Protection of health care workers and patients against infection

An important aspect of the care is protection of health care workers and patients. Guidelines and recommendations for prevention and infection control are given in the WHO brochure "Preventing HIV transmission in health facilities" (WHO 1995c). Some of these are:

- Transmission of the virus from patient to health care worker can take place through needle-stick injuries; the greatest risk is from sharp injuries with HIV-contaminated hollow needles. The risk is real, but small: the indications are that a sharp injury with HIV-positive blood will result in HIV infection in 0.3-0.4% of the cases. For hepatitis B the same injury carries a much higher risk (9-30%).

- Very few cases of occupational HIV transmission have been reported after exposure of mucous membranes (mouth and eyes) or broken skin to infected blood. The risk of acquiring HIV infection by this route is much lower than the risk from percutaneous exposure. Nevertheless, continuous efforts must be made to minimize any possible transmission from patient to health care worker.

- The risk of transmission from HIV-infected health workers to patients is remote, if they avoid exposure-prone procedures. In midwifery practice, normal vaginal delivery itself is not an exposure-prone procedure, but infected health care workers better avoid the use of sharp instruments.

- Safe handling and disposal of sharp instruments is essential. Recapping needles is dangerous; if unavoidable, the single-handed "scoop" method should be utilized. Recapping with two hands increases the likelihood of sustaining a sharp injury. Puncture-resistant disposal containers must be available for the disposal of sharps. Episiotomy repairs are an obvious source of needle-stick injury and all such invasive procedures should be kept to a minimum.

- Safe decontamination of instruments and other contaminated equipment includes:
  - sterilization of instruments which penetrate the skin (alternative: single use of disposable),
  - sterilization, boiling or chemical disinfection of instruments which come into contact with mucous membranes or non-intact skin,
  - thorough washing of equipment which comes into contact with intact skin.

- Hands should be washed thoroughly before and after care of a patient, and if the hands are contaminated with body fluids. HIV cannot pass through intact skin, but it is possible to acquire the infection when blood is in contact with damaged skin. Cuts, abrasions or other damaged skin should be covered with a waterproof material while working with patients.

- Protective clothing should be worn where exposure to significant amounts of blood is anticipated. In obstetric practice this includes attending deliveries, handling the placenta and sanitary towels soaked with blood. Dependent on the expected exposure to blood the protective clothing may include gloves, fluid resistant gown or apron, and eye protection. If eye protection is needed, normal spectacles are sufficient. Usually the wearing of masks is not necessary.

- Safe disposal of waste contaminated with body fluids in leak-proof bags or containers should be ensured. After a home delivery the placenta should be covered with disinfectant and buried.

Based on these guidelines and on the expected risk of infection (e.g. the regional prevalence of HIV) every maternity service should take the necessary preventive measures. If these are too strict they will be neglected: "Universal precautions are universally ignored" (Hammond 1990). Those measures that have been decided on should be complied with by all health workers. Where there is a strong suspicion that contamination has occurred, anti-retroviral (ARV) therapy, where available, should be considered, together with the necessary follow up care and surveillance.

8.5 HIV testing - the merits and demerits

The woman who knows or suspects that she is HIV-positive is under considerable stress, even increased by the knowledge that she may have infected her baby or infect it in the near future by breastfeeding. In many developed countries, since therapeutic measures to reduce mother to child transmission during pregnancy are available, increasing attention has been focused on the availability of voluntary HIV counselling and testing (VCT) at antenatal clinics. Women who want to be tested should, according to this philosophy, have easy access to it. Adequate information and proper counselling must also be available, because unprepared discovery of positive HIV status may be devastating for the pregnant woman. It is therefore important that counselling precedes seeking informed consent and prepares the woman to receive the test results. In developed countries with a low prevalence serious doubts have been put forward about the practicability of intensive counselling and testing (Johnstone 1996). Adequate counselling of all pregnant women seems an impossible task, primarily because a large majority of the women will not be interested at all. However, instead of a lengthy talk to every individual it would be sufficient to provide adequate information (written and/or audiovisual), especially about risk factors, and to leave it to the woman to ask for a test (or for more information) if she decides that she belongs to a group at increased risk. This procedure avoids pointless counselling of uninterested individuals, and leaves the decision to perform a test or not where it should be: in the hands of the women themselves.

In developing countries the problems are different and even more serious. Those measures that seem to be effective for reducing vertical transmission (zidovudine treatment during pregnancy, artificial feeding of the baby) will often not be affordable to many people in the countries with the highest prevalence of HIV. Under these circumstances, what is the benefit of testing? On the other hand, HIV testing and counselling is increasingly accessible, in particular in urban areas in Southern and East Africa. In those urban areas where the clientele is a mixture of poor and middle class and has access to follow-up care and social support for HIV related illnesses, it seems possible to promote the access to VCT, including the decision about infant feeding based on the result. To add to the problem, Verkuyl (1995, 1996) points out that an infected individual might benefit from knowing that an HIV test is positive, but many women in Zimbabwe and other countries in sub-Saharan Africa have little control over their lives and cannot make plans for the future; people are less individual and more components of an extended family, which nevertheless could ostracize the individual should it come to know about her HIV status.

In many developing countries the impact of HIV/AIDS on women is greater than on men for several reasons (De Bruyn 1992):

- Stereotypes related to HIV/AIDS mean that women are either blamed for the spread of the disease or are not recognized as potential patients with the disease; women stigmatised as HIV-positive may be abandoned by their husbands, and may face impoverishment;
- The physical, social and psychological burdens are greater for women who are seropositive/have AIDS than for men in a similar situation (e.g. by the problems related to pregnancy and childbirth);
- As primary providers of care, women may receive greater demands to cope with the effects of the epidemic (e.g. by the care for her infected infant, but also by the care for other family members who become sick);
- Women's social position makes it more difficult for them to undertake preventive measures (e.g. by using condoms).

