

## Review Article

# Exclusive breastfeeding for six months: the WHO six months recommendation in the Asia Pacific Region

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In 2001 the World Health Assembly adopted the infant feeding strategy which included the recommendation for exclusive breastfeeding until 6 months of age with continued breastfeeding while complementary foods are introduced. This recommendation has been endorsed by many national authorities, professional organisations and most countries in the Asia Pacific Region. Reviews by WHO, the US Surgeon General, Agency for Healthcare Research and Quality, US Department of Health and Human Services and others have documented the many benefits of breastfeeding. The introduction of solid foods before six months of age is associated with increased rates of infection, reduced breastmilk production, disruption to the microbiome and possibly obesity. If solids are introduced at around six months (by 26 weeks) there is no evidence of increases in allergic diseases.

**Key Words:** exclusive, breastfeeding, infancy, morbidity, mortality, dietary advice

## INTRODUCTION

The past half century has brought dramatic progress in improving the health and wellbeing of citizens of all ages in our region, but particularly for infants and children. Fifty years ago infant mortality was around 130 per 1000 live births in East Asia and the Western Pacific and it was even higher in some remote areas. Currently infant mortality in the region now averages 17 and is as low as 3 in Japan and in Korea. However, it still remains above 50 in some remote areas, including Papua New Guinea, posing continuing challenges to nutrition.<sup>1</sup> The improvements in infant nutrition and health have been reflected in increased life expectancy which during the past 50 years has increased from 50 years to 74 years, and is as high as 83 in Japan, 81 in Korea and 76 in China. These improvements in health and nutrition are greater and have been more rapid than in any other WHO regions.<sup>1</sup> They reflect the combined influences of economic development, education, and improved public health and health services. Of course improvements in nutrition have played, and continue to play, an important role in improving health and survival. The aim of this review is to discuss the recommendation to exclusively breastfeed for six months and the discussion of modifications of this guideline.

The aims of infant nutrition are to provide all of the nutrients and energy required for growth and development in the 12 months post partum. In recent years there has been increasing emphasis on optimising growth to achieve the best health outcomes over the “whole of life”. Early life nutrition now aims to optimize growth and not to maximize it, as would be the case in many other species. Human infants are also unique amongst animal species in that they require weaning foods when breastmilk by itself is no longer sufficient and adult foods are not yet

suitable. The evolutionary basis for the human need for complementary foods is described by Sellen as a “strategy that provided a unique adaptation for resolving tradeoffs between maternal costs of lactation and risk of poor infant outcomes”.<sup>2</sup> The goals for human nutrition of maximizing longevity and minimizing morbidity and dependence have resulted in considerable debate on the optimum way of feeding infants. This of course is made infinitely more complex as each culture has its own variation in food supplies and beliefs related to infant feeding and the use of food.

The growth of infants and its relationship to whole of life health has been the subject of intensive study, but the ethical restrictions on randomized controlled trials means that we mainly rely on observational studies with their limitations. There is strong evidence, especially from developing countries, that shows that improved infant nutrition is associated with decreased morbidity and mortality from gastrointestinal infections (diarrhoeal diseases). The importance of infant nutrition and infection was initially highlighted in the WHO monograph by Scrimshaw, Taylor and Gordon who summarised available knowledge on the interaction of nutrition and infection.<sup>3</sup> They documented the relationship between undernutrition and infection and mortality and described the importance of breast-

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feeding in infant survival: “the fate of newborn infants in many pre-industrial areas seems to depend largely on whether they are breastfed or not—either they are nursed or they die”.<sup>3</sup> This statement reflects the importance of breastmilk in the provision of bioavailable nutrients and energy and the provision of protective factors against infection. The publication of this monograph led to the implementation of a large number of nutrition programs, the widespread promotion of maternal and child health clinics and increased research into the causes and consequences of poor nutrition in different cultures. The importance of exclusive breastfeeding for six months in reducing infant mortality was documented in the landmark WHO collaborative study which showed increased odds of dying in infants who were not breastfed was as high as 6.0.<sup>4</sup>

As the focus of infant nutrition has shifted on from its original mission to reduce infant and child mortality, there has come a greater understanding of the way that early life nutrition (the first 1000 days from conception) can program the rest of life and the new science of epigenetics has emerged.<sup>5,6</sup> WHO statistics show that approximately 63% of all deaths (36 out of 57 million per year) are due to chronic disease and early life factors, including not-breastfeeding or breastfeeding influence this current epidemic.<sup>7</sup> There have been many reviews that summarise early life influences on later health and most emphasise the importance of appropriate growth rates in early life, beginning from the time of conception.<sup>7,8</sup> Other factors that are important are the influence of nutrition and environment on the human microbiome and chronic low grade inflammation.<sup>9</sup> The use of antibiotics during pregnancy and in the perinatal period may also be an important issue.<sup>10</sup> The issue of the increase in allergic diseases as societies advance economically cannot be ignored and needs to be understood in the context of human development and ecology.<sup>11</sup>

