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Factors Affecting Complementary Feeding Practices of Children 6-23 Months in Developing Countries. A Review

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ABSTRACT

Good nutrition is important for healthy development of children, especially within the first two years of life. At 6 months of age, children should be introduced to nutrition-adequate and safe complementary foods in addition to breastfeeding. Appropriate complementary feeding practices are important in reducing the incidence of malnutrition and improving the health and growth outcome of children. However, few children receive nutritionally adequate and safe complementary foods in many countries, with low indicators of complementary feeding practices. The objectives of the review were to systematically investigate, review and integrate findings from different studies so as to determine factors affecting complementary feeding practices of children aged 6-23 months in developing countries. A literature search on factors affecting complementary feeding practices in developing countries was undertaken in PubMed, Elsevier, and Google Scholar to identify relevant studies between 2014 and 2024. Twenty-five (25) studies were initially retrieved, with sixteen studies that met the study inclusion criteria chosen for data synthesis. Several factors were found to affect complementary feeding practices of children aged 6-23 months. These were; age of child, education level of mothers/caregivers, marital status of mother, occupation of mother, knowledge of caregiver, postnatal care, mothers' decision-making role on use of family income, maternal beliefs, poverty/wealth status, household size, place of birth, accessibility to media and internet, support, and place of residence. Mothers with higher educational attainment were more likely to adopt appropriate feeding practices due to better access to information and decision-making skills. Similarly, families with greater financial resources could afford diverse and nutritious complementary foods, while access to postnatal care provided mothers with critical guidance on feeding practices. To improve complementary feeding practices, policies should focus on expanding maternal education initiatives, enhancing household economic empowerment, and integrating nutrition counseling into postnatal care services. Governments and health agencies need to invest in community-based programs and media campaigns that promote awareness and support for caregivers.

Keywords: Complementary feeding practices; children 6-23 months; developing nations; caregiver; postnatal care; and literature review

INTRODUCTION

Good nutrition is an important element in the healthy development of children, especially within the first two years of their life. Nutritional sufficiency during this period lowers morbidity and mortality, reduces the risk of chronic disease, leads to better cognitive development, enhanced educational achievement and high economic productivity in future (Molla et al., 2017). The World Health Organization (WHO) and the United Nations Children's fund (UNICEF) recommends that infants be breast-fed exclusively for the first six months of life. At 6 months of age, breast milk is no longer enough to meet the energy and nutrient requirements of infants, thus they should be introduced to nutrition-adequate and safe complementary foods from this period with continued breastfeeding until the age of 2 years and more (WHO, 2023).

Complementary foods are any food or liquids, whether manufactured or locally prepared, suitable as a complement to breast milk or to a breast milk substitute, fed to infants during the complementary feeding period (Umugwaneza et al., 2021). Complementary feeding practices with these foods are essential determinants of growth, health and development for infants and young children. The WHO has developed guidelines for

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appropriate complementary feeding. These are frequent, on-demand breastfeeding should continue until 2 years of age or beyond; responsive feeding should be practiced by feeding the child directly, slowly and patiently without using force; practice good hygiene and proper food handling; start at 6 months with small amounts of food and increase gradually as the child gets older; gradually increase food consistency and variety; increase the number of times that the is fed (2-3 meals per day for infants 6-8months of age and 3-4 meals per day for infants 9-23 months of age, with 1-2 additional snacks as required); use fortified complementary foods or vitamin-mineral supplements as needed; and during illness, increase fluid intake including more breastfeeding, and offer soft, favorite foods (WHO, 2023a).

Despite the importance of complementary feeding practices, few children receive nutritionally adequate and safe complementary foods; in many countries, less than a fourth of infants 6–23 months of age meet the criteria of dietary diversity and feeding frequency that are appropriate for their age (WHO, 2023). Poor complementary feeding of children 6-23 months is one of the contributing factors to malnutrition, which remains a major health problem globally. In 2022, about 149 million children under 5 years were stunted, 45 million were wasted and 37 million were overweight or obese (WHO, 2023). Globally, the indicators of complementary feeding practices are low with the minimum meal frequency at 52.2%, minimum, dietary diversity at 29.4% and minimum acceptable diet at 16% (Feleke et al., 2022).

In developing countries, the malnutrition situation is worse with very high levels of childhood underweight found in 12 African countries and 13 Asian countries including Sri Lanka (Kassa, et al., 2016). An analysis of Demographic and Health Surveys (DHS) data from twenty-one countries by Mekonen et al., (2024) revealed that sub optimal infant feeding practices and poor quality of complementary food contribute to nutrition deficiencies, impaired growth and deaths observed among children aged 6-23 months in developing countries. Feleke et al., 2022 add that complementary feeding practices are still poor in most developing countries and are even worsening in some of them.

