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Human milk use in Australian hospitals, 1949-1985

ABSTRACT

This paper will draw mainly on the experiences of fourteen women to explore the use of expressed human milk by hospitals in Australia from the postwar period through to 1985. The purpose is to provide a snapshot of common practices before the decline of human milk banking and other uses of expressed breastmilk in Australian hospitals, thus providing a source for future comparison against the more rigorous, uniform practices being instituted in the new milk banks of the early-21st century. The ten mothers included were a convenience sample drawn from the author's networks, with recruitment continuing till a range of hospital types and a majority of states were included. Three of the mothers also had experience as trainee midwives and midwives, and four midwives contributed their experiences as staff members, only. The hospitals ranged from large teaching hospitals to small private hospitals and were in metropolitan, regional and country locations. The practices included routine expression and expression for specific purposes, whether for the mother's own baby or to donate. Some hospitals pooled the donor milk for premature or sick babies.

Keywords: *human milk, hospitals, milk banking, history, Australia*

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INTRODUCTION

This historical article describes the use of expressed human milk (EBM) by hospitals in Australia in the period from 1949 to 1985. The main focus will be on the 1960s to the early 1980s, as more respondents from this period were available. The purpose of the interviews in this convenience sample was to provide a snapshot of the actual practices that occurred in the collection and processing of EBM, as well as the reasons for expressing milk. Thus it is not the aim of this article to provide a statistical analysis. A previous article discusses the literature searched for this study (Thorley 2012a).

With the establishment in recent years of milk banks in four Australian locations, Perth, the Gold Coast, Sydney, and Melbourne (Hartmann et al 2007; Lording 2009; Mothers Milk Bank 2007, 2009) (Opie G 2011, pers comm 23 February), it is timely to examine EBM use during the period when this was still routine in Australian hospitals. While some mothers of premature infants provided their own milk for their own babies, EBM from mothers in the postnatal ward was used for frail, premature or sick babies in postwar Queensland if their mothers were not

breastfeeding or had not yet established a sufficient milk supply (Thorley 2000). During the period covered by the present study, staff in many hospitals were aware that human milk was the safest food for at-risk infants, despite the coexistence of the view that manufactured baby milks were at least as good as mother's milk for well babies.

Pooling of expressed breastmilk (EBM) from mothers on the postnatal wards was common in maternity facilities in the postwar period, both in Australia and elsewhere (Nutrition Committee, Canadian Paediatric Society 1985; Thorley 2000). Pooling of milk involved mixing all the expressed milk, rather than keeping it in separate batches from individual mothers. This sometimes meant that milk from a mother expressing for her premature baby would go into the pool, rather than specifically to her own baby. EBM, whether pooled or from one mother, was also used to supplement babies at night, since mothers were not allowed to breastfeed at night (Thorley 2000). Routine expression of milk after breastfeeds by mothers in the postnatal wards was believed to prevent breastfeeding problems, such as engorgement, and promote a good supply (Waller nd, 1947). However, in some hospitals it

was recommended for specific reasons, as the interviews demonstrate, rather than as a universal procedure.

Even when they complied with instructions to express their milk, some mothers were uncomfortable about doing so. Indeed, in 1961, a correspondent signing herself 'Doctor's Wife', wrote to the *Medical Journal of Australia* about hospital practices she believed discouraged women from breastfeeding. These included routine breast expression in the postnatal ward, which she considered 'distasteful' and painful and a potential cause of nipple trauma (Thorley 2012a). It appears that her hospital experience involved the use of a pump. Breast expression should, she believed, be optional.

All mothers should be asked if willing to express for the premature babies and thanked for doing so. The only painless contraption for expression is a baby ('Doctor's Wife' 1961).

The practice of using EBM from the postnatal wards for infants in the Special Care Unit (SCU) or Neonatal Intensive Care Unit (NICU) or as routine supplementation was gradually replaced by the use of artificial alternatives. The reasons for this were complex. They included the greater availability of commercial substitutes for mother's milk, especially after the late 1950s (Thorley 2007), the marketing of 'premature' preparations to neonatologists and the availability of free supplies from the manufacturers, as well as a culture shift in which routine postnatal expression of milk had gone out of favour.

Despite the hospital setting, this study will show that screening of donor mothers and their milk appears to have been neglected, at least for in-patients. With the decline of routine expressing by mothers, hospitals appealed to community groups to obtain mother's milk for premature or sick infants. Members of the Australian Breastfeeding Association, then known as the Nursing Mothers' Association of Australia (NMAA), were sometimes used as a source of human milk by hospitals (Dowsett 1979; NMAA 1982). Lacking is any evidence of harm from the use of EBM in hospitals in Australia during this period. Raw human milk has continued to be used safely in Norway since the opening of that country's first milk bank in 1941 (Grøvslien & Grønn 2009).

