

ORIGINAL ARTICLE

Health and nutrition content claims on websites advertising infant formula available in Australia: A content analysis

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Abstract

The use of health and nutrition content claims in infant formula advertising is restricted by many governments in response to WHO policies and WHA resolutions. The purpose of this study was to determine whether such prohibited claims could be observed in Australian websites that advertise infant formula products. A comprehensive internet search was conducted to identify websites that advertise infant formula available for purchase in Australia. Content analysis was used to identify prohibited claims. The coding frame was closely aligned with the provisions of the Australian and New Zealand Food Standard Code, which prohibits these claims. The outcome measures were the presence of health claims, nutrition content claims, or references to the nutritional content of human milk. Web pages advertising 25 unique infant formula products available for purchase in Australia were identified. Every advertisement (100%) contained at least one health claim. Eighteen (72%) also contained at least one nutrition content claim. Three web pages (12%) advertising brands associated with infant formula products referenced the nutritional content of human milk. All of these claims appear in spite of national regulations prohibiting them indicating a failure of monitoring and/or enforcement. Where countries have enacted instruments to prohibit health and other claims in infant formula advertising, the marketing of infant formula must be actively monitored to be effective.

KEYWORDS

breast milk substitutes, food policy, health promotion, infant formula, policy making, public health

1 | INTRODUCTION

In the interests of public health, many governments restrict the use of health and/or nutrition content claims in advertisements for foods (Hawkes, 2004). Such restrictions recognize that health claims can be misleading when used inappropriately or in the absence of contextual information (Gilsenan, 2011). Products where use or overuse may have adverse effects on public health are targeted for the most severe restrictions, and in some cases, health claims may be prohibited for these products (Gilsenan, 2011). Infant formula is one such category of product. The European Union and the USA severely restrict health claims for infant formula products (Code of Federal Regulations, 2011; European Commission, 2006). Australia and New Zealand prohibit the use of health claims in the advertising and/or promotion of infant formula (Australia New Zealand Food Standards Code, 2013; Australia New Zealand Food Standards Code, 2016).

Health claims for infant formula are so treated because exposure to any food or fluid (including infant formula) other than human milk

during the first 6 months of life carries established health risks (Black, Allen, Bhutta, et al., 2008; Victora, Bahl, Barros, et al., 2016; Kramer & Kakuma, 2002). The relationship is dose-dependent, and the sequelae associated can be serious, expensive and may persist throughout the life span (Horta & Victora, 2013). The risks vary according to context and are known to be greatest for infants in the most deprived socio-economic groupings (Quigley, Cumberland, Cowden, et al., 2006). Even in high-income countries, with enviable public health provisions, infants fed infant formula are at significantly increased risk of serious illness. The relationship between exposure to infant formula and hospital admission in high-income countries is well established (Paricio Talayero, Lizan-Garcia, Otero Puime, et al., 2006; Pardo-Crespo, Perez-Iglesias, Llorca, et al., 2004; Quigley, Kelly, & Sacker, 2007; Payne & Quigley, 2016). In low- and middle-income countries, early exposure to non-human-milk-foods has been observed to multiply the health risks associated with poor sanitation, compromised maternal and child nutritional status, and deprivation (Black et al., 2008; Victora et al., 2016).

In Australia and New Zealand, the Food Standards Australia New Zealand Act 1991 provides that Food Standards Australia New Zealand (a statutory agency) outline the conditions under which food may be produced, imported, and sold. These conditions are detailed in the Australian and New Zealand Food Standard Code. For many years, this code has prohibited the use of certain claims or representations on packaging and *advertising* for infant formula products.