The promotion of appropriate complementary feeding practices has been viewed as an important approach to reducing the incidence of malnutrition and improve the health and growth outcome of children. The World Health Organization (WHO) has defined the following indicators for complementary feeding practices: introduction of various foods from the minimum dietary diversity (MDD); minimum meal frequency (MMF); minimum acceptable diet (MAD); and solid, semi-solid, or soft foods (Yunitasari et al., 2022). These indicators are crucial for assessing the complementary feeding practices of children 6-23 months.

Several studies have identified factors that influence complementary feeding practices in general. These include socioeconomic status of caregivers, mother's beliefs, knowledge of complementary feeding guidelines, influence of postnatal care and the social network, and lack of decision-making power in the household. Those factors can be classified at individual (child, caregiver, and child-caregiving) group (home/family, community, work environment) and society (food system, culture, economy) levels (Umugwaneza et al., 2021). Despite this, there is limited data on the specific factors that influence complementary feeding practices of children aged 6 to 23 months in developing countries.

Better knowledge and understanding of the factors influencing complementary feeding practices is crucial for creating targeted, caregiver-friendly and effective interventions that can help addressing the high prevalence of malnutrition and improve the health of children particularly in developing countries. Therefore, the purpose of this study was to review the literature and determine the factors that affect complementary feeding practices of children aged 6-23 months in developing countries.

STUDY METHODOLOGY

The study used systematic literature review (SLR), where a structured and methodological process to analyze existing research was conducted using online databases. Some of the online databases searched included PubMed, Elsevier as well as Google Scholar to identify relevant studies that are related to factors affecting complementary feeding practices in developing countries. The selection of SLR was based on the need to understand the factors affecting complementary feeding practices among children aged 6-23 years. SLR also demands a clear process, which was used here, having a clear inclusion-exclusion criterion, and a transparent

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methodology to avoid researcher bias and enhance reproducibility (Hammarberg, Kirkman, & De Lacey, 2016). Further, SLR was used as it allows the researcher to identify trends or similar findings in relation to a certain topic, assess the validity and quality of evidence, as well as draw reliable and reproducible conclusions.

Search key words

The search terms included "children between 6-23 months complementary feeding practices". "Factors affecting complementary feeding practices of children between 6-23 months", "complementary feeding" 'Infants". Relevant studies were selected based on a predefined inclusion and exclusion criteria and twenty-five studies were initially retrieved for data synthesis.

Inclusion-exclusion criterion

The inclusion and exclusion criteria were used. Studies included were those that talked about complementary feeding practices for children aged 6-23 months, that talked about various socioeconomic, and demographic and institutional factors. Studies included had to have clear quantitative or mixed methods approaches (both quantitative and qualitative methods), and that had considerable sample size. The studies included were those done in developing regions and countries, with studies picked from Sub-Saharan Africa (Benin, Nigeria, Malawi, Ethiopia, Tanzania, Uganda, and Kenya); South East Asia (India and Pakistan) among other developing countries. The studies picked had used various research designs/methods, including meta-analysis, cross-sectional and mixed methods. In relation to the period of research, the study picked studies done in the last ten years (with one exception, done in 2014), showing recent findings on children complementary feeding practices.

Studies that were excluded included those done in more than ten years ago (before 2014), studies that did not focus on children complementary feeding, and those that were not done in developing regions and countries. Further, studies with no clear methodologies were excluded.

Data synthesis and presentation

Sixteen studies that met the study criteria were chosen for data synthesis. The publications were analyzed to determine factors affecting complementary feeding practices of children between 6-23 months. Information was synthesized based on the methodology used, and the findings. Similar findings were paired together (thematic analysis), with a support of some key studies that shared similar findings. Presentation of the results was in a matrix (see Table 1 on the summary of included studies).

RESULTS OF THE ELIGIBLE LITERATURE REVIEW

A total of 16 eligible articles were selected, extracted, and analyzed using content analysis. The studies are summarized in the table below.

Table 1: Summary of included peer-reviewed studies

References	Title	Study description	Findings
Feleke et al. (2022)	Initiation of complementary feeding practice and associated factors among mothers having children 6-23 months of age, in Meket Woreda, North Wollo Ethiopia, 2020: a multicenter community-	Study period 2020 This study aimed at assessing the prevalence of Initiation of complementary feeding practice and its associated factors among mothers with children	There was a statistically significant association of initiation of complementary feeding practices with mothers´ who were advised About CF during ANC follow up, children who were delivered at a health facility, mothers who use family planning methods and who give additional diet for the 1st six months of the child's life and breastfeeding makes the