METHOD

The women interviewed for the present study were recruited during the period from February 2009 to August 2011, via the Australian Breastfeeding Association website, through the author's own networks, and by word of mouth. The intention was to include experiences in at least four states and, in fact, five states and one territory (the Australian Capital Territory) were represented. Their experiences ranged from teaching

hospitals to small private hospitals and an after-care facility, in metropolitan, regional and country areas. The women who responded had donated their milk to hospital milk banks or 'pools' (Table 1), or were staff members of maternity hospitals with experience of the use of EBM (Table 2). Three of the mothers interviewed also drew upon their experiences as trainee midwives or midwives in Australia. Another had trained in Scotland, which is outside the scope of this study. Four respondents were interviewed solely as midwives. None of the women interviewed had a family history of donating milk. One mother who responded to a call for participants in other research in 2007 was ineligible for that study but instead provided information about her experiences with hospital milk pooling in this new study.

Thus no claims can be made that the women who responded to this qualitative study are a statistically representative sample of the childbearing population from these years. The participants do, however, provide a snapshot of the situation experienced by postnatal mothers across Australia who expressed their milk for later use, or whose baby needed breastmilk, during the period before hospitals ceased pooling or handling human milk in the 1980s. Their accounts are supported by interviews with staff members from the same period. The practices described occurred a generation or more ago and this article does not describe current practices at these facilities. Some of the hospitals mentioned in this paper no longer exist.

Interviews were conducted by email or telephone. A set of structured questions provided the framework to the interviews, but participants were free to diverge from this to provide additional information. Ethics approval for this study was obtained from the School of History, Philosophy, Religion and Classics, in the University of Queensland.

RESULTS

The mothers who reported their experiences of donating their EBM to hospital milk banks, to milk 'pools' in the maternity ward, or for their own babies, gave birth in New South Wales, Queensland, South Australia and Western Australia. Some participants also supplied information from when they were trainee midwives or midwives in the Australian Capital Territory, New South Wales, Queensland, Tasmania and Victoria. The hospitals where they gave birth or worked ranged from large teaching hospitals with Special Care or Neonatal Intensive Care nurseries to small hospitals with neither. For the purposes of anonymity, the mothers who responded are identified in the text by the code 'HMB' (human milk banking) and a number, whether or not they also provided information from experience as staff members, while those who participated as midwives or staff members, only, are identified as 'MW' (midwife) and a number.

Table 1. Hospital milk pooling: Summary of mothers' experiences.

	Year & city/ state	Type of hospital	Purpose of expressing	Screening, if any?	Mode of Expression
1	1976, Adelaide, SA	Small, private	To relieve maternal engorgement; for prematures	Access to pregnancy blood screens	By hand
2	1983, Sydney, NSW	Large, public with Special Care Nursery	To relieve oversupply; for hospital milk pool	'Not as far as I know'	Manual pump (breast reliever)
3	1967, Sydney, NSW	Tresillian (after-care hospital)	Hospital routine	No. Hospital records would have been available	Electric pump
4	1964, 1965, 1970, 1975, 1979, Sydney NSW	King George V, Royal North Shore and other, as intermediate patient	Hospital routine; 1st baby premature; expressed for breast comfort, other 4 births	Not for the milk; hospital would have had records of pregnancy blood tests	By hand; pumps tried but proved painful.
5	1967, NSW 1977, Perth, WA 1977, Perth, WA	Canterbury District Hospital (NSW); Maternity hospital (WA) Princess Margaret Hospital (WA), a children's hospital	Hospital routine (NSW) Use of EBM discouraged, WA maternity hospital, 1977. Appeal to mothers in the community for one-off EBM donation, for sick babies	'Not that I recall'	By hand
6	1949, Maryborough, QLD	St Stephens' (private hospital)	To relieve overfull breasts. Hospital used the milk for prematures.	No pregnancy blood tests done	Breast reliever (rubber bulb) & electric breast pump
7	1972, Sydney, NSW	Crown Street Women's (large teaching hospital with Special Care nursery)	Expressing for her own twins	N/A	By hand
8	Brisbane, QLD	Boothville (private)	To avoid use of artificial supplements. No milk bank, but obstetrician arranged for his other patient to breastfeed respondent's baby.	GP held records of both mothers' health status	N/A
9	Wagga Wagga, NSW Canberra, ACT	Calvary, private hospital (1st baby) Canberra and Woden Valley Hospitals	For own baby Expressed after feeds with 2nd and 3rd babies, discarded EBM as hospital did not save it. Expressing no longer recommended after subsequent births.	N/A N/A	Manually expressed; also 2 oz (60 mL) breast reliever
10	Penrith, NSW	District hospital	For own premature baby, but milk was pooled and given to others	Definitely not	Manually or by machine

Table 2. Information from former maternity staff.