Although the internet was in its infancy in 1991 when the Food Standards Australia New Zealand Act was given effect, the websites analyzed for this study clearly conform to the advertising industry's own definition of advertising. The Australian Association of National Advertisers' Code of Ethics (available from http://aana.com.au/content/uploads/2015/12/Code_of_Ethics_081215.pdf) states:

Advertising or Marketing communications means:

1. *any material which is published or broadcast using any Medium or any activity which is undertaken by, or on behalf of an advertiser or marketer,*
 - *over which the advertiser or marketer has a reasonable degree of control, and,*
 - *that draws the attention of the public in a manner calculated to promote or oppose directly or indirectly a product, service, person, organisation or line of conduct*
2. *but does not include*
 - *labels or packaging for products*
 - *corporate reports including corporate public affairs messages in press releases and other media statements, annual reports, statements on matters of public policy and the like*
 - *in the case of broadcast media, any material which promotes a program or programs to be broadcast on that same channel or station.*

As these websites have been created for the purpose of advertising products, they (and the individual pages that comprise them) are appropriately described as "advertisements" and are therefore captured by the provisions of the act.

Prohibited claims include *health claims*. Prohibited representations also include *any information relating to the nutritional content of human milk, reference to a nutrient or nutritive substance* (except in the nutrition information panel or in the name of a lactose-free product) and claims that the product is *suitable for a particular condition, disease or disorder* (with the exception of lactose intolerance; Australia New Zealand Food

Standards Code, 2016). Recently, the Standard has been revised, in part to more clearly describe the health and nutrition content claims that may not be lawfully made for infant formula. The revised Standard (Australia New Zealand Food Standards Code, 2016) became fully enforceable in March of 2016.

The purpose of this study was to determine whether health claims, nutrition content claims, or references to the nutritional content of human milk could be observed in Australian websites that advertise infant formula products. The evidence gathered will address the question of whether the Australian regulations are effectively enforced to protect consumers from inappropriate or misleading advertising claims.

2 | METHODS

In order to approximate consumers' internet search behavior, the Google™ search engine was used to identify websites advertising infant formula products, on a single day, July 14, 2014. In order to avoid returning search results influenced by the researcher's previous online behavior (a feature of this search engine), the browser's cache (browsing history) was cleared, and the researcher did not sign in prior to conducting the search. The search was limited to pages from Australia. Search terms "infant" and "formula" were applied, and the first 10 pages returned were examined to identify websites devoted to advertising infant formula products. Infant formula products were identified as those bearing the term "infant formula," which may only be lawfully applied to products that comply with Standard 2.9.1. That is, breastmilk substitutes for children aged less than 12 months.

It should be noted that, without exception, these pages required the authors (as they do all visitors) to indicate agreement with an official-looking statement in order to view pages advertising infant formula products directly. The statement invariably began, "Breastfeeding is best" and included words to the effect that the information provided by the advertiser was informational or educational in nature and/or that it was provided upon the request of the visitor. In addition, one company only provided product information in an area of the website described as "for health professionals." As the Food Standards Australia and New Zealand Act 1991 provides no exemption to its requirements – on the grounds of agreement to such a statement, on the grounds that the advertising is aimed at health professionals, or on any other grounds – this statement was disregarded in the analysis; as it is at law.

Key messages

- Despite being prohibited, health claims are ubiquitous, and nutrition content claims are extremely common on websites advertising infant formula for sale in Australia.
- Although references to human milk are also prohibited in infant formula advertising, they were being made, even if indirectly, on websites advertising infant formula products or brands associated with them.
- Authorities are failing to effectively enforce regulations designed to protect public health by prohibiting the use of health and nutrition content claims and comparisons to human milk.

Web pages advertising infant formula products suitable for infants from birth (either directly or indirectly by advertising the brands under which infant formula products are sold) were captured, in print if possible (using the "print this page" function), or in screen shot. To ensure the sample was complete, it was cross-checked with the Infant Nutrition Council's membership list and the Marketing in Australia of Infant Formula Agreement signatories. A recent review of this agreement found that signatories account for up to 95% of the Australian market (Department of Health and Ageing, 2012).

