Fluid Intake in Infants and Young Children

What is water important for?

Water has many important roles in the body. It helps transport nutrients, maintains blood volume, regulates body temperature and removes waste products.

Infants and young children:

- Have a higher metabolic rate which increases heat production, waste products and fluid requirements.
- Have immature kidneys and do not concentrate urine as well as adults.
- May not be as tolerant of thirst as adults and may not be able to drink as much fluid as an adult in order to reach their fluid intake target.

All these factors contribute to an increased risk of dehydration in infants and young children.

Dehydration can be life threatening. Symptoms to be aware of include sunken eyes, decreased urine output, irritability and diaphoresis. Dehydration can also contribute to constipation in the colorectal contents become dry and hard, making stools more difficult to pass.

Fluid requirements

The daily fluid intake for 0 – 12 months should average about 300ml/day. After 6 months, a portion of this fluid is provided by solids and is normal for fluid intake to decrease.

Children 1 – 5 years of age should drink at least 1 litre a day. This includes water, milk and some juices.

Best fluid choices are described below.

- Red flag choices

- Full fat dairy products are recommended for children under two years of age, while milk and reduced fat dairy products should not be used for this age group.
- Between the ages of 2 and 3 years, children do not usually need the extra fat and calories from full fat dairy foods, making reduced fat milk a better option for ages 2 years and over.
- Milk should not be used for infants under one year of age.
- Children with allergies or intolerances to cows milk should find a suitable high calcium replacement. Soy milks should not be used for this age group.
- Full fat dairy products are recommended for children under two years of age.
- Skim milk should not be used for this age group.
- Between the age of 2 and 5 years, children do not usually need the extra fat and calories from full fat dairy foods, making reduced fat milk a better option for ages 2 years and over.
- Milk should not be used for infants under one year of age.
- Children with allergies or intolerances to cows milk should find a suitable high calcium replacement.
- Soy milks should not be used for this age group.
- Full fat dairy products are recommended for children under two years of age.

What is milk good for?

Full fat dairy products are recommended for children under two years of age, while milk and reduced fat dairy products should not be used for this age group.

Throughout the day of the survey compared to 79% who consumed milk and 67% who consumed juice (fruit or vegetable) on the day of the survey compared to 79% who consumed milk and 67% who consumed juice (fruit or vegetable) on the day of the survey. Most children (over 12 months) have an adequate intake of key nutrients such as calcium and zinc. However, too much milk can be detrimental to young children as well as adults.

Between the ages of 2-3 year old, drinking juice (fruit or vegetable) on the day of the survey compared to 79% who consumed milk and 67% who consumed juice (fruit or vegetable) on the day of the survey. Most children (over 12 months) have an adequate intake of key nutrients such as calcium and zinc. However, too much milk can be detrimental to young children as well as adults.

Recent research shows soft drinks can contribute to obesity and poor oral health. Putting babies or young children to bed with a bottle increases the risk of developing tooth decay and poor oral health. Putting babies or young children to bed with a bottle increases the risk of developing tooth decay and poor oral health.

Drinking milk is appropriate after 12 months if the child is ready to make this transition. Toddler milk is appropriate after 12 months if the child is ready to make this transition. Toddler milks should not be used for this age group.

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During an annual state from stage IV of non-REM sleep to REM sleep, the child may call out, sit up, speak unintelligibly and then return to sleep. Annual can occur every 40-60 minutes followed by a REM sleep for 5-10 minutes.

The previous diagram is the author’s version of the sleep cycle which parents may find useful.

Environmental factors
There are environmental concerns that affect sleep such as:
- Noisy sleeping environment
- Cots or beds too hot or too cold
- Instability to be allowed time to sleep
- Parents high expectations of how much sleep is necessary
- Constant checking of the infant
- No routine

Stimulated to get to sleep (sleep associations)

Another problem that may exist is the parent’s expectations of infant sleep and crying patterns and the actual crying behaviour of the infant. It is important to work through this problem as you can assist the family to move forward if they are feeling concerned with the sleep pattern of their infant.

