EXPLORING FEEDING PRACTICES IN TYPICALLY DEVELOPING YOUNG CHILDREN IN THREE DISTRICTS OF CHHATTISGARH- A PRELIMINARY SURVEY

PRERNA JAIN

Register No: 20SLP032

A Dissertation Submitted in Part Fulfilment of

Degree of Master of Science (Speech-Language Pathology)

University of Mysore, Mysuru

ALL INDIA INSTITUTE OF SPEECH AND HEARING,

MANASAGANGOTHRI,

MYSURU-570006

AUGUST 2022

CERTIFICATE

This is to certify that this dissertation entitled **"EXPLORING FEEDING PRACTICES IN TYPICALLY DEVELOPING YOUNG CHILDREN IN THREE DISTRICTS OF CHHATTISGARH- A PRELIMINARY SURVEY"** is a Bonafide work submitted in part fulfilment for degree of Master of Science (Speech-Language Pathology) of the student Registration number 20SLP032. This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for award of any other Diploma or Degree.

Mysuru
August, 2022

Dr. M. Pushpavathi
Director
All India Institute of Speech and Hearing
Manasagangothri, Mysuru- 570006

CERTIFICATE

This is to certify that this dissertation entitled **"EXPLORING FEEDING PRACTICES IN TYPICALLY DEVELOPING YOUNG CHILDREN IN THREE DISTRICTS OF CHHATTISGARH- A PRELIMINARY SURVEY"** is a Bonafide work submitted in part fulfilment for degree of Master of Science (Speech-Language Pathology) of the student Registration number 20SLP032.This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for award of any other Diploma or Degree.

Mysuru
August, 2022

Dr. N. Swapna
Guide
Professor of Speech Pathology
Department of Speech-Language Pathology
All India Institute of Speech and Hearing,
Manasagangothri, Mysuru-570006

DECLARATION

This is to certify that this dissertation entitled "**EXPLORING FEEDING PRACTICES IN TYPICALLY DEVELOPING YOUNG CHILDREN IN THREE DISTRICTS OF CHHATTISGARH- A PRELIMINARY SURVEY**" is the result of my own study under the guidance of Dr. N Swapna, Professor of Speech Pathology, Department of Speech Language Pathology, All India Institute of Speech and Hearing, Mysuru and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

Mysuru **Registration No.: 20SLP032**

August, 2022

ACKNOWLEDGEMENT

I would like to thank and express my gratitude to **the Almighty**, who has blessed me with the courage and strength to face all the challenges of my life.

I would like to extend my sincere gratitude to **Dr. M Pushpavathi**. I feel fortunate to be learning under my guide, **Dr. N Swapna** who has always provided her guidance and wisdom. Thank you, ma'am, for being so patient throughout this journey. I thank **Dr. Vasantha Lakshmi MS** and **Dr. Srinivas** for guiding and helping with the statistics.

I will take this opportunity to thank ***my parents*** *for giving me life, and always supporting and encouraging me to achieve something new. It would not be possible for me to reach AIISH, and achieve this milestone in my career without having you both with me. Thank you* ***mummy (Karuna) and papa (Pramendra)*** *for being my all-time supporters.*

Next, I would like to thank my all-time stress buster, partner in crime and my best friend ***Akanksha****, for being with me from childhood and giving me strength to overcome all the stress and keep going until I complete my work.*

Special thanks to ***Amar, Swarna, Navya, Aradhna, Gurpreet, Mudra, Madhurya*** *and* ***Yasha*** *for being with me in hardest of times. AIISH life would have not been easy without you guys around. Thank you for everything, guys.*

I would also like to pay gratitude to my moral supporter ***Dr. Anila K. Rajeevan*** *for her valuable inputs. Thank you for your support aunty. Next, I would thank my juniors* ***Mahima*** *and* ***Ananya*** *for helping me finish this on time. Thankyou guys.*

Special thanks to my teachers, ***Dr. Jayashree Shanbal C****., for her continuous support to boost my moral and carry out the study and* ***Dr. Jagdish Ajwani,*** *for keeping me motivated through his messages whenever I felt low. Thank you, mam and sir.*

I would like to thank my family members, all my aunts ***Dr. Pooja, Patrika, and Dr. Rashmi, Aruna and Deepa*** *for their support in the data collection process. Finally, let me thank the* ***participants*** *(all the mothers) who took their valuable time to participate in this study. Thank you for your time and support.*

Thank you everyone.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter I

INTRODUCTION

Feeding is one of the first abilities that a child usually develops to meet his/her nutritional needs. Feeding and swallowing are the fundamental activities of prime importance for growth, development, nutrition and general health of newborns and early infants. Through the process of feeding, the satisfaction of hunger and maintenance of homeostasis is achieved. It also provides opportunities for sensory and motor stimulation, mother-child bonding and oro-motor skill development (Kummer, 2008). Children's emotional and psychosocial growth are also impacted, in addition to their physical development and health.

The development of feeding skills in the neonates begins with suckling followed by sucking. Complex series of events and coordination of the neurologic, respiratory and gastrointestinal systems are required for efficient feeding. Oral sensory motor abilities are improved through general neurodevelopment, the development of muscle control (posture and tone), and psychosocial development (Torola et al., 2012). These early gains eventually lead to biting, chewing, eating from a spoon, drinking from a cup and a straw and independent finger feeding of food of different consistencies, textures and hardness, which are more mature feeding behaviors (Dodrill, 2014; Morris & Klein, 2000). These developments occur by two years of age as the higher cortical centers gain more control.

What, when and how young children are fed during the first two years of life lay the foundation for life-long survival, growth and development. This is a critical time in which feeding-related practices and behaviors are established. An infant's interpersonal

food environment includes both what and how they are fed. The term ‘interpersonal food environment’ primarily refers to the infant's close relationships with the parents or caregivers, who impose structural restrictions, routines, and expectations for food and mealtimes. For neonates, who solely rely on these connections to obtain food and facilitate mealtimes, these interpersonal interactions are significant elements of the food environment (Rosenkranz et al., 2008).

In the first few months, the infants are exclusively on breast milk. During this period, no other food or drink including water is recommended. The infants, then move on to a diet that includes non-milk items in the pureed, semisolid, and solid form after starting off on an all-milk liquid diet. Later, complementary feeding is initiated at around six months of age, in which foods are introduced to ‘complement’ the ongoing milk feeds. It is described as the intake of meals and liquids when breast milk, infant formula, or follow-up formulations are no longer sufficient to supply the nutritional needs of newborns (Fewtrell et al., 2017). This period is marked by changes in the diet with exposure to new foods, tastes, and feeding experiences. It should promote the consumption of a variety of meals that meet nutritional needs in addition to fostering the development of the best food-related behaviors, skills, and attitudes. Complementary feeding is an important step in the process of transitioning from breast feeding to family foods.

Parents serve as the gatekeepers of the early feeding environment, which is shaped through intricate interactions between parents and children related to feeding and eating. These interactions are known as ‘food parenting’ (Vaughn, Ward, Fisher, Faith, Hughes, & Kremers, 2016). Feeding styles and feeding practices are regarded to be part of food parenting. Feeding style refers to the overall emotional climate of the feeding dynamic,

whereas feeding practices refer to the specific strategies and behaviors (the "when, what, and how") of child feeding (Vaughn et al., 2016). Feeding practices are defined as strategies or behaviors which parents employ to manage their children's diets and food intake (e.g., what, when and how much a child should eat), both within and outside of the mealtime setting (Blissett, 2011; Schwartz, Scholtens, Lalanne, Weenen & Nicklaus, 2011; Ventura & Birch, 2008). There is evidence that feeding children involves two-way interactions, in which parents' feeding practices may influence or respond to children's eating behaviors (Jansen, Williams, Mallan, Nicholson & Daniels, 2018; Mallan, Jansen, Harris, Llewellyn, Fildes, & Daniels, 2018; Selzam, McAdams, Coleman, Carnell, O'Reilly, Plomin, et al. 2018). Additionally, research indicates that parental feeding methods have a significant impact on how children acquire their taste preferences, eating habits, nutrition, and final weight status (Carper, Fisher & Birch, 2000; Faith et al., 2004; Kremers, Brug, De Vries & Engels, 2003; Webber, Cooke, Hill & Wardle, 2010).

Parental feeding and child eating are fundamental to family life and are deeply ingrained in culture and tradition. Typically, the feeding techniques are passed down from grandmother to mother to daughter (Birch, 2006). Hence, feeding practices can be culture specific and can vary across different cultures. Different foods can be introduced to children at different ages as they grow, which may vary based on the place of dwelling. Additionally, the consistency and the type of utensils used could vary. The type of food provided could also vary depending on the place of dwelling and whether the parents are vegetarians or non-vegetarians.

The majority of neonates were given infant cereal by the time they were six months old, according to a study by Yu et al. (2019), making it the most frequently introduced food

(complementary feeds). In the Indian context, in addition to the cereals such as ragi, semolina, arrowroot or banana powder, other foods are also introduced such as pulses, soup, mashed and boiled fruits, fruit or vegetable purees etc. (https://confusedparent.in/baby-food-chart-0-6-months/).

In addition, the time of introduction of complementary foods also could differ based on a variety of factors such as maternal education, age, occupation, family type etc. The study by Yu et al., (2019) found that educated mothers introduced complementary foods earlier. Olatona et al. (2017) discovered that understanding of complementary feeding was low (14.9%) and was related to mother's age, education, and occupation. The relationship between the child and the primary caregiver, interaction, especially during meal and snack times, family mealtime environments, food preparation techniques, and children's participation in food planning and preparation, to name a few, all have an impact on feeding practices (Collins et al., 2014; Larsen et al., 2015; Stang & Loth, 2011). Additional environmental elements that affect feeding practices include food accessibility and availability, parental qualities (beliefs, attitudes, behaviors), child characteristics (temperament, health status, eating habits, learning behaviors, and food preferences), etc. (Scaglioni et al., 2008; Webber, Cooke, Hill & Wardle, 2010).

Need for the study

India has numerous states and union territories, several thousand castes and tribes, six major world religions, and abundant ethnic and linguistic groups. It has a rich culinary heritage that evolved over centuries. Indian food style consists of a variety of regional and traditional cuisines native to the Indian subcontinent, which are unique to the soil, weather and various other environmental factors, leading to differences in locally available food

resources. Food in India has been impacted by many civilizations, each of which has contributed to its general evolution and current shape. Indian food is different from rest of the world in taste, in terms of preparation etc. as the food culture is shaped by climate, land, and access to natural resources.

Eating habits of the Indian culture are primarily based on culinary traditions. The type of food eaten across the country is diverse and highly influenced by social, cultural and economic factors. The diversity of India is surfaced with numerous cultures, religions, castes, class, family, kin-ship, tribe affiliation, lineage, religiosity, ethnicity, and increasingly, of secular group identification that can exhibit differences observed in the feeding practices, from that seen across the world. Given the diversity, what, when and how food is given to infants and children could differ across different states of India. There are higher opportunities of detailed variations in the type of food introduced at each age, its consistency, utensils, feeding position etc. Given the complexity and variation of feeding practices, studies exploring these in a country like India are vital. The present study is planned in the state of Chhattisgarh, part of Central India.

Though the state of Chhattisgarh consists of 27 districts, the present study focuses on the feeding practices across three districts, viz. Raipur, Durg and Rajnandgaon. Raipur is the capital of the state and is situated in the easternmost part of the state. Raipur being the capital, has residents from both rural and urban areas. Durg, the smallest district in terms of geographical area to the east of the Shiva Nath River and is part of the Durg-Bhilai urban agglomeration. Durg- Bhilai being the Twin city has more of industrial and educational influence for the state. The District Rajnandgaon, largest district in terms of geographical area is in the central part of Chhattisgarh and the palaces in Rajnandgaon

reveal its own tale of the rulers, their society & culture and the splendid tradition during that time. Though situated quite close to each other, Rajnandgaon and Durg are different in terms of civilization. The former consists of villages and the latter is more developed in terms of industrialization and literacy. It is assumed that there could be variations in parental feeding practices and beliefs across the three different districts of Chhattisgarh.

Studies examining the existing feeding practices in the Indian context are limited. Studies that have investigated the influence of parental experience on feeding practices are also limited. To the best of researchers' knowledge, there is dearth of studies that address this issue, particularly in Chhattisgarh. Keeping this in view, this research is designed to fulfil the following aim.

1.1 Aim of the study

To investigate the nature of feeding practices in typically developing young children from one to three years in Chhattisgarh.

1.2 Objectives of the study

The objectives of the study include the following:

1. To compare the feeding practices across the three districts of Chhattisgarh (Raipur, Durg and Rajnandgaon).
2. To compare the feeding practices based on maternal experience (first time mothers v/s second time mothers).

1.3 Hypothesis of the study

The following hypothesis are proposed for the present study

$H_0$1 There is no significant difference in the feeding practices across the three districts.

$H_0$2 There is no significant difference between the feeding practices of the first-time mothers and the second time mothers.

CHAPTER II

REVIEW OF LITERATURE

Feeding appropriate types and amounts of foods promotes infant growth and development as well as overall health. Feeding refers to any part of eating or drinking, such as gathering and preparing food and fluids for consumption, sucking or chewing, and swallowing (Arvedson & Brodsky, 2002), while keeping the airway protected. The process of feeding in which the food gets transferred from the mouth to the stomach is classified into different phases. In order to make a cohesive bolus, the food or liquid is manipulated in the mouth. For liquids, the intake is through sucking, whereas for solids, it is chewed or masticated. This is the oral preparatory phase. This is followed by the posterior propulsion of the bolus, and the oral transit phase concludes with the commencement of the pharyngeal swallow. The pharyngeal swallow propels the bolus through the pharynx and upper esophageal sphincter, which constitutes the pharyngeal phase. Finally, the bolus is carried to the stomach through the process of esophageal peristalsis, which is the esophageal phase (Arvedson & Brodsky, 2002; Logemann, 1998).

All four steps of swallowing are reflexive and involuntary in neonates and young infants. Later, as the children age, the oral phase becomes voluntary, which is essential to allow them to begin to chew solid food. Mastication (biting and chewing) is safe and effective when appropriate sensory registration of the food supply is combined with a coordinated motor response driven by cognitive thought processes (Dodrill, 2014). In later life, the triggering of the swallow reflex is generally an involuntary activity, though it can be controlled voluntarily. However, the pharyngeal and esophageal phases of swallowing are involuntary activities.

2.1 Development of Feeding

According to Dellow (1976), swallowing begins in the fetus, with suckling movements, drinking of amniotic fluid, and occasional presentation of the thumb in the mouth. The development of the embryonic gastrointestinal system, recirculating solutes from the fetal environment, and regulating the volume and content of the amniotic fluid all depend on the fetus's ability to swallow (Ross, 1998).

Socially acceptable eating starts at birth and develops during the course of the first few years of infancy in infants with regular development. It develops in a manner similar to that of general neurodevelopment, including the development of oral sensorimotor abilities, the acquisition of muscle control, including posture and tone, the development of cognition and language, and the development of psychosocial skills.

Homeostasis (0-2 months), attachment (3-6 months), and separation/individuation (6-36 months) are the three stages of normal feeding development (Chatoor & Egan, 1984). Infants aim for environmental homeostasis during the first 2 to 3 months of life. Sleep control, regular feeding patterns, and awake states that allow emotional attachment to primary caregivers are among the objectives. Infants begin to engage in interactional patterns with the caregiver during the attachment period (Greenspan & Lourie, 1981). During nipple feedings, they might pause more frequently after sucking bursts. This pausing could be for socialization purposes and thus feeding progressively turns into a social affair. Intuitive nipple control, reaching, grinning, and social play are all made easier by successful feeding experiences.

Around six months of age, infants start to exert more control over their surroundings, which marks the beginning of the separation/individuation phase. The fundamental behavioral development from 6 to 36 months is an effort to achieve a sense of self.