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	based cross-sectional study	aged 6-23 months in Meket Woreda in 2020. The community based quantitative cross-sectional study was conducted among 416 mother-infant pairs of 6-23 months in Meket Woreda, Northwest Ethiopia from March 20-June 30, 2020. One stage cluster sampling technique was used to select study participants. A pre-tested interviewer-based questionnaire was used to collect data.	appearance of the mother thin, that way they like to give complementary foods to the infants(the attitude of the mothers towards complementary infant feeding) were factors that can increase appropriate complementary feeding practice. A high frequency of antenatal visits (4+) was associated with appropriate complementary foods as compared to mothers who did not attend antenatal care, mothers who attend antenatal care have better access to health services such as nutrition counseling and respond to health information messages on CF.
Khan et al., 2017	Determinant of Infant & young child feeding practices by mothers in two rural districts of Sindh, Pakistan, a cross-sectional survey	Study period 2014 The aim of this study was to assess IYCF (Infant and young child feeding) practices and its associated factors in two rural districts of Pakistan. A cross-sectional study was conducted in two rural districts of Sindh province, Pakistan as part of a stunting prevention project between May and August 2014. A standard questionnaire on IYCF practices recommended by World Health Organization was used to collect information from 2013 mothers who had a child aged between 0 and 23 months. A cross-sectional survey was conducted to collect data between May and August 2014. The survey was designed to provide IYCF and baseline indicators on a representative	Evidence suggests that maternal education [AOR (adjusted odds ratio)=1.79] is associated with timely introduction of complementary feeding, meal frequency, dietary diversity, and the practice of a minimum acceptable diet Moreover, household wealth status [AOR=9.7], maternal age [AOR=1.83], and the utilization of antenatal and postnatal visits [AOR=0.55] are associated with improved complementary feeding practices

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		sample of households in the study area	
Rana et al., 2016	Descriptive study to assess factors affecting core indicators of Infant and young child feeding practices in urban area of Gujarat state,India	Study period 2016, To assess factors affecting IYCF practices among sampled population. Cross sectional study was conducted with sample comprising 300 mothers having children aged 0-23 months.	Education of mother, social customs like avoidance of colostrum affect the feeding practices directly or indirectly.
Umugwaneza et al., 2021	Factors influencing complementary feeding practices in rural and semi-urban Rwanda: a qualitative study	Study period 2021 It's a cross sectional descriptive qualitative study A total of ten Focus group discussions were conducted separately with mothers, fathers, grandmothers and community health workers from five different districts in Rwanda	Caregivers' knowledge and beliefs about the benefits of breastfeeding & timely introduction of complementary food were found to be the primary individual factors facilitating good infant & young child feeding practices Community based nutrition education & counselling programs were facilitators of good complementary practices at the group level, At the society level, poverty in rural agrarian households was a barrier to optimal feeding practices Common belief of caregivers that infants should be given liquids as first foods, instead of semi solid foods was a barrier of good feeding practices.
Varghese et al., 2023	Complementary feeding practices in children aged 6–23 months in rural Lucknow: A cross-sectional study	Study period 2022 This study was done to describe the complementary feeding practices in children aged 6–23 months and to identify the factors associated with appropriate feeding practices. A community based cross-sectional study was conducted in rural areas of	Appropriate complementary feeding was seen in slightly half of the children and it was found to be significantly associated with educational status of mothers. Children of mothers who were illiterate had around 59.0% lower odds of having appropriate complementary feeding [AOR 0.412]. There was a statistically significant

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		Lucknow district in Uttar Pradesh. A sample of 300 mother-child pairs were selected by multistage random sampling technique. Data was collected using a semi-structured questionnaire.	Association between initiation of complementary feeding practices and mothers who received counseling had better feeding practices AOR 1.635. Counseling on maternal dietary diversity had the strongest association with appropriate feeding practices AOR 4.485.
Oteri et al., 2020	Complementary Feeding Practices of Children 6-23 Months of Mother-To-Mother Support Groups Participants and Non-Participants in Kakuma, Turkana County, Kenya: A Cross-Sectional Comparative Study	Study period 2018 A cross-sectional comparative study was conducted in 3 locations in Kakuma division, Turkana County, Kenya. The study targeted mothers of children 6 to 23 months of age. Systematic random sampling was used to select the 177 MtMSGs participants from 15 MtMSGs groups, as the study group and 179 MtMSGs non-participants from two locations which had no MTMSGs as the comparison group. Data was collected using a structured questionnaire and Focused Group Discussions (FGDs)	Significant difference was noted for complementary feeding association where Mother to Mother Support Groups participants were 1.8 times more likely to introduce complementary foods at 6 months while MtMSGs non-participants introduced foods earlier than 6 months. There was an association between the mother's age and introduction of complementary feeding (p=0.015), breastfeeding status (p=0.027), and the duration of complementary feeding (p=0.031). There was also a significant relationship between the mother's education level and introduction of complementary feeding (p=0.003), breastfeeding status (p=0.024), and the duration of complementary feeding (p=0.017), Marital status also affected the introduction of complementary foods (p=0.041), breastfeeding status (p=0.008) and duration of complementary feeding (p=0.021)
Mitchodigni et al., 2017.	Complementary feeding practices: determinants of dietary diversity and meal frequency among children aged 6–23 months in Southern Benin	Study period 2013 Poor complementary feeding practices have detrimental effects on child growth, development and survival. This cross-sectional study in rural areas of southern Benin examined some determinants of complementary feeding	Factors such as socioeconomic aspects, farming practices, household demographics, cultural practices and geography. Child age (p=0.0294), income allocated to feeding (0.0083), commune of residence (p=0.0009), ethnicity (p=0.0214), caregivers' occupation (p=0.0326), marital status (p=0.0055) and household size

