MOH NURSING CLINICAL PRACTICE GUIDELINES 2/2002

Management of Breastfeeding for Healthy Full-Term Infants

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STATEMENT OF INTENT

This set of guidelines aims to serve as a guide for practitioners who are involved in caring for breastfeeding mothers and their healthy full-term infants.

The recommendations are based on the available research findings and existing evidence-based guidelines. However, there are some aspects in which there is insufficient published research and, therefore, consensus of experts in the field has been utilised to provide guidelines specific to conventional practice.

Every practitioner must exercise clinical judgement in the nursing management of mothers who breastfeed their infants. It is recommended that every practitioner utilises the suggested guidelines with regards to the individual mother's and her infant's condition, overall treatment goal, resource availability, institutional policies and treatment options available.

FOREWORD

The World Health Organisation (WHO) recommends that infants should be breastfed for the first six months for optimal health and development. It also recommends that infants should continue to be breastfed for up to two years of age and beyond while weaning onto semi-solid food. Breastfeeding benefits both the mother and infant physically, mentally and emotionally. Breastfeeding will give the infant a headstart in life because breastmilk will meet all the nutritional needs from birth till about six months of age.

To promote and support breastfeeding, we are pleased to present these guidelines on 'Management of breastfeeding for healthy full-term infants' to all heath care practitioners involved in the care of breastfeeding mothers and their healthy full-term infants.

These guidelines are the culmination of efforts of a panel of experts from various restructured and private hospitals and a multidisciplinary review committee.

These guidelines are designed to give guidance in providing optimal care to breastfeeding mothers and their infants by promoting early initiation of breastfeeding, prevention and management of breastfeeding problems, and the continual support of breastfeeding. It is hoped that with the use of these guidelines, more mothers will breastfeed their infants for an optimal duration.

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1 SUMMARY OF RECOMMENDATIONS

1.1 Assessment and antenatal preparation for breastfeeding

1.1.1 Contraindications to breastfeeding

- Identify maternal and infant contraindications to breastfeeding so as to appropriately advise mother not to breastfeed under the following conditions:

  Maternal:
  - HIV and certain infectious diseases;
  - substance abuse;
  - certain medications;
  - certain surgeries.

  Infant:
  - galactosaemia;
  - phenylketouria.

  (D/4 - WHO, 1998; ILCA, 1999; WHO, 2000)

1.1.2 Antenatal breastfeeding education

- Provide parents with complete, current information on the benefits and techniques of breastfeeding through antenatal classes, breastfeeding talks, breastfeeding booklets and/or individual counselling. Information should include the following:
  - benefits for mother and infant;
  - anatomy and physiology of the breast;
  - breast care;
  - breastfeeding technique;
  - prevention of breastfeeding problems and
  - rooming-in and immediate contact between mother and infant.

  ($B/2^{++}$ - Kistin et al, 1990; Pugin et al, 1996)

- Provide educational materials that are consistent, accurate, at appropriate reading levels and culturally sensitive. The information should include:
  - lactation consultants;
  - breastfeeding support groups;
  - breast pump rental and sales outlets.

  (D/4 – ILCA, 1999)

- Educational materials should be free of commercial advertisements related to breast milk substitutes in accordance with SIFECS (Sale of Infant Formula Ethics Committee, Singapore) Code.

  (D/4 – SIFECS, 2002)

- Provide women with information on options for feeding to facilitate parents to make an informed choice.

  (D/4 – NHMRC, 1998)

- Include family members or significant others during breastfeeding education sessions.

  (D/4 - ILCA, 1999)

1.1.3 Breast care

- Wash areola and nipple with water. Avoid using soap and alcohol.

  (D/4 – Lawrence & Lawrence, 1999)

- Avoid antenatal treatment of inverted or non-protractile nipples with breast shells or Hoffman's exercises.

  (B/2^{-} - Alexander et al, 1992)

- Avoid antenatal expression of colostrum, nipple rolling or application of breast cream.

  (D/4 – Lawrence & Lawrence, 1999)

- Use "Niplette" antenatally to correct inverted nipples.

  (D/3 – McGeorge, 1994)

1.2 Promotion of early breastfeeding

1.2.1 Initiation of breastfeeding

- Initiate breastfeeding within 1 hour of birth.

  (D/4 – WHO, 1998; ILCA, 1999)

- Provide skin-to-skin contact for at least the first hour after birth or until after the first breastfeeding.

  (D/4 – WHO, 1998; ILCA, 1999)

- Promote maximum mother-infant contact unless there is an unavoidable medical reason.

  (D/4 – WHO, 1998; ILCA, 1999)

1.3 Techniques on breastfeeding

- Show and teach the mother how to adopt a comfortable position and ensure that infant is positioned correctly. The infant is held at the level of the breast and body facing the breast with head and body aligned.

  (D/4 – Escott, 1989)

- Guide mother to attach infant onto the breast and observe infant for signs of correct latch-on such as:
  - wide opened mouth;
  - flanged lips and
  - chin touching the breast and nose is free.

  (D/4 – Escott, 1989)

- Observe infant for the following signs of milk transfer:
  - sustained rhythmic suck/ swallow pattern with occasional pauses;
  - audible swallowing;
  - relaxed arms and hands;
  - moist mouth and
  - satisfaction after feedings.

  (D/4 – Escott, 1989; ILCA, 1999)

- Observe mother for some of the following signs of milk transfer:
  - strong tugging which is not painful;
  - thirst;
  - uterine contractions or increased lochia flow during or after feeding for the first 3-5 days;
  - milk leaking from the opposite breast while feeding;
  - relaxation or sleepiness;
  - breast softening while feeding and
  - nipple elongated after feeding.

(D/4 – ILCA, 1999)

1.3.1 Frequency and duration of breastfeeding

- Facilitate unrestricted breastfeeding 8-12 times per 24 hours.

(D/4 – WHO, 1998; ILCA, 1999)

- Nurse infant on demand and/or every 2-3 hourly whenever infant shows signs of hunger, such as increased alertness, activity, mouthing, rooting or crying.

($C/2^+$ - AAP, 1997; Renfrew et al, 2001a)

- Allow infant to nurse until satisfied, usually 10-15 minutes on each breast.

(D/4 - AAP, 1997)

- Arouse non-demanding infants in early weeks after birth, to nurse if 4 hours have elapsed since the last nursing.

(D/4 – Klaus, 1987; Mohrbacher & Stock, 1997)

1.3.2 Rooming-in

- Facilitate rooming-in 24 hours a day. This means the infant is with the mother from birth.

(D/4 – WHO, 1998; ILCA, 1999)

- Conduct examinations and routine tests of the infant in the mother's room.

(D/4 – WHO, 1998; ILCA, 1999)

- Transfer the infant with mother to the postnatal ward together after delivery.

  (D/4 – WHO, 1998; ILCA, 1999)

- Provide extra support for mothers after caesarean section to room-in with their infants.

  (D/4 – NHMRC, 1998)

- Bring infant to mother to breastfeed if the mother is temporarily unable to room-in with her infant.

  (D/4 – NHMRC, 1998)

1.3.3 Pacifiers and artificial teats

- Avoid the use of pacifers and artificial teats until breastfeeding is well established.

  (D/4 – WHO, 1998)

- Avoid using bottles with artificial teats (nipples) or pacifiers.

  (D/4 – WHO, 1998)

1.3.4 Supplementation

- Identify possible indications for early supplementation.

  (D/4 – WHO, 1992; Powers & Slusser, 1997)

- Provide supplementation when medically indicated using cup, spoon or syringe.

  (D/4 – WHO, 1998; ILCA, 1999)

- Use mother's own colostrum or milk as a first choice for supplementation.

  (D/4 – ILCA, 1999)

1.3.5 Expression and storage of breastmilk

- Teach mother expression, collection and storage of breastmilk.

  (D/4 - NHMRC, 1998; ILCA, 1999)

- Sterilise all equipment such as hand pumps, funnels and collecting bottles before expressing. Instruct mother to wash her hands and breasts before handling the equipment and expressing.

  (D/4 – Lawrence & Lawrence, 1999)

- Massage the entire breast gently, both top and underside, starting from the top and stroking towards the nipple. Do this several times so that the whole breast is massaged.

  (D/4 - NHMRC, 1998)

- Use any of the three methods of expressing milk - hand expressing, hand pump expressing or electric pump expressing.

  (D/4 – NHMRC, 1998)

- Follow the steps for the different methods of expressing milk:

  (D/4 - NHMRC, 1998)

  <u>Hand expressing</u>
  - Place the thumb and finger diagonally opposite on the edge of the areola.
  - Gently press inward towards the centre of the breast and squeeze the finger and thumb together.
  - Repeat with a rhythmic movement.
  - Move fingers around areola and express to empty all sectors of the breast.

  <u>Hand pump expressing</u>
  - Place the flat rim of the breast cup on the breast, centering the nipple.
  - Gently pull the piston and release the suction rhythmically.

  <u>Electric pump expressing</u>
  - Place the breast cup on the areola, centering the nipple.
  - Start the suction strength on low, gradually increase the suction strength as long as there is no discomfort.

- Express for 15 minutes for simultaneous double pumping. Express 30 minutes for single pumping and hand expressing, alternating between breast every 5 minutes.

  (D/4 - Slusser & Frantz, 2001)

- Express eight or more times in 24 hours.

  (D/4 - Slusser & Frantz, 2001)

- Store milk in hard plastic or glass bottles. Label bottles of expressed milk with name, date and time of expression.

  (D/4 - Tully, 2000)

- Transport breastmilk in an insulated container with ice packs.

  (D/4 – NHMRC, 1998)

- Store breastmilk following the recommended guidelines:

Location and temperature	Time
Milk stored at 25°C	4 hr
Milk in a cooler with ice pack (15°C)	24 hr
Fresh milk in refrigerator (4°C)	48 hr
Previously thawed milk in refrigerator (4°C)	24 hr
Frozen milk:	
- Freezer with separate door from refrigerator	3 - 6 months
- Deep freezer (-20°C)	6 -12 months

  (D/4 - Slusser & Frantz, 2001)

- Thaw breastmilk in the refrigerator or by placing it in warm water. Do not thaw or warm breastmilk in the microwave oven.

  (D/4 - NHMRC, 1998)

- Give warmed milk straight away and discard any left over. Do not re-freeze or re-warm breastmilk.

  (D/4 - NHMRC, 1998)

1.4 Monitor the progress of breastfeeding

1.4.1 Observation of breastfeeding

- Observe and document the following for at least one breastfeeding session in each 8-hour period during the hospital stay:
  - condition of breasts and nipples;
  - position of mother and infant;
  - correct latch-on;
  - frequency of feedings;
  - infant's behaviour;
  - number of wet diapers and
  - number and character of bowel movements.