During the infancy period, infants are only able to suckle liquids and swallow, with the tongue still moving back and forth. The oral and pharyngeal cavities are smaller in infants because of the relatively small mandible and fat pads in the cheeks. Later, as the oropharyngeal skill improves, advanced feeding skill develops between 4 and 36 months (Arvedson & Brodsky, 1993). As the child grows, the sucking and swallowing action is followed by biting, chewing, eating from a spoon, drinking from a cup and a straw which are more mature feeding behaviors. The range of food textures which can be eaten by the children safely and efficiently, increases as the age progresses. These developments occur as the higher cortical centers gain more control (Arvedson & Brodsky, 1993). The progression seen in the development of feeding is as follows:

2.1.1 Suckling and sucking in respect to breast feeding

At this stage of development, suckling is characterized by the tongue moving back and forth as it fills the mouth cavity (Morris & Klein, 1987) such that suction and nipple compression succeed each other, which persist until 6 months of infancy. The direction of movement is more pronounced when moving backward. Forward movement does not extend beyond the border of the lips. It involves the coordination of tongue, hyoid, mandibular muscles and the lower lip. Suckling from the breast of the mother is what the infants learn to do first. The tongue's tip remains over the lower gum and under the lower lip while breast feeding, and the remainder of the tongue cups around the breast areola. The

mandible moves the tongue up, allowing the breast areola to be compressed against the infant's alveolar ridge. Milk is then expressed into the oral cavity (Arvedson & Brodsky, 1993). The World Health Organization (WHO), United Nations Children's Fund (UNICEF), recommend and promote exclusive breast feeding for the first six months of life and continuation of breast feeding thereafter till the age of two years or older (Global Strategy for Infant and Young Child Feeding, World Health Organization, 2003).

Sucking develops between 6 to 9 months. In this type of feeding pattern, the tongue body raises and lowers with strong movement of its intrinsic muscles, and thus the jaw makes a smaller vertical excursion (Morris & Klein, 1987). With a change in the direction of tongue movement during sucking, the infant is ready to move on to foods other than breastmilk.

2.1.2 Transition from breast feeding to complementary food

Complementary foods (CF) are defined as "all solid and liquid foods other than breastmilk or infant formula". World Health Organization (WHO) defines complementary feeding as "a process starting when breast milk alone is no longer sufficient to meet the nutritional requirements of infants, and therefore other foods and liquids are needed, along with breast milk" (WHO, 2001). In order to supply additional nutrients to newborns, complementary foods (items other than breast milk or infant formula) should be introduced (United States Department of Agriculture, USDA, 2009). The energy and nutritional gaps between the amount ingested through breast feeding and the amount needed daily for newborns and young children are intended to be filled by complementary foods.

Complementary feeding should be given timely (start receiving from 6 months onward) and adequately (in terms of amounts, frequency, consistency, and using a variety of foods). Food should be prepared and supplied in a safe and suitable manner (food should be of acceptable texture for the child's age) and by utilizing responsive feeding principles for psychosocial care (Monte & Giugliani, 2004).

Most newborns reach developmental readiness and the capacity to tolerate complementary feeding between the ages of 4 and 6 month (Issaka, 2015), which involves progressive gradation from suckle feeding of liquids to voluntary ingestion of physically varied food material. The target age range for complementary feeding is between the age of 6 and 23 months (with continued breast feeding), where most infants reach a general and neurological stage of development (chewing, swallowing, digestion, and excretion) that enables them to be fed other foods rather than breast milk (Monte & Giugliani, 2004).

Changes in the central nervous system along with the changes in anatomy are responsible for inclination for different textures. Additionally, when their neuromuscular system develops, they get the capacity to recognize food, accept spoons, chew and swallow food, and even recognize and appreciate the variety of food flavours and colors (Cohen, 1994). The intraoral space increases as the mandible grows downward and forward. The oral cavity also elongates in the vertical dimensions. The hyoid bone and larynx shift downward, so that the breathing and swallowing coordination becomes a factor during feeding, and breathing and swallowing truly become mutual activities (Arvedson & Brodsky, 1993). While the intestinal tract's capacity to metabolize proteins, lipids, and carbohydrates improves, it also has a well-developed defensive mechanism that reduces or eliminates the danger of allergic reaction following consumption of meals containing

foreign proteins. In a similar manner, the kidney of an infant matures to the point at which it can effectively flush out waste products from food.

The biting and chewing skills develop as an eruption of teeth occurs during this period. Since the size of the oral cavity increases due to the above changes, the tongue and the buccal wall play a major role in manipulating the food. An infant is ready for cup and spoon feeding when there is a decrease in the characteristic anteroposterior tongue action of sucking.

Infants show readiness for the transitional feeding i.e., introduction to complementary feeding can also be called spoon feeding around 4 to 6 months, which also is the period of attachment.

The ability to sit up straight without much support, maintain a midline head position without assistance for several minutes, use hand-to-mouth motor skills, and separate lip and tongue movements, which creates more space for the tongue inside the oral cavity and allows vertical tongue motion in addition to "in and out" sucking, are all signs that a child is ready to eat with a spoon. Infants develop the oral sensorimotor abilities necessary to consume thicker and lumpier food by spoon throughout the following few months.

About a month after spoon feeding becomes established, cup drinking is introduced. Generally, milk, juices and water are provided in the cup. Water should also be introduced to the infants only after 6 months along with other liquid complementary foods (Global Strategy for Infant and Young Child Feeding. World Health Organization, 2003). Normal infants usually get prepared to start drinking from an open cup with assistance from caregivers between 6 and 8 months of age. They initially swallow by sucking with their

tongues outward, which causes fluids to leak out of the mouth's corners. Most infants can drink successfully from a cup held by a caregiver by the time they are 9 to 10 months old. They eventually learn to take one or two drinks from the cup held by a caregiver. By the time they are 12 months old, the majority of infants can hold a cup with two hands and take four or five drinks in a row without choking. Thus, before they turn one year old, the majority of typically developing children can drink everything from a cup (Arvedson et al., 1996).

Between the ages of 6 and 9 months, the majority of children start using "soft chewable" for finger feeding. ‘Annaprasan’ is the name of the religious ceremony performed by most of the communities in India, to start introducing other food items to the child. They eventually get better at picking up little bits of food (or other items) when they develop a thumb-and-forefinger pincer grip, which is projected to happen by 10 to 12 months.

As teeth develop by 6 months, biting emerges. Chewing also emerges with early munching patterns made with vertical jaw excursions and only limited lateral tongue movements. Children gradually develop a mature chewing pattern with rotating jaw motion and increasing lateral tongue excursions as they get more accustomed to certain textures. Foods with texture are gradually introduced, including dissolvable solids (for example, soft biscuits at 6 to 9 months), textured purees (for example, mashed banana at 6 to 9 months), ground solids at 6 to 9 months, and soft diced solids at the same time (for example, fruits and vegetables at 9-12 months). By 12-18 months of age, a standard toddler diet comprising table foods is introduced (Delaney & Arvedson, 2008). Chewing skills continue to mature

over a period of 2-4 years for "tougher" solids, such as some meats, raw vegetables, and fresh fruit.

Children between the ages of 12 and 36 months continue to develop their oral skills, expand the variety of foods they will eat, get better at chewing things that require more extensive oral manipulation, and handle liquids from open cups. Their eating is basically functional for regular table food with their peers and other family members. In summary, the feeding progression from birth to 24 months has been depicted in table 1 below.

Table 2.1

Feeding progression from birth to 24 months (Source: Cichero & Murdoch: Dysphagia: foundation, theory and practice, 2006)

Age	Food	Feeding utensils
Birth to 6 months	Milk, Liquids	Breast or bottle
4-6 months	Cereals, puree	Spoon
6-9 months	Chunky puree, mashed food, soft finger foods	Spoon; drinking from cup (at 9 months)
9-12 months	Chopped food and finger food	Spoon; cup; self feeds with fingers; weaning from breast/ bottle as cup drinking increases
15-24 months	Full diet with some exclusionary items (example- nuts)	Spoon, cup, fork; self-feeding predominates.

Before birth, taste and flavor perception begins to develop. The fetus detects flavors in the amniotic fluid that were carried over from diet of the mother during pregnancy. Exposure to breast milk flavors may help to speed up the weaning process by enhancing preferences for certain flavors. After being weaned from the breast, the child accepts and appreciates that food's flavor. When a novel vegetable is initially presented, some breastfed babies are more receptive than formula-fed babies (Sullivan & Birch, 1994). Picky eating is also less likely to occur in infants who have been breastfed for at least six months (Galloway, Lee, & Birch, 2003).

Because of their sensory systems, infants have a natural affinity for sweets. Infants take about 4 months to develop the ability to taste salt and to like it. After birth, the capacity to recognize additional tastes and flavors grows. Early sensory exposure affects how children in infancy and childhood respond to flavors and foods (Mennella, Jagnow, & Beauchamp, 2001).

2.2 Prerequisites for Feeding Development

The development of feeding and swallowing is the result of a complex interface between the developing nervous system, various physiological systems and the environmental factors that begins in embryological and fetal periods and continues through infancy and early childhood. For successful feeding, children need a typically functioning oral-motor, sensory and swallowing mechanism, and adequate musculoskeletal tone, for which the development and maturation of the neurologic, respiratory and gastrointestinal systems are also essential (ASHA, n.d.).

The transition from brainstem-mediated suckling reflexes to complex, voluntary mouth movement during feeding depends on a number of important preconditions, one of which is early neurologic development. The oral cavity, pharynx, and esophagus, important in feeding, effectively integrate and coordinate their functions through a neuronal network. The integrity of these structures that constitute the feeding and swallowing mechanism is essential. The complex feeding behaviors emerge from the interactions of cranial nerves of the brainstem, which is governed by the neural regulatory mechanisms in the medulla oblongata, as well as the higher cortical and subcortical structures.

Gross motor and fine motor development is a prerequisite for independent feeding to occur. As the nervous system develops, the control of pelvis, trunk, neck, shoulder, and jaw matures in a sequence, which leads to jaw stability. Jaw stability is a prerequisite for developing appropriate refined tongue, cheek and lip movement (Morris & Klein, 1987). The gross motor control is necessary to support the fine motor control which includes chewing and biting.

Adequate oral motor development is also an essential prerequisite (Bosma, 1986). The child's oral motor skills gradually improve as they transition from breast feeding to bottle feeding, take in solid foods with a spoon, move on to mashed and soft pieces that can be broken with the tongue, and then soft and hard food textures that require biting and chewing. They also help them drink from a bottle, straw, or open cup (Dodrill, 2014; Morris & Klein, 2000).

2.3 Critical and Sensitive Periods

Lorenz (1965) stated that early on in development, the organism is prepared to take in and possibly permanently encode significant information from the environment. Although they emphasize the importance of the early experiences, these views do not rule out the possibility of later learning. It is thought that the formation of typical feeding behavior occurs during critical and sensitive periods. Birth to two years is the important feeding learning phase (Bahr & Johanson, 2013). In humans, exposure to age-appropriate meals and experience are crucial. The introduction of chewable textures is the main emphasis of descriptions of sensitive times. When chewing, children often acquire oral side preferences that are related to hand preferences. Compared to foods that are fluid or pureed, children acquire mature chewing techniques for solid foods earlier. However, it is typical for children who haven't mastered the timing and coordination necessary for swallowing purees and other smooth foods to be maintained on such textures since caregivers could think these children aren't ready for the introduction of chewable food. This might not be the case because children need to be exposed to solid foods at the right times. If chewable are offered to infants after the crucial period, they can reject them. Many infants find it more challenging to accept chewable food the longer solids are delayed in being introduced. Respiratory regulation, one of the physiologic systems that supports oral sensorimotor and swallowing abilities, has critical times that can affect the feeding process.

2.4 International Dysphagia Diet Standardization Initiative

The type of food and its consistency can be graded using the International Dysphagia Diet Standardization Initiative (IDDSI, Cichero, Lam et al., 2017) framework. In order to introduce supplementary foods to newborn infants around the world, this

framework offers a common terminology to describe food textures and fluid thickness. The IDDSI Framework consists of a continuum of 8 levels (0 - 7), where drinks are measured from Levels 0 – 4, while the food items are measured from Levels 3 – 7. The complete framework is depicted in figure. 2.1.

Figure 2.1

Complete framework of IDDSI for measuring food textures and drink thickness (source:https://iddsi.org/framework/)

2.5 Factors Affecting Feeding Development

Feeding development is a learnt succession of behaviors that can be altered by a various factor, yet being dependent on anatomical integrity and brain maturation. Infant feeding is a reciprocal procedure involving a give-and-take exchange that is dependent on the skills and personality traits of the caregivers and the infants. This learning is heavily influenced by several experiential opportunities.

A healthy positive feeding relationship between the caregiver and the child is important for successful feeding. The process of self-regulation during the homeostasis stage is something that caregivers need to be aware of. When an infant shows signs of hunger, caregivers must notice them and act quickly. They should also help the child get back into a calm, orderly condition after becoming overstimulated or upset. Understanding the learning processes that underlie the development of food liking and self-regulation of intake during the first 24 months of life is important because what children learn in this domain during infancy and toddlerhood affects subsequent eating behavior, growth, and weight status (Paul 2009).

Caregivers also should respond appropriately to increased pauses taken during breast feeding, as they become more social. Additionally, parents and other caregivers should establish limits, rules, and structures that let infants safely experiment with food. They should have the knowledge of the type of food to be given to the child at different stages and also should use appropriate strategies during feeding.

Numerous environmental and societal factors, including religion and residence, have an impact on feeding. When compared to other religions, the Hindu religion, for instance, was found to be strongly related with timely breastfeeding initiation. The basic physiologic complexity of feeding is compounded by individual temperament, interpersonal relationships, and environmental influences. Oral feeding skill is also influenced by level of awareness, stress, illness and fatigue of the caregivers.

Additionally, experiences within families and social networks as well as social and cultural factors have an impact on feeding decisions (Bloom et al., 2008; Dar et al., 2012, Kruger & Gericke, 2003; Laroia & Sharma, 2006; Yadavannavar & Patil, 2011). Bloom et

al., (2008) compared breast feeding women who were older and of higher socioeconomic position to formula-feeding mothers. They discovered that breast feeders had much higher propensities to consult literature or advice when making their decision to breastfeed. The study revealed the influence of social and cultural aspects in choosing the method of feeding.

Cultural factors, beliefs, knowledge regarding appropriate practices, timing and consistency of complementary food also influences the complementary feeding practices (WHO, 2019), which varies significantly with maternal education and paternal education and socioeconomic status. Cultural variables and women's experiences differ greatly across India. Grandmothers have an important influence on feeding practices (Laroia & Sharma, 2006), which is passed on from one generation to the next. Infant feeding and raising habits vary by community, and are influenced by social traditions, traditional beliefs and prejudices, literacy, and the family's socioeconomic situation, particularly that of the mother.

Kavitha et al. (2014) reported that the use of proper weaning practices was found to be significantly related with residence area and education level of the mother. Nursing mothers who were home makers and had a family income of more than Rs. 10,000 preferred commercial weaning foods. One of the challenges to practicing exclusive breast feeding may be maternal employment. Working mothers from rural areas find it very challenging to continue exclusively breast feeding because they must return to work as soon as possible (Annie, 2017; Zahiruddin et al., 2016). Hence, they tend to introduce complementary feeds at an early age.

In India, the pattern of complementary feeding and its timely commencement are not ideal. Women in employment face challenges for following ideal Infant and Young Child Feeding practices, which have a substantial impact on growth and development of child under 2 years of age. The goal was to research the problems encountered by women in employment for complementary feeding and its pattern in rural area. A qualitative study was carried out in the Wardha district of India's countryside. Six focus group discussions (FGDs) were held, with a total of 39 participants, including community-level service providers and working women with children aged 6 to 23 months. Women in remote areas could not practice exclusive breast feeding for six months and returned to work early. They started complementary feeding early and were not adequately informed about it. At 4-6 months, women begin semisolid and soft food, and at 7-9 months, they introduce mashed solid food. When women are at work, they frequently leave their infants in the care of local neighbours or elderly relatives. There are no creches or child care centers in villages. All of these factors put complementary feeding at risk in terms of timing, sufficiency, suggested dietary diversity, and safe feeding. The difficulties of practicing exclusive breast feeding for 6 months, as well as early initiation and inadequate complementary feeding, have a negative impact on children's growth and development in rural areas, which may have unintended long-term consequences for cognitive development. An effective technique for assisting the women in employment to follow the best IYCF guidelines would be to strengthen the Anganwadi programme in India with a greater emphasis on children under 2 years old and community infant care rooms / creches services. India needs measures that provide a positive work environment and enough legal protection for working women.