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		practices using socioeconomic and dietary data collected among 1225 primary caregivers. Data was collected from October 2013 to December 2013.	(p=0.0001) were identified as the main factors affecting complementary feeding practices.
Molla et al., 2017	Complementary Feeding Practice and Associated Factors among Mothers Having Children 6–23 Months of Age, Lasta District, Amhara Region, Northeast Ethiopia	Study period 2015 The aim of the study was to assess the prevalence of complementary feeding practice and its associated factors among mothers with children aged 6−23 months in Lasta District, Northeast Ethiopia, 2015. A community based cross-sectional study design was conducted among 476 mothers who had children aged 6–23 months in the study area. Simple random sampling technique was used to select the required sample. A face-to-face interview was done to collect data using structured questionnaire.	Exposure to public media [AOR = 2.50], occupation of mother [AOR = 9.50], mothers decision making role on how to use family income [AOR = 5.54], and use of postnatal care service [AOR = 5.98] were found to be independent predictors of complementary feeding practice
Nkoka, Mhone & Ntends, 2018.	Factors associated with complementary feeding practices among children aged 6–23 months in Malawi: an analysis of the Demographic and Health Survey 2015–2016	Study period 2017 This study aimed to examine factors associated with complementary feeding practices among children aged 6–23 months. Utilizing data from the 2015–16 Malawi Demographic and Health Survey (MDHS), 4732 children aged 6–23 months and their mothers were analyzed. Multistage cluster sampling design that included sampling weights was used. The impact of child, maternal, household, community and health service utilization factors on complementary feeding practices was examined .	Children born of mothers with secondary or postsecondary education [AOR = 2.46] and from mothers working in agriculture [AOR = 2.65] and living in the central region [AOR = 2.84] were significantly more likely to have timely introduction to solid, semi-solid or soft food. Being >1 y of age was associated with reduced odds of achieving minimum meal frequency [AOR = 0.67]. In addition, children >1 y of age from mothers older than 24 y [AOR = 1.53] and from mothers with primary, secondary and post-secondary education [AOR = 1.65] were significantly more likely to achieve minimum dietary diversity. Children from rich households [AOR = 1.37] were more likely to achieve both minimum dietary diversity and minimum acceptable diet. Finally, exposure to mass media [AOR = 1.31]was

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			significantly associated with increased odds of achieving minimum meal frequency, minimum dietary diversity and minimum acceptable diet.
Mekbib et al., 2014	Magnitude and Factors Associated with Appropriate Complementary Feeding among Mothers Having Children 6-23 Months-of-Age in Northern Ethiopia; A Community-Based Cross-Sectional Study.	The aim of this study was to assess the prevalence of appropriate complementary feeding practices and associated factors among mothers having 6 - 23 months of age children in Northern Ethiopia. Methods- A community-based cross sectional study design was conducted among 428 mothers who had children with 6-23 months of age in Northern Ethiopia. Simple random sampling was used to select the required number of sample size. A face-to-face interview was used to collect data using structured questionnaire.	In this study only 10.75% children aged 6-23 months received appropriate complementary feeding. Child's age (AOR=4.21), education level of mother (AOR=3.84), and postnatal care follow up (AOR=2.80) were found to be independent predictor of timely initiation of complementary feeding.
Belete et al., (2022)	Optimal complementary feeding practices and associated factors among mothers having children 6 to 23 months, south WOLLO zone, Dessie ZURIA, Ethiopia	Study period 2021 This study was aimed as assessing the optimal complementary feeding practices and associated factors among mothers having children aged 6-23 months. A community-based comparative cross-sectional study was conducted on a total of 732 randomly selected mothers having children 6 to 23 months of age from March 10 to April 21, 2021. Data was collected using an interviewer-administered questionnaire.	The overall proportion of mothers with optimal complementary feeding practice was 18.1%. Mothers from Kebeles with no NGO support were less likely (AOR=0.54) to practice optimal complementary feeding compared to those from Kebeles that received support. Mothers of children aged 20-23 months were four times (AOR=4.47) more likely to practice optimal complementary feeding than mothers having children 6-8 months of age.
Sichalwe et al., 2023	Knowledge and practice of complementary feeding among mothers	Study period 2022	Nearly half of the mothers introduced liquids and gave semi-solid food to their children at the