Many gender issues are involved in this sensitive subject and continuous efforts are needed to increase peoples' awareness of how such attitudes influence the persistence of inequities.

8.6 Tasks of the caregiver

These tasks are tremendous: during pregnancy caregivers should be able to counsel women and their husbands or families about the decision to perform an HIV test. In case of a positive test they should again counsel them on possible therapeutic and preventive measures. In the hospital or the maternity service the necessary measures should be taken to prevent infection of caregivers and others, especially during labour and delivery. In the postpartum period decisions have to be taken by the woman about infant feeding, and about whom she wants to inform about her HIV-positive status, together with follow-up care and guidance. The caregiver should be prepared to support her in these decisions. Finally arrangements should be made about further care for the baby and for the mother.

9 IMMUNIZATION

9.1 Introduction

Immunizations starts already in the postnatal period. Policies in countries may vary, in this section the recommendations of the WHO Expanded Programme on Immunization (EPI) are followed (WHO 1996d). Immunizing the mother is an important way of preventing a disease or a malformation in the newborns. If this was done for this birth, the opportunity in the perinatal period should not be missed for the next pregnancy.

9.2 The target diseases

Tuberculosis caused an estimated 2.6 million deaths worldwide in 1996. The pandemic of HIV infection and an increase in multi drug-resistant *Mycobacterium tuberculosis* have profoundly worsened the public health burden of the disease. BCG is the most widely used vaccine in the world (in 1993, 85% of all infants received a dose). The efficacy in preventing pulmonary TB varies widely in the world, but BCG immunization at birth will reduce the morbidity and mortality from tuberculous meningitis and disseminated disease among children. In some countries where the risk of tuberculosis is low, and where the tuberculin reaction is used for case finding, BCG immunization is only used for individuals at increased risk. Generally, the EPI recommends that BCG should continue to be given as soon after birth as possible in all populations at high risk of tuberculosis infection.

Diphtheria is a threat especially in temperate climates. Immunization is by diphtheria toxoid, an inactivated preparation of diphtheria toxin. It does not prevent the infection, but prevents the systemic manifestations. The immunization is recommended for children in all countries at 6, 10 and 14 weeks after birth.

Tetanus is caused by a potent neurotoxin produced by *Clostridium tetani*, growing in necrosed tissues in dirty wounds and in the umbilical cord affecting neonates if delivery has not been clean. Immunization is by tetanus toxoid (TT), an inactivated preparation of the toxin. All children should receive TT immunization at 6, 10 and 14 weeks.

Women (pregnant or non-pregnant) of childbearing age who have not previously been immunized with TT in their infancy or adolescence should be immunized, both to protect themselves and to protect their newborns against neonatal tetanus.

A five-dose schedule is recommended for the previously unprotected woman as follows:

- TT1 at first contact or as early as possible in pregnancy.
- TT2 at least 4 weeks after TT1.
- TT3 at least 6 months after TT2.

- The two last doses are given after at least one year, or during a subsequent pregnancy.

Pertussis (whooping cough) is a respiratory infection caused by *Bordetella pertussis.* Many of the symptoms are caused by toxins. Immunization takes place by injection of vaccines containing pertussis bacteria killed by chemicals or heat, or by acellular vaccines recently introduced in some industrialized countries, containing pertussis antigens. It is recommended for children at 6, 10 and 14 weeks.

Poliomyelitis is a viral infection spread via the faecal-oral route, and also via the pharyngeal route. The risk of paralysis among infants is approximately 1 in 200 infections among infants <1 year old, and 1 in 100 infections among children aged 1-14 years. Immunization is possible by injection of the inactivated vaccine, or by oral administration of a vaccine composed of attenuated polio viruses. All infants should be vaccinated with oral poliomyelitis vaccine (OPV) according to the following schedule:

- OPV 0 at birth or as late as 2 weeks after birth
- OPV 1 at 6 weeks
- OPV 2 at 10 weeks
- OPV 3 at 14 weeks.

Measles is an acute viral infection, transmitted by close respiratory contact. Deaths occur primarily through secondary infections of the respiratory and/or gastrointestinal tract. The immunization by attenuated virus preparations is recommended at 9 months of age, well after the postnatal period.

Hepatitis B is caused by a virus, transmitted through contact with blood and by sexual intercourse. Perinatal (vertical) transmission from mother to infant takes place during delivery. Child to child transmission is also common during childhood. Many infected infants become hepatitis B virus (HBV) carriers, some may develop serious liver disease. Immunization with vaccine containing the hepatitis B surface antigen (HBsAg) is recommended for all infants as soon as possible after birth, with a second dose at 6 weeks and a third dose at 14 weeks. In Africa, where perinatal infection is less common, immunization can begin later, the three doses can be given then at 6, 10 and 14 weeks, together with other vaccines. Immunization of health workers is also recommended.

9.3 The immunization schedule in the prenatal and postnatal period

The following schedule is recommended during pregnancy and postnatally:

- If in a country most women of childbearing age have not been immunized with tetanus toxoid (TT) in their infancy or before pregnancy, it is recommended that they receive the first dose (TT1) at first contact during pregnancy, and TT2 at least 4 weeks after TT1. TT3 should be given at least 6 months after TT2. The two remaining doses should be given after subsequent intervals of one year minimum. If pregnant women have documentation of prior receipt of tetanus-toxoid-containing vaccines in early childhood or school-age, they may receive a booster dose during pregnancy.