Position	Year & place	Hospital type	Reason for expression	Recipient infants	Screening
Trainee midwife ¹	1967–1968, TAS	Regional Launceston, TAS	Overfull breasts in new mothers	Premature	None observed
Trainee midwife and midwife	1968–69, ACT; NSW	Tertiary Canberra Hospital, & Crown Street Women's, Sydney	Mothers who were already expressing. Their excess milk was then used	Premature or sick babies	None observed
Trainee midwife	1966–67, Brisbane, QLD	Tertiary Mater Mothers' Hospital	Encouraged as hospital routine; to prevent lumps and for milk pool	Supplementation of babies; top-ups at night; premature babies.	None observed; may have been some 'social' screening
Midwife	Narrandera Hospital, Riverina, NSW	Small district hospital	No expressing, unless oversupply	EBM was discarded	N/A
Trainee midwife and midwife	<1982, Penrith NSW	District hospital, NSW	For prematures	Premature or sick babies in SCN	None at all
Midwife. ²	1975–78 NSW	Training facility for midwives in NSW	For prematures. Babies for adoption occasionally put directly to breasts of mothers with oversupply.	Premature	No
Trainee midwife; NICU staff member. ³	Pre-1984, NSW	Royal North Shore Hospital, NSW	For the mother's own premature baby. Excess milk was used for other babies in the NICU and would have come from several mothers. Milk from staff members with oversupply sometimes used.	Premature	No
Trainee midwife. ⁴	January 1985–January 1986	Toowoomba General Hospital	Only mothers with a specific need, eg oversupply	Not specified	No

1. Interviewed only as a staff member and identified as 'MW1':

2. Interviewed only as a staff member and identified as 'MW.2':

3. Interviewed only as a staff member and identified as 'MW3':

4. Interviewed only as a staff member and identified as 'MW4':

Reasons for expression of milk postnatally

Some of the mothers reported that expression of milk after breastfeeds was routine after they gave birth, while other participants described specific reasons for expression. A mother who gave birth to several babies in the 1964–1979 period in two large urban hospitals in Sydney with private, intermediate and public beds, stated that mothers in these hospitals routinely expressed. She reported:

My first baby was premi [sic] but it was also the routine for all the mums at the hospital. [It was] the done thing, everyone did it, didn't faze you (HMB.4).

Another Sydney mother, who in 1967 was sent with her baby to the Tresillian after-care home for assistance to increase the baby's weight, recalled that this facility had a policy of having the mothers express their milk, so she 'went along with it' (HMB.3). Her maternity hospital had not kept a milk bank, she stated, 'whereas Tresillian used [EBM] to feed their babies. All the mothers expressed' (HMB.3). Another mother reported that the practice in Sydney in the Canterbury District Hospital in 1967 was that:

All mothers with new babies were told to express routinely as their milk would be used for prem babies in the nursery and it would be a shame to waste it. Milk was expressed into sterile containers, collected and pooled in the nursery. Babies who required 'top-ups' were also given this pooled breast milk (HMB.5).

The same mother had a totally different experience in a suburban hospital in Perth, Western Australia, in 1977, when she had to be vigilant to ensure it was her EBM that was being fed to her premature baby:

I used to spend time in the nursery to ensure he wasn't 'comped' with formula; comments like he's being [tube] fed formula [as it] is so much easier etc. (HMB.5, 1977).

She also had to advocate strongly for him to be put to her breast. When she offered to donate her abundant EBM for other babies, she was told that it was not required. As she described it, 'In WA in 1977 formula was KING!' (HMB.5).

Routine expression after feeds was the practice when a mother of seven had her second and third babies in the old Canberra Hospital in the early 1970s and she had no trouble manually expressing. She was not told what happened to the milk she expressed. Mechanical breast pumps were available at this and other hospitals. She gave birth to her next three babies in the Woden Valley Hospital, also in Canberra. However, by the time she had her fourth baby in 1974, expressing was no longer routinely carried out. Nor was it practised at the Mater Mothers, a large teaching hospital in Brisbane, when she had her seventh baby.

Years before, in 1966–1967, when she was a student midwife at the Mater in Brisbane, expressing had been encouraged as a routine hospital procedure, 'to prevent lumps', this pooled EBM being used to top up babies if the test weighs indicated they had not received the expected amount at the breast. As the difference between the *anatomical* and *physiological* capacities of newborns' stomachs appears not to have been understood during this period, infants were expected to take more than the average 7 mL per feed that was physiologically comfortable (Walker 2006: 78–81). During this respondent's student days the babies, who were kept in the nursery except for feeds, were fed on demand during the night on modified cows' milk, an artificial baby milk or EBM while their mothers were told to rest 'to bring in milk' (HMB.9). As the EBM was sent to another floor, she reported that she had no idea how it was sterilised, or who carried out the processing.