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	in Dar-es-Salaam, Tanzania: Communty-based cross-sectional study.	This study examines mothers' complementary feeding (CF) knowledge and practices for children aged 6–24 months, highlighting links to adverse health outcomes and childhood malnutrition from both delayed and early CF initiation (before six months). A community-based cross-sectional study collected data from 422 mothers through multistage sampling. A pre-tested structured questionnaire was used a	recommended age of six months. Associations were observed between maternal education and knowledge of dietary diversification (p-value=0.01). The study also found a connection between CF-related information and timely CF initiation (p-value=0.01).
Ali et al., (2021)	Complementary feeding practices and associated factors among children aged 6–23 months in Pakistan.	Study period 2019 This study aims to identify the determinants of inadequate complementary feeding practices among children aged 6 to 23 months in Pakistan by using the latest nationally representative data from the Pakistan Demographic and Health Survey (2017–18).	Multivariate regression analysis shows that child age (p-value=0.01), child weight at birth (p-value=0.01), mother's access to newspapers and magazines (p-value=0.09) at the individual level, wealth at the household level (p-value=0.02), and prenatal visits (p-value=0.00) at the community level are significant predictors of complementary feeding practices among children aged 6–23 months in Pakistan.
Mekonen et al., 2024	Complementary feeding practices and associated factors among mothers of children aged 6 to 23 months in Sub Saharan African countries: a multilevel analysis of the recent demographic and health survey.	Study period 2015-2020 This study aimed to determine the prevalence and associated factors of appropriate complementary feeding practices among mothers of children aged 6 to 23 months in subSaharan African countries. A multilevel mixed-effect analysis was carried out using recent demographic health survey data from 19 sub-Saharan African countries, which were conducted between 2015 and 2020. A total weighted sample of 60,266 mothers of children aged 6 to 23 months	The prevalence of appropriate complementary feeding practices among mothers of children aged 6 to 23 months in sub-Saharan African countries was 13.02% . Maternal educational level [AOR=0.69], marital status of the mother [AOR=0.85], sex of household head [AOR=1.78], total children ever born [AOR=1.52], media exposure [AOR=0.74], ANC visits attended during pregnancy [AOR=0.73], place of delivery [AOR=0.92], currently breastfeeding [AOR=1.12], PNC checkup [AOR=0.75], the current age of the child [AOR=0.26], birth order [AOR=1.31], number of

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		were included in the study. The demographic health survey employs a stratified two-stage sampling technique.	under 5 children in the household [AOR=0.76], community illiteracy [AOR=1.09], and country category [AOR=1.62] were significantly associated with appropriate complementary feeding practices.
Yunitasari et al., 2022	Factors associated with complementary feeding practices among children aged 6–23 months in Indonesia.	The study aim was to analyze the factors associated with complementary feeding practices among children aged 6–23 months in Indonesia. A cross-sectional design was employed using data from the 2017 Indonesia Demographic and Health Survey. A total of 502,800 mothers with children aged 6–23 months were recruited through multistage cluster sampling. Data were analyzed using a logistic regression test to determine the correlation between predisposing, enabling, and reinforcing factors and complementary feeding practices	The probability of achieving minimum dietary diversity (MDD) was high in the following: children aged 18–23 months (OR=9.58), children of mothers with higher education (OR=5.95), children from households with upper wealth index (OR=2.53), children of mothers who received childbirth assistance by professionals (OR=1.63), and children of mothers who had access to the Internet (OR=1.26). Moreover, children from households with the upper wealth index (OR=1.40), children whose mothers were employed (OR=1.19) living in urban areas (OR=1.28) and children of mothers who received childbirth assistance by professionals (OR=1.33) were more likely to meet Minimum Meal Frequency (MMF). Children aged 18–23 months (OR=2.40), of mothers with higher education (OR=3.15), from households with upper wealth index (OR=1.41) and born with professional childbirth assistance (OR=1.82) were significantly associated with minimum acceptable diet (MAD)
Kassa, et al., 2016	Appropriate complementary feeding practices and associated factors among mothers of children age 6–23 months in Southern Ethiopia, 2015	Study period 2015 This study was aimed at assessing practices of complementary feeding and associated factors among mothers of children aged 6–23 months. A community-based cross sectional study design was	The practice of appropriate complementary feeding was minimal. Child's age (12–17 and 18–23 months) [AOR: 2.75, 2.64], educational level of mother (primary and secondary and above schools) [AOR: 3.24, 3.21], and smaller family size [AOR: 12.10] were found to be independent predictors of

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		conducted among 611 mothers who had children with 6–23 months of age in the ten randomly selected Kebeles (smallest administrative unit). A multistage sampling technique was used to identify study subjects. Data were collected using pre-tested structured questionnaire.	appropriate complementary feeding practice of 6–23 months old children.

