

INTRODUCTION

1.1 Background

Infancy and early childhood are the important stages in life where growth and development occur rapidly, whether physical, cognitive, or emotional (Brown et al., 2017). Studies have found that the growth and development stages in infants not only affect normal development during infancy but may also affect life during adulthood, highlighting the importance of ensuring optimal growth and development during infancy. World Health Organization (WHO) suggest infants to receive exclusive breastfeeding (EBF), which means they are given only breastmilk and no other food or beverages (except for vitamin, medication, and minerals in the form of syrup) from either the mother, nurse, or guardian for solid six months (WHO, 2003 as cited in Kemenkes RI, 2020). Aside from being the primary nutrient source for infants, early breastfeeding initiation also gives additional benefits to both the mother and infant, elevating the importance of EBF (WHO, 2021).

As infants grow older, the brain, liver, heart, and kidney are several organs that take the highest toll on the infants' basal metabolic rate (BMR). Maintenance of tissues and organs will occur regularly, which requires nutrition such as protein, resulting in the increase of protein needs and other nutrients that may be a precursor in protein metabolism.

Starting from the age of 6 months, breastmilk is no longer adequate to fulfill the energy and nutritional requirements of infants that increases as they undergo rapid growth and development. As breastfeeding is still recommended until the age of 24 months, complementary feeding is necessary to support breastmilk in fulfilling the needs of infants. Complementary food (CF) also functions to introduce infants to more food texture, train their feeding skills, and adapt them to eat together in a family environment. Failure to introduce complementary food will result in faltering cognitive, physical, or even emotional growth and development (Bassetti et al., 2022; Brown et al., 2017).

Complementary foods for infants and children could be homemade or purchased from stores as commercial complementary foods (CCF). Studies have found that CCF has grown in popularity among infants and children in numerous countries. The sales of CCF in Philippine reached more than 30 million US dollar, increasing by 10% between 2015 and 2020 (Basetti et al., 2022). The per capita sales of packaged food increased from 67.7 kg to 76.9 kg from 2005 to 2016 globally (Zehner et al., 2016), which at second hand means that the CCF consumption increases in the past few years as well with primarily due to its convenience in preparation and storage, as well as massive marketing of the products (Bassetti et al., 2022; Pries et al., 2019; Zehner et al., 2019). Sievert et al. (2019) analyzed the sales of processed food (including breakfast cereals, ready meals, and snacks which includes CCF products as well) from 2004 - 2018 in 16 countries. They found that the sales increase in upper-middle and rapidly in lower-middle countries. A cross-sectional survey from Green et al. (2019) in Bandung

found that out of 495 children aged 6-35 months, 49.5% consumed infant CCF and 37.4% consumed young children CCF the day before the survey. Based on the same study, 46.5% of children 6-11 months old had consumed snack CCF products.

The current CCF products distributed throughout the market in various countries has been revealed not to meet the recommended standards for infants and children's nutritional needs. Alexy et al. (2022) assessed the CCF products from several categories in Germany and found that most products still contain high sugar despite having no added sugar. The study also supported the ban on sugar addition in CCF, sweet snacks, and sugar-sweetened beverages for infants and young children. Dreyfuss et al. (2019) found that almost 70% of CCF products in Bandung, Indonesia, claim to contain iron on the labels. However, only 58% of the products were actually fortified with iron, and even more so, the iron content could still be present in an amount less than recommended or not optimal.

Additionally, studies also found that CCF products in various countries contain high amounts of sugar, salt, and other additives, which is a public concern. As for Indonesia, BPOM (Food and Drug Authority) set the sodium amount in CCF products to be a maximum of 100 mg/ 100 kcal. The addition of salt in infant's food is unnecessary as breastmilk and certain food ingredients already provide minerals including sodium. Salt intake in infants 4 months old could result in increasing systolic blood pressure (BP) at the age of 7 years old (Brion et al, 2008 as cited in Bournez et al., 2019). WHO (2015) and Stanhope (2016) stated that sugar intake leads to increased risk of CVD in adult life. NHANES (National Health and Nutrition Examination Survey) conducted from 2009 to 2014 revealed that in the first year of life, US children consume excessive sugar as much as 10% compared to the recommended amount.