At the Penrith (NSW) District Hospital in the early 1980s, expressing milk on the postnatal wards was still a common practice, the excess milk being used for premature or sick babies. 'Milk pooling was common in the hospital and many mothers donated their excess milk', recalled a mother who delivered there in 1982 (HMB.10). Although the women interviewed did not mention it, other sources have described the excessive and unnecessary cleansing of their nipples, which mothers were required to do before each feed (Thorley 2000).

Some mothers began expressing for a special purpose, to provide milk for their own premature babies. A Sydney mother who expressed her milk for her twins in 1972 stated:

As far as I am aware my milk only went to my babies but I have no actual idea if this happened or not ... as access to the NCC was barred (HMB.7).

In the 1970s and early 1980s, participants who were staff members at New South Wales hospitals with midwifery training schools reported that mothers of prematures were encouraged to express their milk while the babies were in the NICU. The milk was used in house, usually for the mother's own baby, although this was not always the case. A mother whose first baby was delivered in 1982 at 35 weeks by caesarean because of *placenta praevia* and developed respiratory distress syndrome, began expressing the next day, intending her milk to go to her own baby. This was not what transpired.

Definitely not my idea to give the bulk of my milk. I was storing milk for my baby 'for when' she was able to take oral milk fluids/feeds and as I was living 45 minutes away from her (the hospital) when I was discharged and needed to leave milk for her until I returned the next day. I did have an over abundance of milk and was happy to donate

whatever was excess, however, I wasn't at that point. All the milk I had been expressing for at least 5 days had been pooled and given to the prem babies. I therefore had no milk stored for when I was discharged without my baby (HMB.10).

At 10 days her baby was transferred from Penrith to Blue Mountains Hospital where she stayed until she was 2 weeks old. During this time the mother expressed her milk. In the first week at home, her baby progressed from EBM feeds by bottle to direct breastfeeding.

If a baby were transferred to another hospital the milk was pooled in the hospital where the mother remained and so did not go with her baby. At some hospitals, the milk was only pooled if the mother provided more than her own baby needed, in which case it was used for babies whom the midwives believed needed more than their mothers were producing. Occasionally, the milk of a staff member with an oversupply was also added to the milk pool at one of the hospitals.

Other reasons existed for the expression of breastmilk postnatally, when it was not part of the usual routine. Over-fullness of the breasts was one such reason. For instance, a mother was suffering discomfort from over-full, tight breasts following the birth of her first child in 1949 in St Stephen's Private Hospital in Maryborough, Queensland. Treatment for her oversupply consisted of expressing her breasts and, she recalled, applying cool cabbage leaves. Similarly, in February 1976 in Blackwood Hospital, a small, private suburban hospital in South Australia, another respondent also began expressing her milk because of discomfort from over-fullness. When another respondent was a trainee midwife in Launceston, Tasmania, in 1967–1968, the mothers who expressed their milk were mostly postnatal mothers with an oversupply. The recipient babies were premature. In 1983 a Sydney mother who began expressing in the postnatal ward to relieve oversupply was happy to provide her milk to the hospital. 'I was asked if I wanted to take part, there was no coercion' (HMB.2). Although expressing might have provided temporary relief by reducing intra-mammary pressure, it possibly prolonged the oversupply for some mothers.

Nipple trauma was another reason for expressing milk postnatally. A respondent who gave birth to her first child in a private hospital in Wagga Wagga, New South Wales, in 1969 had bleeding nipples and the staff took her baby away from her to prevent her from breastfeeding. She was a trained midwife herself, and so instead of following what she termed the hospital's 'antiquated attitude' and taking the option of artificial feeding that the staff seemed to prefer, she expressed her milk, which was 'abundant' (HMB.9). Her milk went to her own baby. Eventually she was allowed to hold her baby — to bottle-feed her. Her baby went to the breast before she left hospital and she

breastfeed successfully, despite the negative attitudes of maternity staff.

Direct breastfeeding of an unrelated baby during the hospital stay

On rare occasions, instead of expressing for a hospital milk pool, a mother was asked to put a baby other than her own to the breast while in hospital. Feelings about this were mixed. Two mothers and a midwife reported this situation. A Sydney respondent, an experienced breastfeeding mother, recalled having negative feelings about directly breastfeeding an unrelated baby who was to be adopted, but was willing to express and provide her EBM.