Sleep regulation
A sleep problem is defined in children of one year as being a sleep-onset problem, associated with fussy that lasts longer than 30 minutes a regular, night waking episodes that occur at least 4 nights a week and require parental intervention. While this is the definition of a sleep problem, the practitioner should understand that if a parent is raising a concern, then this needs to be addressed regardless of the definition.

A critical sleep renegotiation period is at 8-12 weeks, which is the establishment of the diurnal cycle. Sleep regulation and consolidation (settling and sleeping) through the night is seen as a developmental milestone by many child health professionals. This consolidation refers to the ability of infants to sustain sleep in a continuous fashion for their age – for an appropriate period of time before fully waking.

From the wider reading it is evident that until the infant is 3-6 months of age the infant has the ability to regulate their patterns and has an immature response to waking, so that settling techniques may not be hugely successful prior to 3 months of age.

At 3 months of age, the research tells us that crying becomes more organised and co-ordinated with visual and gestural cues. Infants also begin to be aware of their parent’s voices at this age.

It is important to keep sleep problems in perspective and parents need to be reassured that crying is a normal development for an infant and 70% of infants can self-regulate back to sleep at 3 months and 90% do this regularly by 6 months. So we can see that by 12 months of age, the majority of infants have regulated themselves and are self soothing and perhaps sleeping for longer periods at night. Remember, there will be some parents still experiencing difficulty with their child’s sleep at this stage.

Setting techniques
Setting techniques can be best explained by considering these techniques as being cognitive management and behaviour management.

Cognitive approaches
The cognitive approach to sleep will address the parent’s ability to be in tune with their infant and understand what age appropriate for them.

The main cognitive approach suggested is to allow the infant (≤ 3 months of age) to fall asleep on their own bed or cot (at night). This strategy works in 70% of infants by these months of age; and this increases to 90% by nine months of age.

If an infant is put to bed awake, then they are more likely to be self soothers compared to those babies who are put to bed asleep. Infants that require a lot of parental assistance to go to sleep at night are also more likely to require further intervention to fall back to sleep during a waking period in the night.

Many parents, if they accommodate stringent differences, can assist the infant to learn to regulate sleep and waking behaviour according to environmental cues. This may involve ensuring the environment or minimising interaction during the night, and/or varying routines to help the baby to sleep.

At around 3-6 months of age, parents can regulate the infant by:
- Moving the infant out of the family bedroom.
- Not singing to the infant as they make a sound.
- Infants are given greater opportunity to self-soothe.
- Reduce stress to distance themselves away.
- Some may only seek food at 6-7 months of age.
- Nighttime feeds become less interactive.

Other techniques to encourage sleep are:
- Identification of a child’s unique tired signs and acting on these as soon as possible.
- Listen to the baby’s crying by listening and getting to know their own infant’s crying and acting accordingly.
- Hearing parents that about crying periods at setting times are normal and it may take 10 minutes of crying and grizzling to allow the infant to settle back to sleep.

In most cases these small/subtle settling techniques can be enough of a signal for the infant to relax into a sleep.

Behaviour modification strategies
Behavior modification strategies tend to come into play when parents are crying techniques in the past and the infant and family are continuing to struggle to find a balance in their routine. There has been much discussion on the different types of behaviour modification strategies, particularly the controlled crying / comfort setting / extinction methods.

From the evidence, it is paramount when considering using a particular modification technique to ensure professional competence and assess whether a technique such as this should be recommended.

It is important not to recommend a controlled crying technique if the infant is under 6 months of age as this can be admissible if the technique follows up while parents are using the technique.

It is also advisable that behaviour modification methods not be introduced on an infant that is up less than 6 hours of age.

Another cautionary note would be that the parents need to listen to their infant’s need and cry and assess how they are managing when using a technique such as controlled crying / extinction.

