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Guidelines for authors of original research studies:

Authorship. Authors should give their full names and the name and address of their institutions. **Tables and Figures** should be numbered consecutively (e.g. Table 1, Fig. 1) and should not exceed a total of 4. **Abstracts** should not exceed 250 words, in English at the beginning and is translated into Arabic, at the end of the article. **The body of the text** should be structured as Background, Methods, Findings and Discussion, typed in a double spaced word document (font 12 Times New Roman), not exceeding 12 pages (size A4). The journal does not accept any papers or work funded by infant milk formula companies or code violators. Ethical considerations for work on mothers and babies should be clearly described. **References** should not exceed 30. They should be in American Psychological Association (APA) style used for citing in social sciences articles. Then they are sorted alphabetically and numbered for reference in the text. For more information on references please refer to *http://owl.english.purdue.edu/.*

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About the cover photo: Birth house, mammisi

For and after the birth of her child, the mother withdrew to a special location outside the house for a ritual purification period of (at least) two weeks. This was often placed on the roof of the house and, according to depictions on ostraca and wall paintings.
The best known are those from Dendera, Edfu and Philae. They are always chapels situated in front of the main temple, to one side of the main axis and perpendicular to it.
http://www.globalegyptianmuseum.org

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Ten Steps to Successful Breastfeeding

Every facility providing maternity services and care for newborn infants should:

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within half an hour of birth.
5. Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breast milk, unless medically indicated.
7. Practise rooming-in - that is, allow mothers and infants to remain together - 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

Source: *Protecting, Promoting and Supporting Breastfeeding: The Special Role of Maternity Services*, a joint WHO/UNICEF statement published by the World Health Organization.



Introduction

Egypt's MoH commitment to scale with Baby Friendly

This special issue is dedicated to the substantial efforts of ***Her Excellency the Minister of Health Professor Dr. Maha ElRabat*** for her relentless efforts in upgrading and expanding health care services in Egypt. As the first woman leader of the Minister of Health and Population she has demonstrated that efficacy of medical care systems through public health interventions. A strategic thinking that is recognized by developed health care systems around the world to prevent and ameliorate the rising the burden of chronic disease and disability. Her Excellency challenged the system that was engaged in dogmatic traditional curative care. Her efforts substantiated the efforts of previous Ministers such as H.E. the late Dr. ElNabawi who introduced the primary health care system in Egypt, which was the first in the Middle East, followed by H.E. Professor Dr. Mamdouh Gabr who introduced the obligatory vaccination system and others whose inputs were supportive yet not engaging in matters of public health.

Her Excellency the Minister of Health & Population Professor Dr. Maha ElRabat has issued a Ministerial decree no. 36/2014 in response to a suggestion made by the MCFC association and the recommendations of the supervising consultant for the Primary Health Care sector that states that:

Article (1) All hospitals (public or private) that serve mothers during pregnancy, childbirth or care of the newborn or infants to implementation of the global criteria of the Baby Friendly Hospital Initiative and the International Code of Marketing of Breast milk Substitutes by preventing advertisement and distribution of free samples. These hospitals should implement the Ten Steps of the international initiative for protecting and promoting breastfeeding.

Article (2) It is the responsibility of the Curative Section and Maternal and Child General Department to prepare all such hospitals under the MoHP to become accredited as Baby Friendly by incorporating the Ten Steps mentioned above in the Quality assurance and Accreditation criteria that are implemented in hospitals caring for mothers and babies.

Article (3) This decree must be published in the "Wakeaa Masria" and must be implemented the following day of its publication and dissemination.

Signed by Minister of Health & Population

Prof. Dr. Maha ElRabat

on 16/01/2014

Section I: Editorial articles

I.1 Natural childbirth

Adapted from www.Kellymom.com

Natural Childbirth is a philosophy of childbirth that is based on the notion that women who are adequately prepared are intuitively able to give birth to their child, without invasive obstetric interventions. The term "natural childbirth" was coined by obstetrician Grantly Dick-Read upon publication of his book *Natural Childbirth* in the 1930s, which was followed by the 1942 *Childbirth without Fear*.

Historical background

Historically most women gave birth at home, without medical intervention. These births were generally attended by a midwife, local family physician, or members of the birthing woman's family. At the onset of the Industrial Revolution in the 19th century, giving birth at home became more difficult due to congested living spaces and dirty living conditions. This drove urban and lower class women to newly available hospitals, while wealthy and middle-class women continued to labor at home [1]. In the early 1900s there was an increasing availability of hospitals, and more women began going into the hospital for labor and delivery. In the United States, the middle classes were especially receptive to the medicalization of childbirth, which promised a safer and less painful labor [2], and in fact the ability to labor without pain was part of the early feminist movement [1]. With the change from primarily homebirth to primarily hospital birth, changes set in the care women during labor: in the 1940s it was common for women to be routinely sedated and for babies to be delivered from their unconscious mothers with forceps (termed by Dr. Robert A. Bradley as "knock-em-out, drag-em-out obstetrics"). Other routine obstetric interventions have similarly come and gone: shaving of the mother's pubic region; mandatory intravenous drips; enemas; hand strapping of the laboring women; and the 12 hour monitoring of newborns in a nursery away from the mother, all of which were proven to be unnecessary and even harmful to the outcome of childbirth.

Beginning in the 1940s, childbirth professionals began to challenge the conventional assumptions about the safety of medicalized births. Physicians as Michel Odent and Frederick Leboyer and midwives such as Ina May Gaskin pioneered birthing centers, water birth, and safe homebirth as alternatives to the hospital model. Research has shown that low-tech midwifery provides labor outcomes as good as those found in hospital settings with fewer interventions, except for a small percentage of high-risk cases [3]. Today natural childbirth is taught through a variety of childbirth classes and books.

Physical benefits of natural childbirth

Natural childbirth aims to maximize the innate birth physiology and laboring movement of healthy, well-nourished women.

For the mother, a natural birth increases the probability of a healthier postnatal period and an easier recovery due to fewer post-operative discomforts. This is because a woman who has given birth

with minimal intervention is less likely to have to recover from major abdominal surgery (caesarean section), instrumental delivery (by forceps or ventouse), cutting of the perineum (called episiotomy), bruises from IV lines, or severe headache or backache (a possible and well-documented side effect of epidurals).

For the infant, a natural birth reduces the exposure to narcotics and drugs that augment labor. A natural birth also reduces the likelihood of needing to separate the infant from its mother after birth. This is important, as immediate skin-to-skin mother-newborn contact leading to initiation of breastfeeding in the first hour after birth increases the likelihood of successful breastfeeding for a longer duration [(4)].

Psychological benefits of natural childbirth

Many women consider natural birth empowering [(5)]. A woman, who is supported to labor as she instinctively wants to, is a woman who will likely feel positive about her birth experience and future parenting skills. Her baby is more able to be alert and placed on her skin (promoting maternal bonding) and breastfeeding is more likely to be enjoyable and successful [(6)].

Other women consider natural birth to be primitive and unnecessarily painful. Some women report less anxiety surrounding the birthing process when they know medical intervention and pain relief will be available.

Alternative interventions during labor

1- Pain management

A variety of methods are implemented during natural childbirth to aid the mother particularly in pain management techniques as alternatives to medication and include: hydrotherapy, massage, relaxation therapy, hypnosis, breathing exercises, vocalization, visualization, mindfulness, water birth, movement and different positions (i.e. using a birthing ball), hot and cold therapy (i.e. using hot compresses and/or cold packs) or having one-on-one labor support, such as a midwife or doula.

2- Augmentation of labor

Methods to augment labor without medication include: changing positions frequently; remaining in an upright position to increase pressure of the baby on the cervix; walking or going up and down stairs; acupuncture. **Methods to reduce need for episiotomy**: manage the perineum with counter-pressure; hot compresses; pushing the baby out slowly [(7)].

Preparation: Birth education classes such as Lamaze or the Bradley Method help to prepare women for a natural childbirth. Recently Amany technique has been introduced. In all these methods a midwife or *doula* may be involved in assisting women and their partners to a natural birth. This may be a part of the prenatal care services in some countries, while in others it is left to the women to demand for it.

Prevalence of medical intervention: Medical intervention continues to be on the rise and this interferes with the success of breastfeeding. Unfortunately in the United States a recent study revealed the rates of medical intervention in childbirth were as follows [(8)]: electronic fetal monitoring- 93%; epidural use- 63%; had their membranes ruptured- 55%; received oxytocin to progress labor- 53%; received episiotomies- 52%.

Changing obstetric practice can only be achieved by mature obstetric practice that takes into consideration nature's science and wisdom, rather than that of man.

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Parents need to fill a child's bucket of self- esteem so high that the rest of the world can't poke enough holes to drain it dry...

A quotation by M. Ghandi

I.2 Implementing Skin-to-Skin in Obstetric Practice

Why does obstetric practice differ from midwifery practice? While midwifery practice encourages the natural instincts that come with childbirth, many obstetricians believe that child birth is all about pharmacological agents and surgical interventions. This tag of war between midwifery and obstetric practice has left lactation consultants in dismay and state of confusion, increasing the complexity and difficulty of their work to assist mothers to breastfeed. "*When breastfeeding rocks, the rocks are in the delivery process*" i.e. ***when breastfeeding is going wrong it's because of the poor perinatal practices…***

The right of a woman to a companion at birth: Obstetric practice denies a woman to have a companion at birth; ***while midwifery practice encourages this practice; terming it be a "mother friendly practice".*** Why is intercourse a private matter between couples, but when the reward of this event is heralded by the birth of a child, why are the partners denied the right to share this moment together? The ultimate satisfaction of the couple and climax of their orgasmic experience is attained with the birth of their baby. BUT when and how has the medical profession intervened to claim it to be theirs to control? In doing so they eligibly castrate the parents from their biological rights to experience the birth of their child; an achievement they deserve to rejoice as a proclamation of their reproductive rights**.** Many obstetricians have claimed the rights of women to experience childbirth in nature's way. But have these schools been taught to medical students? To what extent is a medical practitioner prepared to lead a birth in nature's ways and respect the rights of women to unite with their partner at birth and for them to share and bond with their newborn at birth, rather than hassle this helpless creature away from his owners and protectors. Do we not give those caretakers alleged messages of trust and faith in the medical system with its daunting technology to dazzle them and keep them under its spell, whilst depriving them from the greatest moment in their lives together with the exceptional gift of love and security they can endow to their newcomer? Can this ever change? But how? How can we pave the way to a Baby and Mother Friendly Practices? This has long been the mission of UNICEF and WHO over the past 20 or more years. Recently countries like the USA have responded by making hundreds of Baby Friendly Hospitals in close association with New Zealand and Australia. Although Egypt was one of the flagship countries in the early 1990s and reached over 100 hospitals to make Baby Friendly, yet the initative waned. Currently a political leader, Her Excellency Professor Dr. Maha ElRabat, Minister of Health & Population in Egypt has released a Ministerial decree No. 36 for 2014. This is a ministerial decree protects the rights of newborns and their mothers against the malpractices in maternity hospitals around the country from the hazards of early separation and unnecessary supplements, thus aiming at saving lives and reducing morbidity. ***This remarkable and courageous leader is the <u>First</u> woman Minister of Health in the history of Egypt who identified with the needs of women*** *and the need to protect their babies and*

give this dyad the best, safest and most secure start in life.

The Remarkable First Hour of Life!

When healthy infants are moved from the womb to their mother's chest skin-to-skin dried, embraced in the warmth of their mother's bosom immediately after birth, they exhibit remarkable responses. They are alert. They can crawl, stimulated by mother's gentle touch, across her abdomen, aiming to reach her breast [(1)]. They begin to touch and massage the breast. This first gentle touch of a baby's hand or head at the breast stimulates release of maternal oxytocin[9], thus beginning both the flow of milk and enhancing the feelings of love for the baby. Then the baby smells, mouths and licks at the mother's breast. Finally, he or she attaches to the breast and feeds. This sequence of events is important for the survival of human young [(1,2,3)].

Why is skin-to-skin contact after birth and breastfeeding within the first hour of life so important?

1. The mother's body helps to keep the baby appropriately warm, which is especially important for small and low birth weight babies [(4,10)] .
2. The baby is less stressed, calmer and has steadier breathing and heart rates [(3)].
3. The baby is exposed first to the bacteria from the mother which are mostly harmless, or against which the mother's milk contains protective factors. The mother's bacteria colonize the baby's gut and skin and compete with more harmful bacteria from health providers and the environment, and so prevent them from causing infection[(5)].
4. **The baby receives colostrum for the first feeds – liquid gold, sometimes called the gift of life.**

- Colostrum is rich in immunologically active cells, antibodies and other protective proteins. Thus it serves as the baby's first immunization. It protects against many infections. It helps to regulate the baby's own developing immune system.
- It contains growth factors, which help the infant's intestine to mature and function effectively. This makes it more difficult for micro-organisms and allergens to get into the baby's body.
- It is rich in Vitamin A, which helps protect the eyes and reduce infection
- It stimulates the baby to have bowel movements so that meconium laden with bilirubin is cleared quickly from the gut, reducing jaundice.
- It comes in small volumes adapted to the small volume of the stomach and the frail and limited functions of the maturing intestine.

5. **Touching, mouthing and suckling at the breast stimulates *oxytocin* release – this is important for many reasons:**

- Oxytocin causes the uterus to contract. This may help delivery of the placenta and reduces maternal bleeding after the birth (6)
- Oxytocin stimulates other hormones which cause a mother to feel calm, relaxed, and its release in the brain causes the loving feelings of motherhood to develop and grow (7)
- Oxytocin stimulates the milk ejection and flow of milk from the breast, giving space for more milk to be produced.
- Women experience incredible joy with this first meeting of their child! The

process of bonding between mother and baby begins, when the father is there, the three are bonded in the family triad.

Overall, early and continued skin-to-skin contact during early feeds enhance intake of adequate colostrums, the rich immuno-nutrient; the pulsion of life, associated with significant reduction of mortality in the first month of life. They are also associated with increased exclusive breastfeeding and prolongation of breastfeeding to two years or more, reducing mortality and leading to improved health, growth and development of the child and reduced mortality [8,9,10].

IF BABIES BREASTFED WITHIN THE FIRST HOUR, 1 MILLION LIVES MIGHT BE SAVED

Researchers in rural Ghana, where early initiation of breastfeeding was not the norm, found that babies who started to breastfed in the first hour of life were more likely to survive the neonatal period than those who did not [10].

- Babies who did not start breastfeeding until after 24 hours of age were 2.5 times more likely to die than babies who started within the first hour of life, whether they were partially or exclusively breastfed.
- 30% of babies in the study were fed solids or other milk before one month of age
- These infants were 4 times more likely to die than babies who were exclusively breastfed
- Conclusions: 16% of newborn deaths could be prevented if newborns were breastfed exclusively from day one, 22% of newborn deaths could be prevented if newborns initiated breastfeeding within one hour of birth (10).

The newly revised Expanded Integrated BFHI Update modified **Step 4** of the Ten Steps to successful breastfeeding *to indicate the need for immediate skin-to-skin contact and ongoing support to achieve breastfeeding within the first hour*. Other steps increase the likelihood of continued exclusive breastfeeding: help the mother to position and attach the baby at the breast; keep them together after delivery; *encourage feeding on infant's cue (demand feeding)*; avoid the use of artificial teats or pacifiers; and avoid any other food or drink unless medically indicated. In Baby-Friendly hospitals, rates of *breastfeeding initiation, exclusive breastfeeding and duration of breastfeeding are improved* [6,14]. Policy matters as shown in the following box:

How to Initiate Breastfeeding in the First Hour of Life

1. **Provide appropriate, culturally sensitive** and supportive labour companionship to mothers
2. **Encourage non-pharmacologic measures** to help support women through labour (massage, aromatherapy, water injections, movement)[3]
3. Allow delivery to occur in the position preferred by the mother[7]
4. **Dry the baby quickly,** preserving the natural white cream (vernix) that soothes a baby's new skin
5. **Place the baby naked skin-to-skin** on mother's naked chest, facing her, and cover them together
6. **Allow the baby to seek the breast.** The mother will stimulate the baby with her touch and may help position the baby closer to the nipple (Do not force the baby to the nipple)
7. **Keep the baby skin-to-skin** with the mother until the first feeding is accomplished and as long as she desires thereafter
8. **Women who have surgical births** should also have their infants skin-to-skin after delivery
9. **Delay intrusive or stressful procedures**. The baby should be weighed, measured, and given preventive medications AFTER the feed[1,11]
10. **No pre-lacteal liquids or feeds** should be given unless there is a clear medical indication[1,11]

Is normal breastfeeding initiation in the first hour all that is needed to guarantee continued exclusive breastfeeding?

Mothers need continued support to breastfeed exclusively for 6 months. The family, health workers, traditional healers and others in the community are all important contributors to their network of support. Health providers, health visitors and others need clinical training in assessment of breastfeeding, identification of problems, as well as knowledge and

Skills for helping the mother to resolve difficulties. Follow-up by a health worker within 48-72 hours after the birth, again after one week, and at appropriate times thereafter provides the opportunity to intervene early if there are problems, as well as to reassure the mother when things are going well.

Mistaken Beliefs: Barriers to Normal Breastfeeding Initiation

1. Colostrum is not good, or even dangerous for babies. NO!

Colostrum is essential for normal growth and development [5]:

- First immunization – protects against intestinal and other infections
- Purgative to reduce severity of jaundice

2. Infants need special teas or other fluids before breastfeeding. NO!

Any pre-lacteal feeds (feed given before breastfeeding has started) increase the infant's risk of infection, reduce the likelihood of exclusive breastfeeding and shorten the duration of breastfeeding[6,8,11].

3. Babies will not get enough food or fluid with only colostrum and breast milk. NO!

Colostrum is sufficient for a baby's first feeds [5]. It is normal for a newborn to lose 3-6% of birth weight. They are born with a store of water and sugar in their bodies to use at this time.

4. Baby will get too cold. NO!

Babies are at safe temperatures when skin-to-skin with their mothers [4]: mother's breast temperature rises 0.5 degrees C within 2 minutes of having the baby on her chest [2].

5. Mothers are too exhausted after labour and delivery to feed their baby immediately. NO! The surge of oxytocin that comes with skin-to-skin contact and breastfeeding helps to calm a mother after the birth of her baby.

6. It is very important to suction the baby's mouth, nose, and oropharynx before the first breath to prevent inhaling birth fluids, especially if the baby had a bowel movement during the labour. NO!

Suctioning the normal healthy newborn does not reduce the occurrence of meconium aspiration, and may injure the tissue of the mouth, throat or vocal cords. Gastric suction also interferes with breastfeeding [13].

7. Vitamin K and medication to prevent gonorrhoea eye infection must be given immediately after birth. NO! The American College of Obstetrics and Gynaecology and the Academy of Breastfeeding Medicine state that these important preventive measures can be delayed for as long as an hour, until after the baby has breastfed, without risk to the infant [1,11]. They should not in any case require separation of mother and baby.

8. Women require pharmacologic intervention to cope with the pain of labour. Normally, **NO!**

Use of labour analgesia/anaesthesia may sedate the baby, hindering breast-seeking behaviour and delaying initiation of breastfeeding for hours or days [7]. Use of complementary therapies including having a companion during labour help women to cope with the pain, and the obstetric outcome may be improved [3]**.**

9. It requires too much work and time to help the mother during this time. NO!

While the baby is on the mother's chest, the birth attendant can continue to do the usual assessment of mother and baby or other duties [11]. The baby will find his or her own way to the breast.

10. **Should be postponed to delivery of placental and cutting of cord. No!**

Immediate placement of baby skin-to-skin aids placental separation and delivery. Clamping of the umbilical cord can be delayed for ***up to 2 minutes*** after delivery of placenta to ensure sufficient blood transfer to vital organs as brain and lungs, provided placenta is at same level of baby, while milking of the cord should be avoided[7].

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I.3. Breastfeeding after Operative Delivery

Introduction

The cesarean rate has sky rocketed in the 1980s until more than 1 in 5 births took place via cesarean and will probably continue to have a very significant increase in the next few years. Cesareans affect breastfeeding especially when no support is given to breastfeeding. Moreover stress of surgery tends to delay lactogenesis, but more important are hospital routines that tend to delay the first breastfeed and interfere with early initiation of breastfeeding. Too often, women who have had a long difficult labor and/or a cesarean encounter breastfeeding difficulties. Many of these difficulties could have been avoided, or fixed much sooner, had the women been offered timely help. For most women, breastfeeding difficulties are resolvable with timely help, emotional support, patience, and diligence. Unfortunately, not all women receive timely help or emotional support after birth, and so breastfeeding does not last long for some.