The Australia and New Zealand Food Standard Code (F2014C01200) was used to inform the development of a thematic coding frame by which nutrition content claims, health claims, and references to the nutritional content of human milk (including references to breast milk or breastmilk) were identified. Australian and New Zealand Food Standard Code – Standard 1.2.7 sets out the claims that can be made on labels or in advertisements for food products in Australia. Part 2 and Paragraph 3 of this Standard states, *A nutrition content claim or health claim must not be made about ... (c) infant formula.* Definitions of these terms are given in Box 1.

Box 1. Definitions of terms in Standard 1.2.7

Standard 1.2.7 Part 1 Paragraph 2.

Health claim means a claim which states, suggests or implies that a food or a property of a food has, or may have, a health effect.

Health effect means an effect on the human body, including an effect on one or more of the following:- (a) a biochemical process or outcome; (b) a physiological process or outcome; (c) a functional process or outcome; (d) growth and development; (e) physical performance; (f) mental performance; (g) a disease, disorder or condition.

Nutrition content claim means a claim about – (a) the presence or absence of – (i) a biologically active substance; or (ii) dietary fibre; or (iii) energy; or (iv) minerals; or (v) potassium; or (vi) protein; or (vii) carbohydrate; or (viii) fat; or (ix) the components of any one of protein, carbohydrate or fat; or (x) salt; or (xi) sodium; or (xii) vitamins; or (b) glycaemic index or glycaemic load; that does not refer to the presence or absence of alcohol, and is not a health claim.

All web pages that advertised an infant formula product or a brand associated with an infant formula product were hand-coded independently by individuals experienced in content analysis. Initially, the web pages were coded as either containing or not containing a health or nutrition content claim. Cohen's Kappa was used to measure inter-coder reliability prior to discussion of the results. Disagreements were resolved by consensus with reference to a medical dictionary. Technical advice was sought from the NSW Food Authority to confirm that the authors had not misunderstood the provisions of the Standards. Web pages advertising infant formula products available only by prescription were excluded because a different instrument regulates the advertising of such products in Australia.

3 | RESULTS

Advertising websites were identified for seven brands of infant formula. Three of these brands were owned by the same parent company – two of which were produced under license by a different company. Each of these websites was comprised of several web pages. Each page shared a brand identity, contained brand advertising and direct or indirect advertising for an infant formula product or for another infant feeding product that shares the company's infant formula brand identity. This practice is known as line extension in the marketing literature (Berry, Jones, & Iverson, 2010; Berry, Jones, & Iverson, 2012).

Web pages that directly advertised 25 discrete infant formula products were identified and are listed in Table 1. Some of the websites identified also contained web pages that made claims for a line of products sharing a single brand or logo, including an infant formula product. These claims were treated as part of a single advertisement for the infant formula products that bear those brands.

It should be noted that the content of these web sites has been altered since data collection. The changes we have observed are presumably a response to a change in the regulatory environment. In April

TABLE 1 Australian infant formula advertising websites

Parent company	Brand and website (home page) ^a	Product name
Nestle	Nan www.nestlebaby.com.au	HA 1 gold Pro 1 gold Comfort 1 LI gold Sensitive A.R.
Aspen Nutritionals sells Nutricia and S-26 products under licence in Australia	S-26 www.meandmychild.com.au Nutricia www.aptaclub.com.au www.karinourish.com.au	Original Newborn Gold comfort Gold newborn Gold soy SMA Aptamil gold + 1 Aptamil Gold + HA Karicare+ Karicare + goat
Bayer	Novalac www.novalac.com.au	Gold Colic Constipation Diarrhea Reflux Sweet dreams
Bellamy's organic	Bellamy's organic www.bellamysorganic.com.au	Infant formula
A2 dairy products Australia	a2 www.a2nutrition.com.au	Platinum premium infant formula
Heinz Watties	Nurture www.heinzforbaby.com.au	Original infant formula 1 Nurture gold + infant formula 1

^aIndividual advertising pages were accessed via these home pages. Specific URLs are too cumbersome to include here.