National Family Health Survey-III (NFHS) & National Family Health Survey-IV (NFHS) of India identified various other determinants like low maternal education, lower maternal Body Mass Index (<18.5 kg/m2), lower wealth index, less frequent antenatal clinic visits, lack of postnatal visits and poor exposure to media for not meeting minimum dietary diversity and minimum acceptable diet in complementary feeding (International Institute for Population Sciences, 2017; Patel, 2012).

Mothers with two or more children were more likely to cease exclusive breast feeding in the first six months compared to mothers with less than two children. Also, mothers in nuclear families, compared to mothers from joint families, were more likely to cease breast feeding. Hence, the number of children and members in a family were a significant determinant (Velusamy et al., 2017).

In an Australian study, first-time mothers did not show a strong comprehension of the reasoning behind the advice to introduce complementary foods until after six months or of the signals that an infant is ready to start eating solid foods (Walsh et al., 2015).

Thus, several studies highlight that feeding practices such as age of introduction and termination of breast feeds, age of introduction of complementary feeds, the type of complementary feeds could be influenced by several factors.

2.6 Feeding Practices in the Western Context

Several studies have explored the feeding practices primarily in terms of age of introduction and termination of breast feeds, introduction of formula milk and complementary feeds. For Eastern Ethiopia, the prevalence of timely beginning of complementary feeding was 60.5%. Nineteen percentage of mothers started

complementary feeding before their babies were six months old. Due to mother's perceived insufficient breast milk production and lack of knowledge, complementary feeding was started too early. When compared to mothers of female children, mothers of male children were three times more likely to promptly begin complementary feeding. This might be due to traditional gender norms that discriminate against female feeding "female eat little talk little" this might start at an early age of life (Semahegn et al., 2014).

In a Pakistani research, just 49% of mothers started breast feeding within an hour after giving birth. For the first six months, 37% of mothers exclusively breastfed their babies. At 6 to 8 months of age, supplemental feeding was first offered by 70% of mothers. Breast feeding was continued by 82% of women for at least a year, and there were no appreciable differences in behaviors between boys and girls. Low-quality practices were discovered, and they were linked to factors like mother age, illiteracy, unemployment, and low household wealth status (Khan et al., 2017).

2.7 Feeding Practices in India

Similarly, studies have explored the feeding practices in India primarily in terms of age of introduction and termination of breast feeds, introduction of formula milk and complementary feeds. According to The Third National Family Health Survey (NFHS-3, 2005-2006) of India, overall, 48.3% of children between zero to five months were solely breastfed, and 53.8% of children aged six to nine months got introduced with complementary foods.

A study by Aggarwal et al. (2008) in an Indian tertiary hospital, 17.5% of women began complementary feeding at the suggested period. The most often cited justification

for improper behavior among women who postponed feedings was "tried but did not eat, vomits everything." Only nine of the 151 mothers interviewed in six villages in Uttar Pradesh's Ghaziabad area offered semi-solid/solid foods with breast feeding at six months of age, according to a study by Garg and Chadha (2009).

A study by Mahmood (2012) conducted in villages of Uttar Pradesh, indicated that within 24 hours of birth, majority of the mothers (78.8%) started nursing. Colostrum was not given to 15.4% of the newborns. The most prevalent reason given by women for rejecting colostrum is that they believe it is harmful to their children. The percentage of infants who weren't exclusively breastfed was about 22.8%. Insufficient milk secretion was the most common reason for not doing so (71.4 %). Pre-lacteal meals included Ghutti, which is water combined with honey and herbs (42.9%), heated water (21.4%), tea (21.4%), and animal milk (14.3%). One-fourth of those surveyed began complementary feeding before the infant was six months old. Semi solid food was the most prevalent type of complementary meal supplied (53.7% of mothers provided the semi solid food), out of which 13.8 % of the mothers started introducing semi-solid meals, before the infant was six months old.

According to a cross-sectional study conducted by Khan et al. (2012) to examine the diet pattern of children under the age of two years with regard to specific infant and young child feeding (IYCF) indicators, 72% of Delhi children were found to be weaned at 6 to 8 months, which was greater than the data from the national family survey. 57.1 % of mothers of infants under 6 months old were found to exclusively breastfeed their children. Of children between the ages of 6 months and 2 years, 32.6 %, 48.6 %, and 19.7 %,

respectively, thought their diets met the minimum requirements for nutritional diversity, meal frequency, and minimum acceptable diet.

The parents of 100 children aged six months to two years in Madhya Pradesh favored liquid feeds (63%), followed by semisolid (32%) and solid (5%) foods. The feeds that were deemed excellent were rice water (72%) and top milk (67%). Ghee/oil was added to the child's diet by 62% of parents (Lodha, 2013). Complementary feeding was typically initiated with liquid diets such as diluted bovine milk and rice water, followed by semi-solid meals such as dal, khichdi, rice, and other locally available foods in the majority of studies. At the age of nine months, solid meals such as chapati, eggs, and mashed vegetables were introduced. Green leafy vegetables were not offered to the majority of the infants.

Kavitha et al. (2014) assessed the complementary feeding practices of 50 mothers with infants between the ages of 6 months to one year in Salem, district of Tamil Nadu. They found that 62% of the mothers had initiated complementary feeding before the recommended time of 6 months.

At the age of 6-8 months, 46.67% of newborns were fed solid, semisolid, or soft foods, according to the results of a study conducted among 120 mothers in West Bengal with children aged 0 to 23 months. The proportion of children aged six to nine months who received supplemental feeding was substantially lower than the NFHS-3 findings in rural West Bengal (55.3%) (Mondal, 2014).

Foods including mashed dal and rice, mashed seasonal fruits and vegetables, and biscuits with milk were given to the majority of the children in a study of 100 children

under the age of five in Pune. Milk was supplied to 73% of newborns, while the rest were unable to receive it either due to financial constraints (15%) or because the child refused to drink (11%) (Sapra, 2015).

In Kolkata, the weaning of only 36% of the children was started on complementary feeding at the correct age of 6 months and 32% of children aged from 6 to 23 months began before they were 6 months old (Dasgupta et al., 2014).

In another study carried out by Kalita and Borah (2016) in rural areas of Assam, it was found that before the age of six months, 14.2% (out of total 380 mothers) of mothers provided complementary foods. Insufficient breast milk was reported by 37 (68.5%) of the 54 women as the reason for starting complementary feeding earlier than six months, followed by child's demand by 17 (31.5%) of the mothers. 70 (50.3%) women were unaware of the real time of commencement, 41 (29.5%) mothers believed the kid could not digest solid food, and 28 (20.2%) mothers initiated late as instructed by elders among the 139 moms who introduced supplemental feeding later than six months.

Gaddapa and Behera (2016) studied 125 children aged 0 to 24 months and found that only 38% received complementary feeding between the ages of 6 and 9 months, compared to 48.8% who began complementary feeding before the age of six months, in some cases on the first day of birth. Sixty percent of children aged nine months and older who received complementary feeding suffered severe acute malnutrition. Malnutrition was found to have a statistically significant connection with the age at which supplemental feeding began.

According to a study conducted in Chandigarh to evaluate infant feeding behaviors among mothers of newborns, 81.7 % of 300 women began supplemental feeding between the ages of six and eight months for their infants (Pradhan, 2016).

Zahiruddin et al. (2016) investigated the difficulties faced by employed women for complementary feeding and the pattern of complementary feeding in rural area of Wardha district, Central India using focus group discussion. Thirty-nine women with children between 6-23 months were included as participants. They found that, in rural area, women start work early and find it difficult to practice exclusive breast feeding for six months. They commence complementary feeding early, but had scanty awareness regarding complementary feeding. They found that newborns were given prelacteal feeds such as honey, sugar or jaggery dissolved in water. They did not use a baby feeding bottle to feed the child. It was also noted that babies were given pacifiers in the form of biscuits and other food when he/she cries, especially when mothers are working women or when women are busy doing household work. Women begin semisolid and soft food at 4-6 months and crushed solid food at 7-9 months since they must leave their baby with elders or neighbours. This impairs complementary feeding in terms of dietary diversity, timing, adequateness, and safety.

Dhami's study (2019) found a wide range of prevalence of solid, semi-solid, or soft food (complementary meals) introduction among infants aged 6–8 months throughout regional India, with the highest prevalence in the South (61%) and the lowest prevalence in the Central and Northern regions (38%). Similarly, the South (33%) had the highest minimum dietary diversity (MDD), while the Central region had the lowest (12%). The minimum meal frequency (MMF) and minimum acceptable diet (MAD) differed

significantly between areas. The factors associated with complementary feeding practices also differed across Indian regions.

Other liquid foods, including as cow's milk, lentil soup, and rice water soup, were typically offered in Maharashtra between the ages of 5 and 7 months. The semisolid, solid foods and fruits were introduced by 6 to 8 months. Bananas were being introduced quite late compared to other fruits. It was found that infants between the ages of 6 months and 12 months received two food categories for 24 hours, namely milk and cereals, while children between the ages of 13 and 24 months received three food groups, primarily milk, cereals, vegetables, and/or fruits. However, older people, particularly grandmothers, made the decision regarding the choice of complementary feeding (Kogade et al., 2019).

Behera et al. (2020) assesses complementary feeding in an urban slum of East Delhi and explored its association with the socio-demographic factors. Early initiation of breast feeding was practiced in around half of the children. Minimum Dietary Diversity (MDD), Minimum Meal Frequency (MMF) and Minimum Acceptable Diet (MAD) was found to be 17.7%, 69.1% and 16.6%, respectively. These complementary feeding indicators were found to be better among higher age group children, mothers with higher level of education and middle socio-economic class in comparison to lower socioeconomic sections of the study population. They concluded that infant and young child feeding practices were poor.

Liaqualthali (2020) assessed the infant feeding practices in the rural region of Kancheepuram district, Tamil Nadu from June to December 2019. They found that only 10.2% were solely breastfed for 6 months. 58.6% of children were introduced to soft/solid/semisolid food at the end of 6 to 8 months. Infants who were breastfed had a minimum acceptable diet of 31.5%, while non-breastfed infants had a minimum acceptable

diet of 14 %. Additionally, they discovered that proper Infant and Young Child Feeding practices were statistically associated with the mother's age, educational level, employment position, and mode of delivery.

Kamble et al. (2020) found that mothers in Haryana had good knowledge about breast feeding, but with regard to complementary feeding practices, there was a knowledge gap regarding initiation and composition of complementary foods.

To summarize, an in-depth review of literature revealed that the feeding practices across India, particularly the age of introduction of complementary feeds and the type of food introduced are varied. The review also highlighted that the feeding practices are influenced by several factors. The existing studies mostly focused on the type of food and age of introduction of food. The consistency of the food, the utensils used and the position used for feeding have received less attention. These are important from the perspective of management of feeding difficulties for speech-language pathologists. Moreover, the knowledge regarding the type of food and liquid including water introduced and age of introduction, will assist the speech-language pathologists during management. Most of the existing studies have been conducted from the nutritionist perspective. Similar studies in parts of Central India, particularly in Chhattisgarh, which is a newly formed state, are scarce. Since studies investigating these aspects are limited, the present study was planned with the aim of assessing prevalent feeding practices. The next chapter describes the method employed in the study.

CHAPTER III

METHOD

The primary aim of the current study was to explore the feeding practices prevalent in Chhattisgarh. The study investigated the feeding practices across the three districts and across maternal experience (between first-time and second time mothers). This chapter describes the participants who were involved in the study, the tool that was developed and used in the survey, and the procedures that were followed in the process of collecting and analyzing data.

3.1 Research Method/Design

The study followed a cross sectional survey type of research design conducted through an online mode.

The study was conducted in three phases:

Phase 1: Development of the survey tool

Phase 2: Validation of the tool

Phase 3: Administration of the tool

3.2 Phase 1: Development of the survey tool

A survey tool was developed to assess the feeding practices incorporating different sections. The survey tool was designed based on a literature search through google and books related to development of feeding. Item pools for each section were created after taking into consideration the redundancy of items and relevance under each domain of interest. Care was taken to maintain suitability of the items to Indian context.

3.2.1 Section 1

The survey tool comprised of a section on demographic details of the participants. The questions of the demographic section were intended to gather information like maternal age, contact details, number of children, their ages and gender. It also included questions to extract information about maternal education, employment, socioeconomic status, religion, type of family, type of diet, first/second time mother etc.

3.2.2 Section 2

The section 2 of the survey was developed to gather information on the child's general health and behavior. This was included to ensure all the children had normal developmental milestones with no health and behavioral issues. It also gathered information on child's feeding behavior whether the child was a picky eater and whether the child was easy to feed.

3.2.3 Section 3

The third section of the survey tool was developed to extract information about the hierarchy of food type, texture and consistency introduced, the age at which introduced, position used to feed the child, utensils used etc. Information regarding introduction of water was also included. Provision was also made to document the variety of food items fed to the child in the first two years of life. Sixteen items were included in this section. Pictures were added to support the written information for the options of a few items on consistencies, textures, utensils and positions used for feeding.

3.3 Phase 2: Validation of the tool

The prepared survey tool was given to three Speech-Language Pathologists (SLPs) with at least ten years of clinical experience in the area of feeding and its disorders. The content validation was done using the parameters from feedback rating questionnaire (adapted from Manual for Non-fluent Aphasia Therapy in Kannada, Goswami et al., 2012) and Survey Instrument Validation Rating Scale (Michael, 2020). The SLPs were asked to judge the clarity, simplicity, relevance, framing, applicability and appropriateness of the items as well as clarity, simplicity, relevance, color, appearance and iconicity of the pictures included using a Likert rating scale from 1 to 5 wherein 1 indicated 'poor', 2 indicated 'fair', 3 indicated 'good', 4 indicated 'very good' and 5 indicated 'excellent'.

A master chart was made with the validation scores and remarks provided by all the three SLPs. The items with a rating of 3 and above, by 2 or more SLPs were included in the tool. The modifications and suggestions provided by the judges were incorporated. The options under the items related to position were expanded. A few questions were reframed to resolve their ambiguity. A few questions were added based on the suggestions provided by the judges. A few pictures were replaced with other pictures better clarity.

A pilot study was conducted on six participants (two from each district) after which a few age ranges in the options were modified. The final survey tool had the same three sections as the initial one, however, the number of items in the third section were 21. The final survey tool has been attached in the Appendix.

3.4 Phase 3: Administration of the tool

3.4.1 Participants

The present study included 90 mothers of typically developing children in the age range of 11 months -36 months (mean age 23.9 months) - 30 mothers from the each of the three districts- Raipur, Durg, Rajnandgaon. Chhattisgarh is rich in its cultural heritage. The State has a very unique and vibrant culture. There are over 35 big and small colorful tribes spread over the region. Raipur, the eastern most district and also being the capital of state constitutes population from both rural and urban areas. The Durg district, in the southern region of the state and being the twin-city with the Bhilai city, is known for its industrialization, and education hub, hence is much evolved and civilized more than other districts. The Rajnandgaon district, lies in the western part of the state, and due to its most parts constating of villages, is less civilized compared to the other two districts. These three districts were taken because of their civilization differences, and geographical locations for better representation of the Chhattisgarh state as a whole. Convenience sampling method was used to select the participants. The participants were recruited through personal contacts, referral through friends and family, and from pediatric clinics. The participants were selected based on the following inclusion and exclusion criteria.

Participant inclusion criteria

• Females in the age range of 18-40 of years

• Both first-time and second time mothers

• Mothers of typically developing children

• Native residents of the particular district

• Mothers with feeding experience of at least 6 months

Participant exclusion criteria

• Mothers of specially abled children

• Mothers of children with frequent medical illness

• Mothers of children who went to the day care

The mothers belonged to the age group of 21-35 years. The mean age of infants across all the districts was 23.9 months out of which 43 were males and 47 females. In order to determine the socio-economic status of participants, Modified Kuppuswamy socioeconomic scale updated for the year 2021 by Sheikh and Shah (2021) was used. Majority of the mothers belonged to upper middle class and upper class and resided in urban areas of the three districts. All of the mothers were literate and were at least educated till graduate level.