- Soon after birth BCG is recommended in all populations at high risk of tuberculosis infection. The starting dose of oral poliomyelitis vaccine (OPV 0) is also recommended soon after birth, and the first dose of hepatitis B vaccine (HB 1) in those countries where perinatal transmission is frequent.

- At the age of 6 weeks the first dose of the combined vaccines against diphtheria, pertussis and tetanus (DPT 1) is given as well as the OPV 1 dose, and the HB 2 dose. In countries with a low perinatal transmission rate of hepatitis B, the HB 1 dose may be given at this age.

- At 10 weeks DPT 2 and OPV 2 are given, and HB 2 in countries with a low transmission rate.

- At 14 weeks DPT 3 and OPV 3 are given, and HB 3 in all countries.

9.4 Passive immunization post partum against rhesus-sensitization

One of the most effective immunological interventions post partum is the Rh-prophylaxis in Rh-negative women who did not produce anti Rh-D antibodies during pregnancy, and who gave birth to a Rh-positive infant. They receive anti Rh-D 200 μg within 24 hours or at the latest 72 hours post partum. This eliminates fetal Rh-D positive erythrocytes that have reached the maternal circulation during labour and delivery, and prevents Rh-sensitization of the mother in a high percentage. The implementation of Rh-prophylaxis requires an elaborate organization and is not universally available. Where the possibility exists, all pregnant women are screened for Rh-D, and if they are Rh-negative, Rh-D antibodies are determined at 32 weeks of pregnancy. After birth Rh-D of infants of Rh-negative mothers is determined, and anti Rh-D should be available if the infant is Rh-D positive (Bennebroek Gravenhorst 1989).

9.5 Postpartum rubella vaccination

The postpartum period is an appropriate time for immunization against rubella, because pregnancy is a relative contraindication to rubella immunization, and the probability of pregnancy occurring within 30 days of delivery is extremely small. It has been shown to be effective (Villarejos et al 1973, Black et al 1983). If during pregnancy a rubella test has been done and has shown the woman to be non-immune to rubella, immunization can be offered in the early puerperium. Thus congenital malformations due to rubella in subsequent pregnancies may be prevented.

10 CARE AND SERVICE PROVISION IN THE POSTPARTUM PERIOD

10.1 The challenge of care provision

In the preceding sections the needs of women and their newborn and the major health challenges of the postpartum period have been discussed. All these issues are or should be objects of care, but the organization of the care remains vague. Unlike prenatal and intrapartum care, where clear standards are usually available though not always complied with, in postpartum care explicit aims and objectives are often lacking. Sometimes this results in isolated actions, valuable as they may be, for immunization, contraception or other goals. Postpartum care all too often does not incorporate all the essential elements required for the health of a woman or her newborn in a comprehensive package.

This section describes the aims and standards of postpartum care, based on the needs, the evidence and challenges outlined earlier in this text. It offers guidance on the way postpartum care could be organized. With respect to clinical problems, attention is focused on primary care, directed at the prevention, early diagnosis and treatment of disease and complications, and at referral to hospital if necessary. Specialist care in hospital is not addressed here. The whole thrust of the Technical Working Group discussions was to protect the normal while exercising that vigilance which enables an early response to emerging problems. The promotion of breastfeeding, contraceptive and nutritional advice, and immunization are also essential components of postpartum health care.

The majority of maternal and neonatal deaths, as well as a significant burden of long term morbidity occur during the postpartum period. Postpartum complications can be grouped into acute life-threatening, mid- and long-term chronic conditions. Increased awareness of warning signals and appropriate intervention is needed at all levels. Skilled care and early identification of problems could reduce the incidence of death and disability, together with the access to functional referral services with effective blood transfusion and surgical capacity. The development of a complete functional chain of referral from community to the district hospital and back is one of the major tasks in the prevention of maternal and neonatal deaths.

Postpartum care must be a collaboration between parents, families, caregivers trained or traditional, health professionals, health planners, health care administrators, other related sectors, community groups, policy makers and politicians. They all need accurate information about what constitutes best care in the postpartum period.

10.2 Aims and timing of postpartum care

The aims of care in the postpartum period are:

- support of the mother and her family in the transition to a new family constellation, and response to their needs

- prevention, early diagnosis and treatment of complications of mother and infant, including the prevention of vertical transmission of diseases from mother to infant
- referral of mother and infant for specialist care when necessary
- counselling on baby care
- support of breastfeeding
- counselling on maternal nutrition, and supplementation if necessary
- counselling and service provision for contraception and the resumption of sexual activity
- immunization of the infant.

Despite the absence of rigorous evidence there seem to be "crucial" moments when contact with the health system/informed caregiver could be instrumental in identifying and responding to needs and complications. These have been resumed in the formula (which should not be interpreted rigidly) of "6 hours, 6 days, 6 weeks and 6 months". If some form of continuous attention to the woman and her newborn can be assumed for the first few hours after birth, whether at home or in a health facility, this leaves two points of contact - about 6 days and 6 weeks - as most desirable and likely to influence a healthy postpartum. Some form of continuity of support and care of both mother and newborn during the first days of life is strongly desirable.