2016, Food Standard 1.16a became enforceable. This standard clarifies the definition of “health claim” to include many claims that had not been effectively captured by earlier provisions. The authors anticipated this and captured the content of each website in print or screenshot. The complete dataset can be provided upon request. Alternatively, an archiving or caching service (such as www.waybackmachine.org) may be used to evaluate the veracity of our characterization of these pages.

Web pages advertising infant formula products were coded as either making or not making a prohibited claim; health claim, nutrition content claim, or a reference to breastmilk. The authors achieved perfect agreement (Cohen's Kappa =1) on this question. Most web pages advertising infant formula products contained more than one prohibited claim. Table 2 provides examples of text coded as health claims, nutrition content claims, and references to breastmilk.

Advertising pages for every infant formula product identified (100%) contained at least one health claim. Eighteen of the 25 advertising pages (72%) also contained at least one nutrition content claim. References to the nutritional content of human milk were observed on three of the websites advertising infant formula (Table 3). These were usually observed in sections of websites that claimed to be educational or informative rather than on pages devoted to promoting a single infant formula product. These pages contained text, logo, or images clearly indicating a brand identity associated with the company's infant formula products. These images included photographs of infant formula products, known in the advertising literature as “pack-shots.” Pack-shots are used to create familiarity with a product, stimulating sales by triggering recognition of that product in the minds of potential purchasers, while they are in retail environments (Diehl & Terlutter, 2006).

The nature and prevalence of health and nutrition content claims are described in Table 2. Many infant formula product advertising pages contained more than one claim, and some claims appeared on more than one product advertising page.

4 | DISCUSSION

Although health claims, nutrition content claims, and references to the nutritional content of human milk are clearly prohibited in advertising for infant formula in Australia, they were observed in Australian internet advertising for these products. Health claims were ubiquitous in Australian web pages advertising infant formula. Nutrition content claims were also common. References to the nutritional content of human milk occurred on a number of websites advertising infant formula.

The interpretation of advertising standards has often proved to be problematic. Close attention to the literal application of regulatory instruments can leave room for “creative compliance” (Saunders & Yap, 1991), in which messages are developed that conform to the narrowest possible interpretation of regulations (and therefore are immune to sanctions) while conveying an otherwise prohibited assertion. The references to breastmilk observed in this study may fall prey to this phenomenon, since it may be argued that they apply not to a particular product, but to infant formula in general. However, the messages coded as health claims or nutrition content claims were

unambiguous. They cannot be understood except as health and nutrition content claims made for an infant formula product in an advertisement for such a product.

In Australia, exposure to advertising for infant formula is pervasive. A recent study of Australian parents found that 91% recalled seeing an advertisement for one of five infant formula products depicted (Berry et al., 2012). The same study found that Australian parents recognized a number of advertising claims made for infant formula, including health and nutrition content claims (Berry et al., 2012).

This successful targeting of the advertising of infant formula and the inclusion of health and nutrition content claims in such advertising has health implications. Exposure to infant formula advertising messages is associated with infant formula use and early cessation of breastfeeding (Piwoz & Huffman, 2015; Sobel, Iellamo, Raya, et al., 2011). Furthermore, mothers are persuaded of the credibility of advertising messages by language that sounds scientific or technical (Berry et al., 2010). They often believe that infant formula products can treat common ailments or resolve inconvenient but normal infant behaviors (Parry, Taylor, Hall-Dardness, et al., 2013). Both mothers and health professionals confuse advertising messages for scientific or factual information about infant formula (Berry, Jones, & Iverson, 2011). More broadly, it is known that the inclusion of health claims on food products induces a “halo-effect”; consumers are known to view a food product as healthier if it contains a health or nutrition content claim (Parry et al., 2013).