(D/4 - ILCA, 1999)

- Identify the following signs of ineffective breastfeeding:
  - milk 'comes in', but swallowing or gulping is not audible;
  - milk does not seem to have 'come in' by fifth day;
  - infant seems to be nursing continuously, always hungry and never satisfied.
  - infant is exceptionally 'good', rarely crying and consistently sleeping more than four to six hours;
  - fewer than eight feedings in 24 hours (the infant does not have to take both breasts at each feeding);
  - sore and painful nipples throughout most feedings;
  - significant engorgement (breasts are very hard and do not soften after feeding);
  - fewer than six wet diapers in 24 hours after the third day;
  - dark black, green or brown stools after the third day;
  - fewer than three yellow stools in 24 hours (from the fourth day to one month);
  - average daily weight gain of less than 15 to 30g (once the milk "comes in") and
  - infant has not regained birthweight by ten days of age.

(D/4 - Powers & Slusser, 1997; ILCA, 1999)

- Identify the following factors that can affect breastfeeding and provide necessary feeding assistance and monitor closely:
  Maternal
  - previous breastfeeding difficulty;
  - cracked or bleeding nipples;
  - severe engorgement;
  - acute or chronic disease;
  - medication use;
  - breast surgery or trauma and
  - absence of antenatal breast changes.

  Infant
  - birth trauma;
  - prematurity;
  - inconsistent ability to latch-on;
  - sleepiness or irritability;
  - hyperbilirubinaemia or hypoglycaemia;
  - small (SGA) or large (LGA) for gestational age, intrauterine growth retardation (IUGR);
  - tight frenulum (tongue tie);
  - multiple birth;
  - neuromotor problems (i.e. Down's Syndrome);
  - oral anomalies (i.e. cleft lip/palate) and
  - acute or chronic illness.

(D/4 - ILCA, 1999)

1.5 Evaluate the management of breastfeeding

1.5.1 Evaluation of breastfeeding techniques

- Re-evaluate breastfeeding techniques if ineffective breastfeeding is observed within the first 24 hours. Refer to a health care professional with breastfeeding expertise such as an International Board Certified Lactation Consultant (IBCLC) or Lactation Nurse/Midwife.

(D/4 - ILCA, 1999)

- Begin expressing milk within the first 24 hours to develop and maintain an adequate milk supply until infant can suckle.

(D/4 - Powers & Slusser, 1997)

1.5.2 Common problems of breastfeeding

- Provide anticipatory guidance for common problems that may interfere with continued breastfeeding.

  (D/4 - ILCA, 1999)

- Remove and re-attach infant to ensure proper latch-on if nipple pain continues after the initial attempt.

  (D/4 - Powers & Slusser, 1997)

- Detach infant from the breast by inserting a finger into the corner of the infant's mouth.

  (D/4 – ACOG, 2001)

- Apply breastmilk to the sore nipples after feed and air dry to aid healing. Use modified lanolin for very sore and cracked nipples.

  (D/4 – Lawrence & Lawrence, 1999)

- Use different feeding positions to reduce pressure on the sore nipple.

  (D/4 – RCM, 2002)

- Teach mother to express her milk for a day or two until her nipples have healed if she cannot tolerate the idea of feeding. Feed infant temporarily using alternative methods.

  (D/4 – Cable et al, 1997; Inch & Fisher, 2000)

- Advise on frequent, effective feedings to minimise swelling.

  (D/4 - ILCA, 1999)

- Apply cold cabbage leaves or cold gel packs on engorged breasts to reduce swelling. This measure is used with breast massage, milk expression (pumping), and analgesics.

  ($B/2^{++}$- ILCA, 1999; Snowden et al, 2001)

- Avoid hot compresses unless breasts are leaking.

  (D/4 - ILCA, 1999)

- Observe the following possible indicators of insufficient milk supply:
  - decreased infant's stool and urine output;
  - infant's fussiness;
  - decreased breast swelling at second week after delivery and
  - increased frequency of feeding.

(D/4 - ILCA, 1999)

- Respond to infant's cry and identify why infant is crying.

(D/4 - ILCA, 1999)

- Advise mother to eat a variety of foods from all the food groups and drink to satisfy thirst.

(D/4 - ILCA, 1999)

1.6 Support for continued breastfeeding

1.6.1 Going out with or without the infant

- Support the mother how to breastfeed discreetly when she is out with the infant.

(D/4 - ILCA, 1999)

- Introduce a supplement (preferably expressed breast milk), if mother is unable to breastfeed directly.

(D/4 - ILCA, 1999)

1.6.2 Continued breastfeeding

- Support continued breastfeeding during any rehospitalisation of mother or infant.

(D/4 - ILCA, 1999)

- Provide a list of available support resources:
  - helplines;
  - lactation consultants;
  - breastfeeding support groups and
  - breast pump rental and sales outlets.

(D/4 - ILCA, 1999)

- Include family members or significant others during breastfeeding education sessions.

(D/4 - ILCA, 1999)

1.6.3 Working and breastfeeding

- Guidance and education on continuing breastfeeding during employment should be given to all nursing mothers.

(D/4 – Mohrbacher & Stock, 1997; NHMRC, 1998)

- Workplaces can adopt policies to enable women to breastfeed on returning to work. This includes flexible working hours, work-based childcare facilities, providing rooms for expression of breastmilk or breastfeeding and refrigerators to store expressed breastmilk.

(D/4 – NHMRC, 1998)

1.7 Advice on gradual weaning

- Breastfeed exclusively for the first six months after birth.

($A/1^{+}$ - Kramer & Kakuma, 2002)

- Gradually introduce iron-enriched solid foods in the second half of the first year to complement the breastmilk diet.

(D/4 - AAP, 1997)

- Breastfeed for at least 12 months, and thereafter for as long as mutually desired.

(D/4 - AAP, 1997)

- Wean infant from breastfeeding gradually by eliminating a feed every 2-3 days.

(D/4 - ACOG, 2001)

- Apply cool compress and manually express sufficient milk to relieve the engorgement.

(D/4 - ACOG, 2001)

2 INTRODUCTION

2.1 Benefits of breastfeeding

Breastfeeding is a way of providing optimal nutrition for the development and healthy growth of an infant. Breast milk provides nutrition in the early critical months of life and protects the child from the common childhood infections and diseases throughout childhood and into adulthood. In addition, breast milk provides unique biological and emotional basis for the health of both mother and child.

2.1.1 Benefits for mother

Breastfeeding is beneficial to the mother's health. In a review by Labbok (2001), eleven of 20 studies reviewed showed that women who did not breastfeed were significantly more likely to develop premenopausal breast cancer compared with women who breastfeed. The protective effect shown in these studies generally increased with the longer duration of breastfeeding. Another review of epidemiological studies (The collaborative group on hormonal factors in breast cancer, 2002), reported that the risk of breast cancer reduced by 4.3% (CI, 2.9-5.8) for each year that a woman breastfeeds, in addition to a reduction of 7.0% (CI, 5.0-9.0) for each birth. The relationship reported in this review was found to be consistent for women from developed and developing countries, of different ages and ethnic origins and with various childbearing patterns and other personal characteristics. It was also reported that the initiation and physiologic completion of breastfeeding during the first two to seven months postpartum was associated with a significant decrease in the risk of developing ovarian cancer. An average protective level of 20% was reported in the studies (Labbok, 2001).

Other benefits to the breastfeeding mother include more rapid postpartum weight loss and delayed resumption of menses in the mother (Kramer & Kakuma, 2002).

2.1.2 Benefits for infant

A systematic review of five studies, including some conducted in industrialised countries has shown a protective effect of breastfeeding on diarrhoeal disease. For infants who were exclusively breastfed for at least four months, there was a significant reduction of risk for gastroenteritis compared with those who were mixed-fed or formula-fed (Kramer and Kakuma, 2002). Four studies reviewed showed that breastfeeding had a significant protective effect against lower respiratory tract illness. It was also associated with a shorter duration of respiratory illness in infants. Several prospective studies reviewed have shown that four months of exclusive breastfeeding is associated with a lower risk of otitis media (Heinig, 2001).

A review of 20 studies by Reynolds (2001) which evaluated developmental or cognitive outcome in breastfed infants showed an average 3.2 point higher 'cognitive developmental score' among breastfed infants. The advantage was seen in infants between 6 and 23 months, and continued throughout childhood till 10 - 15 years of age. The meta-analysis also found that the duration of breastfeeding correlated with better developmental and cognitive outcome. Infants who were breastfed for 28 weeks or more had a higher cognitive development score compared to those who were breastfed for less than 28 weeks (Reynolds, 2001).

Mortensen and colleagues (2002) reported a positive significant association between duration of breastfeeding and intelligence in young adults, with results indicating that breastfeeding may have long term positive effects on cognitive and intellectual development.

2.2 Background

There are many complex factors which may influence a woman's choice of feeding her infant. In general, the reasons for which the infants are not breastfed fall into two categories: physiopathological (e.g. certain medical conditions of mother and infant) and socioeconomical (e.g. mothers who need to return to work). Some of these factors may be related to the mother, the infant or both.

In Singapore, up to the early ‘50s and ‘60s, breastfeeding was the main method of feeding babies. Subsequently, as women received education and were gainfully employed outside home, life-styles changed with more money for spending per household. The infant formula companies immediately took advantage of this situation to quickly sell their products to the working mothers. During that period, persuasive advertisements and free formula samples were distributed to mothers (for their infants) before they were discharged from the hospitals. This resulted in infant formula being widely used which might have led to the decline in the number of mothers who breastfed.

Since the 1980’s, there has been a number of national and international initiatives to promote and support the initiation and sustenance of breastfeeding. Studies by Chua and colleagues (1989) showed an overall decline in the incidence of breastfeeding in Singapore from the 1950’s to 1980’s. However, it is encouraging to note that there was an improvement in breastfeeding rates amongst well-to-do mothers from the 1970’s to 1985’s. A study conducted in a maternity hospital from Nov 1995 to Oct 1996 by Ng and colleagues (1998) showed that only 6% of infants were fully breastfed at four months of age. Overall, monthly statistics from the various hospitals showed that while breastfeeding rates were high at birth (85%), they declined significantly over time (Ng et al, 1998).

There is a need for us to increase the awareness among healthcare personnel and the general public on the importance of breastfeeding and its superiority. The challenge is also to increase the rates of initiation and duration of breastfeeding (at least six months) in accordance with the recommendation by the World Heath Organisation (WHO, 1998). As healthcare providers, we have the responsibility to provide accurate and consistent information regarding infant feeding and women have the right to make an informed decision about the method of feeding for their infants.

2.3 Definition of breastfeeding

Exclusive breastfeeding:

- requires the infant to be fed breastmilk (including expressed milk);
- allows the infant to receive drops, syrups (vitamins, minerals, medicines) and
- does not allow the infant to receive anything else (water, non-human milk, food-based fluids e.g. glucose).

Supplementary feeding (if medically indicated):

- requires the infant to be fed breastmilk and
- allows the infant to receive any food or liquid including non-human milk.

2.4 Role of healthcare team and family in promoting breastfeeding

Health care professional should:

- remain updated on current breastfeeding practices;
- provide accurate and consistent breastfeeding information to mothers and their families;
- encourage and promote breastfeeding antenatally; and
- initiate and support breastfeeding postnatally during hospitalisation and follow up if necessary.