The participants of all the districts were divided into three groups based on their feeding experiences: Group 1 consisted of first-time mothers; Group 2 consisted of second time mothers. Among the total participants, Group 1 consisted of 52.2% (n=43) mothers, whereas Groups 2 consisted of 47.8% (n=47) mothers. The district wise distribution of mothers based on the same is depicted below in the Table 3.1 (See also Table 4.1).

Table 3.1.

Distribution of maternal experience across all the districts

District	Feeding Experience of mothers		
	FT*	**ST***	**Total**
Raipur	14	16	30
	46.7%	53.3%	100.0%
Durg	17	13	30
	56.7%	43.3%	100.0%
Rajnandgaon	16	14	30
	53.3%	46.7%	100.0%
Total	47	43	90
	52.2%	47.8%	100.0%

*FT- First time mothers, *ST- Second time mothers.

3.4.2 Procedure

The finalized survey tool was administered on the participants through the virtual mode in the form of an interview via Google Meet or WhatsApp Video Call. Since there were participants from all socioeconomic strata, both these online platforms were chosen. The specific online platform for a particular participant was selected based on the convenience, availability and the knowledge regarding its use. During the interview, the participants were also shown the pictures of various utensils, positions used to feed the child, textures and consistencies of the food items, which were a part of the third section of the survey tool. Before the initiation of the interview, the purpose of study was

explained. All ethical standards were met for participant selection and their participation. Prior to testing, a written consent was obtained from the parents of the participants after explaining the purpose of the study. AIISH Ethical Guidelines for Bio-Behavioral Research involving Human Subjects (AEC, 2009) were followed. The online interview was conducted for about 30-35 minutes for each participant.

3.5 Assessment of test-retest reliability

To assess the reliability of the data, the survey tool was readministered on ten percent of the participant sample (3 per district), selected randomly after 1-2 weeks of the initial responses.

3.6 Data Analyses

The compiled data was analyzed through appropriate statistical measures. As the present study was survey type of research, simple descriptive statistics were applied to obtain the frequencies and the percentage. The next chapter describes the findings obtained in the study, which have also been discussed with regard to the existing literature.

Chapter IV

Results and Discussion

The primary aim of the current study was to investigate the nature of feeding practices in typically developing young children up to three years (36 months) (mean age 23.9 months, SD ~9.12) in Chhattisgarh. The objectives were to compare the feeding practices across the three districts (Raipur, Durg and Rajnandgaon) and to compare the parental feeding practices between first time mothers and second time mothers. A total of 90 mothers (30 from Raipur, 30 from Durg and 30 from Rajnandgaon) in the age group of 22-39 years (mean age 31.2, SD ~3.7) participated in the study.

The survey tool had three sections; section 1 was focused on documenting the demographic details, section 2 focused on the child's general health and behavior and section 3 included items related to the hierarchy of food type, texture and consistency introduced and the age, at which it was introduced, position used to feed the child, utensils used, etc. This section contained 21 items.

The survey tool was validated by experienced speech-language pathologists. The responses from the parents were obtained through an online interview and the responses were recorded. Statistical Analysis (frequency and percentage) was carried out using SPSS-Statistical Package for Social Sciences Version 20.0 (IBM Corp., Armonk, NY, USA).

In order to assess the reliability of the responses obtained, the assessment of test-retest reliability was done. The survey tool was readministered for 10% of the population (3 from each district) within 1-2 weeks from the first administration. The Cronbach's alpha

value was calculated for each item, which turned out to be 1, suggesting high reliability of the responses.

In addition to the maternal age, other demographic details of the participants documented were maternal feeding experience (first-time/second time mothers), type of family, type of diet, employment of mother, socioeconomic status, religion and literacy levels of mothers. This information was extracted as these factors could influence feeding practices in terms of initiation or termination of breastfeeding, introduction of formula milk/any other milk to the child rather than continuing exclusive breastfeeding for 6 months and/ or introduction to complementary food, its type, consistency, utensils and position used during feeding etc. The details of the demographic information have been provided in the tables 4.1 and 4.2.

Table 4.1

Distribution of religion, employment and socioeconomic status of the participants across districts.

Districts	Religion			Employment		Socioeconomic Status	
	Hindu	Jain	Muslim	Employed	Unemployed	Upper	Upper-middle
Raipur	11	17	02	09	21	13	17
	36.7%	56.7%	6.7%	30.0%	70.0%	43.3%	56.7%
Durg	16	14	00	05	25	07	23
	53.3%	46.7%	0.0%	16.7%	83.3%	23.3%	76.7%
Rajnandgaon	07	23	00	04	26	15	15
	23.3%	76.7%	0.0%	13.3%	86.7%	50.0%	50.0%
Total	34	54	02	18	72	35	55
	37.8%	60.0%	2.2%	20.0%	80.0%	38.9%	61.1%

It was found that majority of the mothers, 60% (n=54) belonged to Jain religion, while 37.8% (n=34) mothers were from Hindu religion and 2.2% (n=2) mothers belonged to Muslim religion. In total, 80.0% (n=72) of the mothers were homemakers and the rest 20.0% (n=18) were employed. Khan et al. (2017) also revealed that low quality feeding practices are associated with unemployment. With regard to the socioeconomic status, the participants included only belonged to the upper or upper middle class. A vast majority of the mothers (n=55, 61.1%) belonged to upper middle class. Also, all participants (n=90, 100%) mothers were literate and were educated at least till graduation level.

Table 4.2

Distribution of maternal experience, type of family and diet of the participants across districts

District	Maternal Exp.*		Type of Family		Type of Diet Taken			
	FT*	ST*	Nuclear	Joint	Veg*	Egg*	N-veg*	Jain*
Raipur	14	16	13	17	23	01	03	03
	46.7%	53.3%	43.3%	56.6%	76.7%	3.3%	10.0%	10.0%
Durg	17	13	13	17	19	02	04	05
	56.7%	43.3%	43.3%	56.6%	63.3%	6.7%	13.3%	16.7%
Rajnandgaon	16	14	08	22	20	00	03	07
	53.3%	46.7%	26.7%	73.3%	66.7%	0.0%	10.0%	23.3%
Total	47	43	34	56	62	03	10	15
	52.2%	47.8%	37.8%	62.2%	68.9%	3.3%	11.1%	16.7%

*Maternal Exp- maternal experience, *FT- First time mothers, *ST- Second time mothers.

*Veg- vegetarian diet, *Egg- Eggetarian *N-veg- non vegetarian diet, *Jain- Jain diet (no under root vegetables, egg and non-vegetarian food).

As shown in Table 4.2, almost half of the mothers were first time mothers and half were second time mothers. Experience as a mother could also influence feeding practices. Second-time mothers already have the experience of feeding their first infant. Hence, they tend to follow appropriate feeding practices as compared to the first-time mothers with no experience. Walsh et al. (2015) also found that first time mothers introduced

complementary feeding early because of lack of experience. In the present study, since the data comprised of nearly equal number of first time and second time mothers, the participants were compared based on their feeding experience.

Across the three districts, majority of the participants (n=56, 62.2%) were from a joint family, out of which majority of them (n=22, 73.3%) were residents of Rajnandgaon district. The remaining 37.8% (n=34) of the participants were living in a nuclear family. Studies in the literature suggest the type of family could influence feeding practices. For example, a study by Velusamy et al. (2017), found that mothers of nuclear families terminated breastfeeding early because of their other household chores which have to be looked upon by them single handedly. With regard to the diet, a vast majority (n=62, 68.9%) reported to be vegetarians and 16.7% (n=15) of the mothers reported to consume Jain diet.

The results of the section 3 of the survey tool have been described and discussed under the following sections.

4.1 Breastfeeding Practices

This section gathers information related to breastfeeding, introduction of formula milk or any other additional feeding given to the infants, and also has questions related to the age of introduction, type of milk, utensils used to feed and also the position in which the child was fed.

4.1.1 History of breastfeeding: The first item in this section gave information about the trend of breastfeeding among mothers. This item was included because some studies

revealed that some mothers would provide formula feed as they had insufficient breast milk. The results of this revealed that in total almost all mothers, 97.8% (n=88) practiced breastfeeding for their infants. Also, out of the total number (90), the majority of mothers (n=60, 66.7%) practiced breastfeeding exclusively up to 5-6 months of age, whereas less than half number (n=30, 33.3%) of mothers introduced formula milk or other milk within the age of 3-4months.

a) Comparison across districts:

The results revealed a similar trend across all three districts, that among the total, 97.8% (n=88) mothers breastfed their babies after birth. However, 2.2% (n=2) mothers did not breastfeed their infants due to lack of milk secretion and since they were covid positive from Raipur and Durg respectively. All 100% (n=30) mothers in Rajnandgaon district breastfed their babies after birth. Detailed distribution of number and percentage of mothers who breastfed their infants across districts is shown in Table 4.3.

Table 4.3

Distribution of breastfeeding mothers across districts

Districts	**Group 1***	**Group 2***
Raipur	96.7% (n= 29)	3.3% (n=01)
Durg	96.7% (n= 29)	3.3% (n=01)
Rajnandgaon	100.0% (n=30)	0.0% (n=00)
Total	97.8% (n=88)	2.2% (n=02)

Group 1*- Mothers who breastfeed, Group 2*- mothers who did not breastfeed the infant.

This finding could be attributed to factors like awareness among mothers about advantages of breastfeeding, which could be due to high literacy rates and also due to similar socioeconomic status as all the participants in the current study across three districts were educated at least till graduate level, and belonged to upper or upper middle class, and hence had more opportunities to visit health centers and get more knowledge on benefits of breastfeeding the infants. Bloom et al. (2008) compared formula-feeding mothers with breast feeders of older age and higher socioeconomic status found that breast feeders showed significantly greater tendencies to use professional and family advice or literature in choosing breast feeding.

For newborns, breast milk is the best food. It contains antibodies that aid in preventing a number of prevalent pediatric ailments, and it is secure and hygienic. Breastmilk continues to supply up to half or more of a child's nutritional needs during the second half of the first year of life and up to one third during the second year of life, providing all the energy and nutrients that the infant needs for the first few months of life as recommended by WHO. Very early skin-to-skin contact and suckling may have physical and emotional benefits as well (American Academy of Pediatrics, 2012). In the current study as well, a vast majority of the mothers breast fed their babies.

b) Comparison between first time and second time mothers:

All second time mothers (n=43,100%) breastfeed their infants, which was greater than (n=45, 95.7%) first-time mothers, who breastfeed their infants. The remaining 4.3% (n=2) of first-time mothers did not breastfeed their infants due to lack of milk secretion and

being covid positive. Detailed distribution of number and percentage of mothers who breastfed their infants between first-time and second time mothers is shown in Table 4.4.

Table 4.4

Distribution of breastfeeding mothers between first-time and second time mothers

Group of mothers	Group 1*	Group 2*
First time mothers	95.7% (n= 45)	4.3% (n=02)
Second time mothers	100.0% (n= 43)	0.0% (n=00)
Total	97.8% (n=88)	2.2% (n=02)

Group 1*- Mothers who breastfeed, Group 2*- mothers who did not breastfeed the infant.

Experiences of women vary widely across regions in India. Many studies support the findings that decisions for feeding choices like breastfeeding are influenced by social, cultural factors and experiences within family and social networks (Bloom et al., 2008; Dar et al., 2012, Kruger, 2003; Laroia, 2006; Yadavannavar, 2011).

4.1.2 Breastfeeding termination age: The second item in the section provided information if the breastfeeding was terminated or not and at the age at which breastfeeding was terminated. The results revealed that out of 88 mothers who breastfed their infants, 73.9% (n=65) of mothers terminated breastfeeding, among them the majority of the mothers (n=34, 38.6%) terminated in the age range of 12-18 months. However, 26.1% (n=23) mothers still continued to breastfeed as their infants were in the range of 11-16 months and the remaining small number of mothers continued breastfeeding based on the awareness of

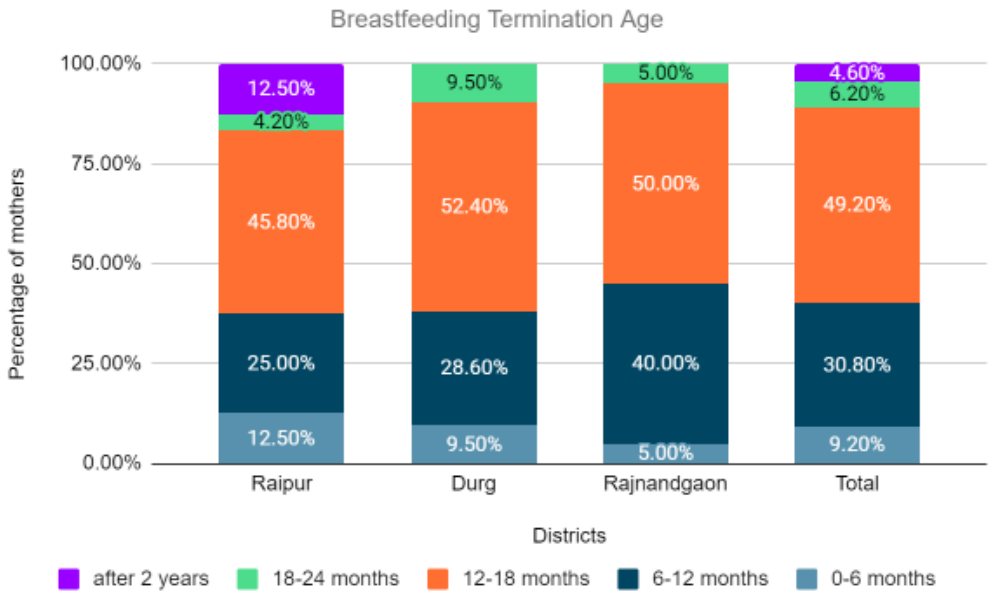
the fact that the child should be breastfed up to 2 years (Global Strategy for Infant and Young Child Feeding. World Health Organization, 2003).

a) Comparison across districts:

The results revealed a similar trend across all three districts indicating that the majority of mothers (49.2%) terminated breastfeeding at 12-18 months. However, a comparison across the districts revealed that the greater percentage of mothers (n=11, 52.40%) from Durg district terminated breastfeeding at 12-18 months than the other districts. Raipur district was found to have a greater number of mothers (n=3, 12.50%), who terminated breastfeeding before 6 months of age. The breastfeeding termination age across districts has been depicted in figure 4.1.

Figure 4.1

Breastfeeding termination age across districts



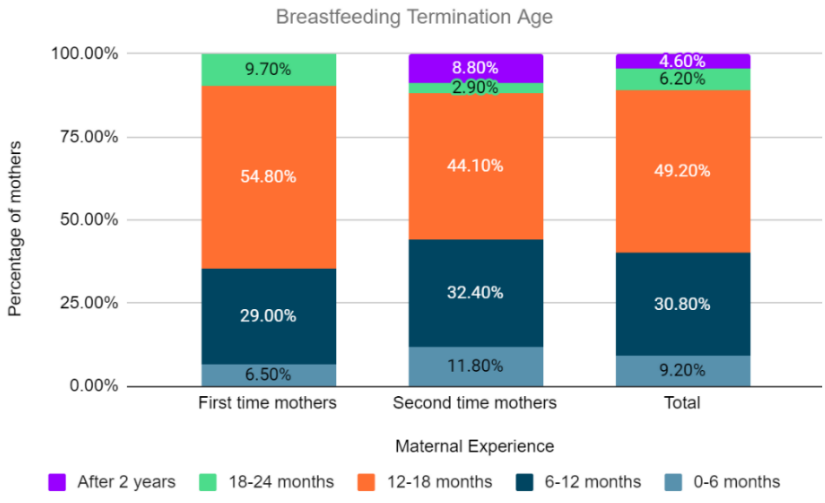
The similarity seen in the breastfeeding termination age across districts could be due to some factors such as mother's literacy level and socioeconomic status. All the mothers in the study were educated and were from urban areas, and belonged to upper or upper middle class.

b) Comparison between first-time mothers and second time mothers:

The results revealed that there was a similar trend seen across first time and second time mothers. The majority of mothers, irrespective of their feeding experiences, terminated breastfeeding by the age of 12-18 months. However, a greater percentage (n=17, 54.8%) of first-time mothers terminated breastfeeding by the age range of 12-18 months, which is more than (n=15, 44.1%) second time mothers. However, greater percentage (n=3, 8.8%) of second time mothers continued breastfeeding after two years of age, compared to first-time mothers. Distribution of the age of breastfeeding termination across first-time and second time mothers is illustrated in Figure 4.2.