Clearly, current restrictions on the use of health claims, nutrition content claims and references to the nutrition content of human milk advertising of infant formula in Australia are ineffective. State authorities responsible for enforcing the Standard employ passive monitoring (responding to complaints rather than conducting regular audits), and this has not prevented prohibited claims being made about infant formula. A lack of effective enforcement of controls of health and nutrition content claims in general has been noted in many countries (Patel, Smith, Knowles, et al., 2012). All of the companies we found to be advertising infant formula on their websites are multi-national entities. It is therefore unlikely that the situation described is unique to Australia.

Experiences in other jurisdictions demonstrate that the mere existence of regulation is insufficient to protect consumers and that this has a measurable impact on the behavior of populations (Kent, 2015; Rollins, Bhandari, Hajeebhoy, et al., 2016; Zehner, 2016; Pries, Huffman, Mengkheang, et al., 2016; Piwoz & Huffman, 2015). India and China, both countries experiencing rapid modernization and economic growth, have enacted instruments that comparably severely restrict the marketing of infant formula (Jain, 2003; Ministry of Health, Ministry of Internal Trade, Ministry of Radio Film and Television and State Press and Publication Administration, 1995). However, only India enforces their regulations. Regular prosecutions are mounted, through which company executives can be jailed if the company or any of its employees engages in the advertising or promotion of infant formula in breach of the regulations (Jain, 2003). In China, however, the regulations are routinely ignored (Gong & Jackson, 2013). The impact of effective enforcement is clearly demonstrated by a comparison of sales growth figures between India and China. Between 2002 and 2008 sales of infant formula in India increased 10% (~ US \$200 million – \$US220 million). During the same period, sales of infant formula in China more

TABLE 2 Prevalence of product pages making prohibited claims by type of claim

Claim type	Product pages containing this claim type*
Health claims	25
Functional process or outcome effect	15
eg [†] Easy to digest	
Easier to digest	
Easily digested	
May assist with digestion	
To help facilitate easy digestion	
Formulated to help with digestion	
Aid their digestion	
Slower to digest ... helping to keep ... tummy fuller for longer	
May assist the body's natural defenses	
Softens stools	
Relieves discomfort of constipation by producing softer stools	
Encourages gastric emptying	
Improved intestinal transit	
Promote gastric emptying	
Protecting the oesophagus from acid	
Reduced acid exposure reduce regurgitation	
Decreases wind and bloating	
Less wind/discomfort	
Assist with mineral absorption	
Reduces abdominal discomfort	
Provides a longer lasting feeling of fullness	
The stomach empties more slowly	
Slows gastric emptying	
Maintain satiety	
Slowly digestible	
Feel hungry less often	
Rehydrate	
Reduce transit time	
Improve stool consistency	
Easy for babies to digest	
Growth and development effect	12
Provides essential ingredients for ... growth and development	
May help support growth and development	
Support healthy growth and development	
(Helps) support brain and eye development	
Support your baby's developing immune system	
Ingredients for growth and development	
Promote brain and eye development	

(Continues)

TABLE 2 (Continued)

Claim type	Product pages containing this claim type*
Helps support development of the central nervous system	
Helps support bone growth and tissue growth and maintenance	
Helps support healthy gastrointestinal development	
Helps support a health immune system	
Support baby's appropriate growth and development	
Support their physical growth and development	
Optimal growth and development	
Helps support eye, brain and nervous system development	
Effect on a disease, disorder, or condition	9
Designed for babies with symptoms of lactose intolerance	
For the dietary management of ... symptoms of lactose intolerance / maldigestion and diarrhoea	
For formula fed babies with regurgitation	
Aid digestive discomfort	
Relieves the discomfort of constipation	
Help manage infant reflux	
Effectively preventing reflux	
Reduce regurgitation	
Helps decrease wind and bloating that contribute to colic abdominal discomfort	
Diarrhea	
Avoids secondary intolerance	
Helps rehydrate	
Physiological process or outcome effect	8
Supports your infant's digestive and immune systems	
Helps to support your infants digestive system	
May help support your baby's natural digestion	
Nutritionally support the immune system	
Less challenging to an infant's immune system	
Helps support a healthy immune system	
Healthy development of intestinal flora	
Nutrition content claims	18
Protein	10
Whey dominant	
partially hydrolysed 100% whey protein	