Infants who are fed by artificial infant formula grow at a more rapid rate than breastfed infants. It had been recognised for some years that exclusively breastfed babies grow at a slightly lower rate than the old WHO (NCHS) growth reference.<sup>12,13</sup> In 1997 de Onis expressed concerns

about the existing growth reference recommended by WHO that was based on growth data from the USA: “the NCHS curves are inappropriate for healthy, breastfed infants. Recent research shows that infants fed according to recommendations by the WHO and who live under conditions that favour the achievement of genetic growth potentials grow less rapidly than, and deviate significantly from, the NCHS reference”.<sup>12</sup> This has been confirmed in more recent studies including in a major intervention study, the PROBIT study.<sup>14-16</sup> The increased rates of growth led to concerns that this increases the rate of obesity in children and predisposes to overweight adults.<sup>14,17-19</sup>

Recent studies continue to document the importance of breastfeeding in reducing rates of infection in both developing and developed countries.<sup>20</sup> In neonatal intensive care units the use of breastmilk has reduced the risk of necrotising enterocolitis with substantial cost savings in high and low income countries.<sup>21-23</sup> Other studies have documented the beneficial effects of breastfeeding, or the detrimental effects of not breastfeeding, on a wide range of conditions from cognitive development to reduced rates of obesity and diabetes.<sup>18,19,24,25</sup> See Table 1 for a summary of the risks of not breastfeeding prepared by the US Surgeon General.

In 2001 the report of a WHO Expert Consultation recommended exclusive breastfeeding for six months and then the introduction of complementary foods with continuing breastfeeding. This report reflects the Cochrane systematic review which has been updated since its original publication.<sup>26</sup> In 2001 the World Health Assembly adopted the infant feeding strategy which included the recommendation for exclusive breastfeeding until 6 months of age with continued breastfeeding while complementary foods are introduced.<sup>27</sup> In Australia the wording has been modified to recommend exclusive breastfeeding to ‘around six months’ of age to reflect individual variation in growth and nutritional needs.<sup>25</sup> The WHO recommendation has since been endorsed by many national authorities and professional organisations including the WHO/UNICEF, US Surgeon General, American Academy of Pediatrics, American Dietetic Association,

**Table 1.** Increased risks to health from not breastfeeding (percentages)

Outcome	Excess risk (%)
Among full-term infants	
Acute ear infection (otitis media)	100
Eczema (atopic dermatitis)	47
Diarrhoea and vomiting (gastrointestinal infection)	178
Hospitalisation for lower respiratory tract diseases in the first year	257
Asthma, with family history	67
Asthma, no family history	35
Childhood obesity	32
Type 2 diabetes mellitus	64
Acute lymphocytic leukaemia	23
Acute myelogenous leukaemia	18
SIDS	56
Among preterm infants	
Necrotising enterocolitis	138
Among mothers	
Breast cancer	4
Ovarian cancer	27

<sup>†</sup>The excess risk is approximated using odds ratios.

Source: Adapted from US Department of Human Services 2011<sup>18</sup>

European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPHAGN), the United Kingdom, Singapore, Australia (NHMRC), Japan and China (References available on request). In the UK the National Institute for Clinical Excellence (NICE) 2008 guidelines refer to the Baby Friendly Initiative as appropriate guidance.<sup>28</sup> Most countries in the Asia endorse the WHO/UNICEF policy of exclusive breastfeeding to six months. Other important components of the WHO/UNICEF strategy were the emphasis on early mother to infant contact (within 30 mins), no prelacteal feeds and no complementary feeds until 6 months.

The ESPHAGN recommendation on breastfeeding states "Exclusive breastfeeding for around 6 months is a desirable goal, but partial breastfeeding as well as breastfeeding for shorter periods of time are also valuable. Continuation of breast-feeding after the introduction of complementary feeding is to be encouraged as long as mutually desired by mother and child".<sup>29</sup> The message that any breastfeeding is beneficial is an important public health message, but obviously the longer the better for the infant and mother. However the ESPHAGN statement that is often cited is on the introduction of complementary foods which concludes: "Complementary feeding (ie, solid foods and liquids other than breast milk or infant formula and follow-on formula) should not be introduced before 17 weeks and not later than 26 weeks".<sup>30</sup> The position of ESPHAGN was later clarified when they stated "exclusive breastfeeding for about 6 months is a desirable goal. Indeed, ESPGHAN strongly promotes the protection, promotion and support of breastfeeding for 6 months and thereafter as long as mutually desired by both mother and child".<sup>31</sup>