In 1979, when I was in the hospital with my 5th baby, I was asked to feed a baby who was up for adoption if I felt comfortable [about it]. I had big engorgement (rocks) and was asked if I could help. But [it] felt too unnatural and uncomfortable and [I] just expressed. ... [I] said I couldn't do it, [as] it felt very unnatural and I was also disgusted at myself for not being able to do it (HMB.4).

This reflects similar attitudes reported by Thorley (2009a) among some of the women in a study of Australian women who shared breastfeeding or breastmilk in the 1978–2008 period. That is, they were more comfortable about donating EBM than directly breastfeeding a baby other than their own.

For other mothers, breastfeeding another baby was a welcome solution to a problem. At a New South Wales hospital, which had a midwifery and nursing school, senior midwifery staff occasionally asked engorged mothers whose babies had been transferred to other hospitals if they would agree to breastfeed a baby waiting to be placed for adoption. My respondent, a midwife on the staff in the second half of the 1970s, recalled that, to her knowledge, no mother had refused the request, as they preferred having a baby at breast to the use of a pump. The Boothville Hospital, a small private hospital in Brisbane, lacked a milk bank, and in 1978 a mother whose milk was slow to come in after a caesarean section under a general anaesthetic did not want her daughter to be given any non-human milk. As a solution, her GP obstetrician asked one of his other patients if she would be willing to feed this mother's baby directly at the breast. Both mothers consented. Their health histories were known to the doctor who made the request. The first mother stated:

I sat with her and watching her [breastfeed my baby] my milk came very soon and [so I] did not have any problems (HMB.8).

She went on to breastfeed her baby on demand for 2 years, with the support of the Nursing Mothers' Association of Australia (now the Australian Breastfeeding Association).

Although these experiences did not involve banked EBM, they are included here as instances of other ways in which an infant was occasionally provided with breastmilk from a source other than the mother during the hospital stay.

Appeals for donors in the community

During the latter part of this period, some Sydney hospitals, for instance, the children's ward of the Bankstown Hospital in 1979 (Dowsett 1979) and the Royal Alexandra Hospital for Children in the early-1980s (Nursing Mothers' Association of Australia 1982), depended on EBM collected from mothers in the community to feed some of their sick babies if the mother's own milk was unavailable or insufficient. This became necessary when postnatal milk expression went out of practice in associated maternity facilities. One of the respondents to this study reported going to the Princess Margaret Hospital for Children in Perth in 1977 to make a one-off donation of EBM, in response to an appeal by the hospital to mothers in the community. Earlier, she had asked her suburban maternity hospital to send her excess EBM to the Princess Margaret Hospital for use by sick babies, but she doubts that this was done in view of the negative attitude shown towards use of EBM by the Special Care Unit staff she encountered.

Methods of expression of mother's milk

The milk was expressed by various means, including by hand or with manual or electric pumps. Manual expression was reported by some of the correspondents as the method they used. A Sydney mother described her experiences of expressing after the premature birth of her first baby, in 1964:

Everyone was brought around a bowl after feeding time ... I tried the pumps but they hurt and I preferred hand expressing (HMB.4).

Mothers expressed into autoclaved sputum mugs when one respondent was a trainee midwife at the Mater Mothers' in Brisbane in 1966–67. This milk was then pooled. Manual expression into a sterile bowl was usual at an Adelaide suburban hospital in 1976 (HMB.1). Significant oversupply problems developed in this respondent, apparently because of the additional stimulus to her already abundant supply. Indeed, her baby doubled his birth weight at 6 weeks, despite projectile vomits. A Sydney mother recalled that in 1972 she expressed by hand. According to another mother, whose babies were born between 1967 and 1977 in Sydney and Perth, expressing was by hand, both in hospital and when expressing at home for whatever reason. This was because:

apart from being the easiest and quickest way when learned [or] shown how — hand expressing was the only option as very few had access to breast pumps and they were a cow to clean. Clements was the only one around ... for many years (HMB.5).

One implement that was used for expressing milk, and which is still on pharmacy shelves today, was a small glass manual breast reliever with a small bulb on its underside for milk collection. It had a red rubber squeeze bulb to produce negative pressure to extract the milk and was used by some of the respondents (Figure 1). It holds only about 60 mL, there is a high risk of contamination of the milk from overflow into the rubber bulb, and the lack of control over vacuum may lead to nipple damage (Walker 2010). A cylinder-type manual breast pump, the Kaneson, was available, too, at least in the latter part of this period. Another respondent, who was a trainee and a midwife in a district hospital in New South Wales and later gave birth in the same hospital, reported that mothers expressed:

anyway they could. Hand pump mostly, a few scattered 'old' milk machines, heavy duty/sit on the floor ones. I am guessing one per ward (HMB.10).