(Continues)

TABLE 2 (Continued)

Claim type	Product pages containing this claim type*
A2 type of beta-casein protein	
Partially hydrolysed	
Whey	
Decreased casein	
Casein dominant	
Biologically active substance	5
Contains L-rueteri, a beneficial (probiotic)c bacteria	
Bifidus bacteria	
Minerals	5
Reduced minerals	
Increased magnesium and calcium	
Phosphorus ratio 2:1	
Minerals	
Electrolytes	
Carbohydrates	4
Starch	
Increased lactose	
Reduced levels of lactose	
Easily digestibl carbohydrates	
Easily digestible maltodextrins	
Slowly digestible carbohydrates	
Lower levels of rapidly absorbed carbohydrates	
Increased levels of maltodextrins and starch	
Negligible lactose	
No sucrose	
Fat	3
DHA	
ARA	
LCP	
Fish oil	
Specially treated vegetable oil	
Omegas 3 and 6	
Components of protein	1
Nucleotides	

*Although many product advertising pages contained more than one of any type of claim, each page was counted only once for each type.

†Some examples listed appeared on more than one product page.

TABLE 3 References to human milk found on infant formula advertising websites

Information relating to the nutritional content of human milk
Modified so it's as close as possible to breastmilk
The ratio is similar to mature breastmilk
High-quality protein found naturally in breastmilk
Protein profile closer to breastmilk
Our team ... take inspiration from breast milk
Whey dominant as is breastmilk

than tripled (\$US 1.1 billion to \$US3.5 billion; Euromonitor International, 2008). As noted in a leading industry market report, "the huge disparity in the retail value of milk formula sales between China and India is mainly due to the significant differences between their official regulatory regimes," (Euromonitor International, 2008). The regulatory regimes are in fact remarkably similar; the "significant differences" seem to reflect differences in the enforcement of the regulations.

Globally, it is estimated that inappropriate use of breastmilk substitutes (including infant formula) is responsible for the deaths of more than one million children under 5 years of age every year (Black et al., 2008). Overuse of infant formula in high-income countries with well-developed health systems imposes a significant cost burden. Economic modeling suggests that if 90% of families in the USA could avoid breastmilk substitutes, predominantly infant formula, for 6 months, USD13 billion in health costs could be saved (Bartick & Reinhold, 2010). Even modest decreases in the use of breastmilk substitutes, predominantly infant formula, are likely to result in significant cost gains for health care systems (Pokhrel, Quigley, Fox-Rushby, et al., 2014). Regulation of the advertising of infant formula has a role to play in protecting and promoting child health, provided such regulations are monitored and enforced.

Future research should address the questions of whether parents are exposed to the messages found in websites advertising infant formula and whether their infant feeding decisions are influenced by them.

5 | LIMITATIONS

This study was limited to examining a defined section of advertising for infant formula in Australia (company websites that contain pages advertising infant formula products). Therefore, the results may not be generalizable to all internet advertising for infant formula products (such as banner advertisements, relationship marketing vehicles including so-called "mothers clubs," direct email, social media campaigns and so-called "advice" forums or chat services). Although the authors attempted to replicate a search strategy typically used by a parent or expectant parent seeking information about infant formula products, we were unable to find accounts of relevant search behaviors. While the authors are confident they collected a near-complete sample of company websites advertising infant formula in Australia, there may have been omissions. Similarly, there may be other companies operating in this market who do not use websites to advertise infant formula products and who may or may not use prohibited claims in their advertising.

As evidence of the reach of these websites (hit rates, unique visits) is privately owned, commercially sensitive and therefore confidential, the data presented here cannot address the question of whether the messages we observed on infant formula advertising websites reaches mothers. Nor can it address the question of how these messages might affect infant feeding behaviors. That said, investing in websites to advertise infant formula products would run contrary to the commercial interests of the advertisers themselves if they neither reached those who make purchasing decisions

about infant feed products nor influenced their purchase (and therefore feeding) behaviors.