The physiological adequacy of this recommendation has been confirmed in that human milk production is sufficient and infant growth is adequate and does not lead to obesity.<sup>32,33</sup> Since the introduction of the revised WHO policy with the emphasis on exclusive breastfeeding, infant mortality in the Asia Pacific Region has continued to fall, suggesting at the very least this policy is not having any detrimental effects and is probably bringing benefits to the infants of the region. In east Asia and the Pacific infant mortality has fallen from 44 to 17 per 1000 live births in just over a decade.<sup>1</sup>

As emphasis on infant mortality has declined in high income countries there has been increasing interest in allergic diseases which have been increasing in incidence.<sup>34</sup> A systematic review of the literature from Europe by the EAACI Food Allergy and Anaphylaxis Guidelines Group concluded that the lifetime prevalence and point prevalence of self-reported food allergy (FA) in Europe is around 17% and 6%, respectively. The point prevalence of food challenge confirmed FA is under 1%. The frequency of FA is higher among children than among adults and highest in North Western Europe than in other regions, while Southern Europe seems to have the lowest prevalence. Caution is required due to the heterogeneity among the studies suggesting important methodological and diagnostic differences within and across geographical regions of Europe. While the incidence of FA seems stable over time, there may be an increasing trend in Europe.<sup>35</sup> However in the USA in recent years

there may have been a decline in hospital admissions for food allergies.<sup>36</sup> In a recent commentary on the world prevalence of asthma, Sears found that 50 years ago, only 2% to 4% of the population reported asthma compared to 15% to 20% or more currently reported by the general population in many countries.<sup>37</sup> He found that present trends in asthma have varied in different countries with some reported that the incidence has peaked while others are reporting some increases, albeit in mild cases.<sup>37</sup>

It is interesting to note that since the change in the recommendation on increasing the length of exclusive breastfeeding in Australia, the incidence of asthma in children seems to have declined or at least remained stable.<sup>38</sup> The Australian Institute of Health and Welfare has reported that the prevalence of current asthma among children increased during the 1980s and early 1990s, but the trend has since reversed. Between 2001 and 2007-08 the prevalence of current asthma among children aged 0-15 decreased from 13.5% to 9.9% (age standardised rates).<sup>39</sup> The decline in the reported prevalence of asthma was also accompanied by a decline in hospital discharges. The asthma hospital separation rate decreased from 1000 per 100000 children in 1996-97 to 554 in 2010-11.<sup>39</sup> The Infant Feeding Practices Study II (n=2833 infants) where infant feeding was assessed at monthly intervals found that breastfeeding reduced the rate of wheezing and respiratory diseases.<sup>40</sup>

Several allergy special interest groups have suggested that the introduction of solid foods should be earlier rather than later. The Australasian Society of Clinical Immunology and Allergy (ASCI) recommends breastfeeding to six months and beyond and the introduction of solid foods in the 4-6 month period.<sup>41</sup> The 4-6 month period corresponds to the hypothesised period of tolerance for the introduction of complementary foods.<sup>34</sup> Other reviews have supported an earlier introduction of complementary foods including the review in the BMJ by Fewtrell that attracted a lot of responses.<sup>42,43</sup> The responses to this review highlighted the risks to infants of this strategy, particularly from infection, and the scarcity of evidence to support a change away from the six month recommendation.<sup>44,45</sup> A recent study of atopic eczema in infants with a family history from Finland found that eczema was not increased if the introduction of solid foods was at six months or after.<sup>46</sup>

The risks of obesity and disruption to the microbiome should also be considered. The constituents of the human microbiome are different between breast fed and formula fed infants.<sup>47</sup> The microbiome is thought to have a role in the development of obesity and other chronic diseases.<sup>48,49</sup> As well as the increased health risks associated with the introduction of solids at this time, there is now evidence that introducing solids reduces the amount of breastmilk consumed with a consequent reduction in bioavailable nutrients during a critical growth period.<sup>33</sup> For many areas in our region, including in parts of Australia, the issue of safe water supplies remains a problem. The preparation of complementary foods under these circumstances increases the risk to infants.<sup>45</sup>

Almost all infants in the Asia Pacific region receive a variety of solid foods before the age of six months.<sup>50</sup> And this is while the WHO recommendation is for introduc-

tion at six months. In Australia the recommendation on infant feeding was changed in 2003 from introducing complementary foods at 4–6 months to around six months. Since that time the age at introduction of solid foods to infants in Australia has increased and the number of mothers introducing foods before four months has declined from around 40% to 9%.<sup>51–53</sup> A similar trend has occurred in Sweden and when the recommendation was 4–6 months, 34% were given solids before 4 months based on daily food records.<sup>54</sup> As a result of her study in Australia Brodribb concluded that “Any changes to the recommendations away from 6 months may result in an increase in the proportion of infants who receive solids by 17 weeks.”<sup>51</sup>