Table 5 below suggests the broad lines of care that can be offered at each point of contact during the puerperium. Details will be modified according to local need and country policy. More important than a rigid but unfeasible visiting schedule is the possibility for all women to have access to a health care provider when she needs it, and to have the information necessary in order to make the decision to access that care

Table 5 Key elements of postpartum care

6-12 hours	3- 6 days	6 weeks	6 months
Baby: breathing warmth feeding cord immunization	feeding infection routine tests	weight/feeding immunization	development weaning
Mother: blood loss pain BP advice/ warning signs	breast care temperature/infection lochia mood	recovery anaemia contraception problems	general health contraception continuing morbidity

10.2.1 The place of care

The vast majority of women and newborns needing care are in the community, whether urban or rural, throughout the postpartum period, and many will not access the formal health system for care even if it is available. Complex patterns of traditional support exist in many societies to provide protection and nurture for around seven to forty days. Formal care provision can build on this pattern. Interventions should be congruent with culture as far as possible and should give special regard to the following:

- the needs of women whose social situation means that the traditional networks are weakened or absent.
- the woman who has lost a baby, or who is ambivalent about her baby because it is the "wrong" sex or has an abnormality.
- the role of men in determining both access and quality of postpartum care
- the needs and capacities of the "natural caregiver"; TBA, family member, etc.

10.3 The first hours after birth

10.3.1 The baby

The care in the first hours or first day includes meeting the physiological needs of the newborn and assessing the baby carefully. The physical assessment of the newborn has two purposes: to determine the anatomic normality for the first time in a new life and to determine the state of health. Many signs of this transitional period are similar to those of early serious disease. Therefore it is very difficult to differentiate between normal transitional

variations and subtle or early disease. The condition of the newborn can change quickly. The first examination is an orientation and frequent observations are needed in this early period to identify problems on time. All the findings must be interpreted in the light of the whole event (pregnancy, birth and postnatal period).

Care in the first hours includes:

- thermal protection by providing a warm environment and not separating the mother and the newborn to prevent hypothermia of the baby (section 5.3).
- supporting frequent and exclusive breastfeeding and assisting the mother if necessary to adopt correct breastfeeding practice (section 6.2). In case of a known HIV positive mother she has to decide now about the feeding of the baby, if she has not decided during pregnancy and about whom she wants to inform about her HIV-positive status (sections 8.2, 8.5, 8.6). She needs support and counselling in these difficult decisions.
- cleanliness and clean cord care (section 5.2, WHO 1996a,b).
- weighing the baby.
- examination of the newborn for health in order to reassure the mother and to recognize problems early (report on *Essential Newborn Care*, WHO 1996b).
- frequent observation by the mother who knows about the danger signs.
- administering vitamin K to the baby if country policy prescribes it, either by injection or orally. However, the evidence for routine administration of vitamin K to all newborns to prevent the relatively rare haemorrhagic disease of the newborn is still lacking.
- starting immunization with BCG and hepatitis B vaccine, and the first dose of oral poliomyelitis vaccine, as recommended (sections 9.2, 9.3).

10.3.2 The mother

The first hours postpartum are extremely important. During this time caregivers should:

- assess maternal well-being, measure and record blood pressure and body temperature.
- assess for vaginal bleeding, uterine contraction and fundal height regularly.
- identify signs of serious maternal complications, in particular haemorrhage, eclampsia and infections and instigate treatment (sections 3.1, 3.2, 3.3).
- suture the perineum where necessary.

10.3.3 Health facility births

If mother and baby stay in a health facility for a shorter or longer period it is of great importance that they remain together and are not separated. The infant should be in the immediate vicinity of the mother day and night, with free access to her at any time. The "rooming out" system (all babies together in a separate nursery) promotes the spread of nosocomial infections, and has negative influences on the bonding of mother and child, and on breastfeeding (6.3). This "Western" system of care has been exported to developing countries.

10.3.4 Advice, counselling and follow-up

Before the caregiver leaves mother and baby, he (she) should assure him- (or her-)self that they are both in good condition. In a health facility further observation of both mother and baby should be guaranteed; if the birth took place outside a health facility the mother and the family have to know where they can call for help in case of emergency. Arrangements for further care in the first week and later should be made. Since many births do take place outside the health system, caregivers at community level should be trained to recognise and seek help for early signs of serious complications arising in mother or baby. Such caregivers need clear instructions regarding the actions to be taken in the face of complications.

10.4 The first week postpartum

10.4.1 Duration of stay in health facility

A healthy mother and newborn need not be in a hospital. If the birth took place in a health facility, she may stay there for a while, especially if her home is far away and care is difficult to obtain in the home environment. However, the quality of the care is not dependent on the duration of the stay in a health care facility. On the contrary: care can sometimes better be given at home. The essential is that adequate care be provided. It is important to realize that the mother is member of a family and of a community, and that the birth of her child took place in this community or, if she went to a health facility, she returns with her baby to her own family and community. The members of this community, especially her husband or partner and other family members, in some countries perhaps also the traditional birth attendant (TBA), should be involved in the care, and should therefore be informed about the aims of the care, and the signs of danger for mother and baby that should prompt them to call for professional help.

In many countries the length of hospital stay postpartum has been decreasing. In the eighties after a vaginal birth women remained in the hospital for 3-4 days; currently the norm is 24-48 hours. This creates the need for some form of postpartum home care. Among the main problems are the financing of these programmes, and malpractice liability risks. According to recent guidelines from the American Academy of Pediatrics and American College of Obstetricians and Gynecologists (1992), when no complications are present, the postpartum hospital stay should be from 48 hours for vaginal delivery to 96 hours for caesarean birth. In 1997 national legislation was passed that requires insurers to cover up to 48 hrs after a vaginal delivery and 96 hrs after a caesarean section if the woman desires.