Figure 4.2

Breastfeeding termination age in first-time and second time mothers



More second time mothers continued to breastfeed after two years of age probably because it takes less time and effort to breastfeed for the second time mothers. They also have a prior experience in feeding and are probably more aware of the importance of continuing to feed for a longer time. Ingram et al. (2001) also reported that it is easier to breastfeed for the second time mothers. As all the participants in the current study were educated, majority of them were housewives and more second time mothers continued breastfeeding after two years of age. The findings of Hajian-Tilaki (2005) falls in line with the findings of the current study that increasing birth order, higher education level of mothers, and being housewives can be some of the factors associated with longer duration of breastfeeding.

4.1.3 Introduction of formula/ other milk: The third item in the section gave information on the introduction of formula milk or milk from any other source other than breastfeeding to the infant. Among the total 90, 33.3% (n=30) of the mothers introduced formula/other milk.

a) Comparison across districts:

The results revealed a similar trend among mothers with regard to introducing additional milk across all three districts. In total out of 90, 33.3% (n=30) introduced formula/other milk. However, a greater percentage of mothers from Rajnandgaon district (n=12, 40.0%) introduced additional milk to their infants, in comparison to mothers from other districts along with breastfeed. The number and percentage of mothers who introduced additional milk for the babies along with breast feeding across districts is depicted in Table 4.5.

Table 4.5

Distribution of mothers for introduction of formula milk /other milk across districts

Districts	Introduced additional milk	Not introduced additional milk
Raipur	33.3% (n=10)	66.7% (n=20)
Durg	26.7% (n=08)	73.3% (n=22)
Rajnandgaon	40.0% (n=12)	60.0% (n=18)
Total	33.3% (n=30)	66.7% (n=60)

b) Comparison between first-time mothers and second time mothers:

The results revealed that both first time and second time mothers introduced additional milk. However, the prevalence of introducing formula milk or any other milk to infants was more among first time mothers (n=19, 40.4%) than second time mothers (n=11,25.6%). The number and percentage of mothers who introduced additional milk for the babies along with breast feeding across first time and second time mothers is depicted in Table 4.6**.**

Table 4.6

Distribution of mothers for introduction of formula milk/other milk across maternal experience

Type of mothers	Introduced formula milk	Not introduced formula milk
First-time mothers	40.4% (n=19)	59.6% (n=18)
Second time mothers	25.6% (n=11)	74.4% (n=32)
Total	33.3% (n=30)	66.7% (n=60)

The reason reported during the data collection by the majority of mothers, especially the first-time mothers for introducing formula milk was insufficient milk secretion. There are a handful of scientific studies also to support this notion stating that second time mothers can have a significantly increased milk supply as compared to first time mothers (De Amici et al., 2001; Ingram et al., 2001; Ingram et al., 1999; Zuppa et al., 1988).

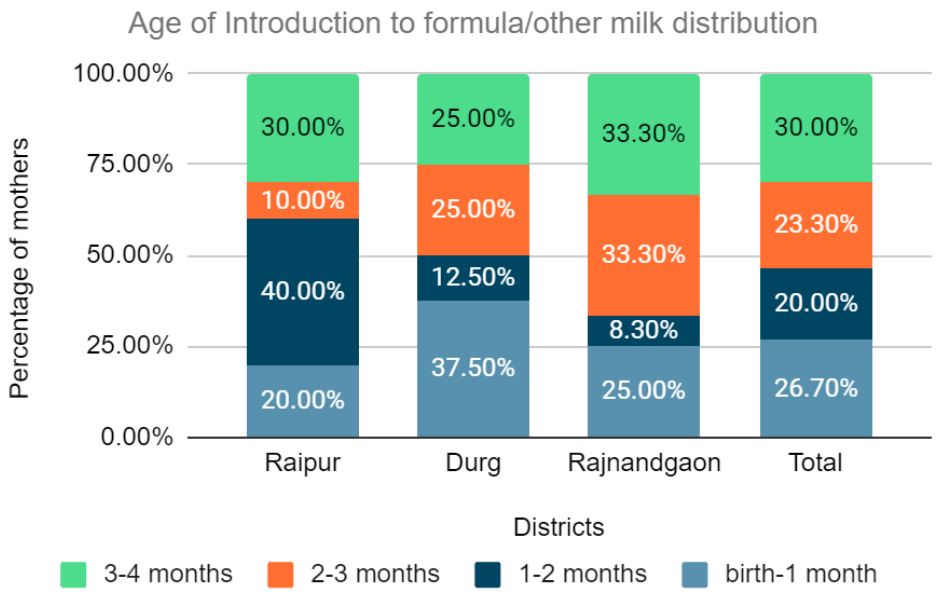
4.1.4 Age of introduction of formula/other milk: The fourth item in the section provided information about the age of introduction of formula milk or any other source of milk to the infants. The results revealed that among the total participants, 30.0% (n=9) of the mothers introduced formula milk/ cow milk at 3-4 months. The American Academy of Pediatrics (2019) recommends that formula feed can be started after the first week. Formula can be given to the baby in their first 12 months, which was also recommended by a national support and informational service (Pregnancy, Birth and Baby: https://www.pregnancybirthbaby.org.au/), especially if the milk production is inadequate.

a) Comparison across districts:

The results revealed that there was a difference in trend across districts. Nearly equal percentage of mothers introduced formula/other milk at 2-3 months and 3-4 months in Rajnandgaon districts. However, a greater percentage of mothers (n=4, 36.4%) from Raipur district had introduced at 1-2 months of age. Whereas, greater percentage of mothers from Durg district introduced formula milk from birth to 1 month of age as compared to other districts. The detailed depiction of data is illustrated in Figure 4.3.

Figure 4.3

Age of introduction of formula/ other milk across districts

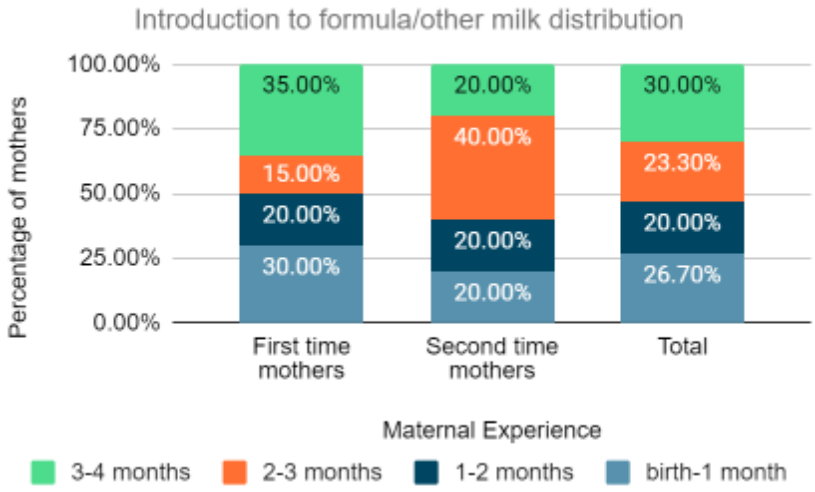


b) Comparison between first-time mothers and second time mothers:

The results revealed that there was a difference in trend as the majority of second time mothers (n=4,40%) introduced formula milk/cow milk between the age range of 2-3 months whereas, the majority of first-time mothers (n=7, 35.0%) introduced in the age range of 3-4 months. The clear distribution of data is shown in Figure 4.4.

Figure 4.4

Age of introduction of formula/ other milk by first-time and second time mothers.



4.1.5 Type of other milk introduced: The fifth item in the section gave information about the type of milk introduced to infants other than breastfeeding in the early months of life. The results revealed that among the total participants, 63.3% (n=19) of mothers gave formula milk to their infants.

a) Comparison across districts:

The results revealed that formula milk was given by the majority of mothers (n=19,63.3%) across all the districts. However, greater percentage of mothers from (n=7, 87.5%) Durg district introduced formula milk. It was seen that cow milk was introduced by mothers (n=7, 58.3%) of Rajnandgaon district to a greater extent. Table 4.7 shows a detailed distribution of the data.

Table 4.7

Type of other milk introduced across districts.

Districts	Formula milk	Cow milk
Raipur	70.0% (n=07)	30.0% (n=03)
Durg	87.5% (n=07)	12.5% (n=01)
Rajnandgaon	58.3% (n=07)	41.7% (n=05)
Total	63.3% (n=19)	35.5% (n=10)

The reason for more mothers from Rajnandgaon district introducing cow milk compared to other two districts can be due to the geographical location of the district. Rajnandgaon district comprises of a greater number of villages where more fresh cow milk is easily available. In addition. the majority of mothers lived in a joint family, where in the elders generally believe that cow milk can be better than formula milk. Support can be drawn from the study by Laroia (2006). Also, education of mothers can also be a factor. As found by Taye et al. (2021), that mothers with a college graduation or higher were more likely to practice formula feeding for their infants than those with a primary education or less.

b) Comparison between first-time mothers and second time mothers:

The results of the study revealed that greater percentage of first-time mothers (n=13, 65.0%) gave formula milk than compared to second time mothers (n=06, 60%). Table 4.8 shows a detailed distribution of the data.

Table 4.8

Type of other milk introduced by first-time and second time mothers.

Maternal Experience	Formula Milk	Cow Milk
First-time mothers	65.0% (n=13)	35.0% (n=07)
Second time mothers	60.0% (n=06)	40.0% (n=04)
Total	63.3% (n=19)	36.7% (n=11)

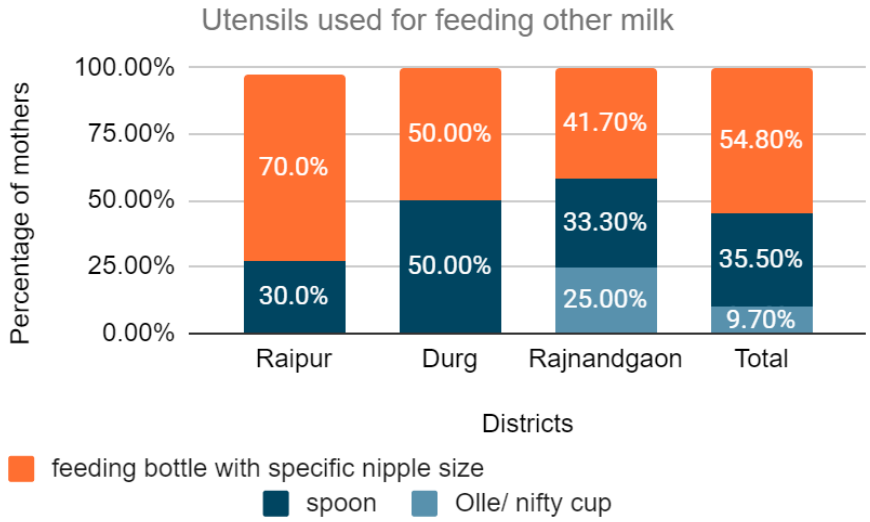
4.1.6 Utensils used for feeding other milk: The sixth item in the section gave information about the utensils used for feeding the formula milk/ cow milk to the child. The results revealed that among the total participants, 53.3% (n=16) of mothers using feeding bottles.

a) Comparison across districts:

The results revealed that there was difference in trend for utensils usage for feeding other milk. Majority of mothers in Raipur district (n=7,70%) used feeding bottles as compared to Rajnandgaon and Durg districts. However, there was an equal distribution of mothers (n=4, 50%) using feeding bottle and spoon in Durg district. Also, in Rajnandgaon district there were a few mothers who used nifty cup. Figure 4.5 shows the distribution of utensils used by mothers across districts.

Figure 4.5

Distribution of participants using different utensils for feeding other milk across districts

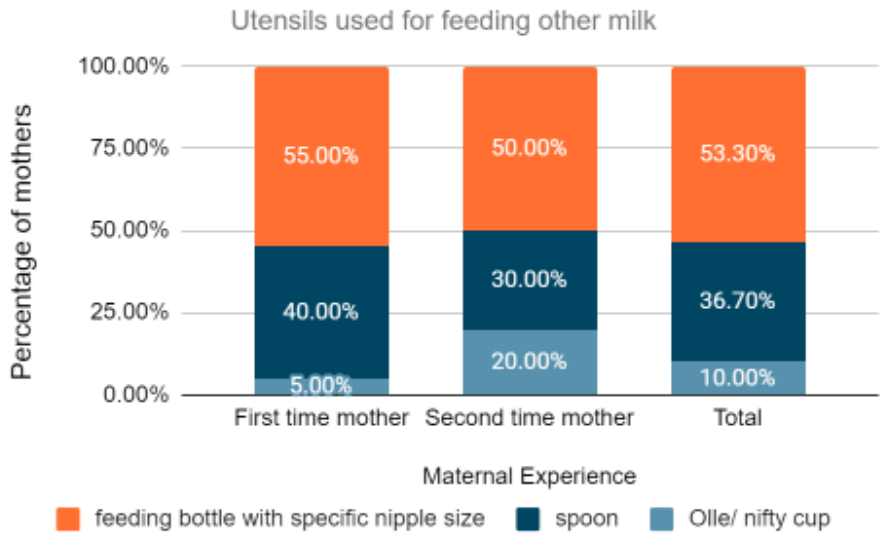


b) Comparison between first-time mother and second time mothers:

Results revealed that both first time and second time mothers used feeding bottles. However, greater percentage of first-time mothers (n=11,55.0%) used feeding bottles as compared to second time mothers (n=5,50.0%). Figure 4.6 represent the distribution of utensils used by mothers between first-time mother and second time mothers.

Figure 4.6

Distribution of participants (first-time and second time mothers) using different utensils for feeding other milk



This similarity may be attributed due to factors like ease of feeding the child with a feeding bottle as compared to any other utensil as reported by mothers during the data collection. It also supports the child's suckling and sucking reflexes and provides the child with a similar feeding experience as that of a mother's nipple. In line with the data, Kumar et al. in 1989 in their study specified the values of breastfeeding, trends of supportive feeding methods using cup and spoon and feeding bottles. In the results of their study, they reported that a greater number of mothers shifted from cup and spoon method to bottle feeding. Also, all mothers using cup and spoon method indicated difficulty in feeding at night. Hence, it was reported that it gives a more soothing and comfortable experience for both young infants and mothers to feed with feeding bottles than feeding with spoons or other utensils.

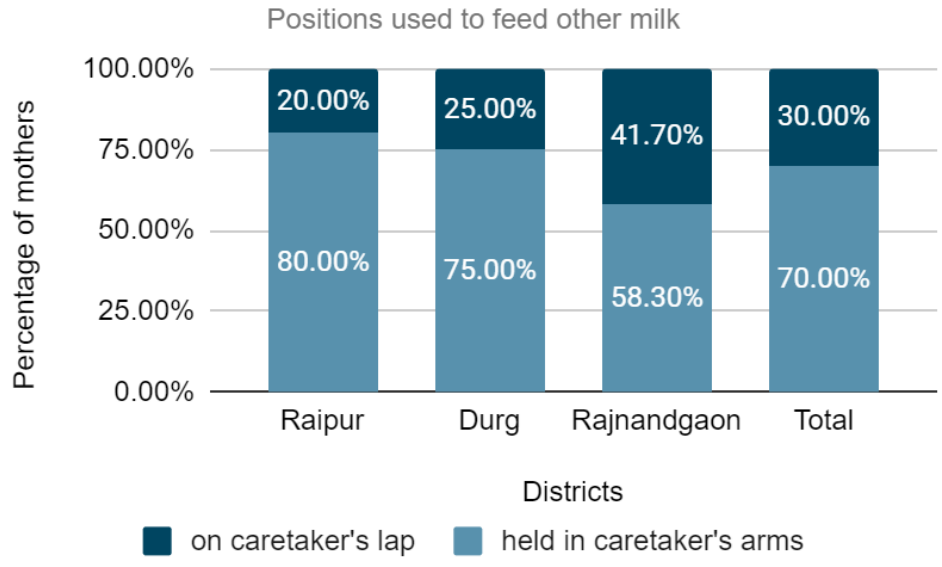
4.1.7 Position used to feed other milk: The seventh item in the section of breastfeeding gave information on the position of feeding the formula/cow milk. The results revealed among the total participants, 70% (n=21) of the mothers used holding the baby in their arms during feeding. This is in accordance to the recommendation by Connolly (2019) that infants should be held in arms for formula feeds.

a) Comparison across districts:

The results revealed that mothers across all districts fed their babies in arms However, the majority of mothers (n=8,80%) from Raipur district used this position as compared to mothers from Durg (n=6,75%) and Rajnandgaon (n=7, 58.3%) districts. Figure 4.7 shows the distribution of position used during feeding by mothers across districts.