Final words:
From literature reviews and meta-analyses, it is evident that there needs to be many questions clarified in relation to the technique for sleep and setting. It is important that we consider all opportunities to gather evidence and research, to develop and review current best practice. Some questions that need to be answered are:
- What are different cultural theories and expectations on sleep for infants?
- How does the use of behavioral modification techniques affect maternal attachment and the ability to respond to their infant? And visa versa.

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Useful websites for parent information on sleep and crying patterns:
- Child and Youth Health – www.cyh.com
- Raising Children Network – raisingchildren.net.au
- Child & Youth Health – www.cyh.com

Reflection Questions
1. How informed are you about infant tired signs? Can you confidently explain these to parents?
2. How do you personally feel about behaviour modification techniques? Would you use or recommend them to parents? Would your decision be based on evidence or personal feelings?
3. Consider the demographic and cultural characteristics of the parents attending your services. What are their expectations on sleep for infants? Are these realistic?

Infant Sleep Cycle
Infants go on REM sleep immediately (50 days)
During an annual sleep state from stage IV of non-REM sleep to REM sleep, the child may call out, sit up, speak unintelligibly and then return to sleep. Annual cycles occur every 40-60 minutes followed by a REM sleep for 5-10 minutes. The previous diagram is the author's version of the sleep cycle which parents may find useful.

**Environmental factors**

There are environmental concerns that affect sleep such as:

- Noisy, chaotic home
- Cold or hot home
- Inability to be allowed time to sleep
- Parents high expectations of how much sleep is necessary
- Constant checking of the infant
- No routine

Stimulated to get to sleep (sleep associations).

**Sleep regulation**

A sleep problem is defined in children of one year as being a sleep-onset problem, associated with having look less than 10 minutes on a regular basis, or night waking episodes that occur at least 4 nights a week and require parental intervention. While this is the definition of a sleep problem, the practitioner should understand that if a parent is raising a concern, then this needs to be addressed regardless of the definition.

A critical sleep regulation period is at 5-12 weeks, which is the establishment of the diurnal cycle. Sleep regulation and consolidation (setting and sleeping through the night) is seen as a developmental milestone by many child health professionals. This consolidation refers to the ability of infants to sustain sleep in a continuous fashion for their age – for an appropriate period of time before fully waking. From the wider reading it is evident that until the stage of 3-6 months of age, babies have the ability to regulate their patterns and have an immaturity in response, so that settling techniques may not be highly successful prior to 3 months of age.

All 3 months of age, the research tells us that crying becomes more organised and co-ordinated with visual regard and gestures. Infants are also able to be soothed by their parent’s voice at this age. It is important to keep sleep problems in perspective and parents need to be reassured that crying is a normal developmental for an infant and 70% of infants can self-regulate back to sleep at 3 months and 90% infants do this regularly by 6 months. So we can see this by 12 months of age, the majority of infants have regulated themselves and are self soothing and perhaps sleeping for long periods at night. Remember, there will be some parents still experiencing difficulty with their child’s sleep at this stage.

**Sleeping techniques**

Setting techniques can be best explained by considering these techniques as being cognitive management and behavioral management.

- **Cognitive approach**

  The cognitive approach to settling allows the parent to be in tune with their infant and understand what is age appropriate for them.

  The main cognitive approach suggested is to allow the infant (3-6 months of age) to fall asleep on their own. This strategy works in 10% of infants by three months of age and this increases to 95% by nine months of age.

- **Behavior modification ideas**

  Behaviour modification strategies tend to come into play when cognitive techniques are in place and the infant and family are continuing to struggle to find a balance in their routine. There has been much discussion on the different types of behavioural modification strategies, particularly the controlled crying / comfort settling / extinction methods.

  From the evidence, it is paramount when considering using a behaviour modification technique that the health professional completes a full assessment of the situation and assesses whether a technique such as this should be recommended.

  From literature reviews and meta-analyses, it is evident that there is evidence showing there is not a controlled crying / extinction technique that works on its own. It is vital to have a controlled crying / comfort settling / extinction technique that is tailored to the child’s needs and progresses at a rate that is comfortable to the family to move forward if they’re feeling concerned with the sleep pattern of their infant.