10.4.2 Maternal and newborn assessment and advice

In the first week postpartum assessment of the condition of mother and baby is important, together with appropriate advice and counselling, particularly where this is the woman's first child. The postpartum visit during the first week should include:

The Mother

- General well-being, micturition (especially the first 8-12 hours, see 3.5), possible complaints.
- Abdomen: fundal height, distended bladder?
- Perineum, vaginal haemorrhage, lochia, haemorrhoids.
- Legs: thrombophlebitis, signs of thrombosis?
- Temperature, if there is reason to suspect infection. Body temperature of 38.0°C is abnormal, especially during the first days after delivery (section 3.3).
- Assessment and help with breastfeeding, to prevent problems.

The caregiver should be prepared to support the woman in the initiation and practice of breastfeeding (sections 6.3, 6.4), but also in many other problems that arise in the first week after birth, especially if the mother is primipara. The special problems of HIV positive women are discussed in section 8; they include the decisions on HIV testing and on infant feeding. Counselling on contraception should be offered in combination with the advice on breastfeeding (sections 7.2, 7.3, 7.5). Too often these two issues are dealt with separately by different persons, who don't know about the other's advice. In case of anaemia, an iron preparation is prescribed to the mother. Rhesus negative women with a Rh positive infant should receive anti Rh-D (section 9.4). If the mother is known to be non-immune to rubella, immunization may be offered (section 9.5).

Nutritional advice and supplementation of pregnant and lactating women is a subject of special importance for those countries and regions with a high prevalence of malnutrition. Under these conditions nutritional advice and supplementation of women with proteins and energy is useful for the woman and probably for her infant (section 4.3). The provision of these supplements will primarily be a matter of concern for government authorities, but health care providers may support the government by advice, and by selection of the women who are eligible for supplementation. Micronutrient supplementation (section 4.4) is usually regulated by governments, dependent on the local situation.

More specifically, caregivers should offer:

- advice/counselling on maternal and newborn physical, psychosocial and culturo-environmental needs, including nutrition and breastfeeding
- information regarding warning signs of problems and where to seek help

- counselling to women and men on sexual issues related to the postpartum period, including fertility regulation and provision of contraceptives
- voluntary counselling and testing of HIV/AIDS
- immunization of the newborn/infant and the women, including Rh immunization where/when applicable.

Assessing the baby

A routine neonatal examination does not take more than 5-10 minutes and should be done in a quiet, warm and clean environment, preferably in daylight and with parents present. Assessment should include:

- asking the mother how she feels about the baby, how the baby is feeding and about any concerns
- general condition: is the baby active, feeding well and frequently? (be alert for the "too good baby", who never cries)
- if necessary, observing breastfeeding and helping the mother to improve the technique
- skin: is it clean (no pustules), not jaundiced?
- are eyes clean (not draining pus)?
- if the baby is not active, not feeding well or other abnormalities are observed more thorough examination should be done:
  - respiration: frequency; is there difficult and fast breathing, grunting, intercostal indrawing?
  - temperature measured (section 5.3)
  - tone and motor function: hypotonia, paresis?

In countries and populations at high risk of tuberculosis infection, infants receive BCG as soon as possible after birth (sections 9.2, 9.3). A first injection of hepatitis B vaccine is given in the first week, and also the first dose of oral poliomyelitis vaccine (OPV). In countries with a screening programme on hypothyroidism and phenylketonuria at the end of the first week a blood sample is taken and tested in a laboratory.

Observation of the baby during the first week is much more important than a once-only examination by a health worker.

10.4.3 Frequency of postnatal visits

There is no consensus about the optimal number and timing of home visits by a caregiver (midwife, nurse, maternity aid, etc.) during the first week postpartum. In many developing countries the shortage of professionals limits the possibilities to the bare

minimum. In both developing and developed countries there is no general agreement about the precise purpose of home visits, and about their frequency and effectiveness. In the TWG the general opinion was that, with limited resources, a contact with the health care system at least during the first twenty-four hours and before the end of the first week would be most effective. More research is necessary into the needs of women and the value of home visits (Marchant 1995).

10.5 The first months

If mother and baby are healthy, after the first week frequent support by a caregiver is no longer necessary. Traditionally, the mother is asked to come back for a check-up 6 weeks after birth. However, in the meantime she will need advice on the condition of the baby, and possibly on breastfeeding or other problems that may arise. At the age of 6 weeks, the baby receives a second dose of OPV and the first dose of the diphtheria/pertussis/tetanus (DPT) vaccine. Baby's growth should be assessed.

What should be done at the check-up consultation of the mother 6 weeks after delivery? First of all the caregiver should ask the woman about her well-being and possible complaints or problems. As shown in section 2, there is more maternal morbidity in the postpartum period than most caregivers are aware of. Traditionally a vaginal examination is performed, but it is doubtful if such examination is useful, except to check the healing of a large tear, or if the woman complains about pain or other discomfort. Haemoglobin may be measured, especially if anaemia has occurred during pregnancy or in the postpartum period, and if necessary a prescription of iron may again be given. It is important, if possible, to involve the husband or partner in the consultation. Often women and their partners feel the need to discuss the course of labour, and events that occurred at that time. Questions should be answered, and information given. However, most important is the future: if future pregnancies are planned, are there special measures that should be taken, considering the course of the last pregnancy and labour? And what about family planning? How long will breastfeeding be continued, and is its protection against pregnancy adequate? Are additional contraceptive measures necessary? These questions are discussed in section 7.5. A combined advice on breastfeeding and contraception is essential. Contraceptive counselling belongs to the most important aspects of postpartum care; further help or referral for further consultation should be offered. It is important that the husband or partner is involved in this counselling.

10.6 Integrated care

In many countries there is a tendency to provide the above mentioned segments of care as separate entities by different caregivers, at different locations and times. As becomes clear from several examples, integrated care is much more effective. Of course it is often impossible for all parts of the care to be provided by one caregiver, but the organization of the care can be such that the woman experiences it as a coherent system of care.