Figure 1. 'Bicycle horn' breast reliever, used as a pump



Photo by Joy Anderson

Electric pump expression was sometimes used. For instance, in 1949 at a private hospital in Maryborough, Queensland, milk expression was done either with a rubber bulb breast reliever or a large electric pump on a trolley. It was most likely that this machine was a Clements. The participant who was asked to express in the Tresillian after-care home in 1967 used an electric machine to express her milk, which she thought was crueler, but it was easy and apparently did not result in soreness. She stated:

I didn't really like it as I didn't have a problem with breastfeeding. I'd never expressed before ... [I had] an overabundance with previous baby and fed one-sided (HMB.3).

Another mother used an electric breast pump when her premature baby remained in hospital in 1982 and she believes this was a Clements.

What, if any, screening was done of donor or milk?

This was a period when the risks were low for transmission of the two infectious diseases, pulmonary tuberculosis (TB) and syphilis, which had been of concern earlier in the 20th century (Thorley 2009a). Federal funding for the long-running national screening program of chest x-rays ceased in 1977 because so few cases of TB were discovered (Tyler 2006; Stylianou 2009). Then, as now, screening for syphilis was an integral part of pregnancy blood testing (Campbell J 2008, pers comm. 9 January). Syphilis had ceased to be common in this population. Newer disease concerns, such as HIV, were to come after 1985 (Boyes 1987; Ziegler 1985).

Some of the donor mothers stated that they were unaware of any screening process. By that it can be understood that they were not subject to a screening questionnaire, though this does not necessarily mean that their records of blood tests were not checked. However, there is evidence from the interviews that checking of the results of pregnancy blood screens may not have been done. A Queensland mother was emphatic that no screening was done in the hospital in 1949 before her EBM was used for premature babies and, indeed, no blood tests had been done during her pregnancy. In fact, the first time she had a routine blood screen during pregnancy was in 1958, before the birth of her third child, and it was only then that she was found to be Rh negative. At the time of her first and second births she was living in a small town and gave birth at a hospital in a larger centre. Two respondents who had babies in Sydney in 1967 and 1983 were not aware of any screening process when their expressed milk was used for other babies. Another Sydney mother who had her babies during 1964–1979 assumed that the only screening was the blood screen done during her pregnancy and on record in the hospital.

Responses by women who were trainee midwives or midwives confirm the lack of screening. A participant who did her midwifery training at the Queen Victoria Hospital in Launceston, Tasmania, in the late 1960s believes that the donor mothers on the postnatal ward were not screened. Although pasteurisation was usual in this hospital, on occasion raw EBM was given to top up a particularly hungry baby on the other wards. A midwife who worked at a large Sydney hospital until 1978 was certain the staff did no screening or checking of records before using expressed milk, in a population of largely white, middle-class women, with some Turkish and Lebanese women. This was also the case in a large Sydney hospital in the early 1980s.

A mother who gave birth during the same period in Penrith had a very clear memory about the lack of screening of mothers and their EBM, and the absence of any questionnaire or testing.

Definitely no. No consents to share the milk, or accept milk for your baby from others, questions on your health. Nothing (HMB.10).

She had experience of the procedures for use of the donor EBM from when she was a trainee midwife and midwife at the same hospital, and confirmed the lack of any screening.

I am certain no records were checked before 'we' (as nurses and when we were in the nurseries) gave any EBM to any babies, any time (HMB. 10).

A respondent who was a midwifery trainee at a provincial Queensland teaching hospital in 1985 does not recall checking mothers' medical records before using their milk. After checking with a friend who trained with her, she confirmed that the containers of EBM were labelled, in handwriting, with the patient's name and probably the date, though she was not sure if the patient's Unit Record (UR) number was used. The hospital still had a well-baby nursery and she remembered an occasion when a baby was wheeled out to the wrong mother to be breastfed. The mistake was identified after the baby had been breastfed and neither mother raised any concern.

Provided they were checked, hospital records of blood tests taken during pregnancy would have identified the existence of a transmittable disease. However, the interviews have shown that routine pregnancy blood tests were occasionally not done when mothers came from country areas. Even if tests were done antenatally, the respondents agreed that there was a good chance that they were not checked when EBM was shared.

Processing and dispensing of donor EBM

A mother who gave birth to her first baby in 1949 in a private hospital in Maryborough, Queensland, stated that she was told that her milk was used for premature babies, but she had no information about the procedures for storing and administering this milk. She thought it was 'a good thing' that her EBM was being used, instead of being wasted. This was an era when mothers were not always informed about what happened to the milk they expressed (Thorley 2000). In a major Sydney teaching hospital in 1964, a respondent expressed her milk for her first baby, who was 7 weeks premature, and later expressed at home and took the milk into the hospital for him. She stated, 'I assume [the EBM] went to a pool, but I never actually asked and we weren't told' (HMB.4) Likewise another Sydney mother stated she did not know if the EBM were boiled. Some mothers, however, reported being fully informed. A Sydney mother who expressed her milk while on the postnatal ward in the 1960s reported:

All mothers with new babies were told to express routinely as their milk would be used for prem babies in the nursery and it would be a shame to waste it. Milk was expressed

into sterile containers, collected and pooled in the nursery (HMB.5).