Benefits of Breastfeeding after a Cesarean Section

Briefly breastfeeding offers many benefits to women by lowering their risk for reproductive cancers like breast cancer, ovarian cancer, etc., and may have less osteoporosis. Breastfed infants receive superior nutrition and immunological protection that *strongly* lowers their rate of ear infections, gastrointestinal problems, allergies, and many other illnesses. The longer the breastfeeding, the stronger the benefits to both mother and baby.

However, breastfeeding offers many special benefits to the cesarean mother in particular. These include faster uterine involution and quicker weight loss after birth, stimulation of their immune system to reduce risk of postoperative complications especially as wound and womb infections. Cesarean babies who are breastfed also receive significant benefits such as immunological protections, and prevention/minimization of hypoglycemia and jaundice problems. Finally, the cesarean mother/baby duo often finds that breastfeeding is extremely healing emotionally after a difficult birth and can do much to help the pair bond under trying circumstances.

Many mothers find it difficult to return to the pre-pregnancy weight after birth, and anecdotally, this may be particularly true after a cesarean. Restrictions on mobility, pain from the incision, anemia from blood loss, adhesions from the surgery, etc. may all combine to make a cesarean mother less active than one who has given birth vaginally, sometimes for significant lengths of time, which may affect postpartum weight loss.

Research shows that breastfeeding helps women return to their pre-pregnancy weight levels faster than those who do not breastfeed. Therefore, breastfeeding may be particularly helpful for losing pregnancy weight if a woman is having difficulty resuming her activity level after a cesarean.

Immunological protection for the baby

Cesarean babies may be more at risk for infection for several reasons. Premature rupture of membranes exposes babies to risk for infection. Cesarean mothers also have higher rates of infection than mothers who have had vaginal births, thus potentially exposing their babies to this

infection as well. Invasive procedures and equipment for the breathing problems common to cesarean babies may also further the risk for infection. And since cesarean babies stay in the hospital longer as their mothers recover, they are exposed to more germs and risk for infection, since recent research has shown that neonatal and maternity units are often home to some of the most virulent germs in the hospital.

Colostrum (the 'first milk') is extremely high in protective antibodies that help coat the baby's gastrointestinal system and protect it from harmful bacteria, and it also contains substances that help stimulate the baby's own immune system. Research has shown that colostrum is *extremely* important in reducing a child's risk for infections.

As one doctor put it, "Breastfeeding is nature's first vaccine." Considering the possible infection risk many cesareans babies face, breastfeeding's immunological protections become especially important.

Hypoglycemia

Because of the possibility of low blood sugar after a difficult birth, many hospitals routinely give a bottle of glucose water to cesarean babies, 'just in case.' Unfortunately, this tends to cause a quick spike in blood sugar followed by a crash, and this unstable blood sugar can be a problem for the baby, causing a vicious cycle of treatment and re-treatment.

Unless the hypoglycemia is really severe, a better treatment is nursing frequently. The first milk a mother produces ('colostrum') has plenty of lactose to help raise the baby's blood sugar, but unlike glucose water, it also has a high amount of protein and fatty acids to help stabilize the blood sugar. The long-term treatment for adults with low blood sugar is frequent doses of protein to help slow and stabilize the rise in blood sugar. The Womanly Art of Breastfeeding states, *"Nursing at least ten to twelve times per day is the best way to stabilize a baby's glucose levels."*

Jaundice

Another common complication for newborns is physiological jaundice. In low levels, bilirubin is not harmful, but high levels may potentially be harmful. Jaundice is most common in premature babies, sick babies, babies of diabetic mothers, and when labor was induced or augmented artificially with pitocin. Many of these babies end up with cesareans. Thus jaundice is not uncommon in cesarean babies, not because of the cesarean itself but because of the conditions and drugs that tend to cause a higher cesarean rate.

Frequent nursing causes the baby to stool more frequently, and much of the bilirubin in the first days is eliminated through the baby's meconium (stool). If the baby does not stool enough, the bilirubin is reabsorbed through the intestines. Because the colostrum acts as a laxative, it helps the body process and excretes the extra bilirubin instead of re-absorbing it. Thus breastfeeding frequently is one of the best ways to minimize jaundice. Research clearly shows that nursing 7 or more times a day significantly decreases the occurrence of jaundice [(1)].

Although in the past jaundice was often treated by giving bottles of glucose water to help "flush" out the jaundice, research has shown that this does not help and may actually increase jaundice. Nursing early and frequently and exposing the baby to indirect sunlight are the best treatments for normal physiological jaundice. If extra help is needed, treatment with 'phototherapy' lights can also help lower bilirubin levels.

Many babies that end up with cesareans may be at more risk for physiological jaundice. Nursing is one of the best treatments for mild jaundice, and in conjunction with other therapies, can help even in more serious cases. But the benefits are strongest when the baby is able to nurse as soon as possible after birth, and as frequently as possible in the first few days.

Bonding

Bonding is often an issue after a cesarean. Many mothers report feeling distant and detached from their cesarean babies being preoccupied with physical pain, grogginess from drugs, and exhaustion. Breastfeeding can help restore the bond between mother and baby. Many women reported that breastfeeding aided them to heal after going through the cesarean.

Breastfeeding is important for cesarean mothers and babies not only for physiological reasons, but for emotional ones too. Unfortunately, too many hospitals do not place a priority on breastfeeding, or have routine protocols that actively interfere with breastfeeding.

How a Cesarean Can Interfere with Breastfeeding

Maternal Pain, Stress, and Fatigue

Research clearly shows that after a cesarean, fewer women initiate breastfeeding at all, or give up within the first month. Several workers [2,3,4,5,6,7,8] show that women who had a cesarean had lower breastfeeding rates.

Delayed Access to Baby

Studies show that the most critical issue for breastfeeding success after any birth is **early and frequent breastfeeding** [9,10]. Research shows that breastfeeding works best if the first nursing takes place within the first hour after birth. Unfortunately, even in vaginal births many hospitals are hard-pressed to meet this standard, but delays tend to be especially long after a cesarean.

Although a few women are able to nurse their babies right on the table

Exposure to supplementary Feedings

Many cesarean babies are given bottles of formula routinely [11], which research clearly shows also lowers the rate and duration of successful breastfeeding [12,13]. *"Infants given a supplementary feeding had 4x the risk of not being breastfed at 3 months [14]."* and *"30% of mothers whose babies received bottles in the hospital reported severe breastfeeding problems, as compared with 14% of those whose babies did not [15]."*

Offering exclusive formula-feeding before onset of lactation was shown a strong risk factor for delayed onset of lactation (mature milk coming in late), which can lead mothers to think they 'don't have enough milk' and stop breastfeeding [16]. Yet many hospitals still have policies requiring routine bottles, or nurses who aggressively insist that a postpartum bottle is necessary to 'prevent hypoglycemia' or 'test the baby's ability to suck and breathe at the same time.'

Even pediatricians rarely understand just how much supplementary feedings can interfere with breastfeeding; *"Only 64% of practitioners and 52% of residents knew that supplementing during the first few weeks of life may cause breastfeeding failure [17]."* Disdained culture and obstinate traditions of hospitals and their staff who regularly promote supplementary feedings yet are not aware of their harmful consequences.

When the mother's access to the baby is delayed, the baby is often given a pacifier to soothe it and keep it quiet in the meantime. Even when 'only' a pacifier and no supplementary bottles are given,

research shows that breastfeeding can still be affected. Pacifier use reduces breastfeeding duration *breastfeeding rate at 4 months by 54% compared to 9% nonpacifier group* [(18)].

Although supplementary feedings should be avoided as much as possible, sometimes circumstances or medical conditions really do necessitate them. If they must be done, research shows that doing them by non-bottle means preserves breastfeeding more often than if the baby is given a bottle. One study reported that 87% of babies who had 'prelacteal feeds' by spoon went on to total breastfeeding, while only 33% of babies who had prelacteal feeds by bottle went on to total breastfeeding [(19)]. So why aren't hospitals avoiding bottles when supplementation truly is needed?

Many hospitals strongly resist non-bottle supplementation options because they are not aware of other options, are not trained or encouraged in other options, or are stuck in old, rigid protocols. Many different types of non-bottle options are available, including syringes, cup feeding, finger feeding, eyedroppers, spoon feeding, supplementary nursing systems, etc. Further information on these alternatives can be found below, and also online at www.breastfeeding.com, www.lalecheleague.org, and www.promom.org.

Separation of mother and baby

Women whose babies are not separated from their mothers practice total breastfeeding more frequently and that *Rooming in* makes a difference [(20,21, 22)]!

The secretion of prolactin (an important hormone in milk supply) is 10x higher at night, and therefore nursing frequently at night *"may be more important than daytime in the establishment of lactation* [(23)]*."* Frequent nursing at night is much more likely if the baby rooms in than if it goes to the nursery.

Since frequent feedings are an important part of establishing milk supply in a timely manner, rooming in is an important part of helping cesarean mothers breastfeed more easily, and sleeping with the baby in your arms can help even more.

Anemia from blood loss

Research shows that women having a cesarean lose about twice the amount of blood as women having a vaginal birth. If a woman experiences excessive blood loss during surgery, she may experience anemia afterwards, which can interfere with milk supply significantly [(24, 25)].

Women most at risk for anemia postpartum include those who were anemic prenatally; those whose babies were born by cesarean; those who experience a hemorrhage during or after birth; those with certain placental problems like placenta previa, accreta or abruption; women carrying multiples; those with a history of prior post-partum hemorrhage; those with uterine atony; and heavy women (because of extra blood vessels feeding extra tissue).

Mechanical issues

Cesarean surgery also makes positioning the baby for nursing more painful. The usual 'cradle' nursing position can be painful after a cesarean, since this places baby against an abdomen that has just been traumatized. Placing a pillow over the incision may help cushion it sufficiently, but for some women even this places too much pressure on a tender area.

The football (underarm) hold is useful feeding after a cesarean delivery as the mother can see to latch the baby on easier and the baby is away from the

incision. Alternatively mother may breastfed in side lying position.

Type of anesthesia

The type of anesthesia used for the cesarean can also influence breastfeeding rates. Several studies [26,27] have shown that breastfeeding rates are significantly higher after regional anesthesia (epidural or spinal) than after general anesthesia.

General anesthesia tends to reach the baby strongly, and may depress his/her responses after birth for some time. This may make the baby harder to rouse for nursing, resulting in baby getting nursed less often (creating less demand for the milk supply).

Whether the cesarean was scheduled or unplanned also may make a difference in 'delayed onset of lactogenesis. Women with scheduled cesareans experience delayed lactogenesis (mature milk coming in later) less than women who had unscheduled or emergency cesareans [28]. This may reflect the type of anesthesia, the amount of medications the baby received, the amount of separation of mother and baby after the operation, or many other factors.

Inhibition of newborn suckling responses by medications

"Staff nurses and lactation consultants have noted that many babies whose mothers receive labor analgesia, including epidurals, have difficulty performing a cluster of behaviors necessary for successfully initiating feedings at the breast. They have difficulty latching to the breast, are unable to sustain sucking once latched on, have inefficient or uncoordinated sucking leading to little milk transfer and low intake, have difficulty arousing or staying awake, and exhibit poor cueing to feed. Thus, these babies gain slowly or not at all, and many lose excessive amounts of weight during the first week following birth. Mothers of these babies may present with sore nipples, low milk supply, secondary engorgement, plugged milk ducts, and blocked areas of the breast [29]."

A scoring system used to evaluate the effect of medications on neonatal suckling showed that babies of medicated mothers scored lower in suckling effectiveness than babies of unmedicated mothers, and the scores were lowest in the group that received both epidurals and IV drugs. The overall breastfeeding duration to 6 weeks postpartum was not significantly affected, but even so the authors concluded that:

Labor medications impair suckling in the early postpartum period. Therefore, lactation consultants should be concerned that breastfeeding mothers who have received labor medications may become discouraged, especially if they are discharged before effective breastfeeding is established. If mothers lack adequate support at home or did not receive follow-up care, babies with poor breastfeeding behaviors are at greater risk for dehydration, jaundice, and poor weight gain. [30]

Drugs used in epidurals are known to cross the placenta. Bupivacaine *"enters the maternal blood stream rapidly from the epidural space. It then crosses the placenta so that a measurable concentration is present in the fetal circulation within 10 minutes of administration."* Narcotics (such as Fentanyl) that are commonly added also *"show significant placental transfer."* A few studies showed that infants may be affected by labor medications for as long as a month after birth [31].

Certain specific labor or postpartum medications may also suppress breastfeeding. Postoperative extradural buprenorphine decreases the amount of

breastfeeding and infant weight gain for 11 days after a cesarean. Although this study needs to be replicated, the authors suggested that extradural buprenorphine suppressed breastfeeding after cesareans [32].

Many women are given Duramorph in their epidurals during the cesarean to help with post-operative pain. Duramorph and similar drugs are associated with a high incidence of itching (pruritis), and women are often given Benadryl or other antihistamines to lessen the itching.

Magnesium Sulfate can interfere with establishment of breastfeeding. This is a medication used to help women with pre-eclampsia prevent seizures and other problems.

Many women are given diuretics after birth to help deal with significant swelling/edema as in pre-eclampsia, or induced with pitocin, and women who have had lots of extra IV fluids, all tend to have the worst problems with edema after the birth. Diuretics interfere with breastfeeding supply.

It is clear that medications given during labor and birth can affect the baby's suckling response and feeding behaviors and can also affect mother's milk supply.

Hints to support Breastfeeding Success after a Cesarean

- Go for a vaginal birth if possible; the hormones of labor will help breastfeeding get started sooner and more easily
- If you must have a cesarean, utilize regional anesthesia (epidural, spinal, or combined spinal epidural) instead of general anesthesia
- Nurse as early as possible after the baby is delivered, especially before regional anesthesia wears off
- Take pain medication as needed in order to be comfortable
- Pursue regular, frequent feedings
- Don't limit time on the breast
- Use relaxation tapes (as music or holy recitations) and guided imagery to help decrease stress and increase milk output
- Utilize the support of a professional lactation consultant to help with positioning and latch-on concerns
- Avoid artificial nipples and unnecessary supplements as much as possible
- The ' football' or 'clutch' hold is often more comfortable after a CSDection
- Room in with the baby to increase the breastfeeding success rate
- Have a family member (father or other relative) room in too
- Sleep with the baby, which can greatly ease regular feedings
- Be sure your nutrition is excellent and that you are getting plenty of extra fluids
- Watch carefully for thrush (a yeast infection) after a CSDection
- If experiencing problems, get expert help from a professional lactation consultant as soon as possible

Final remarks

The mechanism by which cesarean delivery interferes with breastfeeding can be remedied by reversing hospital practices. However the understanding of hormonal patterns may shed more light. One study examined the number of oxytocin pulses, and the levels of prolactin and cortisol. Vaginal birth mothers had significantly more pulses of oxytocin than the cesarean mothers, and had more of a rise in prolactin levels as

well. This study may shed some light on why milk may come in a bit later in some cesarean mothers [33].

The poor outcome of breastfeeding in cesarean deliveries may also be related to maternal psychological status, where one study showed that *cesarean mothers, as a group, expressed less satisfaction with the birth (both short-term and long-term), were less likely ever to breastfeed, had a longer time to first interaction with their babies, had less positive reactions to them after birth, and interacted less with them at home [34].*

However the high level of commitment of mothers to breastfeed even after cesarean delivery and their persistence in breastfeeding [2,34] with support given by reversing to Baby Friendly practices can ameliorate and may reverse the adverse effects of cesarean practice [35]. Moreover supporting early initiation of breastfeeding as early as possible within the first hour after delivery through continuous uninterrupted skin-to-skin contact can reduce many of the side effects of medications and stress of operative delivery [36,37].

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قلبي و النبي يا طبيـــــــــب
همد و مات و الا سامع له دبيـــــــــب
قاللي لقيته مختنق بالدمـــــــــــــوع
و ما لوش دوا غير لمسه من إيد حبيب

عجبي!!!!

بحر الحياه مليان بغرقي الحياه

صرخت خش الموج في حلقي ملاه
قارب نجاه .. صرخت قالوا مفيش
غير بس هو الحب قارب نجاه

عجبي!!!!

من رباعيات صلاح جاهين

I.4 International Guidelines on Umbilical Cord Clamping

Adapted from: Timing of umbilical cord clamping after birth. Committee Opinion No. 543. American College of Obstetricians and Gynecologists. Obstet Gynecol 2012;120:1522–6.

Introduction

Before the mid 1950s, the term "early clamping" was defined as umbilical cord clamping within 1 minute of birth, and "late clamping," as umbilical cord clamping more than 5 minutes after birth.

In a series of studies of blood volume changes after birth carried out by investigators in Sweden, the United States, and Canada, it was reported that in healthy term infants, more than 90% of blood volume was achieved within the first few breaths the infant took after birth [(1)]. Because of these findings and the lack of specific recommendations regarding the optimal timing, the interval between birth and umbilical cord clamping began to be shortened. In most cases, umbilical cord clamping is performed within 15–20 seconds after birth, with the infant maintained at or below the level of the placenta. Although many randomized controlled trials of term and preterm infants have evaluated the benefits of immediate umbilical cord clamping versus delayed umbilical cord clamping (generally defined as umbilical cord clamping performed 30–60 seconds after birth) [(2–26)], the ideal timing for umbilical cord clamping has yet to be established and continues to be a subject of controversy and debate [(21, 27–29)].

Concerns exist regarding universally adopting delayed umbilical cord clamping. Delay in umbilical cord clamping may jeopardize timely resuscitation efforts, if needed, especially in preterm infants. However, because the placenta continues to perform gas exchange after delivery, sick and preterm infants are likely to benefit most from additional blood volume derived from a delay in umbilical cord clamping. Another concern has been raised that delay in umbilical cord clamping increases the potential for excessive placental transfusion, which can lead to neonatal polycythemia, especially in the presence of risk factors for fetal polycythemia, such as maternal diabetes, severe intrauterine growth restriction, and high altitude. Additionally, delayed umbilical cord clamping (with the infant placed at or below the level of the placenta) may be technically difficult in some circumstances. Another issue is that delayed umbilical cord clamping might interfere with attempts to collect cord blood for banking. However, the routine practice of umbilical cord clamping should not be altered for the collection of umbilical cord blood for banking [(30)].

Neonatal Outcomes

Physiologic studies in term infants have shown that a transfer from the placenta of approximately 80 mL of blood occurs by 1 minute after birth, reaching approximately 100 mL at 3 minutes after birth [(16, 31, 32)]. This additional blood can supply extra iron, amounting to 40–50 mg/kg of body weight. This extra iron, combined with body iron (approximately 75 mg/kg of body weight) present at birth in a full-term newborn, may help prevent iron deficiency during the first year of life [(33)].

Several systematic reviews have suggested that clamping the umbilical cord in all

births should be delayed for at least 30–60 seconds, with the infant maintained at or below the level of the placenta because of the associated neonatal benefits [1, 21, 29, 33–35], including increased blood volume [2, 3, 13, 31, 36–40], reduced need for blood transfusion [17, 22, 41], decreased incidence of intracranial hemorrhage in preterm infants [10, 18, 29], and decreased frequency of iron deficiency anemia in term infants [7–9, 13, 24–26, 35–37, 40, 42].

In addition, a longer duration of placental transfusion after birth may be beneficial because this blood is enriched with immunoglobulins and stem cells, which provide the potential for improved organ repair and rebuilding after injury from disorders caused by preterm birth [39, 43]. Although the magnitude of the benefits from enhanced placental stem cell transfusion has not been well studied, the other neonatal benefits have led investigators to consider revising umbilical cord clamping practice guidelines [4, 28, 40, 44–43].

Maternal Outcomes

The effect of delayed umbilical cord clamping on maternal outcomes has not been adequately studied. Some studies have shown no increase in the incidence of postpartum hemorrhage from delayed umbilical cord clamping. However, this remains a theoretic concern because blood flow through the spiral arteries and veins in a term uterus is approximately 600 mL/min. Concerns regarding maternal risks become particularly relevant in special circumstances in which the benefits of delayed umbilical cord clamping need to be balanced with the timely resuscitation of the woman (eg, in cases of hemorrhage from placenta previa or placental abruption after delivery of a preterm infant).