ICMER (Instituto Chileno de Medicina Reproductiva) in Santiago Chile, offers postpartum services. Women are contacted at the maternity ward and invited to attend the clinic. Visits are scheduled at regular intervals during the weeks and months postpartum. Both mother and child are seen during these visits. Practical advice on breastfeeding is given. Exclusive breastfeeding on demand is promoted during the first six months. At the end of the first month, women receive information and counselling on contraceptive choices available for lactating women. Choices varied depending on the ongoing research projects in the clinic, such as copper IUD's,

devices that release progesterone, Norplant^{R} implants, progestin only pills and barrier methods. A change from progestin-only pills to combined pills is advised at the time of weaning. During the 15 years of the programme the proportion of women who breastfed at 6 months (91%) and breastfed at 12 months (58%) remained stable. In the general population in Santiago 40% to 50% weaned at 6 months. Growth and health of the breastfed children were reported as extremely positive, but after weaning the rate of diarrhoea and of respiratory disease increased. The results were considerably better than those of a nearby state clinic (report of Dr Soledad Diaz, Santiago).

In the city of Sfax, Tunisia, a postpartum programme has been organized for mothers who delivered in the Maternal and Neonatal Hospital of Sfax, with their babies (Coeytaux & Winikoff). After birth, the woman and her baby are invited for a consultation on the fortieth day. This day has been chosen, because in most Muslim cultures a rest of 40 days after delivery is considered essential for the convalescence of the mother and the development of the infant. During this period the mother does not leave her home and is relieved of all household responsibilities, except that of tending to her newborn infant. The fortieth day marks the end of this period of convalescence. Traditionally, a celebration is held on this day. By linking the follow-up visit with this significant day, the Sfax centre has managed to incorporate the postpartum visit into the day's observances. In 1987, 83.2% of all women who delivered in the Sfax Maternity came back with their babies for the postpartum visit.

During the consultation, first the infant is seen and examined by a paediatrician. Immunizations are discussed, and referrals are made to local health centres for the child to receive them. Mothers are encouraged to continue breastfeeding, but if the mother is not nursing, the correct preparation of formula is explained. Then follows a consultation with the midwife, during which the nutrition of the mother is discussed, a gynaecological examination is performed and family planning advice is given. The most commonly used methods in 1983 were the IUD and tubal ligation. Oral contraceptives are rarely prescribed.

In many countries and institutions the consultations for mother and baby are organized separately. Inevitably different caregivers are often involved in the care for mother and baby. Nonetheless, the examples mentioned above show that integration of both consultations in one clinic and at the same time, increases the attendance and the effectiveness. An integrated service provision which meets the needs of both mother and newborn is clearly in their best interests, including counselling on family planning. It is important that different caregivers give similar advice, especially on infant feeding and contraception, because the effectiveness of lactation as a contraceptive method depends on the feeding pattern of the infant (sections 7.2, 7.5).

Traditionally, after 6 weeks the postpartum period ends. However, the care should not end then: in many countries follow-up consultations for baby care are organized; at 10 and 14 weeks after birth further immunizations of the baby are planned (section 9.3). If baby health care clinics are available, the immunizations are best integrated in the care of these clinics. LAM as a contraceptive method spans the first 6 months postpartum (sections 7.2, 7.5); this means that care of the mother should also be available during that period, and should be integrated with baby care. Theoretically, the best time to end postpartum care is 6 months after birth.

10.7 Who are the caregivers?

Postpartum care starts after the birth of the infant, and the initial caregivers are those attendant at the delivery: the midwife or physician, a nurse or nursing aide, possibly others, such as TBAs when birth takes place at home. In case of a difficult delivery, or of problems with the newborn, an obstetrician and/or paediatrician may have attended. If there are serious problems, these specialists may remain involved, but if mother and baby are healthy they are not the most obvious persons to act as caregivers. In some hospitals it is customary that before discharge all babies are seen by a paediatrician. The value of such a quality mark is doubtful. It is impossible to predict potential problems in the near future; a careful (daily) observation in the first week by a midwife, nurse or nursing aide is much more rational.

If all is well, a healthy mother and baby need not stay in a health facility for more than a few hours after the birth. On the contrary; adaptation to the new situation and to the new tasks is more appropriate in the home environment. At home family members as primary caregivers are usually present to take care of many small problems that may arise. It is important to involve them in the counselling and information given during pregnancy and in the first hours after delivery. However, adequate care and support by a professional is needed, and this seems very difficult to realize at home in many countries, particularly those with very limited resources. Discharge from a health facility within 24 hours after birth with just one or two home visits may be hardly adequate for a young and inexperienced primipara unless there is adequate support. The most appropriate caregiver for the observation and support of mother and baby at home is the midwife or a health care worker with special training in maternity care.

The check-up consultation of the woman 6 weeks after delivery is best done by the midwife or physician who attended the delivery, because he or she can best answer questions on labour and delivery. Of course this will not always be feasible, but then the person who is giving the consultation should be very well-informed about the events and complications during birth. During this consultation there should be enough time to listen to the woman and her partner, to answer questions and to counsel on breastfeeding and family planning. Throughout the world the attendance of women at these check-ups is low. One of the reasons for this poor compliance is the fact that the consultations are sometimes given by persons unknown to the woman, badly informed about the events during labour and without enough time and patience to listen to the couple. Apart from personal attention to the woman and her partner, integration of baby care with the consultation may improve the attendance. Integration and continuity of services can be achieved either by the same care provider, or by different providers but providing care according to national/local standards and guidelines, giving consistent messages and having compatible schedules. A home-based record that include medical information on complications is an important link between services and provides the basis for the consultation.