A participant who trained in Launceston, Tasmania, and who checked her memories with a friend who trained with her, believes the EBM was stored in the refrigerator in the milk room in the neonatal nursery, before being used either raw, pasteurised or boiled. The milk was used only for prematures. She was unable to confirm if there was any checking of the pregnancy blood tests of the mothers whose milk was pooled, but she doubts it. Two other respondents, who had undertaken midwifery training in Brisbane in 1966–1967 and in Canberra in 1968–1969, respectively, were not aware of any screening process for mothers whose milk was being used for other babies. However, one of them thought that some ‘social screening’ might have been done at the Mater Mothers’ in Brisbane, that is, women with poorer hygiene would not have been asked. When the other was a trainee midwife, and then midwife, at large teaching hospitals with Special Care nurseries in Canberra and Sydney in the 1968–1971 period, the mothers who were expressing were doing so for their premature or sick babies. They were in-patients and their excess milk was thus available. A respondent who worked as a midwife until shortly before the premature birth of her first baby at the Penrith District Hospital reported that the EBM was processed in the milk room. She assumed that the milk used for her sick baby was processed in the pasteuriser, since this is what happened when she worked in the milk room as a student midwife.

Two of the respondents who had trained as midwives mentioned a specific problem with heat treating the EBM. In Penrith, the EBM was heat treated in the same machine that was used for sterilising the bottles, and care was needed so as not to caramelise the milk by using the incorrect cycle. The need to prevent caramelisation was also mentioned by the respondent who trained as a midwife in Launceston, where the sister-in-charge was responsible for ‘sterilising’ the EBM. In Penrith:

they were pretty careful with the handing of the breastmilk, they treated it as GOLD, and especially allocated it to the smallest/sickest infant as a priority system (HMB.10)

The actual process was as follows:

The milk would arrive in ... small pots or bottles, be pooled together and then poured out into the number of bottles in quantities needed for each infant for a 24 hour [period]... eg 8 feeds of 35 mL etc, labelled for the infant and put into the machine to be ‘pasteurised’, then would be sent down to the SCN [Special Care Nursery] fridge. Every day repeat the process (HMB.10).

In the small Blackwood private hospital in South Australia in 1976 the staff requested excess EBM from maternity in-patients for ‘fussy feeders, mother [sic] with supply

problems’ (HMB.1). This respondent was happy to help. The hospital had no premature nursery, but excess EBM from Blackwood was supplied to the now-defunct Queen Victoria Hospital for babies in the Special Care Unit and Neonatal Intensive Care Unit. Another respondent, in New South Wales, reported that it was the idea of the hospital staff for her to contribute to the milk pool for premature babies, to which other new mothers were also donating. Although the respondent who was in the Tresillian home in 1967 was there to increase her baby’s weight, the milk she expressed went to the facility’s milk pool.

In 1982 the EBM from the mother of a premature baby was used for other babies, despite her having had a blood transfusion after a postpartum haemorrhage. This was the year when another patient in the hospital became the first person in Australia to contract HIV from a blood transfusion, eventually dying of AIDS (HMB.10; anon nd). In fact, this respondent was not cleared as free of HIV infection for several years and consequently her partner, a regular blood donor, was banned from donating blood to the Red Cross Blood Bank. Although transmission of HIV via blood was acknowledged, it was not until 1985 that the possibility of transmission of the HIV virus via milk was first suggested (Ziegler et al 1985). Even if this respondent had been infected, the heat treatment of her milk in the pasteurisation process would have protected the recipient babies and they were not put at risk.

The in-house neonatal paediatric text used by trainee midwives in the Royal Women’s Hospital, Melbourne, did not provide instruction or protocols for the expressing and processing of mothers’ milk for use by other babies (Royal Women’s Hospital, Melbourne 1973). This would suggest that EBM was not being formally collected and banked in this hospital at this time. However, the text recommends that, in cases of under-supply, the mother express her breasts after each feed and give this milk to her baby after the next feed (Royal Women’s Hospital, Melbourne 1973: 22–23). It is not stated whether this milk was stored separately or pooled with the milk of other mothers. EBM (‘if possible’) is listed first in the types of food offered to low-birth-weight babies at this hospital, but no mention is made as to whether this was the mother’s own milk or pooled milk.