Clinical Trials in Term Infants

A 2008 Cochrane review assessed the effect of umbilical cord clamping in term infants on maternal and fetal outcomes in 11 clinical trials that involved 2,989 women and their infants [42]. Reviewers found no significant differences in postpartum hemorrhage between the women whose infants underwent early umbilical cord clamping (within 1 minute after birth) and late umbilical cord clamping group (at least 1 minute after birth or after cessation of cord pulsation) in any of the five trials (2,236 women) that measured this outcome (relative risk [RR] for postpartum hemorrhage of 500 mL or more, 1.22; 95% confidence interval [CI], 0.96–1.55). The reviewers found that late umbilical cord clamping had positive and negative effects on neonatal outcomes. In five trials, which involved a total of 1,762 infants, a significant increase was noted in the need for phototherapy for jaundice after birth among infants in the late umbilical cord clamping group (RR, 1.69; 95% CI, 1.08–2.63). However, infants who underwent late umbilical cord clamping had significantly higher levels of hemoglobin (Hb) compared with infants in the early umbilical cord clamping group (weighted mean difference, 2.17 g/dL; 95% CI, 0.28–4.06). Infant ferritin levels remained higher in infants in the late umbilical cord clamping group compared with those in the early umbilical cord clamping group until 6 months (weighted mean difference, 11.8 micrograms per liter; 95% CI, 4.07–19.53).

Clinical Trials in Preterm Infants

In a systematic review of 10 trials of early umbilical cord clamping versus delayed umbilical cord clamping in 454 preterm infants (at less than 37 weeks of gestation), no statistically significant differences were found between the groups for cord blood pH (mean difference, 0.01; 95% CI, –0.03–0.05), Apgar scores (RR

for 5-minute Apgar score of less than 8, 1.17; 95% CI, 0.62–2.2), and ***body temperature at admission*** (mean difference, 0.14 °C; 95% CI, –0.31–0.03) (2, 29). Benefits of delayed umbilical cord clamping included a ***reduced need for blood transfusions for low blood pressure*** (RR, 0.39; 95% CI, 0.18 to 0.85) and anemia (RR, 0.49; 95% CI, 0.31–0.81). No significant differences were noted for infant deaths (RR, 0.71; 95% CI, 0.3–1.69), but a significant ***reduction in the incidence of intraventricular hemorrhage*** with delayed umbilical cord clamping was reported by 7 of the 10 published studies (RR, 0.53; 95% CI, 0.35–0.79).

Another systematic review on this topic analyzed the results from 15 eligible studies (738 premature infants) (21). Infants were born between 24 weeks of gestation and 36 weeks of gestation. The maximum delay in umbilical cord clamping was 180 seconds.

Delaying umbilical cord clamping was associated with fewer infants who required transfusion for anemia (seven trials, 392 infants; RR, 0.61; 95% CI, 0.46–0.81) and for low blood pressure (four trials with estimable data for 90 infants; RR, 0.52; 95% CI, 0.28–0.94); and less intraventricular hemorrhage (ultrasound diagnosis all grades) (10 trials, 539 infants; RR; 0.59; 95% CI, 0.41–0.85) compared with immediate umbilical cord clamping.

For other outcomes (infant death, severe [grade 3–4] intraventricular hemorrhage, and periventricular leukomalacia), no clear differences were identified between groups; however, many trials were affected by incomplete reporting and wide confidence intervals. Outcome after discharge from the hospital was reported for one small study, and no significant differences were reported between the groups in mean Bayley II scores at age 7 months (corrected for gestation at birth and involved 58 children) [(21)].

Umbilical Cord Milking

One clinical trial and a secondary analysis from the same trial have compared "milking" of a 20-cm segment of the umbilical cord versus immediate umbilical cord clamping in preterm singleton infants born between 24 weeks of gestation and 28 weeks of gestation [(49, 50)]. Significant findings in the clinical study included higher initial Hb concentration, higher mean systemic blood pressure, reduced need for blood transfusion, and higher urine output during the first 72 hours in the group that underwent umbilical cord milking compared with the group that underwent immediate umbilical cord clamping. The group that underwent umbilical cord milking also required a shorter duration of supplemental oxygen and mechanical ventilation. A 2011 randomized controlled trial of 58 preterm neonates (born at 24–32 6/7 weeks of gestation) randomized to receive either repeated milking of the umbilical cord (4 times) or delayed umbilical cord clamping of 30 seconds found that the two strategies had similar effects on Hb levels after birth [(51)]. More studies are needed to evaluate the potential benefits and risks of umbilical cord milking, and at this time there is insufficient evidence to support umbilical cord milking in preterm infants.

Conclusion

Currently, insufficient evidence exists to support or to refute the benefits from delayed umbilical cord clamping for term infants that are born in settings with rich resources. Although a delay in umbilical cord clamping for up to 60 seconds may increase total body iron stores and blood volume, which may be particularly beneficial in populations in which iron deficiency is prevalent, these potential

benefits must be weighed against the increased risk for neonatal phototherapy. In addition, no difference is apparent between infants who undergo early umbilical cord clamping versus those who undergo delayed umbilical cord clamping with respect to immediate birth outcomes, such as Apgar scores, umbilical cord pH, or respiratory distress caused by polycythemia (51). Although maternal outcomes have not been rigorously studied, the incidence of postpartum hemorrhage is reported to be similar between immediate umbilical cord clamping groups and late umbilical cord clamping groups.

However, evidence supports delayed umbilical cord clamping in preterm infants. As with term infants, delaying umbilical cord clamping to 30–60 seconds after birth with the infant at a level below the placenta is associated with neonatal benefits, including improved transitional circulation, better establishment of red blood cell volume, and decreased need for blood transfusion. The single most important clinical benefit for preterm infants is the possibility for a nearly 50% reduction in intraventricular **hemorrhage.** It is important to note that the timing of umbilical cord clamping should not be altered for the purpose of collecting umbilical cord blood for banking [30].

Future Research

The ideal time for clamping the umbilical cord after cesarean delivery versus vaginal birth is an especially important area for future research. Premature infants, who may benefit most from delayed umbilical cord clamping, are more likely to be delivered by cesarean delivery because their mothers may have other medical and obstetric complications.

The risks of umbilical cord milking remain unknown, and more studies are needed to compare milking of the umbilical cord with delayed umbilical cord clamping. The value of enhanced stem cell and plasma transfusion associated with delayed cord clamping with respect to immediate and long-term immunity, host defense, and repair is another important area for future research.

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Test your knowledge in Breastfeeding Management

A sample posttest from the American Academy of Pediatrics (AAP) curriculum in Breastfeeding for residents*: *http://www2.aap.org/breastfeeding/curriculum/

1**) The recommended treatment of symptomatic hypoglycemia includes all of the following EXCEPT:**

a) Gavage feeds with glucose water or expressed breast milk
b) Breastfeeding on demand once symptoms resolve
c) Glucose monitoring before each feed until glucose is stabilized
d) Intravenous glucose using 2 cc/Kg 10% glucose bolus, followed by 6–8 mg/kg/min continuous glucose infusion
e) Examination and evaluation to exclude underlying illness

ANSWER: a. Symptomatic hypoglycemic infants need investigation, monitoring, and IV glucose, not forced feedings.

2**) During the postpartum stay, a breastfeeding mother reports that she is having difficulty getting her infant to breastfeed. Your best response to this situation should be to:**
a) Explain that most babies have a difficult time starting out and to just keep trying
b) Advise that the baby may be getting dehydrated, so he is not interested in feeding
c) Encourage supplementation until the baby learns to breastfeed
d) Discharge the infant, so the mother will be more relaxed breastfeeding at home
e) Request assistance for the mother at the infant's next feeding to evaluate the breastfeeding technique

ANSWER: e. Reassurance without observation and investigation may lead to a dehydrated, jaundiced baby and a frustrated, engorged mother. Supplementation without a valid indication and plan will sabotage the supply and demand nature of breastfeeding.

3) **An adequately breastfed healthy, term infant can be expected to have all of the following EXCEPT:**
a) Infrequent stools in the first 2 weeks of life
b) Loss of no more than 8%–10% of birth weight initially, with regain of birth weight by about 2 weeks of age
c) Loose, yellow, seedy stools after most feedings in the early weeks of life, beginning when the mother experiences
an increase in her milk production
d) Desire to feed frequently, at least every 2–3 hours
e) Weight gain pattern of 15–30 grams per day beginning with mother's increased milk production

ANSWER: a. Frequent (4–10 per 24 hours), yellow, cottage cheese and mustard stools are the hallmark of adequate intake after mothers' full milk supply "comes in" (Lactogenesis II). Urine output can be adequate without adequate nutrition for appropriate growth. What goes in must come out!

Section II
Original Research Studies

Does First Hour Skin-to-Skin and Follow-up Support Improve Breastfeeding Outcomes in Cesarean Delivery Despite Anesthesia?

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Abstract

Introduction: Cesarean section delivery (CSD) can influence the outcome of breastfeeding continuity but the mechanism is not clearly defined. Delayed initiation of breastfeeding, anesthetic medications and lack of support are all claimed to play a role.

Aim: To compare the outcome of breastfeeding continuity in CSD versus normal vaginal delivery (NVD) after controlling for skin to skin contact (SSC), anesthetic medications and support after discharge.

Methodology: This is a prospective cross sectional observational study including 100 women delivered by (NVD) and 100 by CSD using spinal anesthesia by heavy bupivacaine. All were offered support to initiate breastfeeding by early SSC. The intervention consisted of support and guidance in breastfeeding (at discharge, 2 weeks, and 3 month) for 50 NVD and 50 CSD. The other one hundred mother infant pairs did not receive intrapartum and post discharge support**.**

Findings: Timely initiation of breastfeeding was significantly delayed in CSD exposed to spinal anesthesia and mostly in the unsupported group (8.6%) compared to the supported NVD group (28%) at $P<0.05$. We identified 25 prefeeding reflexes and were influenced regarding time of appearance and number by the type of delivery and drugs given during delivery. Exclusive breastfeeding discharge rates were higher among the mothers with NVD (85%) compared to the CSD (75%). At 3 months postpartum exclusive breastfeeding rates in the supported groups (55%) was significantly higher than in the non-supported group (45%) at $P = 0.002$, but there was no difference between the CSD and NVD groups in the breastfeeding continuity rates.

Conclusions: Exposure to CSD interfered with timely initiation of breastfeeding by delaying the appearance of prefeeding responses. However early skin-to-skin contact with continued follow-up support by skilled staff can ameliorate to some extent the harmful effects of CSD and assist the mother and baby to continue successful breastfeeding practices.

Introduction

Breastfeeding is more difficult after cesarean section delivery (CSD) for many reasons. These include maternal pain and fatigue, delayed access to baby, separation of mother and baby, blood loss causing anemia, mechanical problems in feeding, interference from medications and increased supplementation of cesarean

babies; use of bottles/pacifiers/artificial nipples with babies[1].

Mothers who have had a CSD may be tired from drugs, nauseous with pain, and exhausted from labor, surgery, and significant blood loss. It was found that maternal stress interfered with the release of oxytocin. It was also found that stressed newborns were more likely to be weak or too sleepy to latch and suckle effectively [2]. Women who had a cesarean delivery tend to receive their baby much later than if they had a vaginal birth [3,4]**.** This delay in first nursing can cause critical differences in hormonal levels [5] and impact milk supply. It also delays the appearance of mature milk [6,7], putting the baby at risk for dehydration or excessive weight loss after birth, which often leads to supplementing with infant milk formula [8]. Moreover, all of these factors mount up to undermine a woman's confidence and success in breastfeeding.

Fortunately, although these factors can present significant barriers to cesarean mothers, many women manage to go on and breastfeed their child anyhow, in spite of the difficulties. This was explained by the persistence of mothers to breastfeed on the one hand and on the other hand by support they are offered by the staff or on return to their home.

This interplay of factors that influence the outcome of CSD on breastfeeding has prompted us to conduct this study. Hence the aim of the current study is to show whether support offered, at birth and through postpartum follow-up, to women who deliver by CSD and identify determinants to successful continuity in breastfeeding after CSD.

Subjects and methods

This is a prospective cross sectional non-randomized observational study conducted with two hundred women from January of 2012 to May of 2012 selected from a mixture of tertiary Cairo governorate hospitals including hospitals representing Universities, teaching organization, public, and private sectors.

The sample included one hundred women delivered by normal vaginal delivery (NVD) and one hundred admitted for cesarean section delivery (CSD). Both groups were matched for age and socioeconomic status. They were explained the benefits and draw backs of the intervention. They consented to participate in the study in line with the ethical criteria for conducting research studies.

Inclusion criteria included women at delivery (nulliparous or multiparous), age 15-49 years, general or spinal anesthesia for those undergoing CSD, women giving birth to normal term single baby, no anesthesia received for those who deliver by NVD.

Exclusion criteria included females whose pregnancy consisted of multiple babies, neonatal complications; premature or babies admitted in an intensive care unit; babies with major congenital anomaly or major birth injury; women who had a complicated birth or severe complications during pregnancy.

The two hundred women were classified according to the mode of delivery, exposure to anesthesia, support and follow up after birth into the following 4 subgroups: **group 1** included fifty women exposed to anesthesia and cesarean section who were supported during delivery and during follow up for 3 months; **group 2** included fifty women exposed to anesthesia and cesarean section and not offered support during delivery and follow up; **group 3**: included fifty women not exposed to anesthesia and delivered vaginally and supported during delivery and during follow up for 3months and **group 4**: included fifty women not exposed to anesthesia during delivery (normal vaginal delivery) with no support at delivery or during follow up.

Sample selection: 20 pregnant women in the antepartum undergoing NVD and 20 pregnant women in the antepartum undergoing CSD were selected from each of the following hospitals: Kasr-Al-Aini University Hospital, Al Galaa Teaching, Shubra General Hospital, Al Zawia General Hospital, and Al-Fatteh

private Hospital, totaling 200 women. The hospitals were chosen because they fit the criteria of having a high turnover of women undergoing NVD and CSD.

Interviews were carried out with the anesthesia specialists of the different hospitals under study to define the drugs used as anesthetic drugs.

The protocol applied in all the hospitals under study for CSD was as follows: 1- General anesthesia: A-Intravenous anesthesia: Thiopental Na or Propofol for women suffering from bronchial asthma or cardiac problem. B-Inhalation anesthesia: Isoflurane. C- Neuromuscular Blocking Agents (muscle relaxation) including succinylcholine and atracurium. The analgesia consisted of pethidine and fentanyl. 2-Spinal anesthesia: included heavy bupivacaine.

Clinical procedures: ***Step 1: Preparation of the staff:*** The staff including the obstetrician, neonatologist, anesthetist, nursing staff, and up to auxiliary workers were briefly informed about the aim of the study, and the technique was thoroughly explained to them. ***Step 2: Observation of the mother in the antepartum ward*****:** The research worker greeted the mother and introduced himself to her, when the mother agreed to comply with the research worker she was included in the study. An interview was conducted with her using a predesigned questionnaire including: personal history: name, age, occupation, education, work status, smoking, intention to breastfeed and experience, preference of the mode of delivery (NVD or CSD), knowledge about general or spinal anesthesia, hazards of formula feeding, special supplemental nutrition program for women and breastfeeding. The mother was also informed and educated about the importance of breastfeeding, the technique and the benefit of early skin-to-skin care (SSC) between the mother and her newborn as a means to successful initiation of breastfeeding. ***Step 3: Observation of the mother-infant pairs in the delivery or operation room:*** In the delivery or operation room information about the mother and the baby was collected including: weeks of gestation, sex, birth type, analgesia given during labour, narcotics given, spinal or general anesthesia, induction of labour, meconium liquor, weight of the baby, length, Apgar score, and temperature. Also events observed were recorded including: birth time, cord cut, head dried, body dried, placed on mother's abdomen, baby cry, and placed in open cot.

Step 4: Observation of the mother- infant pairs In the post partum ward: the 200 cases were randomly divided into one hundred mother infant pairs who were subjected to the intervention of breastfeeding support at discharge, 2 weeks, and 3 month, and included 50 NVD and 50 CSD The other one hundred mother infant pairs did not receive support by the research worker at discharge or 2 weeks but were assessed at 3 months for comparison. They included 50 NVD and 50 CSD cases of mother-infant pairs.

Perinatal support of the mothers was continued even after they left the labour ward and they were transported to the post partum maternity ward to make sure that they initiated breastfeeding with correct positioning and attachment before being discharged from the hospital. We observed and recorded the baby feeding behavior (pre-feeding responses) and included the 25 common responses reported as follows [(7)]: pushes feet down, grasping with hands, hand to mouth, sucks fingers, sucks fist, pokes tongue out, licks, lip smacking, drooling saliva, attempts to turn head, turns head, attempt to lift head, lifts head up, moves toward breast, nudges breast with chin, begins to gape, wide gape, attempts to suck on skin, attempt to grasp nipples, grasp nipples, takes asymmetrical latch, suckles at breast, sustained suckle, reattached, baby off breast [(7)].

Support to mother infant pairs at discharge: The one hundred mother infant pairs subjected to breastfeeding support at discharge included support and guidance in breastfeeding techniques, adherence to exclusive breastfeeding and avoiding feeding baby other milk or foods, avoiding pacifiers, increasing frequency of breastfeeding to maintain and increase milk supply, also information was gathered about their current breastfeeding practices, any worries or anxieties they have this was done by using counseling skills.

Follow up: This was performed mostly by a telephone follow-up at 2 weeks or 3 months for

gathering information about the practice of breastfeeding either exclusive or non exclusive breastfeeding, other feeds given to the baby, herbal supplementation, adding artificial milk, offering pacifiers or bottles to the baby, problems baby growth, responding to her queries, whilst building mother confidence to continue breastfeeding.

Statistical analysis: The program used was SPSS version 16. Quantitative data were analyzed using mean and standard deviation, while frequency and percentage were used with qualitative data. Student t test and F test were used to compare means of different groups, while Z test, Fischer exact test and chi square to compare frequencies.

Results

Sociodemographic data of the studied population showed that 59 women (29.5%) were between 15-24 years, 115 women (62.5%) were between 25-34 years, 11 women (8%) more than 34 years. Mean age of women included in the study was 27.3 years. The majority of women 174 (87%) were not employed, and only 26 women (13%) were employed. Percent of women who achieved primary education in group 1 was (16%), in group 2(14%), in group 3 (14%) and in group 4 (14%). Percent of women who achieved secondary education in group 1 was (46%), in group 2(44%), in group 3 (42%) and in group 4 (44%).

Percent of women who achieved tertiary education in group 1 was (26%), in group 2(32%), in group 3 (32%) and in group 4 (28%). There were no statistical significant differences between the groups as regard the level of education. Co-morbidities showed no difference between the NVD group and the CSD group except for anemia which was significantly higher among women of the NVD group at (p value= 0.038), with 10 cases with history of anemia, 2 cases with history of heart problem, and 4 case with a history of hypertension, 4 case with a history of diabetes in the NVD group, while in women belonging to the CSD group there were 4 cases with history of anemia, 2 cases with history of bronchial asthma, 2 cases with history of diabetes and 4 case with a history of hypertension.

Mean birth weight in male babies was (3364.26 ± 472.6 gm) and (3265.56 ±439.6 gm) in female babies (P = 0.128). Mean gestational age in male babies was (38.82± 1.08 weeks) in males and (38.72±1.21 weeks) in females (P=0.569). The mean Apgar score at 1 and 5 minutes was significantly higher in NVD as compared to CSD babies. At 1 minute in NVD it was 7.4± 1.46, and in CSD group it was 6.52± 1.54 (P value = 0.001). Mean Apgar score at 5 min in NVD was 9.42± 0. 64 and in CSD group it was 8.62± 0.84 (P value = 0.001).

Any initiation of breastfeeding was performed by (80%) of group 1, (70%) of group 2, (90%) of group 3 and (80%) of group 4 (P=0.1).

Timely initiation in the first hour occurred in 12.5% of group I; 8.6% of group 2; 28.9% of group 3; and 25% of group 4. Between first and second hour 15% of group I, 11.4% of group 2, 44.4% of group 3 and 42.5% of group 4 initiated their first suckle at the breast. There was a highly significant difference between the 4 groups as group 3 and group 4 initiated breastfeeding earlier than group 1 and group 2 (P value = 0.001) as shown in table (1).

Pre-feeding responses: we identified 25 pre-feeding responses. These were mostly delayed in groups exposed to anesthesia as shown by the mean time of appearance of pre-feeding responses. The pre-feeding responses which were significantly delayed included *pushing feet down; grasping with hands; hand to mouth; sucks fingers; sucks fist; pokes tongue out; licks; lip smacking; drooling saliva; attempt to turn head; turns head; attempt to lift head; lifts head up; moves toward breast; nudges breast with chin; begins to gape; wide gape; attempt to suck on skin; Attempt to grasp nipples; grasp nipples; takes a symmetrical latch; baby suckles at breast; sustained suckle; reattached and baby off breast finished feeding* (P value= 0.001) as shown in figure (1).

Breastfeeding practices at discharge: The overall rates of exclusive breastfeeding at discharge in the NVD group (85%) was significantly higher than those in CSD group (75%) at P<0.05. In the supported group the rate of exclusive breastfeeding at discharge was 35.7% in the CSD group and 64.3% in the NVD group (P<0.05). Supplementary feeding

prior to discharge was significantly higher in the CSD group as 70% were supplementing with infant milk formula (IMF|) feeds compared to 30% of NVD group (p<0.001), as shown in figure 2).