Lactation consultant should:

- ensure that nurses are adequately trained to help mothers with initiation and maintenance of milk production;
- assist mothers with complex breastfeeding problems and
- oversee best breastfeeding practice in accordance with the clinical practice guidelines.

Family needs to:

- encourage and support the breastfeeding mother in her new role and to accept the change in lifestyle with the arrival of the infant and
- acquire knowledge on current breastfeeding practices.

2.5 Scope of the guidelines

These clinical guidelines are primarily tools to assist healthcare professionals and interest groups who are actively involved in the management of breastfeeding mothers and their infants in institutions and in the community. They should be adapted to suit a particular situation and patient.

These guidelines are intended as a simple and readable reference for the management of breastfeeding of a healthy, full-term infant.

3 DEVELOPMENT OF GUIDELINES

3.1 Training and guidance

Members of the workgroup attended a two-day interactive training workshop to learn about and discuss the theory and practical issues of developing evidence-based guidelines under the guidance of Dr Edwin Chan & Dr Miny Samuel of the National Medical Research Council Clinical Trials & Epidemiology Research Unit. The practical training revolved around topic selection and the development of "mock" evidence-based guidelines which developed into this present guidelines.

3.2 Strategy and literature review

Three highly regarded evidence-based guidelines were reviewed:

- Evidence for the ten steps to successful breastfeeding by World Health Organisation, 1998.
- Evidence-based guidelines for breastfeeding management during the first fourteen days by The International Lactation Consultant Association, USA, 1999.
- Infant feeding guidelines for health workers by National Health and Medical Research Council, Australia, 1998.

The workgroup felt that an updated literature search for the specific topics addressed on MEDLINE, EMBASE, Cochrane Library, and CINAHL would be sufficient. Literature from the year 1998 to August 2002 was reviewed.

3.3 Evaluation of evidence and grading of recommendations

We have adopted the revised Scottish Intercollegiate Guidelines Network (SIGN) system which gives clear guidance on how to evaluate the design of individual studies and grade each study's level of evidence (see 3.3.1 and 3.3.2); and how to assign a grade to the recommendation after taking into account external validity, result consistency, local constraints and expert opinion (see 3.3.3). The extensive reliance on the ILCA and WHO guidelines is acknowledged and treated as a very special case of published expert opinion. For areas where available evidence was inconsistent

or inconclusive, recommendations were made based on the clinical experience and judgement of the workgroup or expert committee reports.

3.3.1 Individual study validity rating

All primary studies and reviews addressing a particular topic were appraised using a SIGN checklist appropriate to the study's design. These were individually rated for internal validity using the system below:

Rating	Description
++	**All or most** of the criteria have been fulfilled. Where they have not been fulfilled the conclusions of the study or review are thought **very unlikely** to alter.
+	**Some** of the criteria have been fulfilled. Those criteria that have not been fulfilled or not adequately described are thought **unlikely** to alter the conclusions.
–	**Few or no** criteria fulfilled. The conclusions of the study are thought **likely or very likely** to alter.

3.3.2 Levels of evidence

Each study is assigned a level of evidence by combining the design designation and its validity rating using the system below:

Level	Type of Evidence
1^{++}	High quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias.
1^{+}	Well conducted meta-analyses, systematic reviews, or RCTs with a low risk of bias.
1^{-}	Meta-analyses, systematic reviews, or RCTs with a high risk of bias.
2^{++}	High quality systematic reviews of case-control or cohort or studies. High quality case-control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal.
2^{+}	Well conducted case-control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal.
2^{-}	Case-control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal.
3	Non-analytic studies e.g. case reports, case series.
4	Expert opinion.

3.3.3 Grades of recommendation

The detailed results of each study and mitigating local circumstances were considered in formulation of each recommendation which was then graded using the system below:

Grade	Recommendation
A	At least one meta-analysis, systematic review, or RCT rated as 1^{++}, and directly applicable to the target population; or A body of evidence, consisting principally of studies rated as 1^{+}, directly applicable to the target population, and demonstrating overall consistency of results.
B	A body of evidence, including studies rated as 2^{++}, directly applicable to the target population, and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 1^{++} or 1^{+}.
C	A body of evidence including studies rated as 2^{+}, directly applicable to the target population and demonstrating overall consistency or results; or Extrapolated evidence from studies rated as 2^{++}.
D	Evidence level 3 or 4 ; or Extrapolated evidence from studies rated as 2^{+}.

3.3.4 Interpretation of the D/4 grading

The grading system emphasises the quality of the experimental support underpinning each recommendation. The grading D/4 was assigned in cases where

- it would be unreasonable to conduct a RCT because the correct practice is logically obvious;
- recommendations derived from existing high quality evidence-based guidelines. We alert the user to this special status by appending the initials of their source e.g. (D/4 - ILCA, WHO).

3.4 Guidelines review and revision

Drafts of the guidelines were circulated to healthcare institutions for peer review on validity, reliability and practicality of the recommendations.

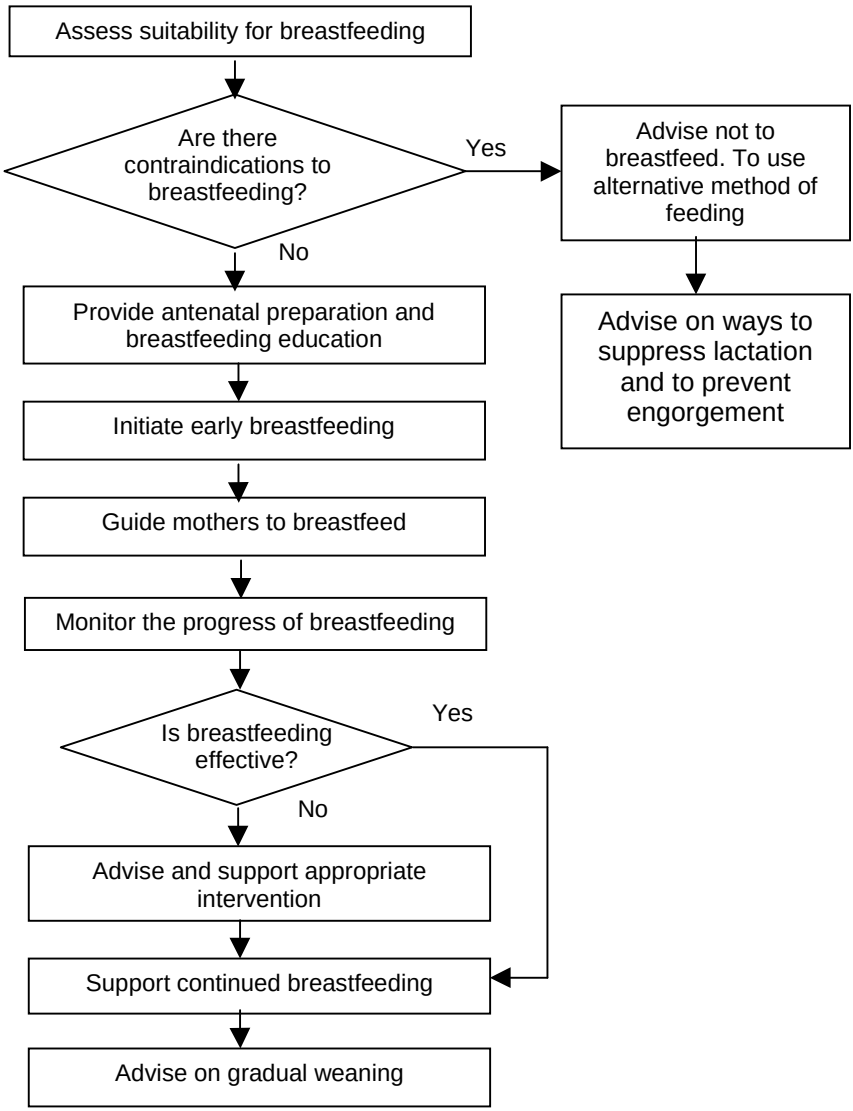
These guidelines will be reviewed and revised periodically to incorporate the latest relevant evidence and expert clinical opinion.

3.5 Limitations

These guidelines offer recommendations that are based on current scientific evidence and professional judgement. They are not intended as the legal standard of care.

Users of these guidelines should determine the appropriate and safe patient care practices based on assessment of the circumstances of the particular patient, their own clinical experiences and their knowledge of the most recent research findings.

4 ALGORITHM FOR THE MANAGEMENT OF BREASTFEEDING



5 ASSESSMENT AND ANTENATAL PREPARATION FOR BREASTFEEDING

5.1 Contraindications to breastfeeding

- Identify maternal and infant contraindications to breastfeeding so as to appropriately advise mother not to breastfeed under the following conditions:

  Maternal:
  - HIV and certain infectious diseases;
  - substance abuse;
  - certain medications;
  - certain surgeries.

  Infant:
  - galactosaemia;
  - phenylketouria.

  (D/4 - WHO, 1998; ILCA, 1999; WHO, 2000)

Rationale:

HIV and infectious diseases

HIV

HIV infection can be transmitted through breastmilk. If there is a safe replacement feeding method available, breastfeeding should be avoided.

(WHO, 2000)

Tuberculosis

Breastfeeding can commence once specified treatment is initiated and mother is no longer infectious. Active pulmonary tuberculosis (TB) is spread almost exclusively by the airborne route.

(Menzies, 1997)

Breastmilk does not contain tubercle bacilli. Mother receiving active TB therapy with shown clinical improvement and sputum smear negative (approximately 2 weeks), can resume breastfeeding while she completes the full course of therapy.

(Lawrence & Lawrence, 2001)

Currently isoniazid, rifampicin, ethambutol, streptomycin (first-line agents), kanamycin and cycloserine (second-line agents) are the only agents considered to be compatible with breastfeeding.

(AAP, 2001)

Hepatitis B

Breastfeeding may continue once the infant has been immunised. The Hapatitis B vaccine virtually eliminates any risk of transmission through breastfeeding.

(WHO, 1996)

Chicken pox

Varicella-zoster virus (VZV) transmission is believed to occur via respiratory droplets and from vesicles. Breastmilk does not contain VZV but contains the antibody against VZV. Airborne precautions are therefore appropriate in the hospital setting.

(Lawrence & Lawrence, 1999)

Maternal VZV infection in the perinatal period requires temporary isolation of the mother from the infant and varicella-zoster immunoglobulin (VZIG) should be given to the infant regardless of the mode of feeding. Perinatal infection can lead to severe infection in the infant if maternal rash develops five days or less before delivery and within two days after delivery. When VZV lesions did not involve the breast, expressed breastmilk can be given as soon as the infant has received VZIG. Breastfeeding should resume when the mother is no longer infectious, no new lesions have developed after 72 hours and crusting of existing lesions has occurred, usually six to ten days after the onset of the rash. Postnatal maternal VZV infection after one month probably requires no suspension of breastfeeding, especially if an infant receives VZIG.

(Lawrence & Lawrence, 2001)

Substance abuse

Nursing mothers should not ingest drugs of abuse (amphetamine, cocaine, heroin and marijuana) because they are hazardous to the nursing infant and to the health of the mother.