DISCUSSION OF RESULTS

The results from the Table 1 above show some of the factors that affect feeding practices of children 6-23 months in Developing countries. A compiled and more detailed analysis are discussed below.

Age of child

The findings indicate that the age of the child is a factor that significantly influences feeding practices. A study by Belete et al., (2022) found out that mothers of children aged 20-23 months were four times more likely to practice optimal complementary feeding than mothers having children 6-8 months of age. Similar results were found in a study Mekonen et al., (2024) where children aged 6-11 months were less likely to have appropriate complementary feeding practices while another by Yunitasari et al., (2022) in Indonesia determined that children aged 18-23 months old had a high probability of achieving minimum dietary diversity and minimum acceptable diet. This might be attributed to vulnerable period for infants as they transition from exclusive breastfeeding to introduction of complementary feeding practices. Children are expected to learn to accept new foods and beverages which might be challenging. Additionally, mothers might belief that the infants cannot digest complementary foods and thus delay introducing them or reduce the number of feeding times. This however changes when the children become older.

Education level of mothers/caregivers

This study identified the education level of mothers as a significant factor influencing complementary feeding practices. Higher level of education was positively associated with appropriate complementary feeding practices. This finding was similar to that of a study by Rana et al., (2016), which showed that caregivers who have a low level of education may tend to pay less attention to nutrition education as the focus may be shifted towards obtaining daily bread for survival. Similar findings were obtained in studies by Oteri et al., (2020), Khan et al., (2017) and Varghese et al., (2023) where children of mothers who were illiterate had lower odds of having appropriate complementary feeding. This could be because educated mothers are likely to access and read books and online materials with useful information about complementary feeding practices. This improves their ability to make decisions on their children's nutritional needs. Moreover, mothers with higher education levels are highly likely to secure employment thus increasing their economic ability to access a diverse type of foods.

Marital status of the mother

Another factor affecting complementary feeding practices of children 6-23 months in developing countries is marital status of the mother. This study established that children whose mothers were married had appropriate feeding practices. The findings from a study by Mekonen et al., (2024) and another by Oteri et al., (2020) also established that married women have higher odds of appropriate complementary feeding practices. This might be due to an increased likelihood of economic, social and emotional support from the husband. The father may

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also be engaged in activities such as purchasing food and feeding children thus improving complementary feeding practices.

Occupation of mother

In this study complementary feeding practices was associated with the occupation of mothers. Similarly, a study conducted in Benin supports this finding that mothers' occupation was significantly associated with complementary feeding practice. Mothers involved in income-generating activities were less likely to meet the minimum meal frequency. (Mitchodigni et al., 2017). A study carried out by Molla et al., (2017) also showed that the occupation of mothers was also a predictor affecting the feeding practices of children with housewives 9.5 times more likely to practice appropriate complementary feeding in comparison to government employees. This can be attributed to the time factor with housewives having more time to prepare meals and feed their children. It could also result from poor work conditions that makes complementary feeding challenging

Knowledge of caregiver

The knowledge of the mothers about breast feeding and complementary feeding is a factor that influences complementary feeding practices. Mothers who were aware of the advantages of breast feeding and complementary feeding such as better general health for the baby, better growth and cognitive development and family planning were highly likely to have appropriate feeding practices (Umugwaneza et al., 2021). A study carried out in Tanzania also established an association between knowledge of mothers and complementary feeding (Sichalwe et al., 2023). Mothers with knowledge on the importance of dietary diversity and meal frequency practiced better feeding practices compared to those with limited knowledge. This trend may be observed because with knowledge mothers are able to understand the benefits of complementary feeding, follow stated guidelines and take necessary steps to ensure that their children are well fed with the required diets.

Postnatal care

This study established that having postnatal care is associated with higher odds of appropriate complementary feeding. A study by Mekbib et al., (2014) also found out that postnatal care follow up was an independent predictor of complementary feeding practice. Ali et al., (2021), Nkoka et al., (2018), and Khan et al., (2017) studies also had similar results with children of mothers who had postnatal checkups more likely to meet minimum meal frequency, diet diversity and minimum acceptable diet requirements. The possible explanation for this is that during postnatal clinics, mothers' knowledge is enhanced as they are taught how to take care of the children, the importance of nutrition, and best breast feeding and complementary feeding practices. Followup is also done to ensure that the children growth is consistent and within the normal ranges. Unfavorable beliefs and attitudes towards complementary feeding can also be addressed and changed during these visits.