Follow-up findings: At two weeks postpartum: In the supported groups the rates of exclusive breastfeeding in the NVD group (52%) was not significantly higher than in CSD group (48%) at P>0.05. Supplementary feeding with IMF was the same in both groups (p>0.05). However in the CSD group decreased from 7 to 6 mothers and in the NVD group increased from 3 to 6 mothers as shown in figure (3). **At 3 months postpartum**: Overall there was no significant difference between the exclusive breastfeeding rates in the CSD group (47.7%) and the NVD group (52.3%) at P>0.05. Of those 13 of the CSD (54%) and 11 of the NVD group (46%) were administering IMF with breastmilk, while 9 of the CSD (60%) and 6 of the NVD group (40%) had stopped breastfeeding. The difference between the groups was insignificant P>0.05 (Figure 4). However exclusive breastfeeding in the supported groups (55%) was significantly higher at 3 month than in the non-supported group (45%) at P = 0.002, as shown in figure (5).

Discussion

In our study we found that mothers who delivered by cesarean section (CSD) were less likely to initiate breastfeeding early than mothers who delivered by vaginal delivery. Timely initiation (within the first hour) was only 26.9% in vaginally delivered mothers and 10.5% in mothers delivered by cesarean section. During the first two hours after delivery (43.4%) of vaginally delivered mothers initiated breastfeeding compared to only (13.2%) of mothers who delivered by CSD initiated breastfeeding. Yet at discharge 75% of the CSD and 85% of vaginally delivered mothers were exclusively breastfeeding, indicating that although there was a delay in breastfeeding, yet the practice of skin to skin prior to the first breastfeed gave breastfeeding a boost to start in an effective manner and avoid consequent complications.

Many workers in various countries, both developed and developing, have reported a delay in breastfeeding among mothers undergoing CSD [(1,9)].

The mechanism by which CSD affects breastfeeding initiation is thought to be related to the fact that this surgical procedure has a longer recovery period than a vaginal birth and can cause serious complications, including pain, uterine hemorrhage, infections, and loss of mobility in the mother. All these aggravated health outcomes can compromise the mother's ability to breastfeed, not only by prolonging maternal–infant separation but also by forcing mothers to concentrate more on their recovery, rather than on their baby's nutritional needs [(10-12)].

We found that (92%) of vaginal delivery group and (94%) of the CSD group who were provided follow-up support were still breastfeeding. The rate of exclusive breastfeeding at 3 months was similar in both supported groups of mothers delivered whether by vaginal or cesarean (72% and 78% respectively). While partial breastfeeding in vaginal delivery supported was (20%) while in CSD group it was (16%). Those who stopped breastfeeding were more in the NVD than the CSD (6% versus 8%). Although at discharge exclusive breastfeeding rates appeared higher in the vaginally delivered group, yet follow-up support revealed that the difference between the groups diminished and became insignificant. Other workers have shown that once breastfeeding had begun, the delivery method no longer had any influence on the duration of breastfeeding [(13,14)]. Despite later first nursing, a high occurrence of general anesthesia, and

increased dissatisfaction with their births, CSD mothers were able to manage to breastfeed about as often as mothers who had a vaginal birth. The single most important variable associated with successful breastfeeding was found to be the degree of commitment reported by the mother [15].

This finding was echoed by another study [7,12], which also found that despite delay in breastfeeding initiation and less satisfaction with the birth experience, cesarean birth was not related to breastfeeding duration. The authors speculated, *"The high level of commitment to breastfeeding in this sample may have overcome the effect of perinatal events."* Even some women who experienced traumatic births or CSD report that the experience of breastfeeding itself is self-healing.

Hence the present study showed that the effect of CSD on early breastfeeding is mediated through processes that delay the onset of lactation, disrupt mother-infant interaction, or inhibit infant suckling. However supporting, counseling and guiding mothers are crucial to increase her commitment to successfully exclusively breastfeed. The first postnatal hours are crucial for establishing mother-infant interaction and breastfeeding success. [16,17,). While the timeliness of the first feed is a key determinant [18]. Postoperative care routines after CSD interrupt bonding [19], delay mothers holding their infants [20,21,22], and reduce early breastfeeding [23]. Implementing Baby and mother friendly practices within these hospitals, can ameliorate the negative effects of CSD, intrapartum and peripartum medications, maternal illness and infant illness [24]. While postnatal support, can significantly increase exclusive breastfeeding rates and continuity [25].

This study, despite its limitations, indicates that postpartum support did have an effect on maintaining the breastfeeding initiation rates. Although exclusive breastfeeding discharge rates were significantly lower among the cesarean deliveries as compared to the vaginal, yet with follow-up support and guidance, these numbers where maintained among the CSD but decreased among the vaginally delivered mothers who were not supported.

The role of early continuous uninterrupted skin-to-skin contact (before the first feed) in assisting the emergence of prefeeding reflexes could explain the differences in the discharge rates of breastfeeding in the different modes of feeding, since more prefeeding reflexes were absent among the cesarean deliveries. The increased breastfeeding rates with postpartum support could be explained by the delayed emergence of the prefeeding responses permitting these babies to catch-up in their breastfeeding skills aided with support given and their commitment to continue to breastfeed.

Overall our findings are similar to other cultures among Arab women who also documented that CSD is a risk factor for early cessation [27, 28]. Strategies to reduce cesarean births need to be considered [31]. While strategies to reduce the negative effects of CSD on the outcome of breastfeeding should include, supporting early skin-to-skin contact and postnatal counseling, with follow-up guidance. Such interventions should be considered be as remedial strategies to reverse what CSD does to babies, mothers and breastfeeding for improving health outcomes of mothers and their babies.

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Table (1): Comparing frequency distribution of breastfeeding initation and time to time to first breastfeed in groups under study:

Breastfeeding initiation		**G I No (%)**	**G II No (%)**	**G III No (%)**	**G IV No (%)**
Initiated Breastfeeding	**Yes**	**40 (8)**	**35 (7)**	**45 (90)**	**40 (80)**
	No	**10 (20)**	**15 (30)**	**5 (10)**	**10 (20)**
	X2 test	**6.25**			
	P value	**0.10***			
Time to breastfeed from delivery	**<1H**	**5 (12.5)**	**3 (8.6)**	**13 (28.9)**	**10 (25)**
	1-2H	**6 (15.0)**	**4 (11.4)**	**20 (44.4)**	**17 (42.5)**
	1ST day	**29 (72.5)**	**28 (80.0)**	**12 (26.7)**	**13 (32.5)**
	Fischer exact test	**35.72**			
	P value	<0.001**			

*P>0.05: not significant, **P<0.05: signifcant, ***P<0.01: highly significant

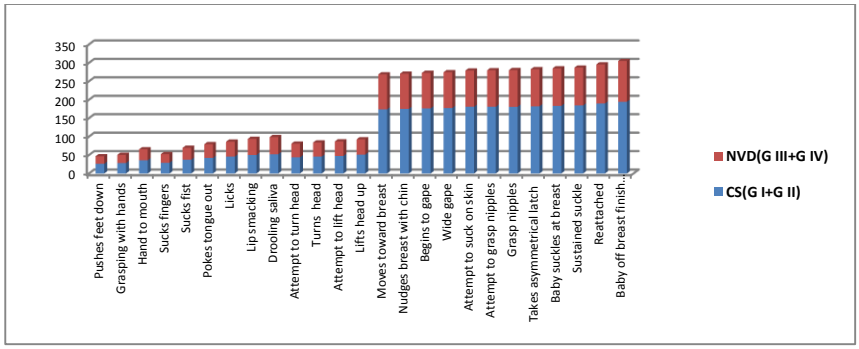

Figure (1) Comparison of time of appearance of pre-feeding responses between groups exposed to anesthesia (groups1 and 2) and groups not exposed to anesthesia (groups 3 and 4).

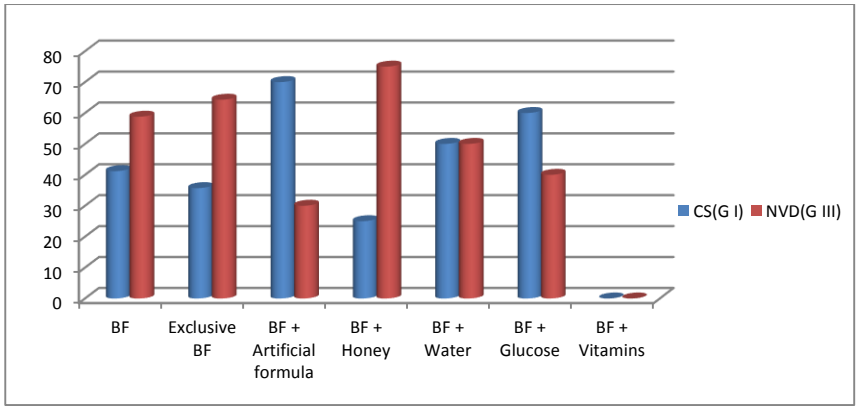

Figure (2) Breastfeeding (BF) patterns at discharge in supported groups by mode of delivery (vaginal versus cesarean delivery) in the studied population.

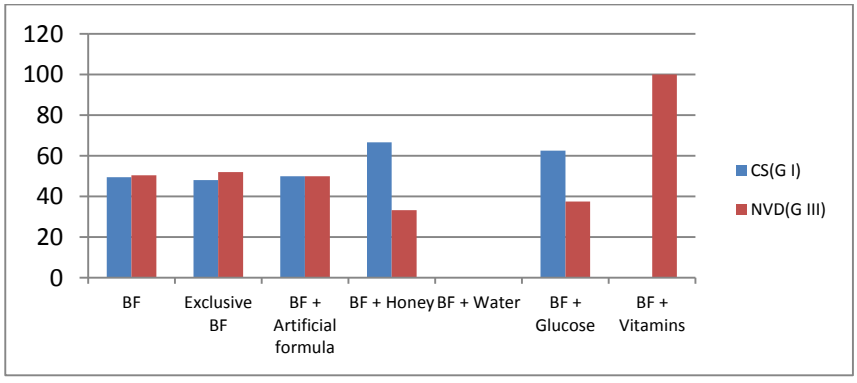

Figure (3) Breastfeeding (BF) patterns at two weeks in the supported groups by mode of delivery (vaginal versus cesarean delivery) in the studied population.

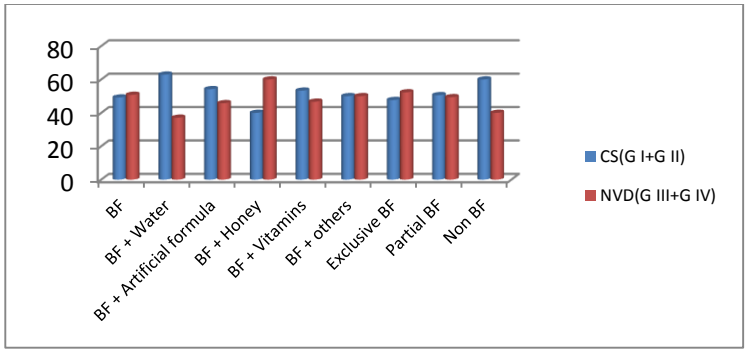

Figure (4) Outcome of breastfeeding at 3 months by mode of delivery (vaginal versus cesarean delivery) in the studied population.

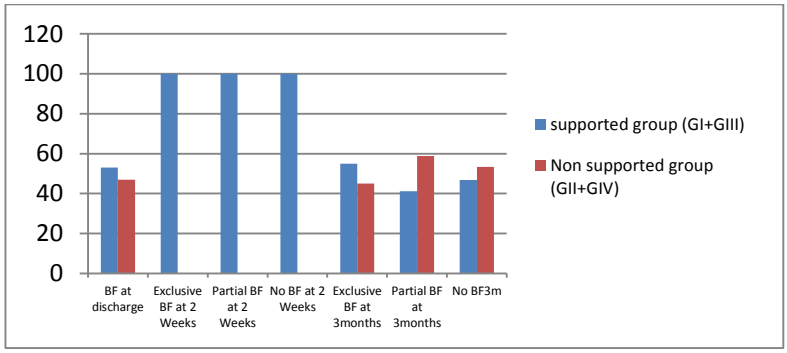

Figure (5) Outcome of breastfeeding at discharge, 2 weeks and 3 months in the supported versus unsupported group in both vaginal and cesarean delivery of the studied population (no data for unsupported group at 2 weeks).

هل تتأثر إستمرارية الرضاعة الطبيعية بملامسة الجلد للجلد المبكر والدعم المستمر رغم التخدير فى الولادات القيصرية؟

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** *قسم طب الأطفال* **كلية الطب بنها- جامعة بنها**

****قسم النساء والتوليد كلية الطب جامعة بنها (*رحمه الله* و البحث تقديراً لجهوده فى دعم فكرة البحث)**

الخلفية: مازال هناك غموض حول الآليات التي تؤثر على إستمرارية الرضاعة الطبيعية وبالأخص دور طريقة الولادة ونوع الدعم التي تتعرض له الوالدة للإستمرار بالرضاعة الطبيعية.

الهدف: مقارنة تأثير الدعم بمتابعة ممارسات الرضاعة الطبيعية فى الأمهات الآتى تعرضن للولادة القيصرية بالمقارنة إلى الولادة الطبيعية بعد التحكم فى ملامسة الجلد بالجلد و التخدير.

طرق البحث: هى دراسة وصفية مقطعية تتضمن مائة سيدة تعرضت للولادة الطبيعية ومائة سيدة أخرى لعملية قيصرية باستخدام التخدير الشوكي عن طريق بوبيفاكائين مكثف. وقدمت لهم ممارسة التلامس بالجلد إلى الجلد عند الولادة وتم ملاحظة إستجابات قبل الرضاعة وتسجيلها وقت ظهورها في كلا من المجموعتين. و تم إختيار 50 أم بولادة طبيعية و 50 أم وطفل تعرضوا للولادة القيصرية وتقديم لهم الدعم عند الولادة و لمدة 3 شهور بعد الولادة.

النتائج: كان هناك تأخر ملحوظ في البدء المبكر في الساعة الأولى بالرضاعة الطبيعية في حالات العملية القيصرية التي تعرضت للتخدير الشوكي ومعظمها في المجموعة غير المدعمة (8.6٪) بالمقارنة إلى مجموعة الولادة الطبيعية التي تعرضت للدعم (28٪). وقد لوحظ تأخرفي المنعكسات العصبية القبلية للرضاعة في المجموعة التي تعرضت للتخدير والعملية القيصرية وفي نهاية التقييم عند 3 أشهر وجدنا أن نسبة الأمهات التى إستمرت بالرضاعة الطبيعية تأثرت بالدعم ووصلت 60٪ مقابل 45٪ في الأمهات التي لم تتعرض للتشجيع والدعم .

الخلاصة:إن العملية القيصرية تعطل البدء المبكر بالرضاعة عن طريق تأخير المنعكسات القبلية للرضاعة مما يؤثر على نجاح الرضاعة ولذلك يجب تشجيع الممارسات الصديقة للأم للتقليل من الولادات القيصرية و كذلك تحتاج الأم الولدة بالقيصريى الى الدعم المستمر حتى تتمكن من التغلب على الصعوبات التى تواجهها فى بداية الرضاعة.

WHO Recommendations to Pharmacological Management of Pain

The World Health Organization (WHO) recommends a pain ladder for managing analgesia. It was first described for use in cancer pain, but it can be used by medical professionals as a general principle when dealing with analgesia for any type of pain.[17] In the treatment of chronic pain, whether due to malignant or benign processes, the three-step WHO Analgesic Ladder provides guidelines for selecting the kind and stepping up the amount of analgesia. The exact medications recommended will vary with the country and the individual treatment center, but the following gives an example of the WHO approach to treating chronic pain with medications. If, at any point, treatment fails to provide adequate pain relief, then the doctor and patient move onto the next step.

Common types of pain and typical drug management		
Pain type	typical initial drug treatment	comments
Headache	paracetamol/acetaminophen, NSAIDs	Doctor consultation is appropriate if headaches are severe, persistent, accompanied by fever, vomiting, or speech or balance problems. Self-medication beyond two weeks should be under doctor's care.
Migraine	paracetamol, NSAIDs	triptans are used when the others do not work, or when migraines are frequent or severe
Menstrual cramps	NSAIDs	some NSAIDS are marketed for cramps, but any NSAID would work
Severe trauma, such as a wound, burn, bone fracture, or severe sprain	Opioids	more than two weeks of pain requiring opioid treatment is unusual
strain or pulled muscle	NSAIDs, muscle relaxants	If inflammation involved, NSAIDs may work better.Short-term use only.
Minor pain after surgery	paracetamol, NSAIDs	Opioids rarely needed.
Severe pain after surgery	Opioids	Combinations of opioids may be prescribed if pain is severe.
Muscle ache	paracetamol, NSAIDs	If inflammation involved, NSAIDs may work better.
Toothache or pain from dental procedures	paracetamol, NSAIDs	This should be short term use. Opioids could be necessary for severe pain.
Kidney stone pain	paracetamol, NSAIDs, Opioids	Opioids usually needed if pain is severe.
Pain due to heartburn or gastroesophageal reflux disease	Antacid, H2 antagonist, proton-pump inhibitor	Heartburn lasing more than a week requires medical attention. Aspirin and NSAIDs should be avoided.
osteoarthritis pain	paracetamol, NSAIDs]	Medical attention is recommended if pain persists.
fibromyalgia	Antidepressant, anticonvulsant	Evidence suggests that opioids are not effective in treating fibromyalgia.

WHO | WHO's pain ladder

Barriers to Making Hospitals Baby Friendly in Egypt: A study in 23 hospitals

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Abstract

Introduction: Promoting breastfeeding through the Baby Friendly Hospital Initiative (BFHI) impacts child health and survival. Identifying the barriers to BFHI is important in order to plan for the success and sustainability of BFHI programs.

Aim: To identify BFHI barriers in different types of hospitals and in three different regions in Egypt in order to recommend simple strategies that can be used to periodically assess and improve hospital practices with regards infant feeding.

Methodology: Out of the 60 hospital targeted by the study only 23 hospitals received permission to be assessed by the investigator; they comprised 9 hospitals from Cairo, 9 hospitals from Menoufia governorate as a representative of Lower Egypt (LE) and 5 hospitals from Giza representative of Upper Egypt (UE). A total of number of 69 staff were interviewed including 23 from administration, 23 from pediatrics or neonatal units and 23 from the obstetric department and 45 mothers with babies in the delivery ward. Tools used were adapted from the self appraisal form and monitoring tool of UNICEF/WHO BFHI material.

Findings: The most significant barriers that influenced BFHI status were offering prelacteals to babies, lack of practice of first hour skin-to-skin, antenatal education about the practices and benefits of breastfeeding and postnatal support on how to breastfeed and to express milk, how to cup feed, lack of information given on hazards of bottles and pacifiers and lack of abidance to the code. There were little regional differences in the practices. There was a gap in perception of these services as seen by mothers versus those reported by staff.

Conclusions: Promotion of breastfeeding through BFHI remains a challenge in most settings. The mother is the true customer but unfortunately she is unable to demand for her rights, creating the gap between provider and customer perception of quality of service delivery. The primary health care can play a significant role in educating pregnant women and their families to demand for the rights at delivery from the facility and staff to provide them with mother and baby friendly practices.

Introduction

The Baby Friendly Hospital Initiative (BFHI) was introduced in 1991 following the Innocenti Declaration that calls for making hospitals that provide maternity services Baby Friendly by implementing the Ten Steps to successful breastfeeding initiation and continuation. Since this time thousands of hospitals all over the world have strived to become Baby Friendly. Many obstacles have faced sustaining baby friendly status in these hospitals especially related to the rapid turnover of staff, the over medicalization of the birthing process and the continued violations of infant milk formula companies despite the release and consensus of almost all the ministries of health of many countries with the articles of the International code of marketing of breast milk substitutes that urge

governments to put a stop to the aggressive marketing of breast milk substitutes that interfere with mother's decisions to breastfeed and make health staff overly prescribe their products [1,2,3].

In any program the monitoring of practices is vital for ensuring sustainability and identifying gaps that can be promptly corrected before they damage the whole system. One of the main defects in the implementation of BFHI program was that no monitoring system was installed to ensure that input, process and outcome indicators were tightly controlled. Despite the presence of such indicators, these were not adopted by most country health care systems; hence BFHI practices have waned over the past decade. Upcoming research has provided evidence to support the Ten Steps and especially in relation to early initiation through skin-to-skin (STS) and exclusive breastfeeding for six months. Hence it was vital to update the BFHI [4,5].