Many countries offer care and advice at baby clinics during the first months. The caregivers are often nurses, supervised by physicians. These clinics are the most appropriate places for the necessary immunizations to be given. If no clinics are available, the immunizations have to be organized separately. The care for the mother in the first 6 months after the birth of her infant, can be given by different persons: general practitioners, nurses or physicians at baby care clinics, midwives, but it should always be integrated into the services offered for the baby

11 RECOMMENDATIONS

Discussing the different aspects of postnatal care raised awareness of the need to provide a solid infrastructure for the provision of a service which is comprehensive, culturally sensitive and which responds to the needs of childbearing women and their families. The following recommendations of the TWG for strengthening the quality of postpartum care are designed to offer that infrastructure. They fall into six broad categories; policy, service and care provision, tool development, training and human resource issues, health protection and promotion and research.

Policy

Policies must be developed at national and international level to:

- **Review the legislative/regulatory framework**

  - the scope of practice of formal care providers
  - for the protection of the woman and her newborn
  - employment protection rights
  - maternity and breastfeeding leave
  - maternity benefits, etc.

- **Ensure availability and access to a comprehensive, continuous and integrated service as part of a reproductive health package**

- **Strengthen vital registration systems**

- **Stimulate communities** to examine how their attitudes and practices support or obstruct the opportunity for women and newborns to receive the best available care

- **Develop positive strategies for increased male involvement** in the postpartum period

- **Strengthen efforts to increase female literacy levels**, decrease poverty and violence against women and protection from abuse

Care and service provision should:

- **Identify the community's perceptions of events** in the postpartum and of the health system before designing services

- **Explore the community's resources and involve the community** itself in planning and evaluating services

- **Establish the incidence and prevalence of postpartum** conditions in the community

- **Ensure culturally acceptable services** for women and newborns

- **Develop/provide home-based maternal record** for all women and newborns

- **Ensure care at all levels**: in the community, health centre (including domiciliary services), and at the referral level

- **Develop, together with the community, a complete functional chain of referral** from community to the district hospital and back

- **Strengthen district hospitals** and health centres as appropriate to their levels to cope with emergencies, including blood transfusion services

Tools for implementing quality postpartum care should include:

- **Guidelines/standards/norms on all aspects of postpartum care**

- **Managerial guidelines on organization/integration of services**, human resources, management, training and logistics

- **Guidelines on assessment of the magnitude and severity of problems** of women and newborns postpartum, including deaths

- **Tools on examining cultural perceptions of postpartum period events** and symptoms and the health care delivery system in order to adapt services to meet women's needs

- **Health education material**.

Training/human resource issues - programme managers should:

- **Ensure knowledge, skills (including counselling) and attitudes of health workers** to provide normal and complicated care postpartum, according to national/local standards of care, in an integrated manner

- **Ensure competence in life-saving skills** of health providers at all levels of care

- **Review human resource implications** - training, deployment, etc. - of an improved postpartum service

- **Improve managerial and supervisory skills**, logistics and supplies

- **Include comprehensive postpartum care in curricula** of midwifery, nursing and medical schools

Health protection and promotion should include:

- **Developing strategies for providing women and communities with focused, accurate and culturally sensitive information about the postpartum period and its warning signs -** and answering their specific questions. Information about the postpartum period must be accurate, attractively presented, of high quality, consistent disseminated widely to 'natural care givers', men, community, health providers and politicians

- **Exploiting all opportunities to strengthen the knowledge base, self care and care seeking within the community** regarding postpartum needs and create new opportunities (health education in schools, rites and ceremonies, men's gatherings, women's groups etc)

- **Stimulating NGOs** to support women and newborns postpartum

Research should address the following areas:

- **Psychological/emotional response to childbirth**, recovery after childbirth including sexuality of women and men after childbirth, variation in breastfeeding and non breastfeeding women

- **Effective interventions in postpartum care** (e.g. significance of temperature rise after labour)

- **Epidemiology of long term morbidities**

- **Health systems and operations research on how to best operationalise an integrated postpartum care service**

- **Ethnographic research on community perceptions of traditional practices postpartum and the health system**; sources of power and control in the community etc

- **Risk of STD/HIV infection during postpartum period**, HIV protection while remaining open to conception (especially for women who have lost babies)

- **Appropriate technologies**: any technology used in postpartum or postnatally should be carefully evaluated before introduced for general use. Such evaluation should include efficacy and safety, economic implications and cultural acceptability

- **Parenting role of men and their involvement in postpartum period**

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ANNEX 1
CLASSIFICATION OF PRACTICES IN POSTPARTUM CARE

This annex classifies a number of practices common in postpartum care into four categories, dependent on their usefulness, effectiveness and harmfulness. Arguments for this classification are not given here; the reader is referred to the preceding sections (numbers of sections between brackets).