Mothers' decision-making role on how to use family income

The decision on how to use family income was also a contributing to complementary feeding practices. Mothers who made the decision on how the family income was used had better feeding practices compared to those who did not make the decision. Results from the Molla et al., (2017) study found out that women whose husbands were the only decision maker on family income were more likely to have inappropriate complementary feeding practice than the women who were involved in decision making about how to use family income. This might be because when mothers are in charge of making decisions about family income, they are more likely to purchase complementary food items for their children as they are more responsible for taking care of the feeding duties of the children than fathers.

Maternal beliefs

Complementary feeding practice is also affected by maternal beliefs. Beliefs such as breast milk production are insufficient, male children are often hungrier than female, and that children's stomachs are not mature enough increased the likelihood of inappropriate feeding practices. The results from the study by Umugwaneza et al., (2021), showed that the introduction of complementary foods at 4 or 5 months was sometimes practiced due to perceived insufficient production of breast milk. The study further established that complementary feeding

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initiation was also delayed or certain foods avoided over concerns about the physiological maturation of the stomach. Findings from the study by Sichalwe et al., (2023) also found that mothers believed that male children were unsatisfied with exclusive breast feeding and thus required more complementary foods than girls. These results might stem from the general believe that men require more energy to perform their duties compared to women thus need to be fed more food.

Poverty/Wealth Status

Findings from this study indicate that poverty level or wealth status affected complementary feeding practices. Children from households with low wealth status were more likely to experience poor complementary feeding practices compared to those with high wealth status. A study by Umugwaneza et al., (2021) showed financial constraints as an important barrier to complementary feeding with mothers unable to access and afford complementary food practicing poor feeding practices. Similarly, a study by Yunitasari et al., (2022) showed that children belonging to families with higher wealth index had a higher probability of meeting the minimum meal diversity, minimum accepted diet and minimum meal frequency than those belonging to families with lower wealth index. This may be a result of mothers from high wealth index households being able to easily access and afford diverse complementary foods for their children.

Household Size

The size of the household is also another predictor's variable showing association with complementary feeding practice. A study in Ethiopia established that those households' having 1–3 persons were more likely to practice appropriate complementary feeding compared with those households' having more than 4 members (Kassa et al., 2016). Mitchodigni et al., (2017) also found similar results with an increase in household size having a detrimental effect on children's probability of minimum meal frequency. This can be explained by the fact that in large households, the share of food and frequency of meals is reduced to accommodate all the members. This is particularly problematic in poor households which lack the resources to acquire adequate foods.

Place of birth

The place of birth for the child was also associated with complementary feeding. The odds of appropriate complementary feeding practices were three times higher among children delivered in a health facility compared to those delivered at home. The study by Mekonen et al., (2024) indicated that mothers who delivered at home were 8% less likely to have appropriate complementary feeding practices compared with mothers who delivered at a health facility. Similar results were obtained from the study in Indonesia where mothers who had received child birth assistance by professionals were more likely to provide minimum dietary diversity, minimum acceptable diet, and minimum meal frequency to their children than those of mothers who were assisted by a non-professional. This is because mothers who deliver at health facilities are provided postnatal care information that includes complementary feeding guidelines for their children from the professional birth attendants

Accessibility to media and Internet

Another factor associated with complementary feeding practice of children 6-23 months is the accessibility to the media. Mothers who had access to media and internet practiced appropriate complementary feeding. This finding was in agreement with studies conducted in Indonesia (Yunitasari et al., 2022), in Pakistan (Khan et al., 2017) and in Ethiopia (Molla et al., 2017). Accessibility to media and Internet as a significant factor can be attributed to the fact that mothers are able to access complementary feeding and other nutrition information and enhance their knowledge on the nutritional requirements of their children and ensure optimal feeding.

Support

Support was also a factor in complementary feeding practice. Mothers who had support from the fathers and other mothers had an increased probability of good complementary feeding practices. A study by Belete et al., (2022) in Ethiopia showed that mothers who got no support were 46% less likely to practice optimal complementary feeding than those who received support. Another study by Sichalwe et al., also found a link between the father's involvement in the child feeding and appropriate complementary feeding practices. These

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results are consistent with those of Oteri et al., (2020) which noted significant difference in complementary feeding practices between mothers who had support and those who didn't. Mothers who were a member of Mother-to-Mother support groups were 1.8 times more likely to have appropriate complementary feeding practices compared to those who were not members of the support group. The observed findings may be attributed to the fact that support acts as a motivating factor for mothers to work harder and be actively involved in their children health. It also helps boost the mothers' confidence and helps to relieve the mother's stress that may accrue from taking care of the children.