Figure 4.7

Distribution of participants using different positions for feeding other milk across districts

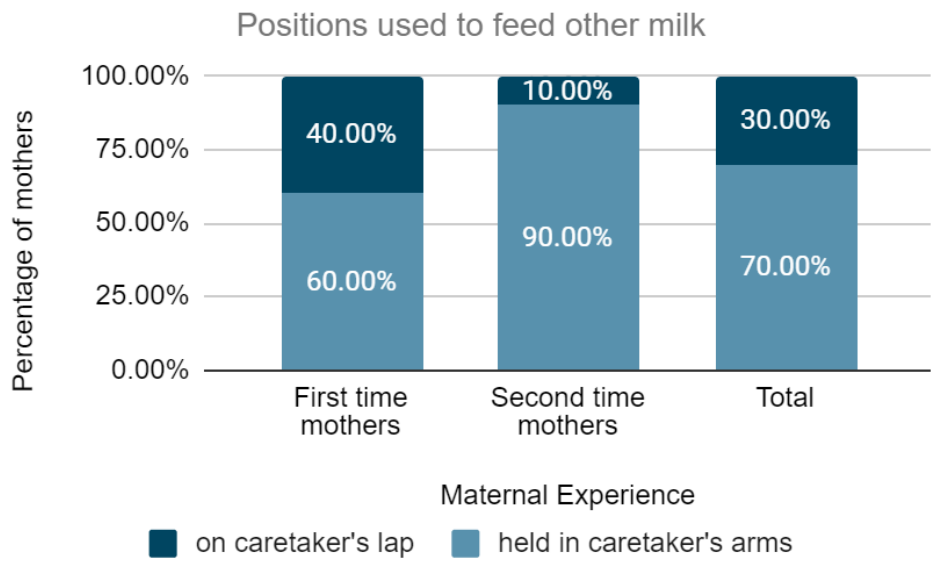


b) Comparison between first-time and second time mothers:

The results revealed that both first-time and second time mothers there held their babies in arms during feeding other milk. However, greater percentage (n=9,90%) of the second time mothers used this position as compared to (n=12, 60%) the first-time mothers. Figure 4.8 shows the distribution of position used by first-time mother and second time mothers.

Figure 4.8

Distribution of participants (first-time and second time mothers) using different positions for feeding other milk



The reason reported by second time mothers during the data collection for selection of this position was to provide support to the child as the infants were too young, and in order to maintain an inclined posture for feeding the child, as recommended by professionals and the other experienced mothers in the families. Studies reported that

during breastfeeding, one of the recommended positions is the “cradle hold position” in which the infant is placed horizontally facing the mother’s breast (Ingram et al., 2002; Neifert et al., 2004). This tendency of feeding young infants is also recommended and adopted for bottle-feeding.

4.2 Introduction of Complementary Feeding

This section gathered all information about the introduction of complementary food to the infants, including the age of introduction, type of consistency, food items given, utensil used to feed and the position in which the child was fed.

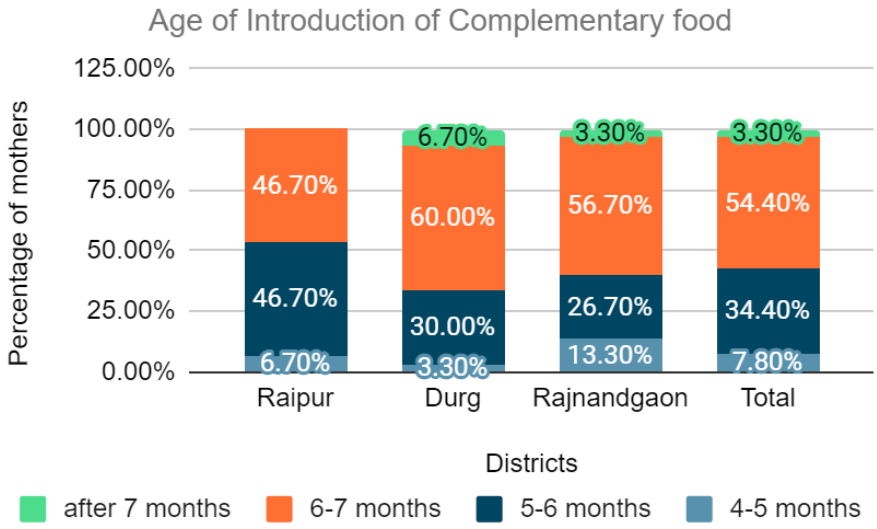
4.2.1 Age of introduction of complementary feeding: The first item in the section gave information on the age of introduction of complementary food to the infants. Among the total participants, 54.4% (n=49) of the mothers introduced complementary feeding after 6 months of age in the age range of 6-7 months.

a) Comparison across districts:

The results revealed there was a difference in trend across all the three districts though the majority of mothers (n=49, 54.4%) introduced complementary food after 6 months and between the age range of 6-7 months. But as shown in Figure 4.9, Durg district had greater percentage of mothers (n=18,60.0%) who introduced complementary food in the age range 6-7 months as compared to Raipur and Rajnandgaon districts. Also, there was an equal distribution (n=14,46.7%) of mothers in Raipur district who introduced complementary food both before and after the age of 6 months.

Figure 4.9

Age of introduction of complementary feeding across districts



As per the recommendation of WHO (2001) and the National Guidelines on Infants and Young Child Feeding (2006), it is crucial to supplement breast milk with solid or semi-solid foods once a child reaches the age of six months, because breast milk is no longer sufficient to meet the infant's nutritional needs after that age.

As found in analysis of demographic data, in Raipur District mothers introduced complementary food before 6 months as greater numbers of mothers were employed and a greater number of mothers lived in nuclear families in comparison to the other two districts. Also, the majority of mothers 16.0% (n=4) who terminated breastfeeding before the age of 6 months were from Raipur district. Hence, these factors might have contributed to more numbers of mothers in Raipur district introducing complementary food before the age of 6 months. Support can be drawn from the findings of several studies that working mothers find it extremely difficult to continue exclusive breastfeeding, as they have to resume work at the earliest. Hence, they tend to introduce complementary feeds at an early age, as they

have to leave their babies with elders or sometimes neighbors (Liaqualthali, 2020; Annie, 2017; Zahiruddin et al., 2016).

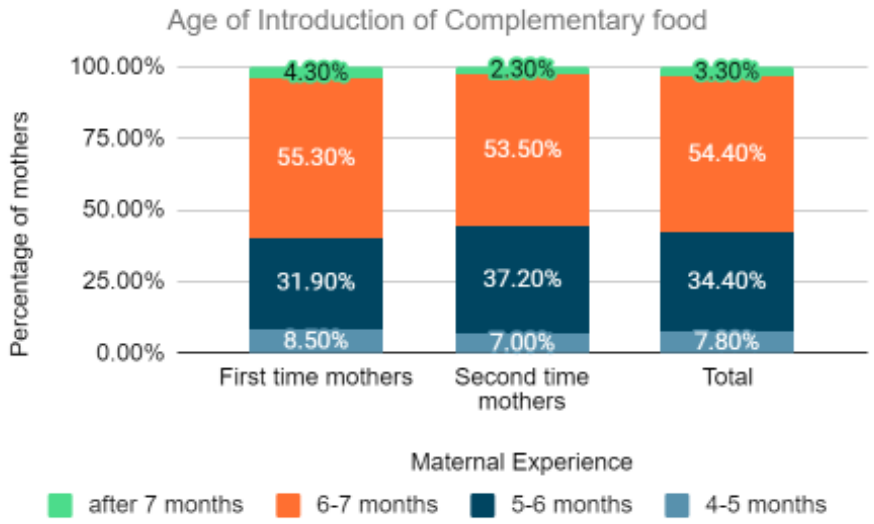
Basnet et al. (2015) reported that 50% of the mothers began supplemental feeds at 6 months of age and NFHS-3 found that 53.8% of children aged six to nine months got introduced with complementary foods, which is consistent with current study's data. Similar results were obtained in a study conducted in West Bengal (Mondal, 2014). In a study by Rao et al. (2011), it was reported that 77.5% of mothers in coastal South India had begun complementary feeding at the suggested time.

b) Comparison between first-time mothers and second time mothers:

The results revealed a similar trend across first-time and second time mothers with more than 50% of the mothers from both the groups (n=49, 54.4%) introducing complementary food to their children between 6-7 months of age. However, as shown in Figure 4.10, a substantial proportion of mothers from both the groups also introduced complementary food at 5-6 months. This is in consonance with the study by Walsh et al, (2015) who stated that first-time mothers did not demonstrate a good understanding of the appropriate age of introduction of complementary food due to their lack of knowledge and experience.

Figure 4.10

Age of introduction of complementary feeding by first-time and second time mothers



4.2.2 Consistency and Type of food items introduced during complementary feeding: The second item in the section extracted information about the consistency of food and the type of food items introduced during complementary feeding. Out of 90 mothers, almost 85.6% (n=77) of the mothers, predominantly started complementary feeding using thin liquids, slightly thick and mildly thick liquids through different food items.

a) Comparison across districts:

Detailed distribution of type of food items given and their consistency is depicted in Table 4.9**.** Results revealed a similar trend across districts. As shown in the Table 4.9, dal water, rice water and patoliya, and fruit puree (apple and banana puree) were the most commonly given food items in all the districts during complementary feeding. Most commonly given consistency was thin liquids across districts. More than 50% mothers

across all three districts generally introduced three consistencies, (thin, slightly thick and mildly thick) simultaneously at different meal times.

Table 4.9

Type of consistency and food items introduced during complementary feeding across districts

Food items given	Consistency of food item	*District 1		2		3	
		%	n	%	n	%	n
Milk (breastfeed/ other milk)	Thin	100%	30	100%	30	100%	30
Dal water	Thin	90.0%	27	73.3%	22	76.7%	23
Mix dal water	Thin	10.0%	03	23.3%	07	23.3%	07
Rice water & Patoliya	Slightly Thick	53.3%	16	53.3%	16	36.7%	11
Cerelac	Slightly Thick	26.7%	08	26.7%	08	40.0%	12
Dalia & Upma	Mildly Thick	20.0%	06	20.0%	06	23.3%	07
Sattu	Mildly Thick	00.0%	00	3.3%	01	00.0%	00
Fruit puree	Mildly Thick	63.3%	19	50.0%	15	60.0%	18

*District 1- Raipur, 2- Durg, 3- Rajnandgaon

Also, Dal water and rice water were the commonly used complementary feeds, which were also commonly provided to the infants in the study done by Kogade et al (2019). Also, Lodha (2013) found that rice water was given by 72% mothers of Madhya Pradesh. Also, more than 50% of mothers from the three districts appropriately started mashed and pureed food items at this stage, which is also recommended by the IAP Parent Guideline Committee (2020).

In contrast to the recommendation by the National guidelines on infant and young child feeding, Government of India, (2004), the results of the current study indicated poor awareness among mothers about the introduction of the right consistency for complementary feeding, as the child's first food should be thinner, which is gradually increased to thicker liquids and semi solid (fruit pulps) based on the comfort level and age of child.

b) Comparison between first-time mothers and second time mothers:

To assess if feeding experience had an influence on the type and the consistency of food items introduced as a part of complementary feeding, a comparison was made across first-time and second time mothers Detailed distribution of food items introduced as a part of complementary food by first-time and second time mothers is depicted in Table 4.10.

Table 4.10

Type of consistency and food items introduced during complementary feeding by first-time mothers and second time mothers

Food items given	Consistency of food item	*Group 1 %	n	*Group 2 %	n
Milk (breastfeed/ any source)	Thin	100.0%	47	100.0%	43
Dal water	Thin	83.0%	39	76.7%	33
Mix dal water	Thin	14.9%	07	23.3%	10
Rice water, Patoliya	Slightly Thick	42.6%	20	53.5%	23
Cerelac	Slightly Thick	31.9%	15	30.2%	13
Dalia, upma	Mildly Thick	25.5%	12	16.3%	07
Sattu	Mildly Thick	2.1%	01	00.0%	00
Fruit puree	Mildly Thick	55.8%	24	59.6%	28

*Group 1- First-time mothers, *Group 2- Second time mothers

The results revealed a similar trend across both the groups, irrespective of their experience. All the three consistencies were provided by all the mothers across groups, which is consistent, with the recommendations of Parent Guideline Committee (2020).

4.2.3 Utensils used for complementary feeding: The third item of the section provided information on the utensils used to feed the child. Among the total, 77.8% (n=70) of mothers followed a similar trend of feeding children with spoons.

a) Comparison across districts:

The results revealed a similar trend among mothers across all three districts using spoons for complementary feeding. However, Raipur district was found to have the majority of mothers (n=26, 86.7%) using spoons in comparison to mothers of (n=21, 70.0%) Durg and (n=23, 76.7%) Rajnandgaon districts. Another frequently used utensil was a feeding bottle attached with a spoon, majorly used by 20.0% (n=6) mothers from Durg district as compared to other two Districts.

b) Comparison between first-time mothers and second time mothers:

A similar trend among both first-time and second time mothers of using spoons for complementary feeding was seen. However, greater percentage of second time mothers (n=34, 79.1%) used spoons in comparison to first-time mothers. In contrast, first-time mothers were found to experiment more with use of other utensils for complementary feeding than second time mothers.

The findings of the study are in agreement with the study done by Esan et al (2022), where she found that among the Nigerian mothers, bowl and spoon were the most often used feeding utensils, followed by the feeding bottle. Also, the usage of multiple utensils by first time mothers could be attributed to the lack of experience which resulted in exploring the most comfortable and suitable utensil for them and their baby.

4.2.4 Position used for complementary feeding: The fourth item of the section gathered information on the position of feeding the complementary food to the child. The results

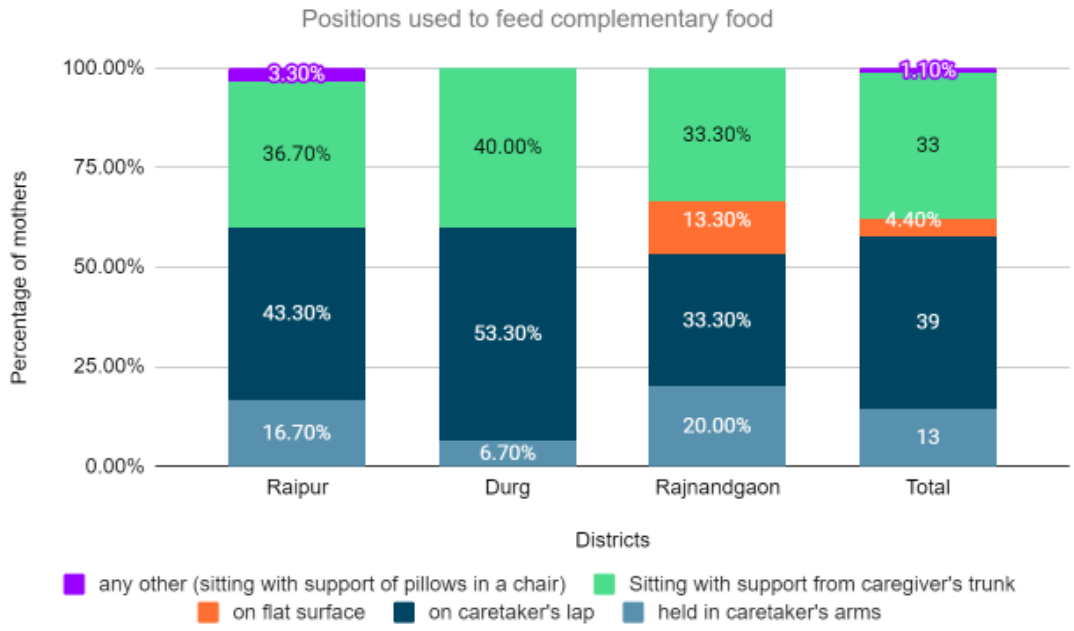
revealed that among the total participants, 43.3% (n=39) mothers fed their infants by placing them on their lap.

a) Comparison across districts:

The results revealed a difference in the position used to introduce complementary feed across all districts. However, as shown in Figure 4.11, a greater percentage of mothers (n=16, 53.3%) from Durg district were found to use the lap position in comparison to other two districts. But, an equal proportion of mothers (n=10,33.3%) used lap as well as sitting with support position in Rajnandgaon district.