- **Settling techniques**

  Infants are given greater opportunity to self soothe.

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A newborn can enter REM sleep immediately after falling asleep. As they get older than 12 months of age, infants and adults spend an increasing amount of time in REM sleep. Infants spend their REM sleep divided into the two periods of Stage 2 and stage 4 sleep. REM sleep is higher in infants than adults and this is parallel in increases in heart rates and blood flow. As infants get older, they are better able to control their dreams and to be less affected by external factors.

Environmental factors

There are environmental concerns that affect sleep such as:
- Noisy chaotic home
- Cold or hot home
- Inability to be allowed time to sleep
- Parents high expectations of how much sleep is necessary

Stage II:

As you transition through the drowsiness into sleep, your body begins to become more relaxed. This is an active stage and the mind is alert and dreaming occurs. Your body does not react to outside world, only to what is happening in your own body. You have rapid eye movements in this stage, which parallel increased heart rates and blood flow. A critical sleep reorganisation period is at 8-12 weeks, following the ability to regulate their patterns and have an immature nervous system, so that settling techniques may not be highly successful prior to 3 months of age. Infants are also able to be comforted by their parent’s voice at this age. It is important to keep sleep problems in perspective and parents need to be reassured that crying is a normal developmental for an infant and 70% of infants can self-regulate back to sleep at 3 months and 90% do so regularly by 6 months. So we can see why by 12 months of age, the majority of infants have regulated crying patterns and are self-soothing and perhaps sleeping for longer periods at night. Remember, there will be some parents still experiencing difficulty with their child’s sleep at this stage.

Setting techniques

Setting techniques can be best explained by considering these techniques as being cognitive management and behavioral management. 

Cognitive approaches

The cognitive approach to settling allows the parent to be in tune with their infant and understand what is age appropriate for them. The main cognitive approach suggested is to allow the infant to 1-3 months of age fall asleep on their own bed. This strategy works in 10% of infants by three months of age and this increases to 39% by nine months of age. If an infant is put to bed and they are more likely to be settled sooner compared to those babies who are put to bed awake. Infants that require lots of parental assistance to go to sleep are at risk of settling patterns and are more likely to require further intervention to fall back to sleep during a waking period in the night. Common causes of infant sleep problems are:

- Not eating the right amount of calories
- Not eating the right type of foods
- Infants are given greater opportunity to self-soothe
- Infants are given more time to sleep
- Infants are allowed more space to move around
- Infants are given more time to sleep
- Infants are allowed more time to sleep
- Infants are allowed more time to sleep

Another cautionary note would be that the parents need to listen to their infant’s need and crisis and monitor how they are managing when using a technique such as controlled crying / extinction.

From literature reviews and meta-analyses, it is evident that there needs to be many questions clarified in relation to the technique for sleep and settling. It is important that we consider all opportunities to gather evidence and research, to develop and review current best practice. Some questions that need to be answered are:

- What are the cultural differences and expectations on sleep for infants?
- How do you personally feel about behaviour modification techniques?
- Would you use or recommend them to parents?
- Would your decision be based on evidence or personal feelings?
- Are these realistic?

Families First Project Officer
Megan Leuenberger
Author:

Behaviour modification techniques

Behaviour modification strategies tend to come into play when sleep problems are present and the infant and family are continuing to struggle to find a balance in their routine. There has been much discussion on the different types of behavioural modification strategies, particularly the controlled crying / comfort settling / extinction methods. From the evidence, it is paramount when considering using a particular technique that the health professional completes a full assessment of the situation and assesses whether a technique such as this should be recommended.

It is important not to recommend a controlled crying technique that is inappropriate for the infant or case and that is not directly following up while parents are using the technique.

It is also advisable that behaviour modification methods not be used on an infant who is aged less than 6-8 months of age. Another cautionary note would be that the parents need to listen to their infant’s need and crisis and monitor how they are managing when using a technique such as controlled crying / extinction.