(AAP, 2001)

Smoking

Smokers have lower prolactin levels in the first weeks and later months of lactation. Prolactin is essential to successful initiation of lactation and an adequate basal serum prolactin is essential to maintenance of lactation. Infants whose mothers smoked are more likely to be hospitalised, to suffer from respiratory and alimentary illnesses, and to be colicky and irritable. Smoking before feeding increases the amount of nicotine transferred to the infant. Nicotine has a half-life of about 90 minutes, thus the intervals between smoking and feeding become important.

(Amir & Donath, 2002)

Alcohol

Alcohol diffuses into human milk and reaches concentrations similar to those in maternal blood within 30 to 60 minutes after maternal alcohol ingestion. Heavy alcohol consumption (three or more drinks of 12 oz of 4.5% beer or 4 oz of 12% wine or 1.5 oz of 86 proof liquor per day) inhibits oxytocin release, which is necessary for the milk ejection reflex or 'let-down'. A low alcohol drink, such as a glass of beer or wine will take a 55 kg woman about three hours to detoxify.

(Schulte, 1995)

Alcohol consumption may adversely affect the infant's sleep and gross motor development and influence early learning.

(Mennela, 2001)

Medications

Certain drugs (drugs of abuse, antimetabolites and therapeutic doses of radioactive compounds) are the few absolute contraindications during breastfeeding (refer to Annex 1). For example, cytotoxic drugs (cyclophosphamide, cyclosporine, doxorubicin, methotrexate) interfere with the cellular metabolism of the nursing infant, causing possible immune suppression and unknown effects on growth or association with carcinogenesis and neutropenia.

(AAP, 2001)

Some useful reference on drug used in lactations are:

- Briggs GG, Freeman RK, Yaffe SJ. 2002. *Drugs in pregnancy and lactation: A reference guide to fetal and neonatal risk*. 5th ed. Baltimore: Williams and Wilkins.

- American Academy of Pediatrics Committee on Drugs. 2001. Transfer of drugs and other chemicals into human milk. *Pediatrics*, 108(3): 776-89.

- Hale T. 2002. Medications and mothers' milk. 10th ed. Texas,: Pharmasoft Medical Publishing.

Other medications can be modified in their effect by dosing schedule changes or careful selection of a medication that appears in much lower levels in the milk but has the same pharmacologic action.

(Lawrence, 2000)

It is well established that all drugs are excreted into breastmilk. However, most drugs appear in only small amounts in the breastmilk.

(Banta-Wright, 1997)

Galactosaemia

An infant with galactosaemia condition will be unable to metabolise lactose in the breastmilk due to metabolic deficiency of galactose-1-phosphate uridyltransferase.

(Lawrence & Lawrence, 2001)

Phenylketonuria (PKU)

In cases of PKU, partial breastfeeding may be possible, with careful monitoring by the paediatrician, dietician expert in metabolic disease and the lactation consultant.

(NHMRC, 1998)

An infant with PKU cannot get enough protein from his diet without also getting too much phenylalanine. But continued breastfeeding is possible because the infant with PKU also needs some phenylalanine for normal growth. This means that in addition to being fed Lofenalac, a special low-phenylalanine formula, the infant also needs some other protein in his diet. The mother can continue

breastfeeding while supplements her infant's diet with Lofenalac. Human milk is lower in phenylalanine than cow's milk formula. An infant with PKU needs to be carefully monitored to be sure the amount of phenylalanine in his blood does not rise above safe levels.

(Mohrbacher & Stock, 1997; Lawrence & Lawrence, 1999)

5.2 Antenatal breastfeeding education

- Provide parents with complete, current information on the benefits and techniques of breastfeeding through antenatal classes, breastfeeding talks, breastfeeding booklets and/or individual counselling. Information should include the following:
  - benefits for mother and infant;
  - anatomy and physiology of the breast;
  - breast care;
  - breastfeeding technique;
  - prevention of breastfeeding problems and
  - rooming-in and immediate contact between mother and infant.

  (B/2^{++} - Kistin et al, 1990; Pugin et al, 1996)

- Provide educational materials that are consistent, accurate, at appropriate reading levels and culturally sensitive. The information should include:
  - lactation consultants;
  - breastfeeding support groups;
  - breast pump rental and sales outlets.

  (D/4 – ILCA, 1999)

- Educational materials should be free of commercial advertisements related to breast milk substitutes in accordance with SIFECS (Sale of Infant Formula Ethics Committee, Singapore) Code.

  (D/4 – SIFECS, 2002)

- Provide women with information on options for feeding to facilitate parents to make an informed choice.

  (D/4 – NHMRC, 1998)

- Include family members or significant others during breastfeeding education sessions.

(D/4 - ILCA, 1999)

Rationale:

Benefits of antenatal education

Antenatal education is associated with:

- increased breastfeeding rates;
- increased initiation of breastfeeding and
- longer duration of breastfeeding.

(Kistin et al, 1990; Pugin et al, 1996)

Parents need to know the advantages of breastfeeding to make an informed choice. Although there is clear evidence to support breastfeeding, parents need to have information of alternatives so that they can compare the various feeding methods and hence make an informed decision.

(Kistin et al, 1990)

To assist in making informed decisions, all pregnant women and their partners should have the opportunity to discuss feeding methods with their midwife or doctor. They should be encouraged to read the wide selection of material available on infant feeding and be told about the resources and support groups which offer information and support to women who intend to breastfeed.

(NHMRC, 1998)

By having correct information on overcoming difficulties, a woman is empowered and confident to succeed in breastfeeding.

(NMAA, 2000)

Women who have good spousal support to breastfeeding tend to breastfeed longer. In our local culture, the woman's mother and her mother in-law play an influential role in terms of her confidence and management of breastfeeding during the confinement month. Their doubts about breastfeeding need to be addressed too.

Benefits of educational materials

Adult learners are more likely to utilise materials that are relevant to a specific learning need. Printed or other audiovisual materials (compact discs, video tapes) reinforce verbal instruction.

(ILCA, 1999)

Internet website such as www.breastfeeding.com is a reliable on-line resource.

Essential to the concept of developing educational materials for a population with a broad range of literacy skills is the need for written materials to facilitate recall of oral instruction.

(Winikoff et al, 1987)

Distribution of infant feeding products decreases duration of breastfeeding.

(Donnelly et al, 2002)

5.3 Breast care

- Wash areola and nipple with water. Avoid using soap and alcohol.

  (D/4 – Lawrence & Lawrence, 1999)

- Avoid antenatal treatment of inverted or non-protractile nipples with breast shells or Hoffman's exercises.

  (B/2^{-} - Alexander et al, 1992)

- Avoid antenatal expression of colostrum, nipple rolling or application of breast cream.

  (D/4 – Lawrence & Lawrence, 1999)

- Use "Niplette" antenatally to correct inverted nipples.

  (D/3 – McGeorge, 1994)

Rationale:

Soap and alcohol have been shown to cause damage to the tissue and areola.

(Lawrence & Lawrence, 1999)

Using of breast shells or Hoffman's exercises have been shown to be of no benefit.

(Alexander et al, 1992)

Antenatal expression of colostrum, nipple rolling and application of breast cream have not been shown to be effective in preventing nipple trauma and sensitivity.

(Woolridge, 1986)

Nipple rolling and manual expression of colostrum antenatally may stimulate the uterus to contract.

(Lawrence & Lawrence, 1999)

The niplette may 'non-surgically' correct inverted nipples.

(McGeorge, 1994)

6 PROMOTION OF EARLY BREASTFEEDING

6.1 Initiation of breastfeeding

- Initiate breastfeeding within 1 hour of birth.
  (D/4 – WHO, 1998; ILCA, 1999)

- Provide skin-to-skin contact for at least the first hour after birth or until after the first breastfeeding.
  (D/4 – WHO, 1998; ILCA, 1999)

- Promote maximum mother-infant contact unless there is an unavoidable medical reason.
  (D/4 – WHO, 1998; ILCA, 1999)

Rationale:
Early initiation is associated with:

- enhanced maternal-infant interaction. Early contact was associated with greater communication between mothers and infants;
  (Renfrew et al, 2001b)

- earlier establishment of effective suckling and feeding behaviours;
  (WHO, 1998)

- longer duration of breastfeeding.
  (WHO, 1998; ILCA, 1999)

6.2 Techniques on breastfeeding

- Show and teach the mother how to adopt a comfortable position and ensure that infant is positioned correctly. The infant is held at the level of the breast and body facing the breast with head and body aligned (see below on different positions).
  (D/4 – Escott, 1989)

Positions for breastfeeding

Cradle hold position

Side lying position

Source: KK Women's and Children's Hospital. 2002. Breastfeed: Give your child a head start. Reprinted with permission.

Football position

Modified cradle hold position – ideal for small infants and newborns

Source: WHO/UNICEF. 1993. Breastfeeding counselling: A training course

- Guide mother to attach infant onto the breast and observe infant for signs of correct latch-on such as:
  - wide opened mouth;
  - flanged lips and
  - chin touching the breast and nose is free.

(D/4 – Escott, 1989)

Steps for attachment

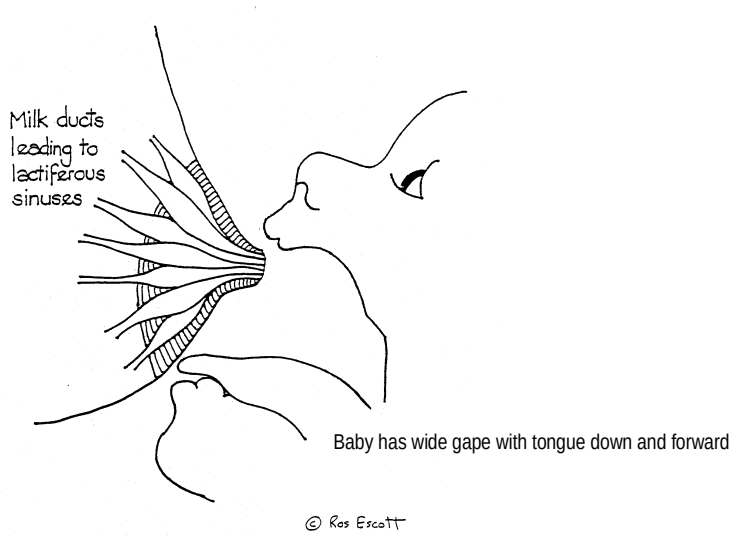
Support the infant at the breast level with his body turned on the side and his mouth facing the nipple.

Support the breast with four fingers below and the thumb by the side, away from the areola. Tease the infant's lower lip with the nipple to get him to open his mouth.

Bring the infant to the breast when he opens his mouth wide. Make sure that the infant grasps as much of the areola as possible.