6 | CONCLUSIONS

Australian manufactures of infant formula are disregarding regulatory prohibitions that apply to the inclusion of health and nutrition content claims in websites advertising their products. This suggests these prohibitions are not effectively enforced, or that sanctions applied do not present a significant disincentive. In order to rectify this situation, resources must be allocated to enforcing existing regulations. Furthermore, attention should be given to the question of whether existing sanctions present meaningful disincentives for non-compliance. Where countries have enacted instruments to prohibit health claims on infant formula, the advertising of these products must be actively monitored if those instruments are to be effective.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

CONTRIBUTIONS

NB conceived and designed the study, collected data, and wrote and revised the manuscript. KG designed the study, collected data and wrote and revised the manuscript. Both authors contributed to and approve the final manuscript.

REFERENCES

- Australia New Zealand Food Standards Code. (2013) Standard 2.9.1- infant formula products- F2013C00621.
- Australia New Zealand Food Standards Code. (2016) Standard 1.2.7- nutrition, health and related claims- F2016C00161.
- Bartick, M., & Reinhold, A. (2010). The burden of suboptimal breastfeeding in the United States: A pediatric cost analysis. *Pediatrics*, *125*, e1048–e1056.
- Berry, N. J., Jones, S., & Iverson, D. (2010). It's all formula to me: Women's understandings of toddler milk ads. *Breastfeeding Review*, *18*, 21–30.
- Berry, N. J., Jones, S. C., & Iverson, D. (2011). Relax, you're soaking in it: Sources of information about infant formula. *Breastfeeding Review*, *19*, 9–18.
- Berry, N. J., Jones, S. C., & Iverson, D. (2012). Toddler milk advertising in Australia: Infant formula advertising in disguise? *Australasian Marketing Journal*, *20*, 24–27.
- Black, R. E., Allen, L. H., Bhutta, Z. A., Caulfield, L. E., de Onis, M., Ezzati, M., ... Rivera, J. (2008). Maternal and child undernutrition: Global and regional exposures and health consequences. *The Lancet*, *371*, 243–260.
- Department of Health and Ageing (2012). *Review of the effectiveness and validity of operations of the MAIF agreement: Research paper*. Canberra: Nous Group.
- Diehl, S., & Terlutter, R. (2006). *International advertising and communication: Current insights and empirical findings* (1st Aufl. ed.). Wiesbaden: Deutscher Universitäts-Verlag.
- Euromonitor International (2008). *Global packaged food: Market opportunities for baby food to 2013*. London: Euromonitor International.
- Gilsenan, M. B. (2011). Nutrition and health claims in the European Union: A regulatory overview. *Trends in Food Science and Technology*, *22*, 536–542.
- Gong, Q., & Jackson, P. (2013). Mediating science and nature: Representing and consuming infant formula advertising in China. *European Journal of Cultural Studies*, *16*, 285–309.
- Hawkes, C. (2004). *Nutrition labels and health claims: The global regulatory environment*. Geneva: World Health Organization.
- Horta B. L. & Victora C. G.. (2013) Long-term effects of breastfeeding: A systematic review.
- Jain, S. C. (2003). The infant milk substitutes, feeding bottles and infant foods (regulation of production, supply and distribution) amendment act, 2003. What has changed? *Indian Pediatrics*, *40*, 747–756.
- Kent, G. (2015). Global infant formula: Monitoring and regulating the impacts to protect human health. *International Breastfeeding Journal*, *10*, 6.
- Kramer, M., & Kakuma, R. (2002). Optimal duration of exclusive breastfeeding: A systematic review. *Cochrane Database of Systematic Reviews*, CD003517.
- Ministry of Health, Ministry of Internal Trade, Ministry of Radio Film and Television and State Press and Publication Administration. (1995) Marketing of breastmilk substitutes management approach.
- Pardo-Crespo, R., Perez-Iglesias, R., Llorca, J., Alvarez-Granda, L., Garcia-Fuentes, M., Martinez-Gonzalez, M. A., & Delgado-Rodriguez, M. (2004). Breast-feeding and risk of hospitalization for all causes and fever of unknown origin. *European Journal of Public Health*, *14*, 230–234.
- Paricio Talayero, J. M., Lizán-García, M., Otero Puime, Á., Benlloch Muncharaz, M. J., Beseler Soto, B., Sánchez-Palomares, M., ... Rivera, L. L. (2006). Full breastfeeding and hospitalization as a result of infections in the first year of life. *Pediatrics*, *118*, e92–e99.
- Parry, K., Taylor, E., Hall-Dardness, P., Walker, M., & Labbok, M. (2013). Understanding women's interpretations of infant formula advertising. *Birth*, *40*, 115–124.
- Patel, A., Smith, C., Knowles, T., & Lin, Y.-L. (2012). Nutrition and health claims: An enforcement perspective. *Trends in Food Science and Technology*, *28*, 15–22.
- Payne, S., & Quigley, M. A. (2016). Breastfeeding and infant hospitalisation: Analysis of the UK 2010 infant feeding survey. *Maternal and Child Nutrition*, Early online.
- Piwosz, E. G., & Huffman, S. L. (2015). The impact of marketing of breast-milk substitutes on WHO-recommended breastfeeding practices. *Food and Nutrition Bulletin*, *36*, 373–386.
- Pokhrel, S., Quigley, M. A., Fox-Rushby, J., McCormick, F., Williams, A., Trueman, P., ... Renfrew, M. J. (2014). Potential economic impacts from improving breastfeeding rates in the UK. *Archives of Disease in Childhood*, *100*, 334–340.
- Pries, A. M., Huffman, S. L., Mengkheang, K., Kroeun, H., Champeny, M., Roberts, M., & Zehner, E. (2016). Pervasive promotion of breastmilk substitutes in Phnom Penh, Cambodia, and high usage by mothers for infant and young child feeding. *Maternal and Child Nutrition*, *12*, 38–51.
- Quigley, M. A., Cumberland, P., Cowden, J. M., & Rodrigues, L. C. (2006). How protective is breast feeding against diarrhoeal disease