DISCUSSION

The information from the interviews and a previously published literature review (Thorley 2012a) concurs with the experiences described by respondents to a previous study by the author (Thorley 2000) of mothers’ experiences during the post-World War II period. The study presented here has confirmed several reasons why women were asked to express. These were: specifically to feed premature babies; to relieve oversupply and supply the premature nursery; a hospital routine for all new mothers in the belief that this would establish lactation

better, at a time when *ad lib* breastfeeding was forbidden; and, lastly, to stimulate the milk supply in women whose babies were not gaining weight.

Some hospitals used the milk raw, some pasteurised it and some boiled it, and there is no identifiable pattern as to which method was used. While some hospitals used pasteurisers, the process was sometimes circumvented, and it is likely that the milk pooling practices in some facilities were *ad hoc* and did not follow a particular protocol. This would explain variations in practices within some locations. As in many areas of neonatal care, practices were often not evidence-based. According to the respondents to this historical study, some Australian hospitals did no specific screening of donors before their milk was used and checking of pregnancy blood screens was seldom, if ever, done. So instances where blood tests were not conducted during the donor's pregnancy would not have been noticed. Indeed, one of the mothers interviewed for this article was able to state categorically that she had no blood tests till her fourth pregnancy (counting one that ended in miscarriage); yet it was after her first child was born that she donated her EBM. Similar information was reported by a respondent who was a staff member at another hospital.

In the last quarter of the 20th century, pooling of collected expressed breastmilk in maternity wards declined. The factors in this decline included that routine hand expressing of the breasts for all mothers had gone out of favour, and that marketing to hospitals of artificial substitutes had increased, including milk mixtures intended for premature infants. In the 1970s, some hospitals sourced donated EBM from mothers in the community to feed to their premature infants (NMAA 1974; Dowsett 1979; Thorley 2009b), a group at risk of necrotising enterocolitis if artificially fed (Barlow et al 1972; Kliegman 1979; Morgan, Young & McGuire 2011; Updegrave 2004).

The reason for the closure of the NMAA-run Townsville milk bank in the children's ward of the Townsville General Hospital was the lack of a volunteer to fill the position of coordinator, which involved a considerable time commitment to coordinate every stage of recruitment, milk collection, testing and storage (Beal D 2009, pers comm. June; Beal, Ashdown & Mackay 1978). After publication of the case report by Ziegler and co-workers (1985) suggesting that human milk was a potential source of transmission of HIV, an overreaction in the second half of the 1980s, hastened the closure of the remaining mothers' milk banks in Australia and elsewhere (Lucas 1987). This is despite the fact that Eglin and Wilkinson (1987) found that HIV-infected breastmilk was rendered safe when pasteurised at 54.5–55°C for 30 minutes in the Oxford pasteuriser and 56–57.5°C for 33 minutes in the Axicare pasteuriser. Others reported that Holder pasteurisation at either 56°C or 62.5° destroyed the HIV

virus (Acheson 1988; Anon 1988; Arnold & Larson 1993; Mortimer & Cooke 1988; Orloff, Wallingford & McDougal 1993) and was being used by human milk banks in other countries (Tully, Jones & Tully 2001), while in Norway raw milk from screened donors continued to be used safely (Grøvslien & Grønn 2009). Today, the protocols used by the Perron Rotary Express Milk Bank in Perth and the Human Milk Banking Association of North America include pasteurisation at 62.5°C for 30 minutes (Hartmann et al 2007; Tully, Jones & Tully 2001).

With maternity facilities providing what little EBM they had to sick or premature babies who were in-patients, and children's hospitals sometimes needing to appeal for EBM from outside sources, mothers in the community who had insufficient milk lacked access to donor EBM to make up the shortfall. Mothers who were reluctant to use manufactured non-human milk to feed their babies were obliged to depend on the good offices of lactating relations or friends. In this situation, some local groups of the Nursing Mothers' Association of Australia rallied donors to help out, either in appeals for EBM by hospitals or for individual mothers in the group (Dowsett 1979; NMAA 1982, Thorley 2009b). Previous research has investigated the development of policies on milk banking by NMAA, 1975–1979, to provide regulation of the sharing of a bodily fluid which was already happening (Thorley 2012b). Even today, with only a sprinkling of milk banks in Australia, and most of these able to service only in-house demand or their local areas, mothers are turning to family or friends for short-term donation of EBM (Maddock 2009; Thorley 2009a).

CONCLUSION

This study provides a snapshot of the experiences of a sample of mothers and staff members in the expression and dispensing of human milk in hospitals in Australia prior to the cessation of milk banking or pooling after 1985. The intention is to provide an account of what was actually done during another period for the purposes of comparison when studies of 21st century milk banking are conducted in the future. The experiences described here reveal that it was not unusual for practices to be more casual that would be accepted in maternity facilities today. Despite this, no evidence of any untoward events emerged from this study.

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