In 2006 the Ten Steps to successful breastfeeding were revised and the Baby Friendly Hospital Initiative was updated, expanded and integrated with mother friendly, community friendly and pediatric friendly practices. Governments face the challenge of implementing, scaling and ensuring sustainability. Monitoring tools can be key to monitoring, continuously detecting early barriers and problems that interfere with sustaining Baby Friendly status in hospitals. The primary health sector (PHC) indicators have been successful in implementing a monitoring systems for assessing community based breastfeeding practices via the registration system of the PHC and the data are fed into the health information system (HIS) of the PHC-MOH [6,7]. However the monitoring systems lack the link to the hospitals to the PHC.

Also there has been no attempt to develop or introduce indicators for monitoring BFHI practices in Egyptian hospitals that provide maternity services. There is increasing demand to improve our HIS of hospitals and prepare them for accreditation by the quality department in the race towards meeting the demand of a competitive market in the globalization process. Hence developing indicators for BFHI in Egyptian settings can reinforce HIS of hospitals, improve service delivery and improve health outcomes.

The aim of the current study is to identify barriers to BFHI practices in hospitals in three regions Upper Egypt (UE) in Giza, Lower Egypt (LE) in Menoufia and an urban governorate (Cairo) in Egypt. Also to recommend solutions or simple strategies that can be used to change hospital practices to become Baby Friendly.

Subjects and Methods

This is a cross sectional descriptive study where a convenient sample of hospitals were selected from the governorates of Cairo, Qaluibiya and Giza representing Upper Egypt (UE), Lower Egypt rural governorates (LE) and Cairo as an urban governorate. A list of public, private and organizational hospitals providing maternity and neonatal care practices were obtained from the Ministry of Health licensing sector. The hospitals were contacted to obtain the number of deliveries per month and confirm presence of neonatal or pediatric services. The hospitals were then sorted according to the highest rates of delivery per month. Hospitals with highest deliveries were selected so as to target a total of 60 hospitals proportionately representing the three governorates. Over a period of 24 months we were able to get permission to enter only 23 hospitals of the 60 hospitals contacted. This was mainly due to the political instability during this time of transition between governments that prevented easy access inside the hospitals, resulting in refusal of administration to cooperate out of fear from espionage by terrorist groups. **Tools:** included

the UNICEF/WHO Baby Friendly self appraisal forms that were translated into Arabic and simplified so as to be easily compiled by the medical officer in charge of the hospital or delivery areas. The mother questionnaire was converted into a collective format for each hospital so that up to 10 mothers could be assessed per visit. It included the practices related to the Ten Steps and some mother friendly practices. This was prepared, tested and finalized. **Methods:** The 23 Hospitals were visited by the investigator for one day, during which all mothers in the maternity ward and labor ward were interviewed. They comprised 9 hospitals from Cairo, 9 hospitals from Menoufia governorate as a representative of LE and 5 hospitals from Giza representative of UE. Inclusion criteria for selecting hospitals: hospital providing maternity services; hospital provides neonatal care services; hospital has a delivery rate of over 150 per month. Exclusion criteria included: absence of maternity services; absence of neonatal services; hospital does not consent to participate in the screening survey.

The staff representative from the administrative, pediatrics and obstetric department were interviewed. A total of number of 69 doctors were interviewed including 23 from administration, 23 from pediatrics or neonatal units and 23 from the obstetric department. Also mothers in the delivery ward who were available at the time of the visit were interviewed about the Baby friendly practices. If the number of mothers is not sufficient, the contact phone numbers of mothers who have recently delivered in the hospital were obtained from the hospital registration and the interview were carried out on phone. If this was not possible a follow-up visit in a couple of days was done to complete at least 3-5 mothers per hospital from maternity ward and 3-5 mothers from the neonatal units. A total of 45 mothers were interviewed from 20 hospitals. At the end of each hospital visit, the hospital staff were handed material for making their hospital baby friendly and were put in touch with an expert support group for assisting them in making the hospital achieve Baby Friendly status.

Results

Knowledge about BFHI was 43.4%, those who reported they had a policy for promoting breastfeeding were 82%, those who had a committee responsible for breastfeeding promotion were 47.8% and those who desired to be designated were 95%. Birthing related records were reported present in 43.4%. There was consensus among all hospitals in the three regions to the acceptance and desire to become designated as Baby Friendly.

Abidance by the code showed that 34.7% of hospitals prohibited advertisement of infant milk formula (IMF) and 39.1% accepted gifts and medical samples, while 47.8% had a policy for prohibiting advertisements of any breast milk substitute related product (BMS), hospitals whose staff was exposed to sponsoring by IMF companies were 47.8%.

In step (2) two third of the hospitals (65%) reported they had a team of trained staff in supporting breastfeeding. In step (3) 91% of hospitals reported having outpatient clinics for caring for pregnant women. This was highest in the urban hospitals (100%) and lowest in the UE hospitals (80%). There was no statistical significant difference between the hospitals in the different regions of the study ($P>0.05$). Education about the importance of breastfeeding was reported to be included in the education given to all pregnant women.

In step (4) timely initiation of breastfeeding; 87% of hospitals reported that they encourage mothers to initiate breastfeeding within the first hour and that 73% encourage the practice of a brief early STS immediately after delivery. This practice was highest in LE hospitals and least in the UE placed hospitals, the difference was not statistically significant ($P< 0.05$).

With regards the encouragement of mother friendly practices at labor there was an overall of 95.6% who reported encouraging normal delivery and encouraging spinal anesthesia in cases undergoing cesarean section (CSD) delivery. This practice was highest in UE and LE hospitals and lowest in urban hospitals and similarly for encouraging spinal anesthesia in CSD, but the difference was not significant at $P>0.05$.

The practice of teaching mothers how to breastfeed was 91.3% in all hospitals. It was reported highest in LE sampled hospitals and

lowest in UE hospitals. By department, overall (91.3%) of the staff in the obstetric and pediatric departments in all hospitals in all regions reported that mothers were shown how to express breast milk. The percent of hospitals who reported that their obstetric department comply with this criteria was highest in LE and lowest in urban hospitals, but the difference was not statistically significant at (P>0.05). For the pediatric departments in the hospitals under study, this practice was reported high for all hospitals in all the three regions.

One half of the hospitals (47.8%) were giving prelacteal feeds to babies. This was shown to be highest in LE hospitals followed by UE hospitals and least for the urban placed hospitals, the difference was not statistically significance at P=0.057. The hospitals that reported discouraging supplements of formula feeds were highest in LE hospitals followed by UE and least in urban governorate hospitals, the difference was highly statistically significant at P=0.002. Although overall all of the hospitals reported that they encourage exclusive breastfeeding at discharge, yet almost one third of the overall hospitals reported that they distribute pamphlets and free samples to their attending mothers with breastfeeding babies. This was highest in LE and urban placed hospitals and the difference was not statistically significant (P>0.05).

All hospitals encouraged rooming–in of the babies with their mothers post delivery with no statistical significant difference between hospitals in the regions under study.

The encouragement of on-demand feeding (Step 8) was absent in almost one third of all the hospitals (31%).

In Step (9) one half of the hospitals in all regions (56.5%) of hospitals report that they do not give any bottles or pacifiers to be given to babies. While 91.3% of the hospitals, under study, encouraged mothers of babies kept in the neonatal care units (NCU) to express their milk to feed these babies. About two third (69.5%) of the hospitals did not encourage the alternative of cup feeding when baby is unable to suckle at the breast. Overall 78.2% of the hospitals under study reported that they encourage the continuous skin to skin care in their NCU units.

For Step (10) the presence of a follow-up system for mothers and babies after discharge was reported by 82.6% of hospitals under study. This practice was highest in UE and lowest in urban and LE hospitals, the difference was statistically not significant at P>0.05. However there was a follow up system for all babies discharged from the NCU as reported by all hospitals (100%).

Only 22.58% of mothers reported that they received any antenatal education compared to response from 100% of hospital staff who reported that they give ANC education to pregnant women about the benefits of breastfeeding as shown in figure (1).

Offering help to initiate breastfeeding in the first hour was statistically significantly lower among mothers (38.7%) compared to those reported by 86.9% of hospital staff (P<0.05). Also mothers who reported help to initiate breastfeeding through first hour skin to skin (FHSTS) was statistically significantly lower (6.45%) than that reported by hospital staff (86.9%) at P<0.05 (figure 2).

Mothers who reported that they were shown how to breastfeed (58.06%) or how to express their milk (58.06%) were statistically significantly less than what was reported by hospital staff of the same hospitals (91.3% and 91.3% respectively) at P<0.05 (figure 3).

We found that 64.5% of mothers reported that their babies were given prelacteals compared to 47.8% as reported by hospital staff in the same hospitals. The difference was statistically significant at P<0.05 (figure 4).

Mothers who reported that they were encouraged rooming in were 74.19%. Those who reported being taught their baby's feeding cues by staff were 16.13% and these were statistically significantly less than what was reported by hospital staff of the same hospitals (100% and 69.5% respectively) at P<0.05 (figure 5).

Finally mothers who reported that they were shown to cup feed when indicated were 32.4%. None of the mothers reported that they had received information about the hazards of feeding bottles or teats to their breastfed baby. Only 6.4% were encouraged to hold their baby in STS. Mothers who reported being referred at

discharge to a follow-up support group in breastfeeding were 70.96%. These practices were not consistant with those reported by hospital staff of the same hospitals being 30.4%, 39.1%, 78.2% and 82.6% respectively. The differences between staff and mother responses were statistically significantly for all practices at P<0.05 (figure 6).

Discussion

Our country's efforts in making hospitals and maternity facilities Baby Friendly has faced many impediments to success in meeting the target criteria for complying by the Ten Steps to successful breastfeeding. Baby Friendly facilities that were once 126 maternity facilities have not been reassessed and their status has declined. Even hospitals that have made efforts to become Baby Friendly have not been designated due to the absence of a system for accrediting Baby Friendly in the country. Although Baby friendly has been integrated in the accreditation system of the Quality assurance department of the Ministry of Health in Egypt, yet the BFHI tool for assessment is not used in the accreditation process. This is probably related to the absence of a regulatory body for designating hospitals. Hence the need to establish a system for monitoring hospitals that were once designated as Baby Friendly and assign a designation body to administer the assessment and reassessment process of these facilities. The first step in any accreditation process is to have an installed monitoring system that can ensure sustainable optimal practices and assess outcome of these practices to check and introduce improvements whenever required [(8)].

The findings of the study indicated that Step (1) of BFHI that less than one half were knowledgeable about BFHI (43.4%), those who reported they had an "informal" policy for promoting breastfeeding were high. Less than one half reported having a committee responsible for breastfeeding promotion (47.8%). However hospitals that desired to be designated were very high (95%). Birthing related records were reported present in 43.4%. This positive attitude was highest in the UE hospitals and lowest among hospitals in urban and LE governorates.

Similar findings were reported by an Australian survey of hospitals who reported that participants in this study were committed to the principles of BFHI, believed it was achievable and were mostly keen to gain BFHI accreditation. However there was a gap between perception of the Baby Friendly Hospital initiative as a program and the management of implementation process. They concluded that the perceived procedural approach to implementation may be contributing to lower rates of breastfeeding continuation [(9)].

The effectiveness of a policy in New Zealand Hospitals was shown to require adaptation to the types of services offered by this hospital. They reported that policy was not necessarily based on government policy; hospital policies were communicated in differing ways and dependent on resources; Hence it is important to give flexibility to service centers to adapt their policy according to the type of services they provide and their organization structure provided they cover the Ten steps to successful breastfeeding to achieve exclusive breastfeeding from birth to six months and continued breastfeeding with complementary foods for two years[(10)].

A study conducted in Spain concluded that each additional month of exclusive breastfeeding may reduce hospital admissions secondary to infection by as much as 30% in the first year of life. A meta-analysis of 33 studies examining healthy infants in developed nations

showed similar results, with formula-fed infants experiencing three times more severe respiratory illnesses compared with infants who had been exclusively breastfed for four months [(11)]. Breastfeeding is economical for families, with no need to purchase bottles and formula. Cost analyses indicate further savings to society in general; by improving the health of both mothers and infants, breastfeeding reduces loss of productivity due to illness [(12-14)].

In the United States, the Surgeon General has issued a call to action in support of breastfeeding, with 'action items' for everyone who plays a role in supporting breastfeeding – families, friends, communities, clinicians, health care leaders, employers and policy-makers [(15)].

Such legislative action should provide a model for our country to follow as a basis for promoting breastfeeding in our country. Hence it is recommended that action be taken to force legislative decrees to hospitals and structural managerial interventions that would make Baby friendly part of the service provision system of the Ministry and ensure that it is continuously monitored and implemented in a manner that would ensure reduction of maternal and infant morbidity and mortality.

In Italy an initial assessment of the situation confirmed that only one to three of the Ten steps were implemented in the assessed hospitals; the mean score attained by health profession and a knowledge test was low; and the rate of exclusive breastfeeding at discharge was far from satisfactory. Training hospitals improved their compliance with the "ten steps to successful breastfeeding," from an average of 2.4 steps at phase one to 7.7 at phase three. They concluded that Training for at least three days with a course including practical sessions and counseling skills is effective in changing hospital practices, knowledge of health workers, and breastfeeding rates [(16)]. Similar findings indicating the BFHI training courses resulted in improved implementation of "Ten steps" and increased exclusive breastfeeding rates in Latin America [(17)]. However although training doctors and midwives greatly improves the feeding practices of mothers, yet, the impact of the training falls off quickly and refresher training is needed to sustain the improvement [(18)]. The UNICEF/WHO 20-hour course was shown to be an effective tool for improving health professionals' breastfeeding knowledge, attitudes, and practices. However practices related to early skin-to-skin contact and cesarean section delivery were difficult to change and require more intensive training [(19)]. The use of innovative methods of training for the latter practices may be effective [(20)].

In this study informing all pregnant women about the benefits and management of breastfeeding showed that overall 91% of hospitals reported having outpatient clinics for caring for pregnant women and that they regularly inform them about the benefits and importance of breastfeeding. This was highest in the urban hospitals and lowest in the UE hospitals. In contradistinction one fifth of the mothers attending these hospitals confirmed they received such information during pregnancy. This reflects the actual gap between policy and practice.

In our study 87% of hospitals reported that they encourage mothers to initiate breastfeeding within the first hour and that 73% encourage the practice early first hour skin-to-skin immediately after delivery. In contradistinction mothers did not report these practices as only 6.4% confirmed that this was practiced with

them. Also more mothers than did staff report that prelacteals and supplements were given to newborns. These practices are sensitive indicators as to how well hospitals are doing to promote Baby friendly. They are used by the demographic health surveys (DHS) to measure national infant feeding practices. According to most recent Egypt DHS survey early initiation within the first hour was 55.9%, being highest in UE (58% and lowest in urban governorates (46%). The practice of prelacteals or supplements given to babies at birth was 46.6% ranging from 45% in UE to 47 in urban governorates. The latter was highest in rural UE and lowest in Frontier governorates. Although the study did not differentiate between home and hospital delivery in such practices, it was evident through the birth attendant (BA) data, whereby deliveries carried out by a trained medical BA initiated breastfeeding later (51%) than a traditional BA (usually home) assisted delivery (74%). Moreover prelacteals were given more often by deliveries carried out by medical BA (48%) compared to the delivery carried out at home by a traditional BA (41%). Hence hospital based deliveries were characterized by delayed initiation in three quarters of deliveries and prelacteals were given in half the cases or more [(21)].

However initiation of breastfeeding, through first hour skin-to-skin contact (FHSTS) between mother and baby, needs to be measured as an indicator for BFHI program implementation as it is a very sensitive measure of how well the hospital is abiding by BFHI. Edmonds et al, [(22)] showed that early FHSTS contact that was continuous and uninterrupted in the first hour could reduce mortality in newborns by 22%. Hence we strongly recommend that the FHSTS be added to the national indicators for measuring and monitoring early infant feeding practices. These three indicators should be cornerstone in the monitoring of any BFHI facility.

In this study hospitals reported that they were teaching mothers how to breastfeed and how to express milk and that they were encouraging rooming-in and on-demand feeding (steps 5 to 8). Although mothers reported that they were encouraged in rooming-in (74.19%), still guidance in on-demand feeding was very low (16.13%) and was not consistent with that reported by hospital staff (69.5%). Maternity ward routines and practices that encourage showing mothers how to breastfeed and how to maintain their milk supply even when separated from their babies have been shown to have a positive impact on the health of infants and outcome of breastfeeding [(23)].

Early and prolonged separation of newborn babies from their mother for medical procedures is currently a problem in many hospitals. This interferes with the establishment of breastfeeding and increases the risk of cross infection [(24)]. Postnatal complications such as hyperbilirubinemia, dehydration and septicemia in addition to breast pathologies and maternal health related complications have been shown to be less among newborns exposed to these practices; good attachment, positioning, on-demand feeding and rooming-in [(25, 26)]. Indicators of health outcomes as readmission for hyperbilirubinemia, septicemia, or breast engorgement in the mothers can be used as indicators for measuring abidance by such practices. Hence it is recommended that neonatal and maternal health indicators in the first week be included in the monitoring of Baby friendly.

The study showed that 34.7% of hospitals prohibited advertisement of infant milk formula (IMF) and 39.1% accepted gifts and medical samples, while 47.8% had a

policy for prohibiting advertisements of any breast milk substitute related product (BMS). Hospitals whose staff was exposed to sponsoring by IMF companies were 47.8%. In LE violations to the code in the form of accepting gifts and free medical samples and having no policy to prohibit acceptance or distribution of free samples or gifts. This was highest in urban hospitals and the difference was statistically significant for the latter and former at ($P<0.05$). Mostly staff in hospitals of the urban governorate were those exposed to sponsorships to attend conferences abroad but there was no significant difference between the different regions and all were exposed to these sponsorships ($P>0.05$). Health providers who distribute IMF materials are ultimately designed to maximize formula sales thereby strengthening the formula promotion message at the expense of patients' plans to breastfeed [27-29].

In Egypt the government subsidizes infant milk formula to make this formula available for those who cannot afford it. A total of 4300 million Egyptian pounds are spent on the subsidization of IMF. Unfortunately the spillover is dramatically higher and more of babies who are breastfeeding are offered formula and eventually stop breastfeeding because of the aggressive marketing and the use of physicians by companies as advertisers for their products through sponsoring them in conferences and gifts as equipment and others. Breastfeeding promises significant cost savings compared to formula feeding: according to the US Department of Agriculture, the USA would save a minimum of $3.6 billion per year in health care and indirect costs if at least 75% of mothers initiated breastfeeding, and 50% breastfed until the infant is at least 6 months old [30].

We found that exclusive breastfeeding rates were lower in infants who were delivered by caesarean section. This is in agreement with other workers who reported that cesarean section was a common risk factor for not breastfeeding in Asian societies, but not in Australia [31]. Breastfeeding can be considered as a coping strategy that serves to normalize an abnormal experience and allows the individual to once again assume control [32].

The WHO and UNICEF concur that childbirth practices have a direct impact on breastfeeding success. In particular, support during labor, maternal positioning, and the use of IV fluids in labor, labor pain medications, surgical procedures, maternal emotional states, and contact with the baby after birth. Furthermore, the impact of procedures such as vacuum extraction, forceps, and cesarean section can affect the newborn's ability to suckle and breastfeed [6].

In this study we found that nearly 90.1% of hospitals under study encouraged mothers to express breast milk for nutrition of babies in the neonatal care units (NCU) whenever they can have oral feeding. Although we noticed that two thirds of hospitals under study did not encourage cup feeding when the baby cannot suckle yet about 75% of hospital staff interviewed in this study reported that they do try to encourage skin-to-skin contact between the mother and the baby. However this was contrary to what was reported by mothers interviewed where only 32.4% of them reported being shown how to practice cup feed, and they were not warned against use of introducing teats or bottle when feeding the babies. While only 6.4% of mothers were encouraged to hold their babies skin to skin and about 70% of mothers were referred for follow up after discharge.

Hence this study reported a significant discrepancy in-between staff and mothers' responses in relation to practices supporting NCU Baby friendly.

Early contact with the baby immediately after birth, especially in small or preterm babies, results in the promotion of a closer relationship between a mother and her baby. Moreover, the use of cup feeding as an alternative to teats and bottles for premature babies enhances their ability to go to the breast faster [33- 35].

We conclude that the Ten steps of Baby friendly and the five steps of Mother Friendly should be addressed from a three dimensional perspective, whereby the actual practices of staff, mother care and baby care practices are all integrated to into making a facility Baby friendly. The care and quality of communication that hospital staff and personnel offer mothers are difficult to measure but could be assessed by mother satisfaction with the services received. Scaling with baby Friendly requires mothers to be made aware of their rights to safe maternity care, which may take big efforts to achieve [36, 37]. Baby friendly success depends on the commitment of dedicated staff and mangers working together to make a Baby Friendly environment. Information systems and regular monitoring by indicators can assist in the challenge of scaling up with Baby Friendly [38-40].