Figure 4.11

Distribution of participants using different positions for complementary feeding across districts

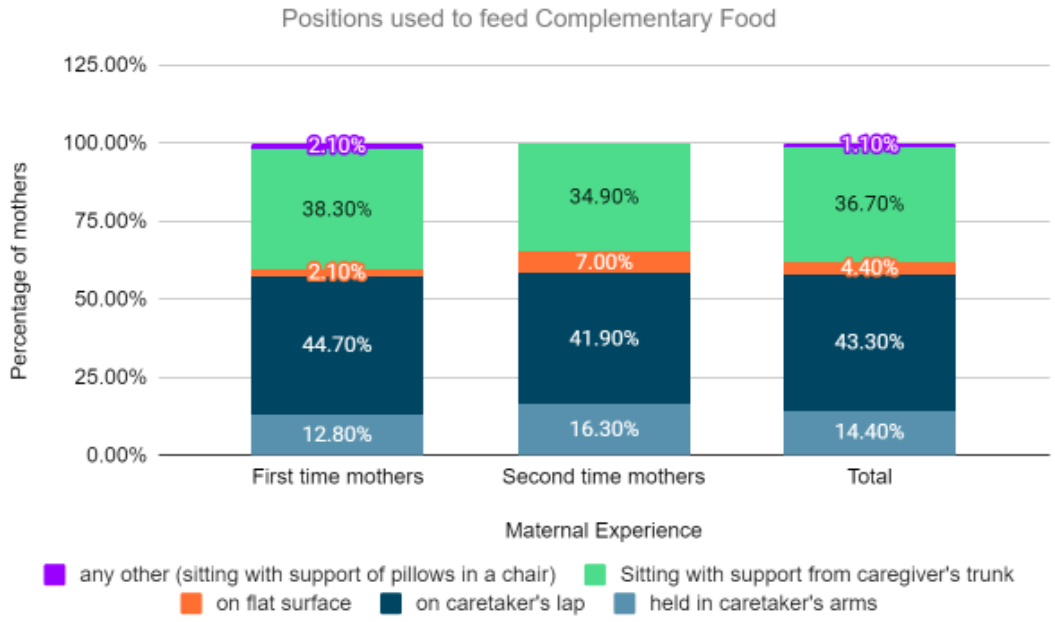


b) Comparison between first-time mothers and second time mothers:

The results revealed a similar trend across mothers from both the groups irrespective of their feeding experiences, with the majority of the mothers (n=39, 43.3%) placing the child in their laps during feeding.

Figure 4.12

Distribution of participants (first-time and second time mothers) using different positions for complementary feeding



4.3 Introduction of next consistency

This section gathered all information about the introduction of the next consistency of food to the infants, including the age of introduction, type of consistency, food items given, utensil used to feed, and the position in which the child was fed.

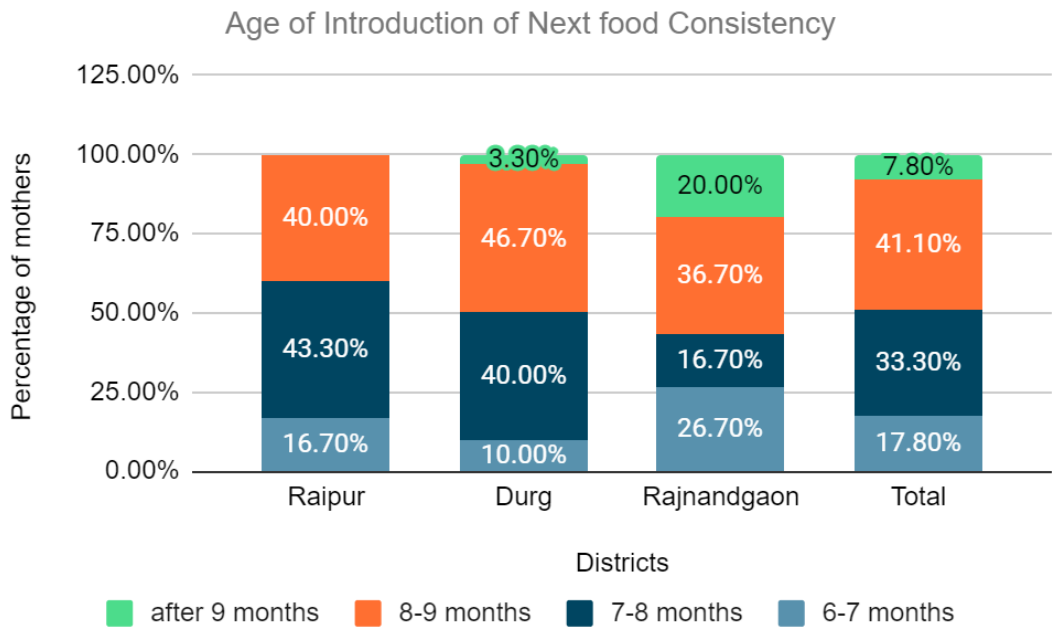
4.3.1 Age of introduction of next consistency: The results revealed among the total participants, 41.1% (n=37) of the mothers, introduced the next consistency of food in the age range of 8-9 months.

a) Comparison across districts:

The results revealed a difference in the age of introduction of next consistency across districts. The majority of mothers across all districts introduced the next consistency in the age range of 8-9 months. Nearly equal percentage of mothers from Raipur and Durg district were found to introduce the next consistency in the age range of 7-8 months and 8-9 months. However, there was a variation in the age at which next consistency of food was introduced in Rajnandgaon district. as shown in Figure 4.13.

Figure 4.13

Age of introduction of next consistency across districts



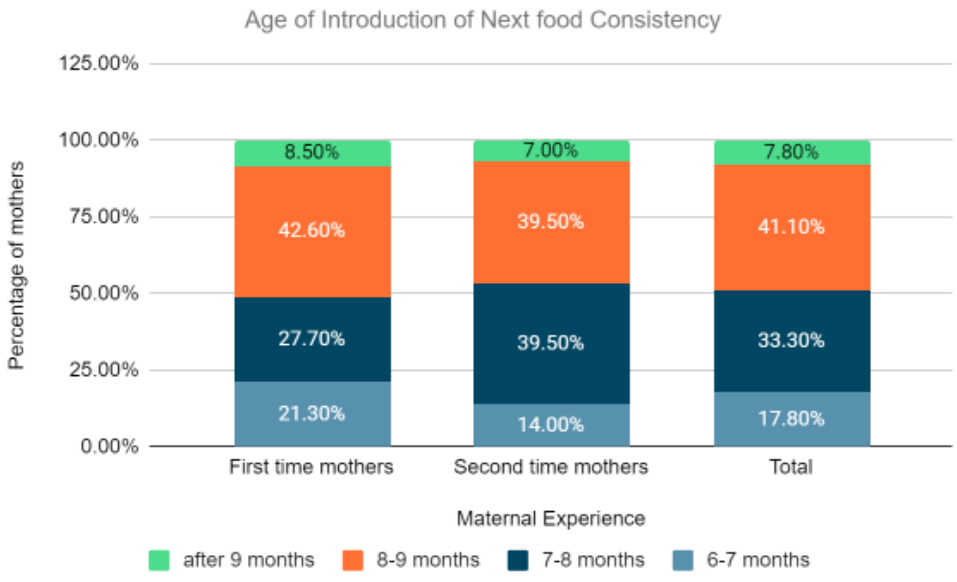
The current findings are similar to Dhami's findings (2019) of wide range of prevalence of solid, semi-solid, or soft food introduction among infants aged 6–8 months throughout regional India, with the highest prevalence in the South (61%) and the lowest prevalence in the Central and Northern regions (38%).

b) Comparison between first-time mothers and second time mothers:

The results revealed a difference based on maternal experience. Majority of the first-time mothers (n=20, 42.60%) introduced the next consistency in the age range of 8-9 months. As shown in Figure 4.14, there was an equal distribution among the second time mothers (n=17, 39.5%) who introduced the next consistency in the age range of 7-8 months and 8-9 months.

Figure 4.14

Age of introduction of next consistency by first-time and second time mothers



4.3.2 Next Consistency and Type of food items introduced: The second item in the section gathered information about the next consistency of food and the type of food introduced. Out of 90 mothers, almost 85.6% (n=77) of the mothers, predominantly started complementary feeding using soft and minced, soft and bite sized and easy to chew food items.

a) Comparison across districts:

Detailed distribution of type of food items given and their consistency is depicted in Table 4.11. Results revealed a similar trend across districts. As shown in the Table 4.11, fruits and boiled vegetables, dal-rice and dal-roti were the most commonly given food items in all the districts as a part of introduction of next consistency of food. The most commonly given consistency was soft and bite sized across districts. More than 50% mothers across all three districts generally introduced three consistencies, (soft and minced, soft and bite sized and easy to chew) simultaneously at different meal times.

Table 4.11

Next Consistency and Food items introduced across districts

Food items given	Consistency of food item	*District 1		2		3	
		%	n	%	n	%	n
Fruits & boiled vegetable	Soft and bite size	100%	30	100%	30	100%	30
Dal-rice	Soft and minced	90.0%	27	73.3%	22	66.7%	20
Dal-roti	Soft and minced	73.3%	22	80.0%	24	76.7%	23
Roti-sabji	Easy to chew	53.3%	16	60.0%	18	66.7%	20
Khichdi	Soft and minced	40.0%	12	50.0%	15	40.0%	12
Egg	Soft and bite size	33.3%	10	13.3%	04	6.7%	02
Biscuits with milk	Easy to chew	26.7%	08	40.0%	12	20.0%	06
Chila/Bread	Easy to chew	10.0%	03	23.3%	07	23.3%	07

*District 1- Raipur, 2- Durg, 3- Rajnandgaon

b) Comparison between first-time mothers and second time mothers:

The results revealed a similar trend across both the groups, irrespective of their experience. All the three consistencies were provided by all the mothers across groups. The most commonly given food items were were fruits and boiled vegetables, dal-roti, and dal-rice across both the groups. The most commonly given consistency was soft and bite sized across both groups.

The findings of study are in line with the recommendations made by IAP Parent Guideline Committee that a greater number of consistencies should be introduced beyond

seven months of age. However, these findings differ from recommended practices for infant and early child feeding issued by the World Health Organization (IYCF, 2008), which calls for ingestion of at least four food groups, at least one animal-source food, at least one vitamin A-rich fruit and vegetable, legumes and nuts, eggs, in addition to a staple food (grain, root or tuber) in a day for children at 6 to 23 months of age.

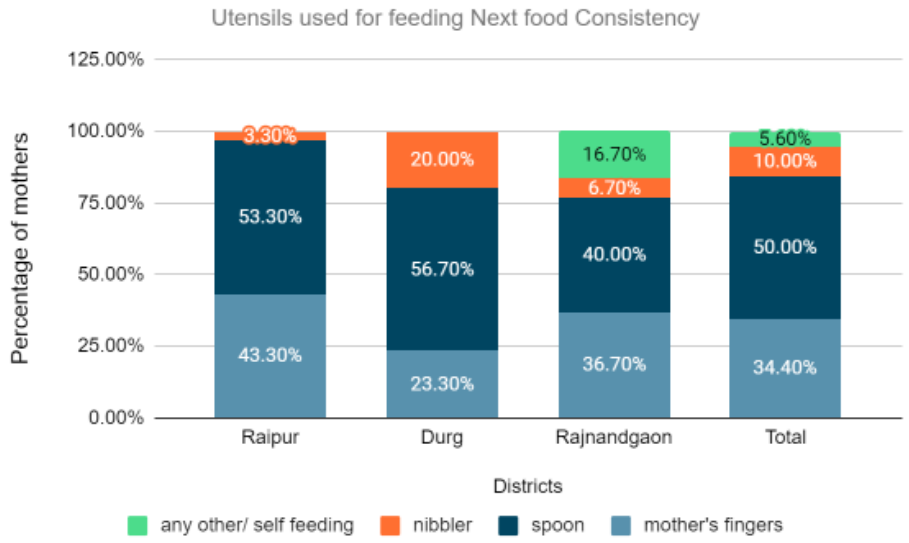
4.3.3 Utensils used to feed the next consistency: The third item of the section provided information on the utensils used to feed the next consistency to the child. The results revealed that among the total participants, 50.0% (n=45) of the mothers used a spoon to feed the child.

a) Comparison across districts:

The results revealed a similar trend as the majority of mothers across all three districts used spoons to feed their children. As shown in Figure 4.15**,** a greater percentage (n=17, 56.7%) of mothers from Durg district used a spoon in comparison to mothers from other two districts. 43.3% (n=13) mothers from Raipur district also fed their children with fingers. However, 16.7% mothers (n=5) from Rajnandgaon district allowed self-feeding with their fingers to their children.

Figure 4.15

Distribution of participants using different utensils to feed the next consistency across districts

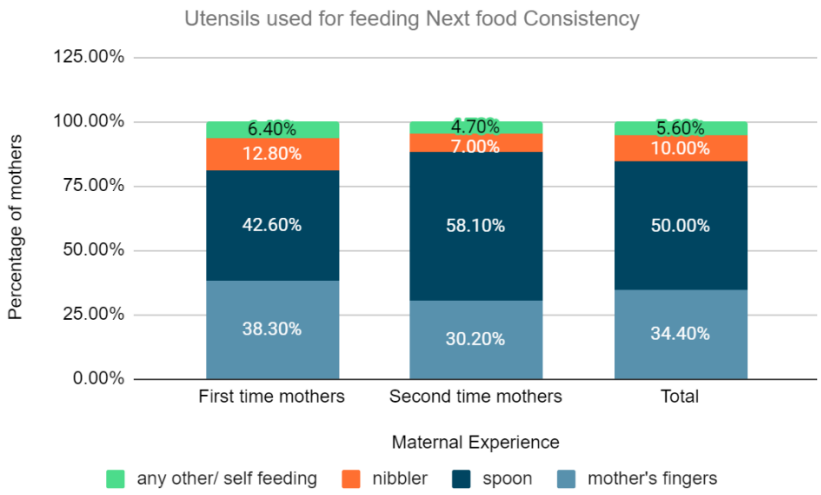


b) Comparison between first-time mothers and second time mothers:

The results of the study showed a similar trend in that majority of the mothers (n=45,50%) used spoons irrespective of their experience. However, as shown in Figure 4.16, greater percentage of second time mothers used spoon to feed the next consistency.

Figure 4.16

Distribution of participants (first-time and second time mothers) using different utensils to feed the next consistency



The Committee on Nutrition recommends that infants and young children should be offered with a spoon or should be fed as finger foods. Also, the infants and young children should be given the opportunity to get to know a variety of foods and food textures supported by responsive feeding between the child and their parents or caregivers. Hence, the findings of the current study are in agreement with these recommendations.

Moreover, according to a few studies (Hetherington, 2017; Silva et al., 2016), if infants and young children are given a variety of textures and pieces of solid foods with a spoon or through feeding themselves by hand, it offers an opportunity for intense interaction between parents and children. This allows for mutual listening and dialog with the child, and for the monitoring and learning of hunger signals and sensitive responses (responsive feeding). It was found that in the present study as well a significant percentage of first-time and second time mothers introduced the next consistency with fingers.