Place of residence

This study found out that living in either urban or rural areas affected complementary feeding of children 6-23 months. Children who lived in urban areas were more likely to meet Minimum Meal Frequency (MMF) (Yunitasari et al., 2022). However, on meeting the Minimum Diet Diversity (MDD), findings from the study by Mitchodigni et al., (2017) found out that children who lived in rural areas were better off compared to those in urban areas. This can be attributed to the fact that in rural areas there is a higher diversity of foods and that most households produce their own food. This is unlike urban areas where mothers can have difficulties accessing local dietary resources. On the other hand, those living in urban areas have a higher income status and are able to purchase more food leading to increased meal frequency.

Study Limitations

Despite providing useful insights into the factors affecting complementary feeding practices among children aged 6–23 months in developing countries, this review has several limitations, which include the following;

Firstly, the review was based on secondary data drawn from published literature, which may not reflect the most recent changes in feeding practices or capture real-time contextual factors. Secondly, the selected studies vary widely in design, methodology, and geographic scope, making cross-comparison and synthesis somewhat challenging. Some studies used qualitative methods, while others used quantitative or mixed methods, which may have influenced how factors were identified and reported.

Thirdly, publication bias cannot be ruled out, as studies with significant or positive findings are more likely to be published and included in databases like PubMed and Elsevier. The exclusion of grey literature may also have led to the omission of relevant findings.

Additionally, while the review attempted to cover studies from developing countries, the data is disproportionately drawn from certain regions, particularly sub-Saharan Africa and South Asia, limiting the generalizability of findings to other developing contexts.

Finally, the use of observational and cross-sectional studies in most of the reviewed articles limits the ability to infer causality between the identified factors and complementary feeding practices.

Future research should aim to include longitudinal and intervention studies across a broader geographic range and integrate local cultural contexts to develop more targeted and sustainable strategies for improving complementary feeding practices.

CONCLUSION

Complementary feeding for children 6-23 months is important for their health and well-being. Proper complementary feeding practices are important for achieving the children's nutritional requirements and preventing malnutrition. It is evident that from the analysis, that there are several factors that affect the complementary feeding practices of children 6-23 months in the developing countries. These factors include the age of child, education level of mothers/caregivers, marital status of the mother, occupation of mother, knowledge of caregiver, postnatal care, mothers' decision-making role on how to use family income, maternal beliefs, wealth status, household size, place of birth, accessibility to media and internet, support, and place of residence.

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Thus, achieving appropriate complementary feeding practices requires several interventions involving various stakeholders. The identified factors should be put into consideration when developing strategies to deal with the challenges of poor complementary feeding practices. This will ensure children get adequate, safe and nutritious foods that will help prevent and eliminate diseases associated with poor nutrition, thus boosting their chances of survival.

Complementary feeding for children aged 6–23 months is crucial for ensuring their optimal health and development. This review identified several factors influencing complementary feeding practices in developing countries. Among them, maternal education, household income, and postnatal care were the most significant predictors of appropriate complementary feeding. Educated mothers are more likely to access information and implement best practices, while families with higher income can afford diverse and nutritious foods. Access to postnatal care ensures mothers receive essential guidance on feeding practices.

RECOMMENDATIONS

It is recommended that awareness creation strategies should be implemented to improve the knowledge of mothers of children 6-23 months on best complementary feeding practices. This can be through utilizing the mass media and during antenatal and postnatal clinics. Additionally, mothers unable to access and purchase complementary foods should be supported through employment opportunities and training on kitchen/home gardens. Targeted policies on enhancing complementary feeding practices should also be developed and integrated into health and child development agendas and guidelines.

To improve complementary feeding, the following policy recommendations are suggested;

Subsidize fortified complementary foods for low-income households through government-supported nutrition programs.

Integrate targeted nutrition education into routine antenatal and postnatal care services, with an emphasis on maternal dietary diversity and appropriate meal frequency.

Support maternal education and literacy programs to empower women with knowledge that promotes proper feeding practices.

Expand social protection schemes that enhance household food security, such as cash transfers or food voucher systems.

Promote community-based support groups, such as Mother-to-Mother Support Groups (MtMSGs), which have shown to positively influence feeding behaviors.

Adopting these measures can help address the barriers to optimal complementary feeding, thereby reducing the burden of malnutrition and improving the survival and long-term well-being of children in developing countries.

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CONFLICT OF INTEREST

The authors declare no conflict of interest at all.

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