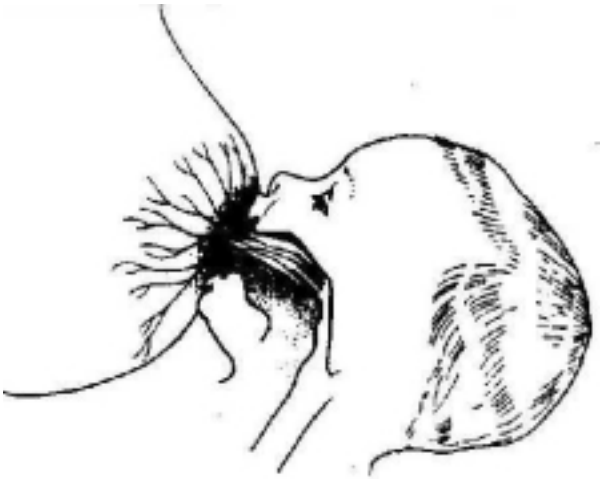
Source: KK Women's and Children's Hospital. 2002. Breastfeed: Give your child a head start. Reprinted with permission.

Attaching to the breast



Source: Escott, R. 1989. Positioning, attachment and milk transfer. Reprinted with permission.

Good attachment



Source: WHO/UNICEF. 1993. Breastfeeding counselling: A training course.

- Observe infant for the following signs of milk transfer:
  - sustained rhythmic suck/ swallow pattern with occasional pauses;
  - audible swallowing;
  - relaxed arms and hands;
  - moist mouth and
  - satisfaction after feedings.

(D/4 – Escott, 1989; ILCA, 1999)

- Observe mother for some of the following signs of milk transfer:
  - strong tugging which is not painful;
  - thirst;
  - uterine contractions or increased lochia flow during or after feeding for the first 3-5 days;
  - milk leaking from the opposite breast while feeding;
  - relaxation or sleepiness;
  - breast softening while feeding and
  - nipple elongated after feeding.

(D/4 – ILCA, 1999)

Rationale:

Correct positioning is paramount to successful breastfeeding. Failure to position the infant correctly on the breast can be the cause of many early breastfeeding problems such as nipple trauma and pain, protracted feeds, an unsettled hungry infant and apparently poor milk supply.

(Woolridge, 1986)

Assistance with breastfeeding soon after delivery has been shown to have lasting benefits and should therefore be a routine part of maternity care. A mother needs help to ensure that she is able to position and attach her infant at her breast. She needs guidance on how to interpret her infant's behaviour and respond to it.

(WHO, 1998)

Individual practical help with breastfeeding technique has been found to be more effective in increasing the duration of breastfeeding. The incidence of breastfeeding was significantly higher among the groups discharged with correct attachment than in the uncorrected group. Breastfeeding difficulties and milk insufficiency were also more frequent in the uncorrected group. Identification and correction of poor attachment helped mothers to breastfeed.

(Righard & Alade, 1992)

Milk transfer occurs more readily with appropriate positioning and latch-on. The position that best facilitates correct latch-on will vary from mother to mother and infant to infant. Correct positioning and latch-on minimises nipple tenderness and trauma.

(WHO, 1998; ILCA, 1999)

Adequate breast stimulation and milk removal is critical to developing a sufficient milk supply.

(ILCA, 1999)

6.3 Frequency and duration of breastfeeding

- Facilitate unrestricted breastfeeding 8-12 times per 24 hours.

  (D/4 – WHO, 1998; ILCA, 1999)

- Nurse infant on demand and/or every 2-3 hourly whenever infant shows signs of hunger, such as increased alertness, activity, mouthing, rooting or crying.

  ($C/2^{+}$ - AAP, 1997; Renfrew et al, 2001a)

- Allow infant to nurse until satisfied, usually 10-15 minutes on each breast.

  (D/4 – AAP, 1997)

- Arouse non-demanding infants in early weeks after birth, to nurse if 4 hours have elapsed since the last nursing.

  (D/4 – Klaus, 1987; Mohrbacher & Stock, 1997)

Rationale:

Infant suckling is the most effective mechanism for removal of milk. Frequent suckling removes excess milk accumulated in the alveolar space and thus prevents engorgement. This in turn facilitates proper latch-on and thereby reducing the incidence of sore nipples.

(Klaus, 1987; Hill and Humenick, 1994; Renfrew et al, 2001a)

Increased suckling stimulates the development of receptors to prolactin in the mammary gland and thus in turn increases milk supply.

(De Carvalho et al, 1983; Klaus, 1987)

The excessive level of bilirubin seen in breastfed infants is the result of inadequate intake of human milk. Frequent feedings stimulate gut motility thereby decreasing the reabsorption of bilirubin through the small bowel and thus reducing serum bilirubin levels.

(Yamauchi & Yamanouchi, 1990; Gartner & Herschel, 2001)

Fat is the major source of energy in human milk, accounting for approximately 40 to 60% of the total calorie intake. The composition and rate of flow of milk from the human breast changes in composition as the feed progresses. The result is that at the start of the feed the infant takes a large volume of the low calorie foremilk, changing to a small volume of high calorie hindmilk at the end of the feed.

(Kirsten & Bradford, 1999; RCM, 2002)

Metabolic adaptation at birth involves mobilisation of glycogen reserves (glycogenolysis), hepatic synthesis of glucose from other substrates (gluconeogenesis), and production of alternative cerebral fuels such as ketone bodies. The process counterregulation ensures regulation of glucose levels in the body during the fasting state.

(WHO, 1997)

Early postnatal feeding of human milk enhances gluconeogenesis and energy balance by providing gluconeogenic amino acid precursors, such as alanine, long-chain fatty acids which initiate the transcription of carnitine palmitoyltransferase, an enzyme essential for ketogenesis, and a disaccharide (lactose), which minimises insulin secretion. In contrast, feeding glucose water (5%-10%) in the immediate postnatal period increases insulin secretion, decreases glucagon secretion and delays the initiation of the natural gluconeogenesis and ketogenic homeostatic processes.

(Eidelman, 2001)

The increased intake of milk provides more calories and thus increases initial infant weight gain.

(Klaus, 1987; Yamauchi & Yamanouchi, 1990)

6.4 Rooming-in

- Facilitate rooming-in 24 hours a day. This means the infant is with the mother from birth.

  (D/4 – WHO, 1998; ILCA, 1999)

- Conduct examinations and routine tests of the infant in the mother's room.

  (D/4 – WHO, 1998; ILCA, 1999)

- Transfer the infant with mother to the postnatal ward together after delivery.

  (D/4 – WHO, 1998; ILCA, 1999)

- Provide extra support for mothers after caesarean section to room-in with their infants.

  (D/4 – NHMRC, 1998)

- Bring infant to mother to breastfeed if the mother is temporarily unable to room-in with her infant.

  (D/4 – NHMRC, 1998)

Rationale:

Rooming-in helps prevent cross infection.

(NHMRC, 1998)

Rooming-in promotes mother-infant bonding and enhances parenting. It promotes contact among the parents, family members and the infant. It also helps the mother to observe her infant's behavioural and feeding patterns, thereby enabling her to manage and care for the infant more quickly. Besides, infants in nursery cry more frequently, and their caregivers do not respond as often as mothers who are in the same room.

(O' Connor et al, 1980; WHO, 1998)

Hospital routines often interfere with the development of effective breastfeeding. Breastfeeding frequency is greater and supplementation with formula milk occurs less often when mothers and infants room-in compared with when they do not.

(ILCA, 1999)

The occasional use of the nursery or staff care during the day or night is an option for the mother. If the mother chooses to place her infant with the nursery staff at night, the infant should be taken to her for breast feeds, or the mother should be encouraged and assisted to express her breastmilk.

(NHMRC, 1998)

Contrary to popular opinion, mothers who have their infants with them at night do not lose sleep when compared with mothers whose infants are in a nursery. The presence of the newborn infant in the mother's room does not greatly alter maternal sleep, but it improves infant's sleep.

(Keefe, 1988)

6.5 Pacifiers and artificial teats

- Avoid the use of pacifers and artificial teats until breastfeeding is well established.

(D/4 – WHO, 1998)

- Avoid using bottles with artificial teats (nipples) or pacifiers.

(D/4 – WHO, 1998)

Rationale:

Pacifier use is associated with risk for early weaning and is a marker of breastfeeding difficulties or reduced motivation to breastfeed rather than a true cause of early weaning.

(Kramer et al, 2001)

Successful breastfeeding requires an infant to learn proper attachment and suckling in the first few days of life. Early oral experiences that mimic sucking mechanics different from those of breastfeeding are believed to cause improper latch and subsequent breastfeeding failure, a problem termed 'nipple confusion'.

(Howard et al, 1999)

In bottle feeding, the infant sucks on the teat with a partially closed mouth. When this latter sucking action is used by infants at the breast, it can lead to sore nipples, a diminished milk supply, and the cessation of breastfeeding. Both bottle teats and pacifiers encourage this sucking technique, which may adversely affect the eventual success of healthy full-term infants being able to establish breastfeeding.

(Lang et al, 1994)

6.6 Supplementation

- Identify possible indications for early supplementation.

  (D/4 – WHO, 1992; Powers & Slusser, 1997)

- Provide supplementation when medically indicated using cup, spoon or syringe.

  (D/4 – WHO, 1998; ILCA, 1999)

- Use mother's own colostrum or milk as a first choice for supplementation.

  (D/4 – ILCA, 1999)

Rationale:

Possible indications for early supplementation:

Infant:

- hypoglycemia documented by blood glucose measurement (glucometer reading ≤ 2.5 mmol/l) after infant has had opportunity to suckle;
- significant dehydration;
- weight loss of 8% to 10% accompanied by delayed lactogenesis (Day 5 or later);
- delayed bowel movements or dark stools at Day 5;
- insufficient intake despite an adequate milk supply;
- hyperbilirubinemia related to poor intake (breastfeeding evaluation and management has occurred and infant is unable to sustain feedings at the breast and
- prematurity (gestation < 37 weeks)/ low birthweight (< 2.270 kg) which necessitates fluids/calories or/and when mother is not available or is unable to express sufficient quantities for the infant's immediate needs.

Maternal:

- delayed lactogenesis (Day 5 or later) and signs of infant problems. Normal lactogenesis occurs on the third or fourth day postpartum;
- intolerable pain during feedings;
- mother is unavailable due to severe illness or geographic separation;
- primary glandular insufficiency (primary lactation failure), as evidenced by poor breast growth during pregnancy and minimal indications of lactogenesis;
- retained placenta causing delayed lactogenesis and
- Sheehan syndrome.

(Powers & Slusser, 1997)

Human milk provides all the fluid and nutrients necessary for optimal infant growth.

(ILCA, 1999)

Giving water or formula supplements will sabotage breastfeeding by decreasing the infant's interest at the breast and subsequently reducing milk removal and production. The healthy infant needs nothing more than breastfeeding though supplementation is

necessary occasionally for the full-term infant in the first weeks of life. Indications for supplementation must be placed in the context of the infant's overall status.

(Powers & Slusser, 1997)

Using a cup to supplement an infant decreases the likelihood of causing nipple confusion.

(Lang et al, 1994)

6.7 Expression and storage of breastmilk

- Teach mother expression, collection and storage of breastmilk.

(D/4 - NHMRC, 1998; ILCA, 1999)

Rationale:

The primary goal for expression of breastmilk is to develop and maintain an adequate milk supply until her infant can suckle.