- in infants in 1990s England? A case-control study. *Archives of Disease in Childhood*, 91, 245–250.
- Quigley, M. A., Kelly, Y. J., & Sacker, A. (2007). Breastfeeding and hospitalization for diarrheal and respiratory infection in the United Kingdom Millennium Cohort Study. *Pediatrics*, 119, e837–e842.
- Rollins, N. C., Bhandari, N., Hajeebhoy, N., Horton, S., Lutter, C. K., Martines, J. C., ... Victora, C. G. (2016). Why invest, and what it will take to improve breastfeeding practices? *The Lancet*, 387, 491–504.
- Saunders, B., & Yap, E. (1991). Do our guardians need guarding? An examination of the Australian system of self-regulation of alcohol advertising. *Drug and Alcohol Review*, 10, 15–27.
- Sobel, H. L., Iellamo, A., Raya, R. R., Padilla, A. A., Olive, J. M., & Nyunt, U. S. (2011). Is unimpeded marketing for breast milk substitutes responsible for the decline in breastfeeding in the Philippines? An exploratory survey and focus group analysis. *Social Science and Medicine*, 73, 1445–1448.
- Victora, C. G., Bahl, R., Barros, A. J. D., França, G. V. A., Horton, S., Krasevec, J., ... Rollins, N. C. (2016). Breastfeeding in the 21st century: Epidemiology, mechanisms, and lifelong effect. *The Lancet*, 387, 475–490.
- Zehner, E. (2016). Promotion and consumption of breastmilk substitutes and infant foods in Cambodia, Nepal, Senegal and Tanzania. *Maternal and Child Nutrition*, 12, 3–7.

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