Finally mothers' satisfaction with the care given to them needs to be taken into consideration when monitoring or assessing a baby friendly facility. Protecting the rights of babies to child health and begins by making hospitals Baby Friendly. Whilst making a facility Baby friendly cannot be achieved without adoption of Mother Friendly practices. The latter requires empowering women through education and awareness campaigns with their parental and maternal rights, in order to demand for them. This role can be achieved through antenatal care services in PHC.

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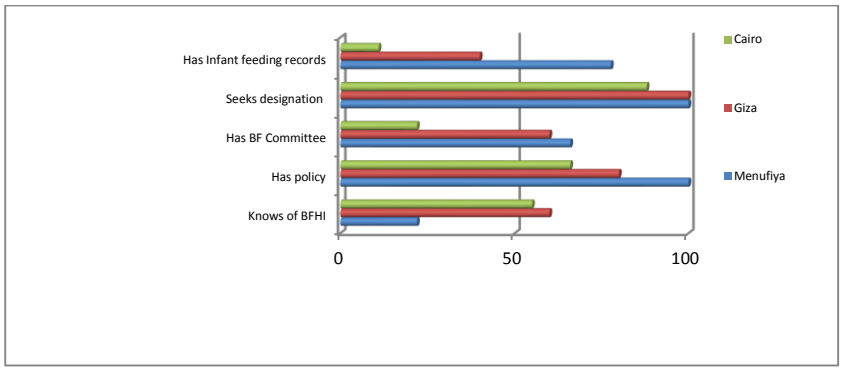

Figure (1): Diagrammatic comparison of hospitals implementing some selected criteria for step (1) of the Baby Friendly Hospital Initiative (BFHI) in Cairo¸ Giza and Menoufiya.

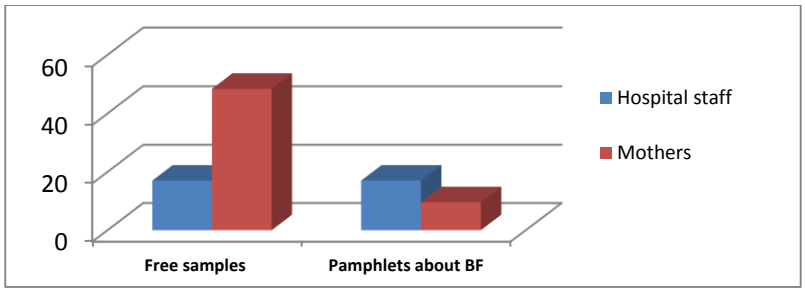

Figure (2): Comparing distribution of staff versus mothers' responses to practices related to compliance with the International Code of Marketing of Breastmilk Substitutes.

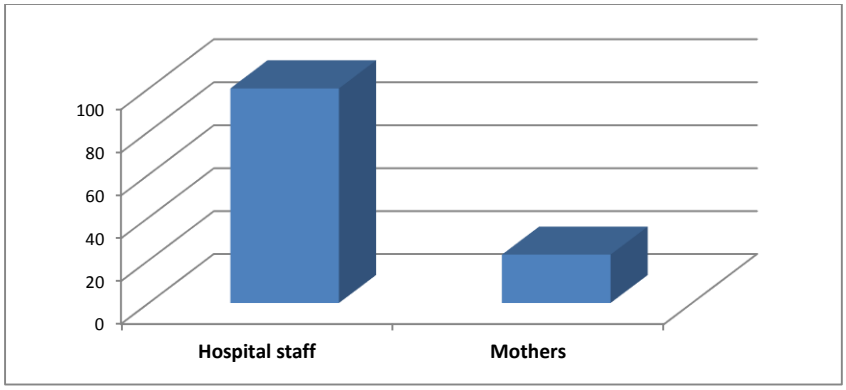

Figure (3): Comparing distribution of hospital staff versus mothers' responses to the Baby Friendly practices related to antenatal (ANC) education about the benefits of breastfeeding

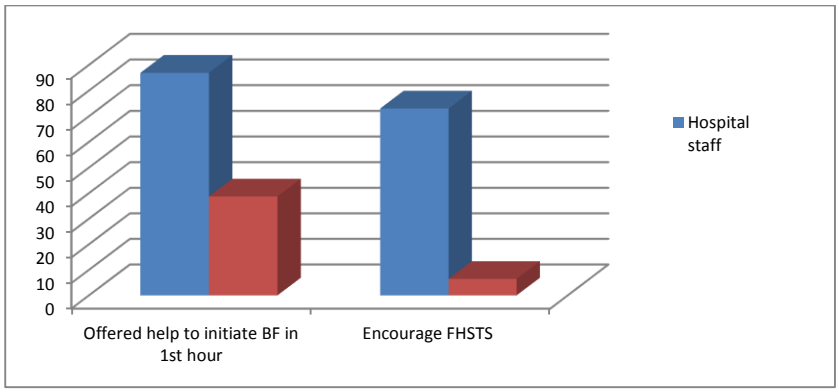

Figure (4): Comparing distribution of hospital staff versus mothers' response to the Baby Friendly practices related to early initiation of breastfeeding (BF) through first hour skin to skin (FHSTS).

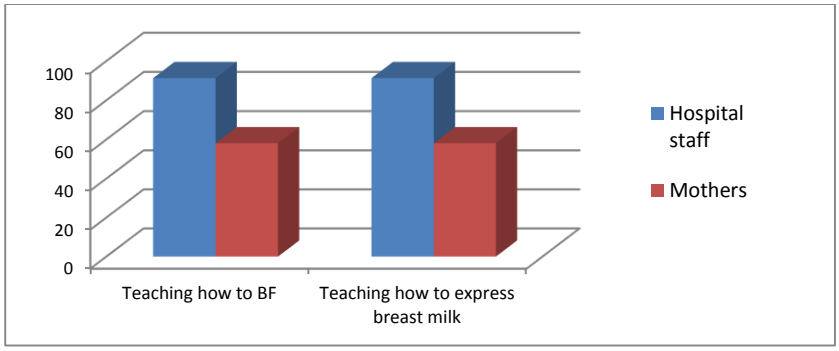

Figure (5): Comparing distribution of hospital staff versus mothers' response to Baby Friendly practices related to teaching mothers how to breastfeed and how to express their breast milk.

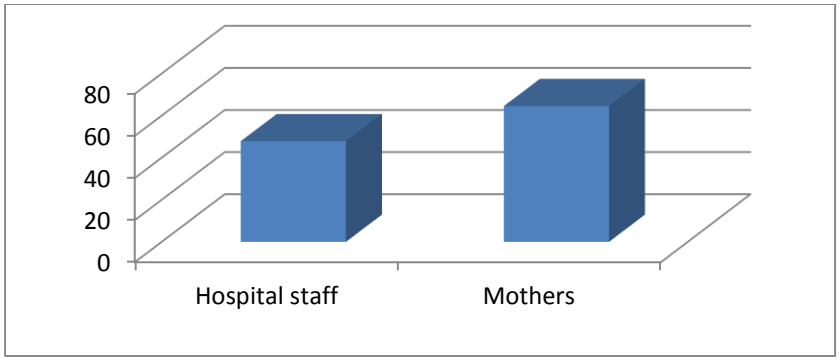

Figure (6): Comparing distribution of hospital staff versus mothers' response to Baby Friendly practices related to teaching encouraging exclusive breastfeeding at birth by prohibiting giving prelacteals and supplements to newborns.

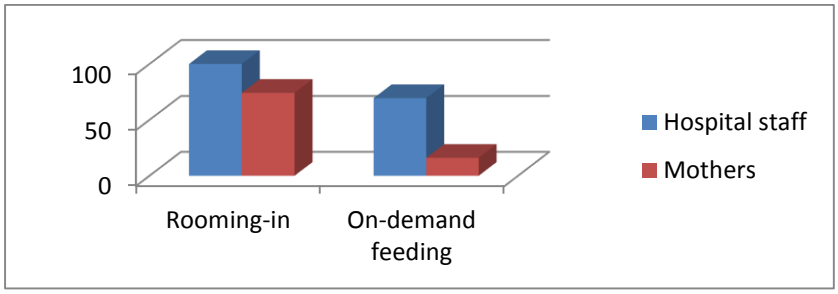

Figure (7): Comparing distribution of hospital staff versus mothers' response to the Baby Friendly practices related to practice of rooming-in and instructions in on-demand feeding.

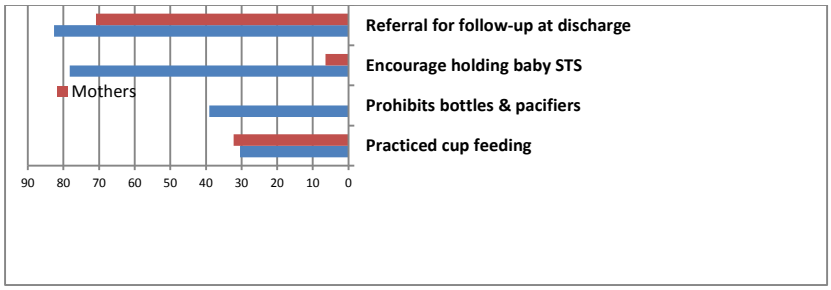

Figure (8): Comparing distribution of hospital staff versus mothers' response to the Baby Friendly practices related to giving prelacteals, prohibition of teats, encouraging skin to skin care and referral for follow-up at discharge.

مسح مستشفيات الولادة و الحضانات فى 23 مستشفى لإكتشاف عوائق الممارسات الصديقة للطفل

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***قسم الأطفال- كلية طب جامعة بنها**

****قسم طب المجتمع – كلية طب جامعة القاهرة**

المقدمة: مبادرة المستشفيات الصديقة للطفل برنامج عالمي يتطلب تطبيق عشر خطوات لدعم بداية و إستمرارية الرضاعة الطبيعية ، وقد تم تحديثه مؤخراً وتوسيعه ليشمل الممارسات الصديقة للأم والاتصال الجلدي بوضع المولود على الأم فور الولادة لمدة ساعة يبدأ خلالها تلقائياً بالرضاعة الطبيعية .

الهدف: تستهدف الدراسة تقييم الوضع الحالي لتنفيذ الممارسات المتعلقة بالخطوات العشروالممارسات الصديقة للطفل وتفعيل المدونة الدولية لتسويق بدائل لبن الأم فى 3 محافظات.

طرق البحث: تم زيارة 23 مستشفى ولادة تشمل 9 مستشفيات من القاهرة و 9 مستشفى من المنوفية و 5 من الجيزة و تم مقابلة وإستجواب 69 من الأطباء و التمريض العاملين بأقسام الولادة و الأطفال 23 من الأطفال و ووحدات رعاية حديثى الولادة و 23 من العاملين بأقسام النساء والتوليد ، كما تم مقابلة 45 أم بأطفال فى أماكن الولادة. وقد إستخدمت إستمارات التقييم الذاتى لمبادرة المستشفيات الصديقة للطفل.

النتائج : أهم المعوقات التى تواجة المستشفيات الصديقة للطفل هى إعطاء المولود إضافات من المشروبات أو الألبان قبل الرضاعة و عدم وضع المولود ملامساً الجلد للجلد على أمه وعدم تعرض الأمهات للتثقيف عن ممارسات الرضاعة الناجحة أثناء الحمل و عدم توعية الأمهات عن أخطار اللبن الصناعى و البزازات واللهايات و عدم إلتزام مقدمى الخدمة بالمدونة. كما كان هناك فجوة كبيرة ما بين إستجابات الأطباء و إجابات الأمهات مما يدل أن على الرغم من معرفة مقدمى الخدمة بالممارسات المتصلة بالرضاعة إلا إنها لا تصل كخدمة مطبقة للأمهات.

الخلاصة: كانت الممارسات الإجمالية الخاصة بالخطوات العشر لبرنامج المستشفيات الصديقة للطفل منخفضة وتشير إلى أهمية إدخال نظم للتدريب المستمر وإدماج هذا البرنامج ضمن مراكز الجامعات للتدريب المستمر لتطوير المهارات المهنية للأطباء وأيضاً للتمريض لضمان استدامة مدخلات البرنامج ، كما يلزم توعية الأمهات بالمطالبة بحقوقهن فى الممارسات الصديقة للأم و الطفل من مستشفى الولادة.

Early Infant Feeding Practices and Risk of Rheumatic Heart Disease: An Exploratory Study

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Abstract

Background: Rheumatic heart disease (RHD) continues to be prevalent among underprivileged communities; however its relationship to early feeding practices and poor nutrition has not been fully investigated.

Aim: To study the pattern of early feeding practices among children with RHD and its effect on the disease patterns and overall growth of these children.

Methodology: This is a retrospective study in which the mothers of 145 children diagnosed as RHD and 75 normal children were interviewed to assess their early feeding practices in relation to being exclusively breastfed in the first six months of life or being fed partially or fully on infant milk formula (IMF). The cases were diagnosed by echocardiography performed by the Cairo University Children's Hospital RHD clinic team of experts. They were also assessed anthropometrically for weight and height and the measurements were interpreted by growth standards using the percentile system**.**

Findings: Mitral regurgitation (MR) was detected in 67 cases (46.2%); MR plus aortic regurgitation (AR) in 58 cases (40.0%); AR in 11 cases (7.6%); MR plus mitral valve prolapse (MVP) in 3 cases (2.1%); Mitral stenosis (MS) plus MR in 5 cases (3.4%). Mother illiteracy was 40.5%. The pattern of feeding showed that 55.2% of children with RHD gave a history of exposure to infant milk formula (IMF) in the early months of life compared to 23% among controls at $P<0.05$. RHD was more severe in cases exposed to IMF. There was a significant increase of cases with underweight among the RHD group (13.1%) when compared to the control group (0%) at $P<0.001$. Stunting was significantly higher among RHD patients (6.9%) than controls (0%) at $P<0.001$.

Conclusions: The study is highly suggestive of a relationship between early introduction of IMF and increased risk of RHD. However this is also linked to stunting and underweight as indicators of poor nutritional status among these children probably related to poor socioeconomic status as suggested by the high prevalence of illiteracy among the mothers of these children. Every effort needs to be made to improve the socioeconomic status and living conditions through education of women and girls. Promoting exclusive breastfeeding in early infancy should be a key preventive strategy for reducing the burden of noncommunicable diseases in childhood.

Introduction

Rheumatic heart disease (RHD) continues to be a common health problem in the developing world, causing morbidity and mortality among both children and adults. Although little longitudinal data are available, evidence suggests that there has been little if any decline in the occurrence of RHD over the past few decades. Recent

reports from the developing world have documented rheumatic fever (RF) incidence rates as high as 206/100,000 and RHD prevalence rates as high as 18.6/1000. The high frequency of RHD in the developing world is due to the high prevalence of poverty and malnutrition [1,2].

Current research suggests that the risk of chronic disease is 20% to more than 200% higher in those who are not breastfed compared to those who were breastfed in infancy. Studies from Western Europe and North America suggest that breastfeeding has a significant effect on the prevalence of obesity. Other workers[3] have investigated the relationship between early growth and development of coronary heart disease in later life and shown controversial findings regarding the risk of ischemic heart disease and early infant feeding practices.

Research has demonstrated that breastfeeding during infancy may lower the risk of heart attacks, chronic heart disease and strokes in later life. They attributed this to the higher levels of cholesterol in human milk that enhance the adaptation of the breastfed babies liver to metabolize cholesterol better than cow's based infant milk formula (IMF) fed infants. This leads to lower blood cholesterol levels as adults and consequently a lower risk of heart disease. Though limited in number, some studies have shown that adults who were fed on IMF in early infancy tend to have higher blood cholesterol and are more likely to have arteriosclerotic plaques than those who were breastfed [4,5].

However the relationship between RHD disease and early infant feeding practices has not been fully investigated. Since RHD is linked to immune system disturbances as is the case of diabetes mellitus. It is expected that the same factors increasing the susceptibility of diabetes in the non breastfed or those exposed early to IMF would also have a similar effect on those with increased susceptibility to RHD. It would also explain why exposure of one child to streptococcal disease does not trigger disease while other develop RF and may or may not progress to RHD.

Hence the aim of the current study is to investigate the retrospective relationship between early infant feeding practices and the development and severity of RHD in children affected by the disease.

Subjects and Methods

The study was conducted in the RF/RHD clinic in the New Children's Cairo University hospitals from January 2012 to June 2013 after obtaining the necessary approvals and clearing logistics.

This is a cross-sectional, observation retrospective, case control study of children diagnosed with RHD in Egypt. It comprised a total of 220 cases aged from 5 to 13 years with a total of 145 cases with RHD fitting eligibility criteria, collected over the period of the study, and 75 children who were age and sex matched healthy children as a control group.

Inclusion criteria: Children diagnosed with RHD, aged 5-12 years with no other abnormality or diseases. Exclusion criteria included congenital anomalies or genetic or hereditary disorders, metabolic diseases, preterm exposed to ventilation, blood transfusion or resuscitation, or children of parents who could not remember the feeding pattern of youngster.

Design of the questionnaire: A structured interview form was designed to collect the personal data of mother and child with a recall of the detailed early infancy feeding patterns from the direct caregiver of the subjects both from the cases and controls. Emphasis was placed on the type of foods and drinks offered in the early months of life and use of bottle for feeding the baby. Cases that could not recall such practices were obviously excluded from

the study. Subjects who were able to confirm their exact feeding patterns were included in the study. The questionnaires were tested and finalized by the supervisors.

The diagnosis of the type of valvular affection was obtained by the echocardiography reports from the medical records/patient files in the RF/RHD clinic in Cairo University Children's Hospital and confirmed by the experts in pediatric cardiology.

All cases and controls were subjected to full anthropometric assessment for weight to the nearest gm, height and to the nearest mm, measured by the standard methods of anthropometry and interpreted into centiles using the national and international growth charts of Egypt and the WHO respectively for *weight-for-age* (W/A) and *height-for-age* (H/A) using the cut-off of the third centile for underweight or stunting and 97th centile for overweight.

The mode of feeding used to classify the early infantile patterns of feeding according to the WHO classification was as follows:

Group I: Fully breastfed included those exclusively or predominantly breastfed (occasional fluids or drinks) as infants in the first six months of life.

Group II: Partially breastfed i.e. children who as infants were fed breast milk with addition of milks mostly IMF during the first six months of life.

Group III: Artificially fed i.e. children who as infants were fed other milks mostly IMF from birth. The emphasis in this classification is to identify those who were exposed to other milks other than breastmilk early in life.

Statistical analysis: Statistical analysis was done using the SPSS software package version 17.0 It was done to obtain the mean, the standard deviation; the standard error of each mean and for comparison between the different groups involved in this study The Chi-square (X2) was used for comparison between distribution of patients according to different items of study. ONE WAY test was used for comparison between independent samples. One Way Analysis of Variance (ANOVA) was performed for comparison between more than two samples using the variance ratio "F*". The probability "p" value* was obtained from special table for probability (p) value, according to the degree of freedom with a cut off of P<0.05.

Results

The age distribution of cases was as follows: under 6 years represented 8.3%; those from 6 to less than 8 years represented 11.7%; from 8 years to less than 10 years represented 22.0%; those from 10 to less than 12 years represented 31.0% and those more than or equal to 12 years represented 24.5% of cases. There was no significant difference between cases and controls P >0.05. As regards sex distribution; RHD tended to be higher among females (58.6%) compared to males (41.4%).

Mother's level of education: illiteracy was reported in 40.5%, mothers who could read and write in 33.2%, those with primary education in 8.2%, preparatory in 6.8%, secondary in 6.8% and higher education in 4.5%, and there was significant increase of illiteracy among the mothers of RHD patients when compared to control subjects (47.6% vs 26.7% respectively) at P<0.05 as shown in table (1).

Pattern of valvular disease: mitral regurgitation (MR) was detected in 67 cases (46.2%); MR plus aortic regurgitation (AR) in 58 cases (40.0%); AR in 11 cases (7.6%); MR plus MVP in 3 cases (2.1%); Mitral stenosis (MS) plus MR in 5 cases (3.4%) and one case reverted to normal as shown in table (2).

Early pattern of feeding: The differences between RHD cases and controls were as follows: 65 RHD cases were fully breastfed (44.8%) including 17 cases had been exclusively breastfed (11.7%) compared to 7 of the controls (9.3%) and 48 cases predominantly breastfed (33.1%) compared to 51 controls (68%). The latter represented those who were not exposed to IMF. While 56 RHD cases had been fed partially on other milks or IMF i.e. (38.6%) compared to 11 controls (14.7%); and 24 RHD cases had been fed completely on IMF or other milks from birth (16.6%) compared to 6 of the control cases (8.0%). So that a total of 80 cases (55.2%) were exposed to other milk in early life compared to 22.7% of controls i.e. indicating a twofold or more risk of exposure to artificial

feeding in early life. There was a significant increase in RHD affection in those exposed to IMF or other milks when compared to controls P<0.05 (Table 3).