(Powers & Slusser, 1997)

6.7.1 Preparation

- Sterilise all equipment such as hand pumps, funnels and collecting bottles before expressing. Instruct mother to wash her hands and breasts before handling the equipment and expressing.

(D/4 – Lawrence & Lawrence, 1999)

- Massage the entire breast gently, both top and underside, starting from the top and stroking towards the nipple. Do this several times so that the whole breast is massaged.

(D/4 - NHMRC, 1998)

Technique for breast massage

Massage the breast using a circular motion.

Stroke the breast in a downward manner, from the top of the breast towards the nipple.

Source: KK Women's and Children's Hospital. 2002. Breastfeed: Give your child a head start. Reprinted with permission.

Rationale:

Breast massage stimulates and facilitates the milk ejection reflex.

(Lawrence & Lawrence, 1999)

6.7.2 Methods of expressing breastmilk

- Use any of the three methods of expressing milk - hand expressing, hand pump expressing or electric pump expressing.

(D/4 – NHMRC, 1998)

- Follow the steps for the different methods of expressing milk:
  (D/4 - NHMRC, 1998)

Hand expressing

- Place the thumb and finger diagonally opposite on the edge of the areola.
- Gently press inward towards the centre of the breast and squeeze the finger and thumb together.
- Repeat with a rhythmic movement.
- Move fingers around areola and express to empty all sectors of the breast.

Hand expressing

Source: KK Women's and Children's Hospital. 2002. Breastfeed: Give your child a head start. Reprinted with permission.

Hand pump expressing

- Place the flat rim of the breast cup on the breast, centering the nipple.
- Gently pull the piston and release the suction rhythmically.

Electric pump expressing

- Place the breast cup on the areola, centering the nipple.
- Start the suction strength on low, gradually increase the suction strength as long as there is no discomfort.

Rationale:

Hand expressing is convenient and the skin to skin contact stimulates milk production. Hand expressing becomes easier with practice.

(NHMRC, 1998)

Hand pumps are portable and relatively inexpensive. They are recommended when the mother is breastfeeding and needs to express regularly once or twice a day when away from her infant.

(NHMRC, 1998)

Electric breast pumps are recommended when the infant is sick, when mothers are separated from their infants for long periods of time or when infants cannot attach well at the breast.

(NHMRC, 1998)

Pumped milk has a higher fat content than dripped or manually expressed milk and in most individuals the volume is also greater.

(Lawrence & Lawrence, 1999)

6.7.3 Duration and frequency of expressing

- Express for 15 minutes for simulataneous double pumping. Express 30 minutes for single pumping and hand expressing, alternating between breast every 5 minutes.

  (D/4 – Slusser & Frantz, 2001)

- Express eight or more times in 24 hours.

  (D/4 - Slusser & Frantz, 2001)

Rationale:

Mothers should begin expressing milk, preferably within the first 24 hours. Optimal routines for milk expression include eight pumpings per 24 hours.

(Powers & Slusser, 1997)

6.7.4 Storage, thawing and warming of breastmilk

- Store milk in hard plastic or glass bottles. Label bottles of expressed milk with name, date and time of expression.

  (D/4 - Tully, 2000)

- Transport breastmilk in an insulated container with ice packs.

  (D/4 – NHMRC, 1998)

- Store breastmilk following the recommended guidelines:

Location and temperature	Time
Milk stored at 25°C	4 hr
Milk in a cooler with ice pack (15°C)	24 hr
Fresh milk in refrigerator (4°C)	48 hr
Previously thawed milk in refrigerator (4°C)	24 hr
Frozen milk:	
➢ Freezer with separate door from refrigerator	3 - 6 months
➢ Deep freezer (-20°C)	6 -12 months

(D/4 - Slusser & Frantz, 2001)

- Thaw breastmilk in the refrigerator or by placing it in warm water. Do not thaw or warm breastmilk in the microwave oven.

(D/4 - NHMRC, 1998)

- Give warmed milk straight away and discard any left over. Do not re-freeze or re-warm breastmilk.

(D/4 - NHMRC, 1998)

Rationale:

Milk collection and storage techniques are important for optimal delivery of nutrients.

(Powers & Slusser, 1997)

Proper storage maximises the preservation of the human milk properties and minimises contamination.

(Slusser & Frantz, 2001)

With hard plastic containers (polyproylene or polycarbonate) and glass, there is less fat loss and the cellular components that tend to adhere to the walls of any container fall back into the solution more readily. There is also less risk of contamination, leaking or spilling.

(Tully, 2000)

Storing expressed milk at ambient room temperature (25 °C) for four hours does not increase bacterial growth. Storing freshly pumped milk in a small cooler with ice pack for up to 24 hours does not allow excessive microbial growth nor excessive breakdown of protein.

(Hamosh et al, 1996)

Breastmilk is best used when fresh and the mother should try to provide fresh breastmilk daily for her infant. Breastmilk can be refrigerated at $4^{o}C$ for 48 hours with little loss of nutrients or immunological properties. The bacterial count is actually reduced.

(NHMRC, 1998)

Milk can be thawed or warmed by standing it in warm water until it reaches the desired temperature. It should never be mircowaved since microwaving decreases lysozyme and Immunoglobulin A. Overheating can also destroy lipase, which helps the infant digest fats.

(Quan et al, 1992)

7 MONITORING OF THE PROGRESS OF BREASTFEEDING

7.1 Observation of breastfeeding

- Observe and document the following for at least one breastfeeding session in each 8 hour during the hospital stay:
  - condition of breasts and nipples;
  - position of mother and infant;
  - correct latch-on;
  - frequency of feedings;
  - infant's behaviour;
  - number of wet diapers and
  - number and character of bowel movements.

(D/4 - ILCA, 1999)

Rationale:

Assessment of breastfeeding session

Observing a feeding session helps a nurse decide whether a mother needs help. Trained staff should assess breastfeeding behaviour of the woman and newborn during the first 24-48 hours after birth for correct nursing positions, latch-on and adequacy of newborn swallowing.

(ACOG, 2001)

Infant's behaviour

Observe infant for signs of hunger, such as increased alertness, activity, mouthing, rooting or crying. Non-demanding babies should be aroused to nurse if four hours have elapsed since the last nursing.

(AAP, 1997)

Number of wet diapers

Until the milk 'comes in', the infant will not pass urine frequently. As long as the infant has at least one to two wet diapers in the first two days, there is no cause for concern. As the milk volume increases, the urine output will also increase. Starting from the third day, expect four to six wet disposable diapers or six to eight wet cloth diapers every 24 hours. Urine should be pale or colourless. These are signs of adequate hydration.

(Powers & Slusser, 1997; NHMRC, 1998)

Number and character of bowel movements

The first bowel movement is meconium which is greenish-black in colour. The infant should have a minimum of three to four bowel movements every 24 hours. Stools should be about one tablespoon or larger. After the third day, the infant should have four (if large) to ten (if small) bowel movements every 24 hours. It is normal for the number of bowel movements to vary in frequency. Some breastfed babies may have their bowel movements after each feed. By the third or fourth day typical breastfed infant's stools is loose mustard yellow, sometimes with milk curds. Frequent, runny stools do not mean a breastfed infant has diarrhoea or lactose intolerance. They should be viewed positively as evidence of sufficient milk.

(Powers & Slusser, 1997; NHMRC, 1998)

7.1.1 Signs of ineffective breastfeeding

- Identify the following signs of ineffective breastfeeding:
  - milk 'comes in', but swallowing or gulping is not audible;
  - milk does not seem to have 'come in' by fifth day;
  - infant seems to be nursing continuously, always hungry and never satisfied.
  - infant is exceptionally 'good', rarely crying and consistently sleeping more than four to six hours;
  - fewer than eight feedings in 24 hours (the infant does not have to take both breasts at each feeding);
  - sore and painful nipples throughout most feedings;
  - significant engorgement (breasts are very hard and do not soften after feeding);
  - fewer than six wet diapers in 24 hours after the third day;
  - dark black, green or brown stools after the third day;

- fewer than three yellow stools in 24 hours (from the fourth day to one month);
- average daily weight gain of less than 15 to 30g (once the milk comes in) and
- infant has not regained birthweight by ten days of age.

(D/4 - Powers & Slusser, 1997; ILCA, 1999)

Rationale:

Parents and health professionals must learn to use behavioural and physical criteria to judge appropriate intake and to identify warning signs that early breastfeeding is not going well. Although a single sign may not indicate a problem, further investigation and follow-up are indicated.

(Powers & Slusser, 1997)

Normative clinical patterns of bowel movements in the breastfed infant vary widely. However, output is a key indicator of adequate intake.

(ILCA, 1999)

Audible swallowing is a positive sign of milk transfer.

(ILCA, 1999)

Incorrect positioning and/or latch-on can cause nipple trauma and pain. Persistent pain during breastfeeding is not normal. During the first two weeks, brief discomfort can occur for a minute or so when the infant is latching on. If pain persists despite correct positioning and latch-on, consider other causes such as bacterial and fungal infections or infant oral-motor dysfunction (abnormal suck pattern).

(Powers & Slusser, 1997; ILCA, 1999)

The infant who is not gaining weight appropriately needs to be evaluated, more importantly if it is associated with any of the above signs, it may be an early sign of ineffective breastfeeding.

(Powers & Slusser, 1997)

7.1.2 Factors affecting effectiveness in breastfeeding

- Identify the following factors that can affect effective breastfeeding and provide necessary feeding assistance and monitor closely:

  Maternal
  - previous breastfeeding difficulty;
  - cracked or bleeding nipples;
  - severe engorgement;
  - acute or chronic disease;
  - medication use;
  - breast surgery or trauma and
  - absence of antenatal breast changes.

  Infant
  - birth trauma;
  - prematurity;
  - inconsistent ability to latch-on;
  - sleepiness or irritability;
  - hyperbilirubinaemia or hypoglycaemia;
  - small (SGA) or large (LGA) for gestational age, intrauterine growth retardation (IUGR);
  - tight frenulum (tongue tie);
  - multiple birth;
  - neuromotor problems (i.e. Down's Syndrome);
  - oral anomalies (i.e. cleft lip/palate) and
  - acute or chronic illness.

  (D/4 - ILCA, 1999)

Rationale:

Mothers often cite one of these factors as the reason for discontinuing breastfeeding. Most problems are amenable to treatment and intervention.

(Hill & Humenick, 1994)

There is no evidence to support that any of the above factors are contraindications to breastfeeding.

(Lawrence & Lawrence, 1999)

Screen mothers and newborn infants for potential problems with breastfeeding. Arrange for early intervention to maximise maternal milk production and infant milk intake if neccessary.

(Powers & Slusser, 1997)

Providing feeding assistance and close monitoring will help to achieve effective breastfeeding. Antenatal breastfeeding education, antenatal breast examination, and assessment of risk factors are proactive measures to achieve effective breastfeeding.

(Wight, 2001)

8 EVALUATION OF THE MANAGEMENT OF BREASTFEEDING

8.1 Evaluation of breastfeeding techniques

- Re-evaluate breastfeeding techniques if ineffective breastfeeding is observed within the first 24 hours. Refer to a health care professional with breastfeeding expertise such as an International Board Certified Lactation Consultant (IBCLC) or Lactation Nurse/Midwife.