Reflection Questions

1. How informed are you about infant tired signs? Can you confidently explain these to parents?
2. How do you personally feel about behaviour modification techniques? Would you use or recommend them to parents? Would your decision be based on evidence or personal feelings?
3. Consider the demographic and cultural characteristics of the parents attending your services. What are their expectations on sleep for infants? Are these realistic?
Fluid Intake in Infants and Young Children

What is water important?

Water has many important roles in the body. It helps transport nutrients, maintain body volume, regulate body temperature and remove waste products.

Infants and young children:

- Have a higher metabolic rate which increases fluid production, waste products and fluid requirements.
- Have immature kidneys and do not concentrate urine well
- May not be verbal about their thirst and urine output, making it hard to be aware of hydration levels.
- All those factors contribute to an increased risk of dehydration in infants and young children.

Dehydration can be life threatening. Symptoms to be aware of include sunken eyes, decreased urine output, irritability and dry skin, mouth and eyes. Dehydration also can contribute to constipation as the colonic contents become dry and hard, making stools more difficult to pass.

Fluid requirements:

The daily fluid intake for children 0 – 12 months old should be 80ml per kilogram body weight per day. In hot weather, babies will usually naturally demand more fluids.

Breast milk is the best fluid for infants under 12 months. Breast milk is appropriate after 12 months if the child is thriving, developing normally, and is not at risk of tooth decay. Offering milk at this stage is a normal progression and does not mean the child is thirsty. Breast fed babies may need extra breast feeds and mother should maintain her hydration. It is not usual to offer flavoured beverages such as vanilla or soy milk.

What milk is best?

Full fat dairy products are recommended for children under two years of age, as milk and reduced fat milk will not be suitable for use after this age group.

Between the ages of 2 and 5 years, children do not normally need the extra fat and volumes of fluids children are drinking. Children may still go on sweet drinks or milk and be less inclined to eat a variety of food.

Weight gain

Recent research shows soft drinks can contribute to obesity and industry data suggests that soft drink intake is increasing. Health are formed at this stage and we should be encouraging our children to be drinking less sweet drinks and other sweet beverages.

Situations requiring increased fluid requirements

- Temperature
- Activity
- Exercise
- Illness/Fever
- Gastroenteritis/Diarrhoea
- Major surgery
- Increase in physical activity
- Unusual stress
- Increased alcohol intake
- Increased fluid intake of tea and coffee
- Increased fluid intake of high caffeine soft drinks
- High altitude
- Increase in body temperature

What is your child drinking?

Children playing outdoors or in a car on a warm day can have low levels of fluid if they are not accustomed to dehydrating heat stress. This is not a problem if children are aware of the need for fluids and are offered fluids regularly in the warmer weather, particularly if they are active.

In hot weather, babies will usually naturally demand more fluids and it is acceptable to give formula milk instead of water. Babies will be more confident to drink their bottle if milk is offered before solids. The percentage of children drinking sweet drinks was also alarming, with 35% of 2-3 year olds and 37% of 4-5 year olds consuming sweet drinks on the day the survey was conducted.

Reflection Questions

1. During hot weather do you regularly discuss with parents the increased fluid needs of their infants and children?
2. Have you reviewed your knowledge of the clinical signs of dehydration in infants and children?
3. Do you currently discuss with parents the range of problems that are associated with sweet drinks?

Fluid intake is important for all children over 6 months to supplement fluid needs. Infant formula should be used for those infants who need extra nutrients. Breast milk is the best fluid for infants under 12 months. The daily fluid intake for children 0 – 12 months old should be 80ml per kilogram body weight per day. In hot weather, babies will usually naturally demand more fluids.
Fluid Intake in Infants and Young Children

Water is very important.

Water has many important roles in the body. It helps transport nutrients, maintains body volume, regulates body temperature and removes waste products.

Infants and young children:
- Have a higher metabolic rate which increases heat loss.
- Have immature kidneys and do not concentrate urine as well as adults.
- Have a higher risk of dehydration because they have a higher surface area to volume ratio.
- Have a higher risk of heat stroke due to their small size and large surface area.

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