The severity of RHD was closely associated with early feeding on other milks since 53.5% of those exposed to partial IMF feeding and 32.6% fully exposed to cow based milks in their early life developed moderate disease compared to 14% who were fully breast fed. Also severe cases were found only in the artificially (100%) but not in those exposed to any breastfeeding (0.0%) (Table 4, Figure 1).

Weight-for-age (W/A) percentiles: Table (5) shows that 13.1% of RHD cases were below the third percentile. There was a significant increase of cases below the third percentile among the RHD group when compared to the control group (P<0.001).

Height-for-age (H/A) of cases with RHD: Table (6) shows that 6.9% of RHD patients were less than the third percentile and from 3rd to 50th percentile in 89.0% and on 50th to the 90th percentile in 4.1%. Stunting was significantly higher among RHD patients than controls at P<0.001.

Discussion

The present study was designed to investigate the relationship between early infant feeding practices especially exclusive breastfeeding for six months versus exposure to cow's based infant milk formula (IMF) and later life risk of Rheumatic heart disease (RHD). Three quarter of our cases were below 12 years, this allowed us to get a good recall of the early infant feeding practices.

In our study there was a significantly higher rate of exposure to commercially available IMF among the RHD compared to the control group. More of the control groups had received exclusive breastfeeding compared to the RHD patients. This is in agreement with EDHS[6] that showed that although exclusive breastfeeding is also low in the general populations (30%), yet the infant milk formula or cow's milk feeding in the first six months of life was around 21% suggesting that lower socioeconomic status may be associated with poorer feeding practices.

In Egypt, recent demographic surveys[6] show that one third or less of women are illiterate, while in the population of mothers of children with RHD over one half were illiterate. Moreover, those with higher education were less than 10% whereas the demographic health surveys of 2008 [6] show that secondary or higher education is almost one half which is 4-5 times as much as what this current study showed, suggesting a relative increased prevalence of disease among children of mothers who are illiterate or who have less years of education. It is well documented that RHD is a disease of poverty and with poverty comes illiteracy and poor levels of education. Poor hygienic practices that permit transmission of the streptococcal disease are characteristic of RHD [7,8]. In a study conducted in Brazil to assess the predictors of disease severity, 258 cases with rheumatic valvular disease were followed up over a period from 2 to 15 years. Some research workers reported that moderate and severe carditis, recurrent rheumatic carditis and mother low level of education were risk factors in predicting severe chronic disease **[9].**

Children with RHD in this study had a twofold or more exposure to artificial milks or milks other than breast milk in the first six months of life. Moreover, the severity of RHD was higher among children who were partially or fully formula fed. While none or very less of the RHD children who were exclusively or predominately breastfed as infants had any moderate or severe disease. This raises the possibility of the role of cow's milk products in influencing the

progression and severity of this disease.

A growing body of evidence suggests that the pathogenesis of many non-communicable diseases (NCD) as diabetes mellitus and probably cardiovascular disease (CVD) are linked by exposure factors in early life, particularly when the first six months of breastfeeding are not exclusive and cows based milk formula are introduced at an early age [10,11]. Exposure to cow's based milk feeds in early life increase the risk obesity, dyslipidemia, blood pressure [12,13], and insulin resistance [14,15]. While human milk feeding is possibly an important protective factor that has been associated with reduced CVD risks, but this is still unclear particularly with regards RHD [16-18].

The underlying explanation of our findings may be related to the possible alteration during the critical period of early development of the immune system of these children; making them susceptible to cow's milk protein and its antigenicity towards altering immune defense mechanisms leading to increased susceptibility to RHD. This is given that the pathogenesis of RHD is based on the development of an autoimmune response to group A beta hemolytic streptococcal infection (GABS) [19]. Another explanation would be the alteration in the genetic susceptibility to RHD, given that there may be underlying genetic susceptibility for development of RHD and its tendency to run in the same family [20].

There are also reports that suggest that adults and children who were breastfed have lower blood pressure [21] and lower rates of obesity[22] and type 2 diabetes[23] than those who were bottle-fed [24], with benefit proportionate to the duration of breastfeeding [25,26]. They suggested that this association between feeding practices and high prevalence of Diabetes Mellitus was mainly among children exposed to cow's milk based formula early in life [27,28].

Observational studies in the United Kingdom, in the early part of the twentieth century, have shown that those who were 'weaned' before 1 year have similar cardiovascular disease (CVD) in adult life, compared to with those breastfed beyond one year [29]. Also, a systematic review and meta-analysis of four observational studies involving 25166 adults, carried out in developed countries found little association between early infant feeding and cardiovascular disease (CVD) [30,31]. Similar findings were reported by Izadi et al. (2013) [32] in national population-based study, which was performed with 5258 students ages 10 to 18 years, were unable to find any significant association between breastfeeding duration and CVD risk factors. Such controversy may be related to population differences in feeding habits and in the interpretation of early infant feeding practices especially related to the practice of exclusive breastfeeding for the optimum duration of six months as recommended by the world Health Assembly in 2001[33].

With regards to growth parameters there was a tendency for RHD cases to be underweight and stunted, as there was a significant increase of cases who were below the 3rd centile and majority of cases were below the 50th percentile for weight-for-age (W/A) and height-for-age (H/A) when compared to the control group. Such findings indicate that growth failure as a result of the poor nutritional status probably and of chronic malnutrition early in life from the poor feeding practices and/or recurrent infection, but unrelated to their current disease state as they were not moribund or hospitalized cases. Hence malnutrition associated with poverty and

poor early child feeding practices are risk factors for the disease and its progression, which is in agreement with many workers who studied epidemiological factors linked with the disease [(1)].

In conclusion, the risk of RHD, especially severe forms, seems to be linked to early poor feeding practices, especially related to early introduction of cow's based IMF. Such practices impair immune response and inflammatory response to pathogens increasing their vulnerability to abnormal autoimmune processes in the genetically predisposed individuals. The exact mechanism by which early introduction of cow's milk based formula triggers various autoimmune disorders is not fully understood and requires further investigation.

The current findings are the first to define the relationship between early infant feeding practices and the development and progression of RHD. It is thereby highly recommended to promote the practice of exclusive breastfeeding in the first six months and delay introduction of any cow's milk based products till after one year of age or more. This is recommended as state of art practice for ensuring optimal health and wellbeing of children on short and long term.

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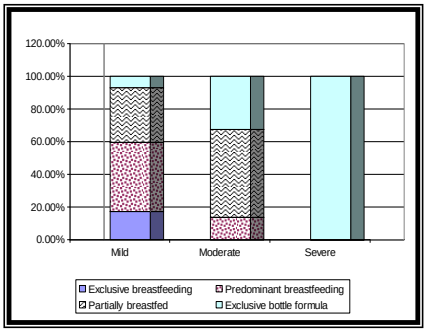

Figure (1): Relation between pattern of feeding and severity of rheumatic valvular disease in patients with RHD

Table (1): Personal and Sociodemographic data of population of rheumatic heart disease under study

Variables		Study(145)		Control (75)		Total (220)		X^2	P
		No	%	No	%	No	%		
Age in years	Under 6 years	12	8.3	5	6.7	17	7.7	2.35	0.67 (NS)
	From 6- to < 8	17	11.7	13	17.3	30	13.6		
	From 8 to < 10	32	22.1	17	22.7	49	22.3		
	From 10 to < 12	45	31.0	25	33.3	70	31.8		
	=> 12	39	26.0	15	20.0	54	24.5		
Sex	Male	60	41.4	40	53.3	100	45.5	2.84	0.09**(NS)**
	Female	85	58.6	35	46.7	120	54.5		
Mother education Level	Illiterate	69	47.6	20	26.7	89	40.5	11.3	0.04S*
	Read & write	46	31.7	27	36.0	73	33.2		
	Primary	9	6.2	9	12.0	18	8.2		
	Preparatory	8	5.5	7	9.3	15	6.8		
	Secondary	7	4.8	8	10.7	15	6.8		
	Higher	6	4.1	4	5.3	10	4.5		

Table (2): Pattern of early infant feeding practices in the cases and control subjects under study

Mode of early feeding	Cases (145)		Controls (75)		Total (220)	
	No.	%	No.	%	No.	%
Full breastfeeding	65	44.8	109	77.3	123	55.9
Partial breastfeeding	56	38.6	11	14.7	67	30.5
Artificial feeding	24	16.6	6	8.0	30	13.6
Statistics	X^2=25.60, p = 0.019*					

Table (3): Distribution of echocardiography findings of valvular disease among of rheumatic heart disease cases under study

	N	%
Normal echo study	1	0.7
MR	67	46.2
MR+AR	58	40.0
AR	11	7.6
MR+MVP	3	2.1
MS+MR	5	3.4
Total	145	100.0

MR: mitral regurgitation, AR: aortic regurgitation, MS; mitral stenosis, MVP: mitral valve prolapse

Table (4) Relation between pattern of feeding and severity of disease in cases under study

	Mild		**Moderate**		**Severe**			
	N	%	N	%	n	%	X^2	p
Full Breastfeeding	59	59.6	0	14.0	0	0.0	45.24	. <0.001*
Partial breastfeeding	33	33.3	23	53.5	0	0.0		
Artificial feeding	7	7.1	14	32.6	3	100.0		

Table (5): Comparison of the distribution by weight-for-age (W/A) in percentiles of the studied cases with rheumatic heart disease versus controls

	Cases (145)		**Controls (75)**		**Total (220)**	
	N	**%**	**N**	**%**	**n**	**%**
Less than 3rd percentile	**19**	**13.1**	**0**	**0.0**	**19**	**8.6**
From 3rd to 50th percentile	**119**	**82.1**	**51**	**68.0**	**170**	**77.3**
More than 50th to 90th percentile	**7**	**4.8%**	**24**	**32.0**	**31**	**14.1**
Statistics	**X^2=36.99 , p < 0.001***					

Table (6): Comparison of the distribution by height-for-age (H/A) in percentiles of the studied cases with rheumatic heart disease versus controls

	Cases (145)		**Controls (75)**		**Total (220)**	
	N	**%**	**N**	**%**	**n**	**%**
Less than 3rd percentile	**10**	**6.9**	**0**	**0.0**	**10**	**4.5**
From 3rd to 50th percentile	**129**	**89.0**	**40**	**53.3**	**169**	**76.8**
More than 50th to 90th percentile	**6**	**4.1**	**35**	**46.7**	**41**	**18.6**
Statistics	**X^2=61.31 , p < 0.001***					

دراسة إستكشافية للعلاقة ما بين أنماط التغذية فى المهد والإصابة فيما بعد بمرض روماتيزم القلب

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الخلفية: مرض روماتيزم القلب من الأمراض التى مازالت منتشرة فى المجتمعات الفقيرة وعلى الرغم من ذلك فإن العلاقة بين أنماط التغذية المبكرة فى الرضع وحدوث هذا المرض و تطورة لم يتم تداركها فى الأبحاث العلمية .

الغرض من البحث: دراسة أنماط تغذية الرضع المبكرة فى الأطفال المصابون بمرض روماتيز القلب و تأثير ذلك على شدة المرض ونمو هؤلاء الأطفال.

طريقة البحث: هذه دراسة مرجعية تم الكشف فيها على 145 طفل مصاب بمرض روماتيزم القلب بالموجات الصوتية على القلب لتشخيص نوع وحدة تأثر صمامات القلب كما تم معاينة نمو الأطفال بقياس الوزن و الطول و وضع هذه القياسات على منحنيات النمو للإستدلال على النحافة و التقزم فى هؤلاء الأطفال وتم مقارنتهم ب 75 طفل أصحاء من نفس العمر والجنس.

النتائج: إستنتجت الدراسة أن الإرتجاع الميترالى كان منتشراً بنسبة 46% و اللإرتجاع الميترالى والأورطى فى40% أما الإرتجاع الأورطى فى 7% و ضيق وارتجاع الصمام الميترالى فى 3% وارتجاع وانزلاق الميترالى فى 2%من الحالات ، وقد إنتشرت الأمية بين أمهات هؤلاء الأطفال بنسبة 40% ، وبالنسبة لأنماط تغذية الرضع المبكرة فقد أظهرت الدراسة إرتفاع إحصائى مؤثر للتعرض للألبان الصناعية فى هؤلاء الأطفال 55% بالمقارنة الى 23% فى الأطفال الأصحاء.كما إرتفعت حالات التقزم (6%) بين أطفال مرضى روماتيزم القلب و النحافة (13%)إرتفاعاً إحصائياً مؤثرا بالمقارنة لقرنائهم الأصحاء الذين لم تكن لديهم مشكلة نحافة أو تقزم (0%).

الاستنتاجات: هناك علاقة وثيقة بين أنماط تغذية الرضع المبكرة وبالأخص إدخال اللبن الصناعى و بين زيادة التعرض لمرض روماتيزم القلب و بالأخص فى الأطفال المعرضون للنحافة و التقزم بسبب سوء التغذية و سوء الحالة المعيشية و الجهل والفقر كعوامل أساسية لحدوث المرض و تطوره و حدته . ولذا توصى الدراسة بضرورة الإهتمام بحالة التغذية للأطفال وذلك بتشجيع الرضاعة الطبيعية المطلقة فى الشهور الستة الأولى من العمر وتكثيف التوعية بالتغذية الصحيحة للطفل.

Growth and Risk of Obesity by Early Feeding Practices in Egyptian Children Under-Five of Age

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Abstract

Introduction: Despite the protective effects of breastfeeding on the overall growth and development of children, yet the inadequate introduction of complementary foods influences the overall growth and health of these children.

Aim: To assess the growth and nutritional status of children under five of age with a focus on prevalence of overweight in relation to early feeding and weaning practices.

Methodology: One thousand children over 6 months and under five of age were selected from different districts from Menoufia governorate in the delta region. The sample included only those who were fed exclusively on breastmilk in the first six months of life and had no major disease or anomaly or were premature. Detailed epidemiological dietary history for complementary feeding, assessing weight-for-age (W/A), height-for-age (H/A), weight-for-height (W/H) and body mass index (BMI) was done for all age groups. Growth was interpreted using the International WHO child growth standards (WHO-CGS) using both the centile and z-score systems.

Findings: Overall growth was influenced by the level of education of the mother. The recent WHO-CGS charts were useful in detecting stunting, wasting and overweight. Overweight was 6.2% in the children under-five, with higher risk among females reaching 10% at 4-5 years and associated with urban residence and mother level of education. Common practices associated with overweight were the early introduction of cow's milk based products at six months (yogurt), carbohydrate rich foods and marketed ready made cereals with weaning off breast before two years of age. Growth patterns were skewed towards stunting and overweight beyond the age of 6 months and increasing with age.

Conclusions: Early feeding practices relying on exclusive breastfeeding in the first six months play a major role in reducing stunting and underweight. However faulty weaning foods introduced beyond 6 months of age are associated with overweight, females are at greater risk than males.

Introduction

The introduction of complementary foods to the diet (weaning) is a critical nutritional stage in an infant's life. The optimal age for this has been much debated. The decision when to wean must balance the risk that weaning too early will stress the immature gut, kidneys, and immune system as well as decrease exposure to the protective effects of breast milk, while weaning too late may result in under-nutrition and feeding problems. Babies weaned before three months had double the rates of parentally reported diarrhea and were more likely to be hospitalized over the age period when solids were being introduced, compared to

those weaned after 4 months. The recommended age has been revised to 6 months, in line with the WHO recommendations [(1)].

The World Health Organization (WHO) has launched the new Global child growth standards for infants and children up to the age of five. With these new WHO child growth standards it is now possible to show how children should grow. They demonstrate for the first time ever that children born in different regions of the world and given the optimum start in life have the potential to grow and develop to within the same range of height and weight for age [(2)].The WHO standard have replaced the NCHS/WHO reference that was used by most countries. The NCHS/WHO curves were also upwardly skewed resulting in an underestimation of obesity. In view of the fact that references are commonly used as standards, they should reflect current health recommendations. For this purpose the WHO Multicentre Growth Reference Study (MGRS) was implemented in six countries between 1997 and 2003 to develop the new Who growth standards [(3,4,5)].

Childhood overweight and obesity rates in the Region are alarming. In some countries, data shows that 80% children aged between 13 and 15 years old are overweight or obese. In Cairo, Egypt about 60% of obese children or adolescents are more likely to become overweight adults. Worldwide the international obesity task force reports that at least 155 million of the world's children aged 5–17 are overweight. An additional 22 million children under the age of 5 years are also affected [(6)].

The growth patterns of healthy infants during the first years of life and the standards for their assessment have been important subjects of research among nutritionists and child health workers in recent decades [(7)]. However in Egypt the Egypt demographic health survey showed the higher prevalence of malnutrition between birth and 6 months of age found using the new WHO child growth standards challenges the traditionally held belief that malnutrition largely begins during the period of complementary feeding between 6 and 24 months of age [(8,9)]. This was also shown in other regions of the world in developing countries [(10)]. The underlying reasons for this require investigation and assessment in order to delineate the role of complementary feeding practices in children who are exclusively breastfed in the first six months of life.

Hence the aim of this study is to assess early feeding and weaning practices that influence growth and nutritional status of children under five years of age.

Methods

This study was carried out on 1000 healthy breastfed infants who were randomly selected from children attending the Family Health Center (FHC) in 6 districts in Menoufia governorate including: Shebin-Elkom, Ewesna, Talla, Elshohada, Berkit-Elsaba and Sers-Ellyan. They were attending for routine child care visits (after vaccination sitting or during a follow-up visit to the clinics).

The selection of 6 districts was done randomly. The number of children selected from each district was based on the birth rates of each district. This was a randomly selected sample with 1000 children under the age of five years including 600 children under the age of 2 years and 400 under the age of 5years. Inclusion Criteria for population under study: full term with birth weight above 2500 grams; exclusively breastfed infants from birth to 6 months of age; children over the age of 6 months and up to 5 years; ***Exclusion Criteria included:*** preterm infants and infants of Low Birth Weight (<2500 g); infants with congenital anomalies, congenital infections,

chronic diseases or syndromes and metabolic disorders; infants exposed to any infant milk formula (IMF) or bottles or teats (pacifiers) during the first six months of life or prior to evaluation.

Data was collected from primary care takers by a predesigned and tested questionnaire to cover information about ***s***ocioeconomic status of infant's family; mother education, working status, health and feeding history of child; child development, social, and mental behaviors of infant. A thorough clinical ***examination*** was done to exclude any chronic illness or major anomalies. We took a detailed description of dietary intake of foods introduced after 6 months, frequency of feeding and daily diet and types of foods and preferred foods by child.

A*nthropometry:* Height was measured with child upright, straight, bare footed, with heels together, arms to the side, legs straight, shoulders relaxed, position the head in the Frankfort horizontal plane i.e. looking straight ahead and heels, buttocks, scapulae (shoulder blades), and back of the head were against the vertical board of the stadiometer. Just before the measurement is taken; the subject took deeply breathing, hold the breath, and maintain an erect posture ("stand up tall"), while the headboard is lowered upon the highest point of the head with enough pressure to compress the hair. The reading was recorded to the nearest mm at eye level with the headboard to avoid errors due to parallax**.**

Body weight was obtained using digital scale. after adjusting the zeroing weight. Two or three times a year the accuracy of the scales were assured by using standard weights or by a professional dealer. The Scale was placed on a flat, hard surface.The subject stood still in the middle of the scale's platform without touching anything and with the body weight equally distributed on both feet. The weight was recorded to the nearest 100 g (0.1 kg) (two measurements were taken in immediate succession should agree to within 100 g (0.1 kg). Ideally, subjects were weighed with minimal underclothing or an examination gown could be worn, and scales were placed where adequate privacy is provided. These values were plotted on International WHO Growth Charts of 2006 in percentiles and z-scores including: Length /Height-for-age (H/A), Weight-for-age (W/A). Weight-for-Length/Height (W/L) body mass index (BMI)-for-age and head Circumference-for-age (HC/A) and mid upper arm circumferences-for-age for both sexes.

Results

The one thousand healthy breastfed infants comprised 50.4% males and 49.6% females. Their mothers were free of major disease and 71.6% had received iron supplements with multivitamins during the last trimester of pregnancy. Still 50.8% of mothers were exposed to smoking from her husband or relatives. 57.7% had normal vaginal delivery.

The majority of mothers (91.9%) were educated. Most of mothers (88.1%) were housewives, one third had one sibling and one third had over 3 siblings. Three quarters were of moderate or high socioeconomic level and the majority of our population (82.2%) was from rural areas.