(D/4 - ILCA, 1999)

- Begin expressing milk within the first 24 hours to develop and maintain an adequate milk supply until infant can suckle.

(D/4 - Powers & Slusser, 1997)

Rationale:
Lactation specialists are allied health professionals who are well equipped with skills and knowledge. They are able to act independently to develop treatment plan for each specific breastfeeding situation.

(Lawrence & Howard, 2001)

8.2 Common problems of breastfeeding

- Provide anticipatory guidance for common problems that may interfere with continued breastfeeding.

(D/4 - ILCA, 1999)

8.2.1 Nipple pain

- Remove and re-attach infant to ensure proper latch-on if nipple pain continues after the initial attempt.

(D/4 - Powers & Slusser, 1997)

- Detach infant from the breast by inserting a finger into the corner of the infant's mouth.

(D/4 - ACOG, 2001)

- Apply breastmilk to the sore nipples after feed and air dry to aid healing. Use modified lanolin for very sore and cracked nipples.

  (D/4 – Lawrence & Lawrence, 1999)

- Use different feeding positions to reduce pressure on the sore nipple.

  (D/4 – RCM, 2002)

- Teach mother to express her milk for a day or two until her nipples have healed if she cannot tolerate the idea of feeding. Feed infant temporarily using alternative methods.

  (D/4 – Cable et al, 1997; Inch & Fisher, 2000)

Rationale:

Initially, mild discomfort may occur at the beginning of each feeding when the infant latches onto the breast.

(ILCA, 1999)

If faulty attachment is suspected, the mother needs to detach the baby inserting a finger into the corner of the baby's mouth to break the seal and release the nipple/areola.

(NMAA, 2000)

Persistent pain during breastfeeding, red, cracked or blistered nipples are not normal, and should be evaluated and treated. Often pain is the result of incorrect positioning and latch-on and should be evaluated. Correct latch-on and positioning are crucial, limiting the duration that an infant nurses has no effect on nipple soreness.

(Wight, 2001, RCM, 2002)

Sometimes, the damage done is too severe for a mother to nurse without pain and further trauma, despite correction to the breastfeeding technique. In such a situation, alternative infant feeding methods should be temporarily employed.

(Cable et al, 1997)

Modified lanolin is a purified, alcohol-free, allergen-free ointment used to encourage moist wound healing for very sore and cracked nipples.

(Lawrence & Lawrence, 1999)

Consider other causes of sore nipples such as bacterial or fungal infections if infant latches well on the breast.

(ILCA, 1999)

8.2.2 Engorgement

- Advise on frequent, effective feedings to minimise swelling.

  (D/4 - ILCA, 1999)

- Apply cold cabbage leaves or cold gel packs on engorged breasts to reduce swelling. This measure is used with breast massage, milk expression (pumping), and analgesics.

  ($B/2^{++}$- ILCA, 1999; Snowden et al, 2001)

- Avoid hot compresses unless breasts are leaking.

  (D/4 - ILCA, 1999)

Rationale:

Engorgement usually affects both breasts and is generally the result of inefficient milk removal secondary to poor attachment (or infrequent expression if the infant is not going to the breast). The areola is often oedematous, which makes attachment difficult. It is essential to encourage milk flow and milk removal as prolonged engorgement will cause milk production to begin to be suppressed. This usually occurs in some mothers approximately three to five days after birth.

(Inch & Fisher, 2000)

Promotion of preventive behaviours should be a high priority. To prevent engorgement, there should be no delay in initiating breastfeeding, effective positioning should be ensured and unrestricted breastfeeding patterns should be promoted. However, when engorgement does occur, it is important to be able to offer the most effective treatment to mothers.

(Snowden et al, 2001)

Management centres on making the mothers comfortable so that she can continue to nurse and maintain her milk supply. It is important to maintain drainage during this period of engorgement to prevent back pressure in the ducts from developing and eventually depressing milk production. The best treatment is breastfeeding frequently around the clock because suckling by the infant is the most effective mechanism for removal of milk.

(Lawrence & Lawrence, 1999)

Cold packs or cold cabbage leaves are applied on the breasts to reduce oedema, warmth and pain. Warm packs improve vascular flow with heat but may aggravate the swelling if the ducts are blocked. Warm packs can be used if the breasts are leaking.

(Lawrence & Lawrence, 1999; Snowden et al, 2001)

Breast massage effectively increases milk supply and relieves plugged ducts.

(Riordan & Auerbach, 1993)

8.2.3 Insufficient milk supply

- Observe the following possible indicators of insufficient milk supply:
  - decreased infant's stool and urine output;
  - infant's fussiness;
  - decreased breast swelling at second week after delivery and
  - increased frequency of feeding.

(D/4 - ILCA, 1999)

Rationale:

Stool and urine output of the infant are the best indicators of adequate intake. If the fussy infant is having appropriate output and gaining weight, low milk supply is not the cause of fussiness. In the second week of life, initial breast swelling decreases but this does not signal a decrease in milk production.

(ILCA, 1999)

When an infant has a growth or appetite spurt, more frequent feedings for about 48 hours will increase total milk production. Most infants are usually alert for one to two hours after birth, they often show little interest in feeding for the next 24 – 48 hours. When the infants become wakeful, feeding tends to be very frequent (eight to more than 12 per 24 hours) and clustered during particular portions of the day and night.

(Powers & Slusser, 1997)

8.2.4 Infant crying

- Respond to infant's cry and identify why infant is crying.

(D/4 - ILCA, 1999)

Rationale:

Not every cry is a hunger cry. Infants will cry to signal other needs. The infant is not exhibiting feeding cues, parents can try other comfort measures before offering the breast.

(ILCA, 1999)

8.2.5 Maternal diet

- Advise mother to eat a variety of foods from all the food groups and drink to satisfy thirst.

(D/4 - ILCA, 1999)

Rationale:

Dietary restrictions are seldom necessary. Few infants are affected by foods eaten by the mother.

(ILCA, 1999)

There is insufficient scientific evidence to show that ginger, sesame oil or other traditional food causes jaundice. However, it would be wise to eat them in moderation.

Most information on herbal products and breastfeeding is anecdotal and not based on scientific research. Breastfeeding women should weigh the risks of using an herbal product against the benefits.

(Kopec, 1999)

9 SUPPORT FOR CONTINUED BREASTFEEDING

9.1 Going out with or without the infant

- Support the mother how to breastfeed discreetly when she is out with the infant.

(D/4 - ILCA, 1999)

- Introduce a supplement (preferably expressed breast milk), if mother is unable to breastfeed directly.

(D/4 - ILCA, 1999)

9.2 Continued breastfeeding

- Support continued breastfeeding during any re-hospitalisation of mother or infant.

(D/4 - ILCA, 1999)

- Provide a list of available support resources:
  - helplines;
  - lactation consultants;
  - breastfeeding support groups and
  - breast pump rental and sales outlets.

(D/4 - ILCA, 1999)

- Include family members or significant others during breastfeeding education sessions.

(D/4 - ILCA, 1999)

Rationale:

If hospitalisation of the breastfeeding mother or infant is necessary, every effort should be made to maintain breastfeeding, preferably directly or by pumping the breasts and feeding expressed breast milk, if possible.

(AAP, 1997)

Women breastfeed longer when support systems are available. Peer counselling significantly improved breastfeeding practices and has been shown to effectively increase the initiation and duration of exclusive breastfeeding.

(Haider et al, 2000; Kistin et al, 1994)

Social support affects duration and perceived success of lactation, mainly through the provision of informational and emotional support. Emotional support involves caring and love and includes intimacy, attachment and reassurance.

(Ryan, 1997)

Support from both lactation consultants and peer groups have been shown to increase the initiation and duration of breastfeeding.

(Raj & Plichta, 1998)

Every call about breastfeeding received over the phone is an opportunity for health care professionals to listen and support the caller and offer factual information and advice to help the mother and family to have an enjoyable breastfeeding experience.

(Philipp, 2001)

As more hospitals implement early discharge for new mothers, the role of fathers in breastfeeding initiation will become more important. This includes emotional and practical support as well as the ability to detect problems and knowledge of community resources to approach for help.

(Bromberg et al, 1997)

9.3 Working and breastfeeding

- Guidance and education on continuing breastfeeding during employment should be given to all nursing mothers.

  (D/4 – Mohrbacher & Stock, 1997; NHMRC, 1998)

- Workplaces can adopt policies to enable women to breastfeed on returning to work. This includes flexible working hours, work-based childcare facilities, providing rooms for expression of breastmilk or breastfeeding and refrigerators to store expressed breastmilk.

  (D/4 – NHMRC, 1998)

Rationale:

Some women who intend to return to work may feel discouraged from initiating breastfeeding and others may feel that breastfeeding has to stop once paid work starts. Support should be given to nursing mothers when they return to work. Mothers need to be aware that breastfeeding and feeding with expressed breastmilk/formula can be combined. Expressed breastmilk or formula is given to the infant during working hours and breastfeeding can still continue before and after work.

(NHMRC, 1998)

Time is needed prior to returning to work for both infant, mother and alternative caregiver to adjust and adapt to new schedule and feeding method (e.g. bottle feeding, expressed breastmilk by caregiver). Working mothers who are given support by their employers and caregivers breastfeed for a longer duration.

(Mohrbacher & Stock, 1997)

10 ADVICE ON GRADUAL WEANING

- Breastfeed exclusively for the first six months after birth.
  (A/1^{+} - Kramer & Kakuma, 2002)

- Gradually introduce iron-enriched solid foods in the second half of the first year to complement the breastmilk diet.
  (D/4 - AAP, 1997)

- Breastfeed for at least 12 months, and thereafter for as long as mutually desired.
  (D/4 - AAP, 1997)

- Wean infant from breastfeeding gradually by eliminating a feed every 2-3 days.
  (D/4 - ACOG, 2001)

- Apply cool compress and manually express sufficient milk to relieve the engorgement.
  (D/4 - ACOG, 2001)

Rationale:

Infants who are exclusively breastfed for six months experience less morbidity from gastrointestinal infection than those who are mixed breastfed as of three or four months. There is delayed resumption of menses and a rapid postpartum weight loss in the mother.
(Kramer & Kakuma, 2002)

Exclusive breastfeeding is ideal nutrition and sufficient to support optimal growth and development for approximately the first six months after birth. Gradual introduction of iron-enriched solid foods in the second half of the first year should complement the breast milk diet. Infants weaned before 12 months of age should not receive cow's milk feedings but should receive iron-fortified infant formula.
(AAP, 1997)

Breast milk alone can meet nutrient needs during the first six months. Complementary foods offered before six months of age tend to displace breast milk and do not confer any growth

advantage over exclusive breastfeeding. Breast milk continues to provide substantial amounts of key nutrients well beyond the first year of life, especially protein, fat and most vitamins. However after a certain age, human milk alone can no longer supply all of an infant's nutritional requirements and complementary foods are needed to ensure adequate nutrition and growth.