CATEGORY A:

A.1 Practices which are demonstrably useful and should be encouraged

- Careful supervision of urine production of the woman 8-12 hours postpartum (3.5, 10.4).
- Regular inspection of the perineum during the first week postpartum (3.6, 10.4).
- Strict hygienic measures in the care of infants and mothers by all caregivers (3.3, 5.2).
- Rooming-in throughout the hospital stay of mother and baby, also at night (6.3, 10.3).
- Psychosocial support of caregivers for postpartum women/couples (3.8).
- Distinguishing healthy low birth weight infants from those at risk (5.2).
- (Daily) observation of the infant during the first week of life (5.2, 10.4).
- Strict hygiene in the care of the umbilical cord and the cord stump (5.2).
- Measures to prevent hypothermia of the baby, immediately after birth (5.3).
- Eye prophylaxis with silver nitrate or tetracycline ointment in all those situations where close daily observation of the infant cannot be guaranteed (5.3).
- Persons with a herpetic lesion on the lip or genitals should avoid contact with newborn infants, or take the utmost hygienic measures (5.3).
- Early skin-to-skin contact of mother and baby, within 1 hour of birth, and early suckling of the baby (6.3).
- Support of the mother in the correct positioning of the baby at the breast (6.2).
- Encouraging breastfeeding on demand (6.3).
- Informing all pregnant and postpartum women about the benefits and management of breastfeeding (6.2).
- Informing all pregnant and postpartum women about all contraceptive choices in the postpartum period (7.1).
- Reinforcing that non-hormonal methods (LAM, barrier methods and IUDs) are the best options for lactating mothers (7.2, 7.3, 7.4, 7.5).
- Initiating progestogen-only methods after 6 weeks postpartum to breastfeeding women, if this is the woman's choice (7.3, 7.5).
- Advising against the use of combined oral contraceptives in breastfeeding women in the first 6 months after birth, or until weaning, whichever comes first (7.3, 7.5).
- Introduction of an IUD either in the immediate (<2 days) postpartum or after 4-6 weeks, if this is the method chosen (7.4, 7.5).
- Performing a surgical sterilization in the postpartum period (female and male) is a medically appropriate option, if this is the free informed choice of the woman/couple (7.4).

- Advising mothers who are carriers of HIV not to breastfeed their babies, but only if they can ensure the baby uninterrupted access to nutritionally adequate breast milk substitutes that are safely prepared (8.2).
- Measures should be taken to protect the caregiver against contact with contaminated blood, by safe handling and disposal of sharp instruments, and by protective clothing where appropriate (8.4).
- BCG immunization of all infants as soon after birth as possible, in populations at high risk of tuberculosis infection (9.2, 9.3).
- Tetanus vaccination of pregnant women in countries where most women of childbearing age have not been immunized with tetanus toxoid (9.2, 9.3).
- Vaccination against poliomyelitis and against hepatitis B soon after birth (9.2, 9.3).
- Vaccination against diphtheria, pertussis and tetanus (DPT) to begin 6 weeks after birth (9.2, 9.3).
- Rh-prophylaxis in Rh-negative women who gave birth to a Rh-positive infant (9.4).
- Rubella vaccination postpartum in women known to be rubella negative (9.5).
- Supplementation of pregnant women with protein and energy, especially during the third trimester, and of lactating women, if the woman herself suffers from malnutrition or if the population of the region has a high prevalence of malnutrition (4.3).
- Giving lactating mothers 200 000 IU of vitamin A orally (in capsules) in endemically vitamin A deficient regions where fortification of food products is not feasible, but only once, in the first month after delivery (4.4).
- Giving children of <1 year of age 200 mg (1 capsule) of lipiodol orally, or 240 mg injected, in regions where iodination of food products is not yet feasible, should receive (4.4).
- Late clamping of the umbilical cord (4.4).
- Measuring the Hb of the woman in the first week after delivery and 6 weeks after delivery, and prescription of iron if necessary. Alternative: prescription of iron to all postpartum women (4.4).
- Daily assessment of the condition of mother and baby in the first week postpartum (10.4).
- Combined advice on breastfeeding and contraception in the first week postpartum, and integrated counselling on both subjects in the first months (10.4, 10.5, 10.6, 10.7).

CATEGORY B:

A.2 Practices which are clearly harmful or ineffective and should be eliminated

- Routine use of oral ergometrine for newly-delivered women (3.1).
- "Rooming-out" system of baby care in a hospital or maternity clinic (6.3, 10.3).
- Hormonal treatment of postpartum depression (3.8).
- Phototherapy for neonatal jaundice in healthy term infants on the third or later days after birth, for bilirubin values <300 μmol/l (5.3).
- Restricted mother-infant contact after birth (6.2).
- Providing breastfed infants bottle supplements with water, glucose or formula while breastfeeding is becoming established (6.2).
- Limiting suckling time to 10 minutes on each breast or any other arbitrary period (6.3).

- Restricting the frequency of breastfeeds to once in 3 hours, or to any other arbitrary period (6.2, 6.3).
- Giving free formula samples, bottles and teats to breastfeeding women (6.4).
- Giving artificial teats and pacifiers to breastfed infants (6.2).
- Lactation inhibition by oestrogens or bromocriptine (6.5).
- Prescription of hormonal contraceptives during the first 6 weeks postpartum to breastfeeding mothers (7.3, 7.5).
- Separate counselling of the woman on breastfeeding and on contraception (10.5).

CATEGORY C:

A.3 Practices for which insufficient evidence exists to support a clear recommendation and which should be used with caution while further research clarifies the issue

- Antibiotics in the early phase of puerperal mastitis (3.7).
- Routine administration of vitamin K to all healthy newborns or to all newborns that will be breastfed (10.3).

CATEGORY D:

A.4 Practices which are frequently used inappropriately

- (Routine) use of ergometrine for newly delivered women (3.1).
- Introduction of milk supplements to breastfed infants (6.2, 6.3).
- Prescription of combined oral contraceptives to breastfeeding women from 6 weeks to 6 months postpartum (7.3, 7.5).
- Sterilization postpartum in women who have not been adequately counselled beforehand (7.4, 7.5).
- HIV testing without pretest counselling and without informed consent (8.5).
- Routine examination of apparently healthy newborns by a paediatrician (10.7).

ANNEX 2
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