Nutrient Profiling could be utilized to evaluate the nutritional content of CCF products. According to WHO, nutrient profiling involves categorizing or ranking foods based on their nutritional content to prevent sickness and promote health. This method has been used as the basis for food marketing to children, health and nutrition claims, product labeling logos or symbols, information and education, and more which makes nutrient profiling suitable for evaluating CCF products for infants and children. For example, a study by Bassetti et al. (2022) conducted in Cambodia, Indonesia, and Philippines found that a lot of product contain excessive sugar and salt content based on the nutrient profile model by WHO regulation for CCF targeted for infants and young children.

There are various food ingredients which provide different nutrients for the body. When ensuring adequate nutrient content in CCF products, it is also important to observe the ingredients used and see whether the nutrient is derived from appropriate food ingredients. Early complementary foods are usually made from single ingredient as the initiation of complementary food introduction for the infants. CCF are usually made or labelled as "flavoured" of ingredients such as cereals, tubers,

beans, fishes, poultry, meat, dairy, fruits, and vegetables. It is important to see whether the ingredients labelled as the flavour present as a nutrient source in the product, rather than just in a small amount for the flavouring purpose.

Government regulation exists to answer concerns regarding CCF's nutritional content and ensure the products' quality and safety. In Indonesia, CCF definitions and criteria are regulated by BPOM, which is Indonesia's Food and Drug Administration in the BPOM Regulation No. 24 of 2019. This study tries to evaluate the nutrient profile of CCF products in the Indonesian market and compare the data to BPOM standards to determine whether CCF products in Indonesia align with the regulation. The study will also evaluate the most commonly used ingredients based on the nutrient source. Lastly, the study will observe the energy and nutrient density of Indonesian CCF products relative to the price per serving. This could ensure that infants and young children consuming CCF products in Indonesia would have nutrient-dense and suitable complementary foods.

1.2 Research Aim

The objective of this study is stated as follows.

1. To evaluate the energy, macronutrient, and micronutrient content as well as calculate the energy density of CCF products distributed in the Indonesian market based on BPOM Regulation No. 24 of 2019 regarding Main Complementary Food.
2. To evaluate availability and accuracy of mandatory labeling information (i.e. product category, age range, serving size, daily value (DV) storage instructions, usage instructions, and other claims) in CCF products distributed in the Indonesian market according to BPOM Regulation No. 24 of 2019.
3. To analyze the most common ingredients used in CCF products distributed in the Indonesian market and whether it aligns with the BPOM Regulation No. 24 of 2019 regarding the main ingredients of complementary foods.

1.3 Research Scope

The scope of this study is limited to store sampling, CCF product sample purchase, data collection, and data analysis. The offline store sampling will be conducted in East Jakarta, ranging from traditional markets, shopping centers, and supermarkets. The 3 largest e-commerce platforms will be sampled for online store sampling across Indonesia. The sample purchase will be based on inclusion criteria settled according to the BPOM standard of CCF products. The data collection will be limited to product information and nutritional information written in the label or packaging, official website, and/or official social media. Lastly, the data analysis will be done by comparing the data collected to the BPOM Regulation No. 24 from 2019.

1.4 Research Questions

- How many percent of CCF products available in the Indonesian market meet the standard of CCF regulated by BPOM in terms of energy, macronutrient, and micronutrient?
- Do most CCF products available in the Indonesian market have written the product category, age range, serving size, RDI, storage instructions, usage instructions, and other claims in the product label according to the BPOM regulation regarding labeling?
- What are the most common main ingredients used to produce CCF products available in the Indonesian market, and are they aligned with BPOM recommendation?