Infant feeding practices showed that the majority of infants (30.1% and 40.1%) started breastfeeding at one hour and two hours after labor respectively. Introduction of weaning foods started at 6 months in 81.6% of infants, 11.6% at 9 months, 4.1% at 12 months and 2.7% of infants were still breastfeeding only. Most of families of our infants 48.7% had a diet of moderate biological values, 24% of families had a diet of low biological values and 27.3% of families had a diet of high biological values. A diet of low biological values meant predominantly carbohydrates, of moderate biological values contained carbohydrates and fat and of high biological value meant a balanced diet containing proteins, carbohydrates, vegetables and fruits.

Table (1) shows the health status of the population under study as 15% of males were admitted to hospitals versus 11.1% of females. Also, 39.7% of males had chest infections in last six months versus 32.2% of females. While 45.6%, 16.9% and 51.8% of males had GIT infections, parasitic infestation and were exposed to smoking, in contrast to 34.9%, 15.5% and 52.2% respectively, of the females.

Table (2) shows that underweight and stunting in the children under study were minimal or absent of the deviation occurred between 6 to 11 months of age. Figure (1) shows that the bell curve of either sex of W/A for our population was overriding that if the international population, but with a wider base. Figure (2) shows that the bell curve of L/A our population was skewed to the left compared to the international population of the WHO standards, reflecting a tendency to stunting. There were no sex differences, except that females were on the higher centiles for weight.

Table (3) shows that W/L and BMI in the children under study showed a tendency to overweight especially among females, with 2.6% and 4.2% for W/L and BMI/A respectively being +2SDS compared to 1.8% and 3% of males. Figure (3) and figure (4) show that the bell curve of either sex for W/L and BMI/A resepctively for our population was significantly skewed to the right compared to the international population of the WHO standards, reflecting a tendency to overweight.

The L/A of the under five population of educated and non educated mothers according to WHO-CGS showed a significant difference between the percent of infants lying between 95^{th}-97^{th} centiles between infants of educated mothers and infants of non-educated mothers at $P<0.01$, with only 0.5% of infants of educated mothers below the 3^{rd} centile and 0.9% above the 97^{th} centile of. While, 1.2% of infants of non-educated mothers were below the 3^{rd} centile and none of infants were above the 97^{th} centile. Infants of educated mothers and infants of non-educated mothers are evenly distributed all over the WHO-CGS (table 4).

The W/H of the under five population by level of education of the mothers using the WHO-CGS showed that (0.5%) of children of the educated mothers were below the 3^{rd} centile (-2SDS or Z-score) and (2.3%) were above the 97^{th} centile of WHO-CGS (+2SDS or Z-score). Whereas 1.2% of those of non-educated mothers were below the 3^{rd} centile (-2SDS or Z-score) and 2.3% above the 97^{th} centile (+2SDS or Z-score) of WHO-CGS. Also BMI of the total population of educated and non educated mothers showed that 3.7% of children of educated mothers were above the 97^{th} centile (+SDS or Z-score) compared to 2.4% in the non-educated mothers (table 4).

The effect of residence on the BMI/A of the population under five of the study by residence showed that 0.9% of rural children were at -2 SDS (z-score) compared to 0.6% of urban areas. While 4.3% of children in urban areas had a BMI of +2SDS (z-score) compared to 0.6% those in living in rural areas (Figure 5).

Discussion

Although many of the demographic surveys over the previous decades have shown that highest rates of poverty and malnutrition prevail in the mid delta region including Menoufia governorate, yet our study showed that, given that children were breastfed exclusively in the first 6 months of life, of cases were below -3SDS and -2SDS were absent or negligible. This is in sharp contrast to the EDHS 2008[9] that showed in this age group underweight to be 5.9% at -2SDS

and 1.2% at -3SDS. While the EDHS of 2005 showed that underweight was 4.9 % at -2SDS and 0.3 % at -3SDS [8]. These findings indicate that the increase in underweight in these studies are related to poor feeding practices, since the exclusive breastfeeding rates in their sample was below 20%. Hence the difference is mainly attributed to early feeding practices, that may lead to exposure to micronutrient deficiency states that can lead to stunting especially vitamin A, d and iron deficiency, all of which are affected by early feeding practices especially in the first six months of life [10].

In another study, a follow-up of 216 normal Ghanian children from one month of age to 18 months showed that the rates of diarrhea increased if the complementary foods were introduced between four and six months. They stressed that introducing complementary feeding after six months of age improved growth by lessening morbidity **(11)**.

Our study showed that the percentage of cases above the 97th centile of WHO-CGS in the age groups 6-11 months, 12-23 months and 24-59 months, was vaery low throughout the age groups being 0.8%, 0.9% and 0.8% respectively. This is explained by the protective effect of exclusively breastfeeding against overweight in children. In another study a comparison of the WHO Growth Standard with NCHS growth reference on a population in Bangladesh showed that the prevalence of underweight during the first six months was much higher when based on the WHO standard **(3)**.

While others showed that breastfeeding had a major role on the growth of infants especially in the first three months and most of the breastfed cases were growing well and fitted to higher centiles**(12)**. They explained their results by the fact that breast milk contains sufficient energy and nutrients that ensure suitable growth for infants in the first six months **(12)**.

While 0.5% of this group were above the 97th centile of WHO-CGS compared to none when plotted on Egy-GC. Assessment of stunting, in this study indicated that Egyptian children who were on exclusive breastfeeding showed no evidence of stunting. When we used the WHO-CGS for assessment of stunting, The rate was 0.8% less than the 3rd centile in the age group 6-11 months, in the age group 12-23 to be 0.3%, increased more and more to be 0.6% in the age group of 24-59 months indicating that these children are exposed to chronic malnutrition once they stop breastfeeding. Also if we used the Z-score system, we found stunting 0.8% less than-2SDS in the age group 6-11 months graded to be 1.7% at the age group 47-59 months. This is due to malnutrition caused by recurrent infections that affect these children. Conclude that exclusive breastfeeding for six months protects against chronic malnutrition by building their immunity and preventing their exposure to frequent infections.

Other workers have characteristically demonstrated higher early growth rates among exclusively breasted and this could explain the higher detection rate of stunting when using the new WHO growth charts **(12,13)**. Similarly The Saudi Arabia study showed that the Saudi children below 5 years of age were shorter than the reference population, using the US growth charts **(14)**. This could be explained by the high prevalence of early bottle feeding in these communities.

In out study the BMI/A of our population showed overweight was present in 3% of males and 4.3% of females. The tendecney tyo overweight increased with age and was mostly related to the foods

introduced and early cessation of breastfeeding. Hence we found that there were no cases in the age group 6-11, indicating that breastfeeding was protective againt obesity in the early period of growth. Also wasting, as shown in those who fall below-2SDS, increased with age. This may be due to the erroneous feeding practices of children and increase exposure of children to infection especially chest infections and gastroenteritis in the older age groups. In addition, the income level of family and socioeconomic levels of families affect the quality of family foods offered to the child. This supports evidence that breastfeeding protects children against malnutrition.

Overweight, assessed by the body mass index (BMI) in our study, demonstrated to increase with age reaching 6.5% by 3 years of age. The increase was more among females rising from 5.8% at 6-11 months to 10% at 24-35 months and decreasing to 2.3% at 4-5 years of age. In boys it peaked at 2-3 years to 4.7% but again declined by 4-5 years to 2.2%. This trend is a reflection of the poor dietary habits at the stage of weaning with an increase intake of carbohydrate and fat rich foods that cause overweight. However the decrease probably reflected an increased exposure to infection and less attention of the families to overfeed the older child. Similar explanations were reported by other workers **(15,16)**.

Obesity is becoming a worldwide problem that deserves intense attention **(17)**. In Egypt the prevalence of overweight and obesity has increased over the past decades to reach estimates of over 41.6% among females and 22.2% among males superseded only by countries of the gulf region and Saudi Arabia **(18)**. Even in developed countries as the USA the problem of obesity is also escalating **(19)**. The causes may be attributed mainly to poor feeding habits with increased salt intake and fast foods but also to less physical activity and change in life styles to sedentary living life styles **(20)**.

Maternal level of education and urban residence were also a confounding factor for overweight in our study. Family prophiles with higher levels of education and urban residence are exposed to practices such as junk foods, fast foods and foods high in fat and salt content, thereby predisposing their children to obesity. Also urban life is characterized by a sedentary life unlike rural life, where children have the privaledge of playing in open air less polluted green field and may be less exposed to junk foods. However with urbanization of rural regions, these trends are reversing too. Hence the burden of obesity is expected to be on the rise.

However the contribution of early suboptimal early infant feeding practices has been proved by other workers to have a significant role in later development of obesity and overweight (21). A meta-analysis survey that extracted sixty-one studies reported that early infant feeding was a measure of obesity in later life (21). In these studies, breastfeeding was associated with a reduced risk of obesity, compared with formula feeding (odds ratio: 0.87; 95% confidence interval [CI]: 0.85-0.89). The inverse association between breastfeeding and obesity was particularly strong in 11 small studies of <500 subjects (odds ratio: 0.43; 95% CI: 0.33-0.55) but was still apparent in larger studies of > or =500 subjects (odds ratio: 0.88; 95% CI: 0.85-0.90). In 6 studies that adjusted for all 3 major potential confounding factors (parental obesity, maternal smoking, and social class), the inverse association was reduced markedly (from an odds ratio of 0.86 to 0.93) but not abolished. They concluded that Initial

breastfeeding protects against obesity in later life [15]. The underlying mechanism for the relationship between early infant feeding practices and later obesity could probably related to the tendency for higher energy intake from other foods than breastmilk introduced in early life to cause the development of bigger fat cells [21]. The latter may also contribute to the increased risk of development of hypertension in later life [21]. Parents play an integral role in influencing the feeding pattern and behavior and thereby intense education program for parents is important to change feeding styles and habits, later weight patterns and health status [22,23].

Our findings suggest that age-inappropriate complementary feeding influences current energy intakes and infant W/L, factors that may increase long-term obesity risk by shaping infant appetite, food preferences, and metabolism. Given the intractability of pediatric obesity, understanding the role of early feeding in shaping long-term health disparities is critical for the development of no communicable diseases in later life [24].

Evidence is building up showing that the age at introduction of complementary foods has some effect on growth in infancy and that these effects might be more pronounced in formula-fed children. The focus of research should be shifted from the timing of the introduction of complementary feeding to the quality and quantity of foods being offered and their consequent impact on weight gain and obesity risk. More research should be conducted on the relationship of primary nutrition to appetite regulation, satiety and food acceptance. [24] Delayed introduction of solids is associated with reduced odds of child overweight/obesity. Wider promotion of current infant feeding guidelines could have a significant impact on the rates of child overweight and obesity [25,26]. Longer breastfeeding, late introduction of complementary foods and use of home-made foods' are the closest practices to infant feeding guidelines that decrease the likelihood of later obesity [23]. Maternity care practices that support breastfeeding are regarded as an effective strategy for preventing obesity and diabetes mellitus later in life. The USA has taken great strides in making more "baby friendly" Hospitals as an effective strategy for preventing the consequences of suboptimal early infant feeding practices on adult health and nutrition related disease [27]. While emphasis on child growth monitoring using growth charts of breastfed [4]. and country specific growth charts for older children [28,29] can influence nutritional status and future health of children. Country programs should integrate data bases that monitor the growth of older children to monitor and prevent obesity[30].

In conclusion, this study clearly shows that early infant feeding practices could play an important role in childhood obesity that could project later into adult obesity with its ill consequences on the health and survival of our population. Intensifying the efforts of early parental education and strategies for promoting exclusive breastfeeding and nutritional guidance and growth monitoring and surveillance programs may be of significant relevance to protecting against obesity in childhood and later life.

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Table (1): Hospital admissions, morbidity from diarrheal respiratory disease and parasitic infestation as well passive smoking among the under five population under study

PARAMETER	TOTAL		MALES		FEMALES	
	N	%	N	%	N	%
Children admitted to hospital	131	13.1	76	15	55	11.1
Children had chest infections in last 6 months:	360	36	200	39.7	160	32.2
More than 3 times	60	6	40	7.9	20	4
Less than 3 times	300	30	160	31.8	140	28.2
Children had GIT infections in last 6 months	403	40.3	230	45.6	173	34.9
More than 3 times	55	5.5	35	6.9	20	4
Less than 3 times	348	34.8	195	38.7	153	30.9
Children had parasitic infestation	162	16.2	85	16.9	77	15.5
Children exposed to smoking	520	52	261	51.8	259	52.2

Table (2) Distribution of population of under-fives for weight-for-age (W/A) and Length/height-for-age in SDS (Z-scores) according to sex for severity of underweight and stunting using WHO child growth standards

Parameter	Weight-for-age %				
	N	% < -3SDS	% < -2SDS	Mean	SD
Males (6-60)	504	0	0	-0.22	0.92
Females (6-60)	496	0	0.2	-0.03	0.83
	Length/height-for-age %				
Males (6-60)	504	0	0.6	-0.78	0.93
Females (6-60)	496	0	0.6	-0.69	0.92

Table (3): Distribution of population of under-fives for weight-for-length/height (W/L/ht) and Body mass index (BMI)-for-age in SDS (Z-scores) according to sex for severity of wasting and overweight

		Weight-for-length/height %					
Z-scores	***N***	% < -3SDS	% < -2SDS	% > +2SDS	% > +3SDS	Mean	SD
Males (6-60)	504	**0**	**1**	**1.8**	**0**	**0.28**	**1.05**
Females (6-60)	496	**0**	**0.2**	**2.6**	**0**	**0.48**	**0.98**
Z-scores		**Body mass index for age**					
Males (6-60)	**504**	**0**	**1.4**	**3**	**0**	**0.36**	**1.09**
Females (6-60)	**496**	**0**	**0.2**	**4.2**	**0**	**0.53**	**1.01**

Table (4): Comparison between growth of the under five population of educated and non educated mothers regarding L/A according to WHO child growth standards

PARAMETER	EDUCATED MOTHERS		NON-EDUCATED MOTHERS		*Z*	*P-VALUE*
H/A	NO	%	NO	%		
< 3rd	5	0.5	1	1.2	1.314	P>0.05*
>95th – 97th	7	0.8	2	2.5	4.63363	0.01**
>97th	8	0.9	0	0	--	
TOTAL	919	100%	81	100%		

P>0.05 not significant, **P<0.05 significant

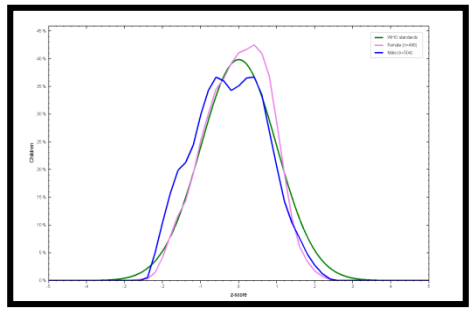

Figure (1): Diagrammatic representation of weight for age (W/A) of the population under study in both males and females as compared to the WHO bell curve for both sexes combined

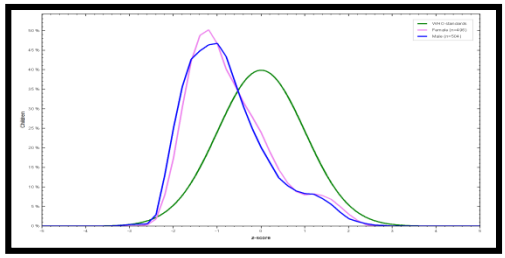

Figure (2): Diagrammatic representation of length/height- for-age (L/H/A) of the population under study in both males and females as compared to the WHO bell curve for both sexes combined

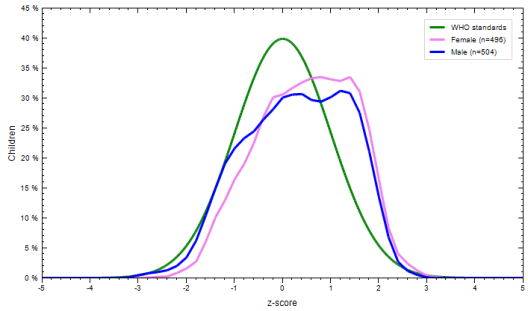

Figure (3): Diagrammatic representation of weight for height (W/H) of the population under study in both males and females as compared to the WHO bell curve for both sexes combined

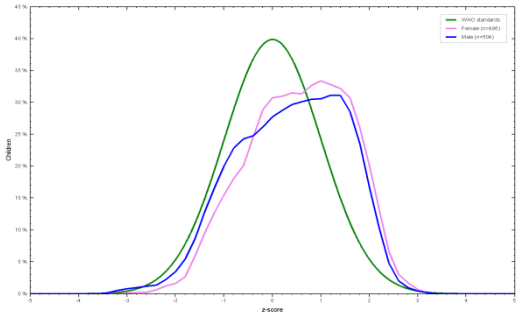

Figure (4): Diagrammatic representation of body mass index for age (BMI/A) of the population under study in both males and females as compared to the WHO bell curve for both sexes combined

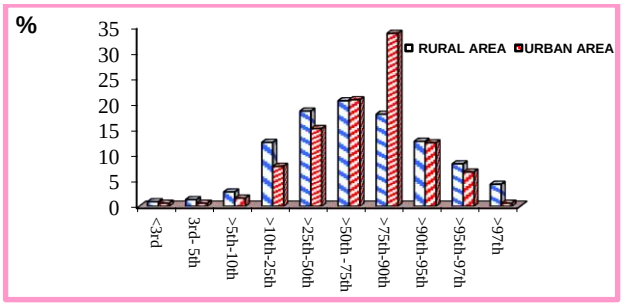

Figure (5): Comparing Body Mass Index (BMI) of population under-five of age living in rural versus urban areas according to WHO child growth standards.

أنماط النمو وتغذية الرضع كدلالات الخطورة للبدانة فى الأطفال المصريين دون الخامسة من العمر

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الملخص

الخلفية: تعتبر البدانة من المشاكل العالمية التى تواجه مجتمعات الدول النامية وقد تؤثر ممارسات تغذية الرضع وصغار الأطفال فى التعرض للبدانة ولكن ليس من الواضح هل ذلك مرتبط بممارسات الرضاعة أم بطرق إدخال ونوعية الأغذية المكملة.

الغرض من البحث: إستهدف البحث دراسة نمط النمو و أنواع سوء التغذية المنتشرة ما بين الأطفال دون الخامسة والعوامل التى تؤثر على ذلك بالأخص بالنسبة إلى دور ممارسات الرضاعة و نوعية الأغذية التكميلية و تاثيرها على البدانة.

طريقة البحث: تمت الدراسة على ألف أم و طفل يتراوح عمرهم ما بين 6 أشهر و خمس سنوات وتم سؤالهم عن ممارسات الرضاعة و التغذية فى الشهور الأولى والوقت الحالى ثم قياس وزن و طول الأطفال و مطابقتها على المنحنيات العالمية الحديثة لمنظمة الصحة العالمية لإكتشاف حالات النحافة و التقزم و البدانة.

النتائج: أوضحت النتائج أن نمط النمو لدى هؤلاء الأطفال كان مائلاً للبدانة مع زيادة السن .وقد تأثر النمو الإجمالي بمستوى تعليم الأم ، كما كانت خرائط نمو منظمة الصحة العالمية مفيدة في الكشف عن التقزم والهزال و زيادة الوزن. كانت المشكلة الغالبة في هؤلاء الأطفال أنهم يعانون من زيادة الوزن والميل نحو السمنة و كانت الممارسات المتصلةً بالتغذية المعتمدة على منتجات حليب البقر في الشهور الستة الأولى والإكثار من الأطعمة الغنية بالكربوهيدرات والحبوب الجاهزة والفطام من الثدي قبل سنتين من العمر مرتبط بزيادة معدلات التقزم وزيادة الوزن بعد سن من 6 أشهر وزيادة مع تقدم العمر.

الاستنتاجات : ممارسات التغذية المبكرة التى تعتمد على الرضاعة الطبيعية المطلقة في الأشهر الستة الأولى تلعب دورا رئيسيا في الوقاية من البدانة والتقزم ، بل وإن أغذية الفطام الخطأ التي تعتمد في الغالب على منتجات الألبان الحيوانية والحبوب الجاهزة والتى تقدم بعد 6 أشهر من العمر تلعب دوراً كبيراً فى التعرض للبدانة و بالأخص عند التوقف المبكر للرضاعة.، ولذلك نوصى بضرورة تشجيع اللرضاعة المطلقة فى الشهور الستة الأولى والإستمرار بالرضاعة لعامين مع الأغذية الطازجة و المتنوعة وعدم تعرض الرضيع للتغذية بزجاجات الإرضاع.