In their 2012 review of breastfeeding the American Academy of Pediatrics stated: “There is a protective effect of exclusive breastfeeding for 3 to 4 months in reducing the incidence of clinical asthma, atopic dermatitis, and eczema by 27% in a low-risk population and up to 42% in infants with positive family history. There are conflicting studies that examine the timing of adding complementary foods after 4 months and the risk of allergy, including food allergies, atopic dermatitis, and asthma, in either the allergy-prone or non-atopic individual. Similarly, there are no convincing data that delaying introduction of potentially allergenic foods after 6 months has any protective effect.”<sup>55</sup> They then went on to recommend “exclusive breastfeeding for about 6 months”. However De Silva noted that “while breastfeeding may have many other benefits, the evidence in relation to the prevention of food allergy is not strong. This to a large extent reflects the ethical challenges of randomizing infants to a non-breastfeeding arm.”<sup>56</sup>

The European Academy of Allergy and Clinical Immunology’s (EAACI) Taskforce on Prevention has summarised the available evidence.<sup>57</sup> They noted the lack of a good randomised controlled trial on the “effect of timing of weaning and introduction of different food antigens-while breastfeeding vs while not breastfeeding” and acknowledged the difficulties of conducting such a trial. Without any further evidence they then recommended “for all infants no special diet during pregnancy or for the lactating mother and exclusively breastfeeding for 4–6 months.”<sup>57</sup>

Most of the studies on breastfeeding and allergic manifestations as noted in the above reviews either suggest that breastfeeding has a protective effect or the results are equivocal. Along with the complexity of designing ethical studies involving breastfeeding should be added the difficulty of actually measuring breastfeeding and complementary foods exposure. The accurate measurement of exclusive breastfeeding requires regular prospective assessment, whereas many studies of allergy and breastfeeding use retrospective questionnaires or inadequate definitions.<sup>58–60</sup>

Koplin has described some of the changes that have occurred in Infant Feeding Guidelines in the past 40 years.<sup>61</sup> In reality the changes have been relatively minor with the main differences being changing the advice on breastfeeding from 4–6 months to 6 months and easing restrictions on the range and rate of introduction of solid foods. The only recommended restrictions on introducing

foods in the current Australian Infant Feeding Guidelines is on the physical attributes of food (ie texture) treating peanuts the same as any other foods such as pieces of apple and suggests introducing them in a suitable form (eg peanut paste) at around 6 months of age.<sup>25</sup>

In the Asia Pacific region the incidence of allergy remains low, but is likely to increase in the future.<sup>62</sup> However the number of children who die before reaching five years of age remains high at 3 million per year in Asia.<sup>63</sup> If these deaths are to be reduced then it is important that the emphasis on exclusive breastfeeding to around six months and the other components of the WHO/UNICEF infant nutrition strategy remain intact.<sup>64</sup>

## SUMMARY

Almost all international organisations and the majority of National Ministries of Health recommend exclusive breastfeeding to six months because of the overwhelming benefits to the infant. Where breastfeeding is contradicted or not possible an artificial infant formula should be used that contains high quality protein in levels approximating breastmilk to minimise the risk of obesity.<sup>25,65</sup> The only doubt expressed about the length of exclusive breastfeeding has been a concern over allergy. There appears to be little evidence to suggest any overall benefits if the recommendation for six months of exclusive breastfeeding is reduced. Indeed mortality and morbidity of infants may be increased. However as some countries already use the wording “about” or “around” six months to accommodate the flexibility in biological systems this change in wording is worth considering. The promotion of exclusive breastfeeding for around six months should remain a public health priority.

## AUTHOR DISCLOSURES

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## Review Article

# Exclusive breastfeeding for six months: the WHO six months recommendation in the Asia Pacific Region

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## 纯母乳喂养 6 个月：WHO 对亚太地区 6 月龄内婴儿的 喂养推荐

2011 年的世界卫生大会通过了婴儿哺乳计划，建议 6 个月内纯母乳喂养，之后可以配以辅食。此项建议得到了许多国家当局、专业组织和亚洲太平洋地区大多数国家的认可。由 WHO、美国公共卫生部、美国卫生保健和质量管理局、美国卫生和公共福利部和其他部门的审议报告指出了母乳喂养的诸多好处。6 月龄之前喂食固体食物会增加感染几率、导致母乳的泌乳量下降、扰乱微生物生存环境、增加肥胖的可能。如果 6 月龄左右（26 周龄）添加固体食物，则会降低过敏性疾病的发生。

**关键词：**单独的、母乳喂养、婴儿期、发病率、致死率、饮食建议