(Dewey, 2001)

The weaning process should be gradual. Eliminating a feeding every 2-3 days will achieve a comfortable transition for the infant and prevent engorgement in the mother. Abrupt weaning can be difficult for the mother and the infant. When this is necessary, certain measures can be helpful. The mother should wear a support bra. She does not need to restrict fluids. She may manually express sufficient milk to relieve the engorgement, but not so much that more milk production is stimulated. Cool compress will reduce engorgement.

(ACOG, 2001)

11 QUALITY ASSURANCE

Hospital and institution administrators should consider these guidelines in their in-house quality assurance programmes. Nurses should critically review the implications of these guidelines for their routine care delivery, trainee teaching and patient education needs.

11.1 Parameters for Evaluation

The parameters are listed in Annex 3.

11.2 Management Role

Hospital and institution administrators, together with quality assurance teams, should ensure that outcome indicators are met. They may benchmark against hospitals or institutions that perform well.

12 IMPLEMENTATION OF GUIDELINES

It is expected that these guidelines will be adopted after discussion with hospital and institution management and clinical staff. They may review how these guidelines may complement or be incorporated into their existing institution protocols.

Feedback may be directed to the Ministry of Health for consideration for future review.

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14 GLOSSARY

Breast massage – involve gentle tactile stimulation of mammary and nipple tissue using hand action that rolled the knuckles downward over the breast, beginning at the ribs and working towards the areola.

Breast shells – two-piece plastic devices worn over the nipple and areola to revert flat or retracted nipples.

Colostrum - the first milk. It is a yellow, sticky fluid secreted during the first few days postpartum, which provides nutrition and protection against infectious disease. It contains more protein, less sugar and much less fat than mature milk.

Counterregulation - the process which ensures availability of glucose and other fuels by which the body makes glucose available in the fasted state.

Foremilk – the first milk obtained at the onset of suckling or expression. Contains less fat than later milk of that feeding.

Frenulum – fold of mucous membrane, midline on the underside of the tongue, which helps to anchor the tongue to the floor of the month.

Galactosemia – a congenital metabolic disorder in which there is an inability to metabolise galactose because of a deficiency of the enzyme galactose-I-phosphate uridyltransferase.

Gluconeogenesis – hepatic synthesis of glucose from other substrates.

Glycogenolysis – glycogen breakdown causing the release of glucose.

Hindmilk – milk obtained later during the nursing period, that is, the end of the feeding. This milk is usually high in fat and probably controls appetite.

Hoffman's exercises – aim at stretching the nipples by manipulation. The exercises try to ease the nipple out further by traction at the nipple base.

Hyperbilirubinaemia – greater than normal amounts of the bile pigment bilirubin in the blood.

Hypoglycaemia – refers to low blood glucose concentration.

Intrauterine growth retardation (IUGR) - foetus that weighs less than the tenth percentile for its gestational age.

Lactogenesis – the onset of copious milk production in the first several days postpartum. After delivery of the placenta, systemic levels of progesterone and oestrogen drop steadily, while prolactin levels remain high.

Large for gestational age (LGA) - infant whose gestation of 37 weeks and more and birth weight is more than 4 kg.

Lipase – an enzyme which emulsifies milk fat to a finer curd and facilitates digestion.

Lysozyme – a nonspecific antimicrobial factor which is thermostable, acid-stable enzyme.

Neutropenia – an abnormal decrease in the number of neutrophils in the blood.

Niplette - a device which incorporates a transparent nipple mould attached to a valve and syringe port. The mould is held on the breast over the nipple areola complex, air is withdrawn using a 5ml syringe and the inverted nipple sucked up into it.

Nipple confusion – the situation that occurs when infants receive nipples and subsequently refuse to latch-on at the human breast.

Phenylketonuria – a rare metabolic disorder in which a liver enzyme is lacking, as a result an essential nutrient, the amino acid phenylalanine is not broken down and accumulates in the blood, interfering with normal brain development.

Premature infant - infant whose gestation is less than 37 weeks.

Sheehan syndrome - postpartum haemorrhage followed by absence of lactogenesis.

Small for gestational age (SGA) - infant whose gestation of 37 weeks and more and birth weight is less than 2.270 kg.

Supplementary feed - fluids or foods dissolved in fluids given to completely replace a breastfeed.

Supplementation - indicates expressed human milk, fortified human milk or formula, preferably given by cup or spoon.

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ANNEX 1 MEDICATIONS AND BREASTFEEDING

TABLE 1: Cytotoxic drugs that may interfere with cellular metabolism of the nursing infant

Please refer to American Academy of Pediatrics web site aap.org

TABLE 2: Drugs of abuse for which adverse effects on the infant during breastfeeding have been reported

Please refer to American Academy of Pediatrics web site aap.org

TABLE 3: Radioactive compounds that require temporary cessation of breastfeeding

Please refer to American Academy of Pediatrics web site aap.org

TABLE 4: Drugs for which the effect on nursing infants is unknown but may be of concern

Please refer to American Academy of Pediatrics web site aap.org

TABLE 5: Drugs that have been associated with significant effects on some nursing infants and should be given to nursing mothers with caution

Please refer to American Academy of Pediatrics web site aap.org

ANNEX 2 SUPPORT RESOURCES

Hospitals	Contact Numbers
East Shore Hospital	6344 7588
Gleneagles Hospital	6473 7222
KK Women's and Children's Hospital	6293 4044
Mt. Alvernia Hospital	6347 6688
Mt. Elizabeth Hospital	6737 2666
National University Hospital	6779 5555
Singapore General Hospital	6222 3322
Thomson Medical Centre	6256 9494

Support Groups	
Breastfeeding Mothers Support Group (S'pore)	6339 3558
Joyful Parenting Services	6488 0286
La Leche League	7000 555 4636

Sale of Breast Pumps

Pharmacies at the above hospitals

ANNEX 3 PARAMETERS FOR EVALUATION

In the management of breastfeeding, quality of care may be defined as an increase in the following rates.
It is suggested that the following parameters are monitored preferably on a monthly basis:

Attendance on antenatal breastfeeding

$$\text{Percentage of women who attended antenatal breastfeeding classes or talks} = \frac{\text{Number of mothers who attended antenatal breastfeeding classes or talks}}{\text{Number of live births}} \times 100\%$$

Initiation of breastfeeding

$$\text{Percentage of women who initiated breastfeeding within 1 hour of birth at Delivery Suite} = \frac{\text{Number of mothers who initiated breastfeeding within 1 hour of birth}}{\text{Number of live births}} \times 100\%$$

Exclusive breastfeeding (up to time of discharge)

$$\text{Percentage of infants who breastfeed exclusively up to the time of discharge} = \frac{\text{number of infants who breastfeed exclusively up to the time of discharge}}{\text{Number of live births}} \times 100\%$$

It is suggested that the following parameters are monitored preferably on a periodic basis:

Breastfeeding counselling

$$\text{Percentage of women who attended breastfeeding counselling at postnatal wards} = \frac{\text{Number of mothers counselled at postnatal wards}}{\text{Number of live births}} \times 100\%$$

Exclusive breastfeeding (at six weeks)

$$\text{Percentage of infants who breastfeed exclusively up to the time of discharge} = \frac{\text{number of infants who breastfeed exclusively at six weeks}}{\text{Number of infants sampled}} \times 100\%$$

Exclusive breastfeeding (at four months)

$$\text{Percentage of infants who breastfeed exclusively up to the time of discharge} = \frac{\text{number of infants who breastfeed exclusively at four months}}{\text{Number of infants sampled}} \times 100\%$$

ANNEX 4 SELF ASSESSMENT

Q1 Which of these statements about risk of cancer for mothers who breastfeed is not true?

(a) They are at lower risk of developing premenopausal breast cancer.
(b) The lower risk of breast cancer is consistent regardless of demographic background.
(c) The duration of breastfeeding is not correlated to the risk of developing breast cancer.
(d) They are at lower risk of developing ovarian cancer.

Q2 Which of the following statements on the benefits of breastfeeding to infants is not true?

(a) Reduced risk for gastroenteritis.
(b) Protective effect against lower respiratory tract illness.
(c) Immunity to HIV.
(d) Likely long-term positive effect on cognitive and intellectual development.

Q3 Exclusive breastfeeding

(a) requires the infant to be fed breastmilk directly from the breasts.
(b) allows infant to receive additional water with a cup.
(c) requires infant to be fed breastmilk (regardless of method of feeding).
(d) does not allow infant to receive breastmilk from other women.

Q4 Hepatitis B positive mothers can breastfeed their infant

(a) if they are only HbsAG positive.
(b) if they are in a active phase of the disease.
(c) if the infant is vaccinated after delivery.
(d) If the virus is not isolated in breastmilk.

Q5 Which of these statements is incorrect?

(a) Prolactin is essential to successful initiation of lactation.
(b) An adequate basal serum prolactin is essential to maintenance of lactation.
(c) Smokers have lower prolactin levels in the first weeks.
(d) The prolactin level is higher in later months of lactation among smokers.

Q6 Early initiation is associated with

(a) enhanced maternal-infant interaction.
(b) delayed establishment of effective suckling and feeding behaviours.
(c) prolonged time needed for each feeding.
(d) shorter duration of breastfeeding.

Q7 Use of pacifier is associated with

(a) risk for early weaning.
(b) better latch-on.
(c) reduced risk of sore nipple.
(d) increased demand for breastmilk.

Q8 Milk stored in the refrigerator at $4^{o}C$ can be kept for

(a) 12 hours.
(b) 48 hours.
(c) two weeks.
(d) one month.

Q9 Thawing of frozen breastmilk is best done in

(a) room temperature.
(b) warm water.
(c) microwave at low temperature.
(d) microwave at high temperature.

Q10 What is the best response to a mother who asks how she will know if her 1 week old infant is 'getting enough' breastmilk?

(a) 6-8 wet diapers per day.
(b) soft breast after feeding.
(c) audible swallow.
(d) all of the above.

Q11 Which of theses statements about engorgement is not correct?

(a) Engorgement usually affects one breast at a time.
(b) In engorgement, the areola is often oedematous.
(c) Prolonged engorgement will cause milk production to begin to be suppressed.
(d) Engorgement usually occurs in some mothers approximately three to five days after birth.

Q12 Which statement is not correct? When weaning infant from breastmilk, the mother

(a) can begin with eliminating a feeding every 2-3 days to achieve a comfortable transition for the infant and prevent engorgement in the mother.
(b) may wear a support bra.
(c) should restrict fluids.
(d) may use cool compress.

Q13 A mother is ready to be discharged from the hospital and will be returning to work when her infant is 8 weeks old. She wants to express milk at work and have her milk fed to her infant by her child care provider. She asks how she can promote a smooth transition to work in the first few weeks. Which of the following suggestions is **least** likely to help her?

(a) Arrange for a child care provider who is supportive of breastfeeding.
(b) Start freezing some extra breastmilk in preparation for her return to work.
(c) Breastfeed the infant exclusively for 4-6 weeks, then start bottle-feeding expressed breastmilk several times per week, so that her infant will bottle-feed in her absence.
(d) Accustom the infant by introducing bottle in the first week.

Answer

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