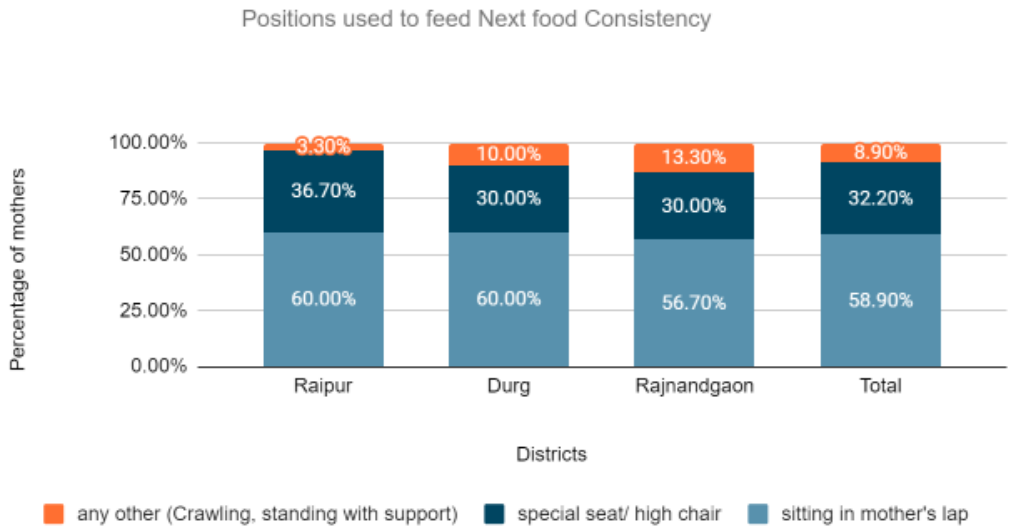
4.3.4 Position used to feed the next consistency: The fourth item of the section gathered information on the position of feeding the next consistency. The results revealed that among the total participants, 58.9% (n=53) of the mothers preferred feeding their infants in a sitting position on their lap.

a) **Comparison across districts:**

The results revealed that a nearly equal percentage of mothers (n=18, 60.0%) from all the districts fed their children by making them sit in their laps. Also as shown in Figure 4.17**,** across all districts a significant percentage of the mothers made their infants sit in a high chair/ special seat while feeding.

Figure 4.17

Distribution of participants using different positions to feed the next consistency across districts

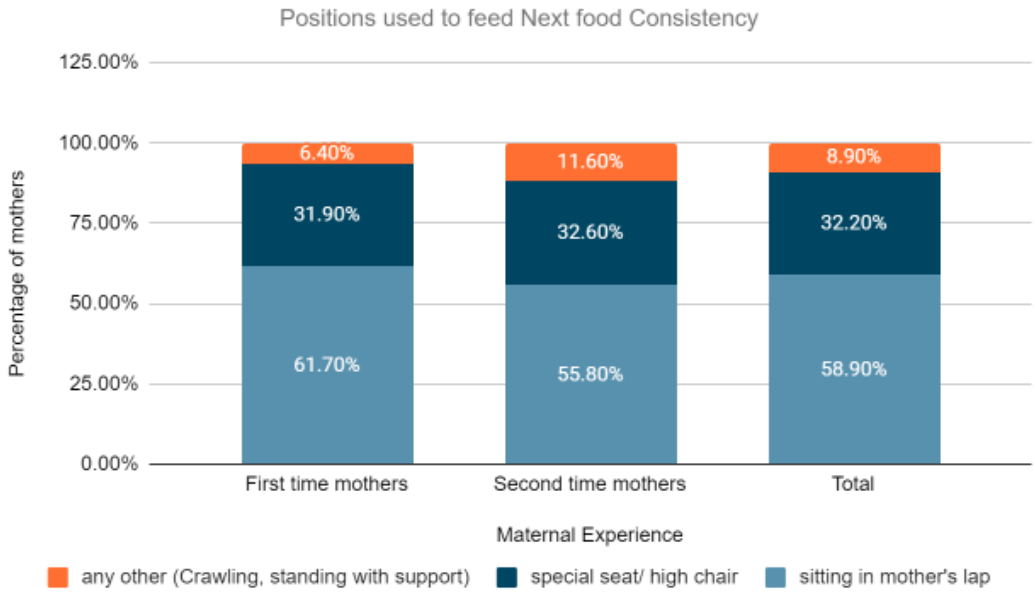


a) Comparison between first-time mothers and second time mothers:

The results revealed that irrespective of their experience, the majority of mothers in both groups fed their child by making the child sit in their lap. However, as shown in Figure 4.18, Greater percentage of first-time mothers (n=29, 61.7%) used this position to feed their child as compared to second time mothers (n=24, 55.8%).

Figure 4.18

Distribution of participants (first-time and second time mothers) using different positions to feed the next consistency



4.4 Introduction of water

This section gathered all information about the introduction of water to the infants, including the age of introduction, utensil used to feed, and the position in which the child was fed.

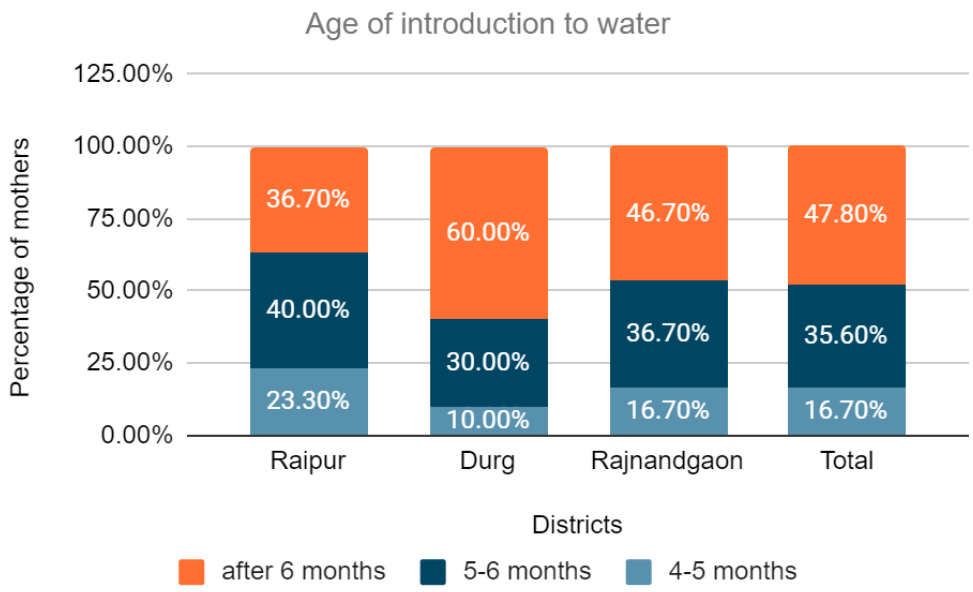
4.4.1 Age of introduction of water: The first item in the section gave information on the age of introduction of water to the infants. The results revealed among the total participants, 47.8% (n=43) of the mothers, introduced water after the age of 6 months.

a) Comparison across districts:

The results revealed a difference in trend among the mothers across districts. As shown in Figure 4.19, majority of the mothers (n=18, 60.0%) from Durg and (n=14, 46.7%) Rajnandgaon districts introduced water after 6 months of age, whereas a greater percentage of mothers (n=12, 40.0%) from Raipur district introduced water at the age of 5-6 months.

Figure 4.19

Age of introduction of water across districts.

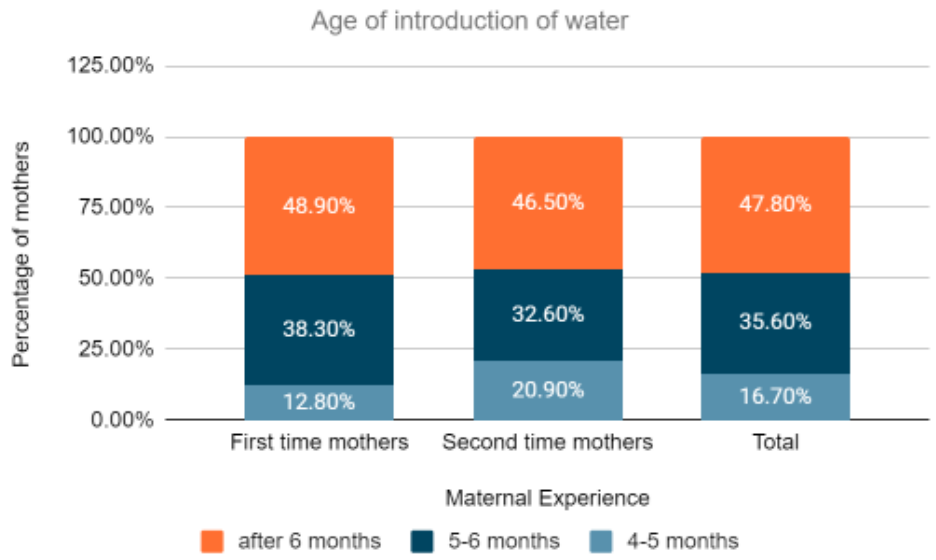


b) Comparison between first-time mothers and second time mothers:

The results revealed a similar trend of age of introduction of water between mothers. Greater percentage of mothers from both the groups introduced water after 6 months of age.

Figure 4.20

Age of introduction of water by first-time and second time mothers



4.4.2 Utensils used for giving water: The second item of the section gave information on the utensils used to feed water to the child. The results revealed that among the total participants, 38.9% (n=35) of mothers used a bowl and spoon to feed water.

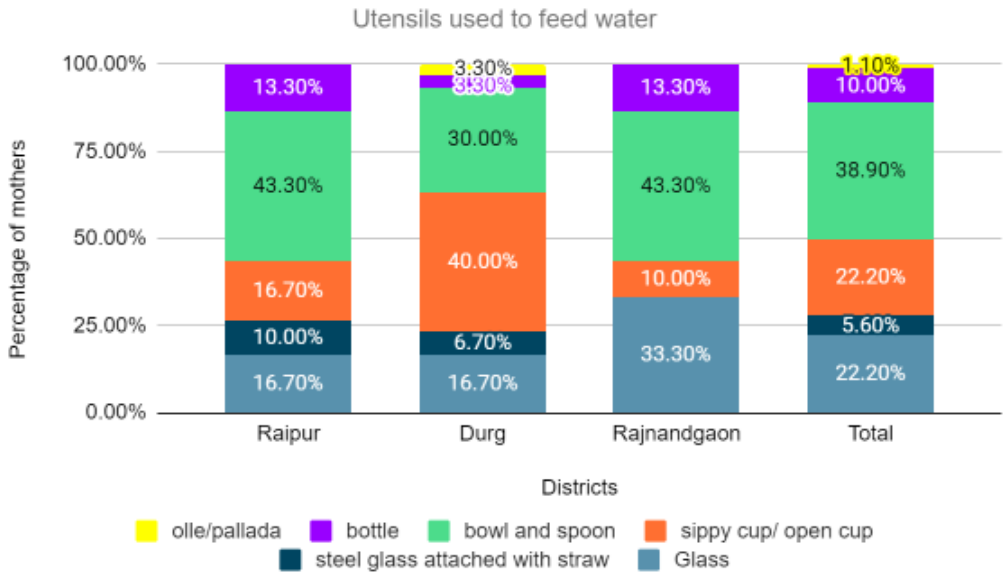
a) Comparison across districts:

The results revealed there was a difference in trend across districts. Greater percentage of mothers from Raipur and Rajnandgaon used bowl and spoon for feeding

compared to the mothers from Durg district. It was seen that the mothers of Durg district used sippy cups/ open cups to a greater extent, as shown in Figure 4.21.

Figure 4.21

Distribution of participants using different utensils to feed water across districts

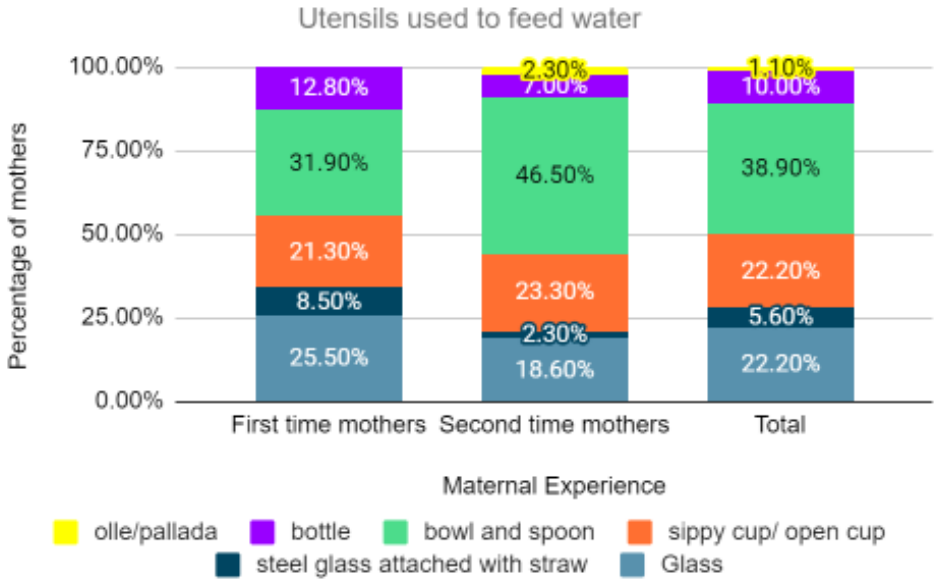


b) Comparison between first-time mothers and second time mothers:

The results revealed that mothers from both the groups used a bowl and spoon. However, as shown in Figure 4.22, there was an increase in the usage of bowl and spoon with increase in experience, as greater percentage of second time mothers (n=20, 46.5%) used bowl and spoon than first-time mothers.

Figure 4.22

Distribution of participants (first-time and second time mothers) using different utensils to feed water



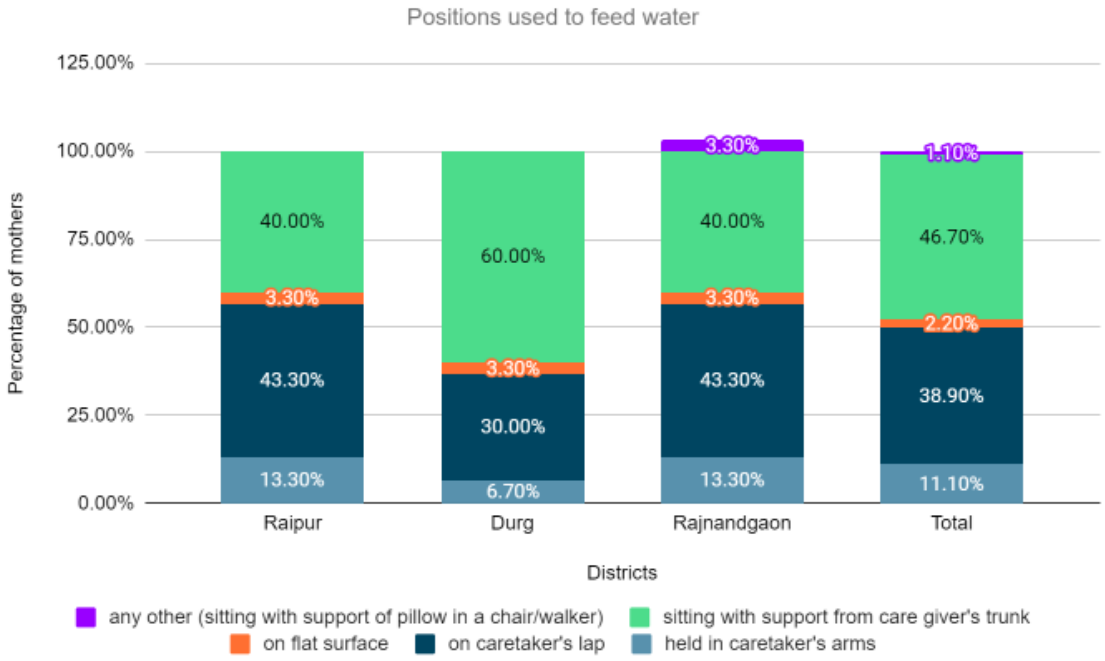
4.4.3 Position used for giving water: The fourth item of the section gathered information on the position of feeding water to the child. The results revealed that among the total, 46.7% (n=42) of the mothers used sitting with a support from caretaker's trunk position while giving water to their infants.

a) Comparison across districts:

The results revealed a difference in trend among mothers across the three districts. Majority of mothers from Durg district (n=18, 60.0%) used sitting with support position while introducing water to their infants. Whereas, an equal number of mothers from Raipur and Rajnandgaon districts (n=13, 43.3%) used to feed water while making the child lay on their lap. A detailed depiction of the data is shown in Figure 4.23.

Figure 4.23

Distribution of participants using different positions to feed water across districts

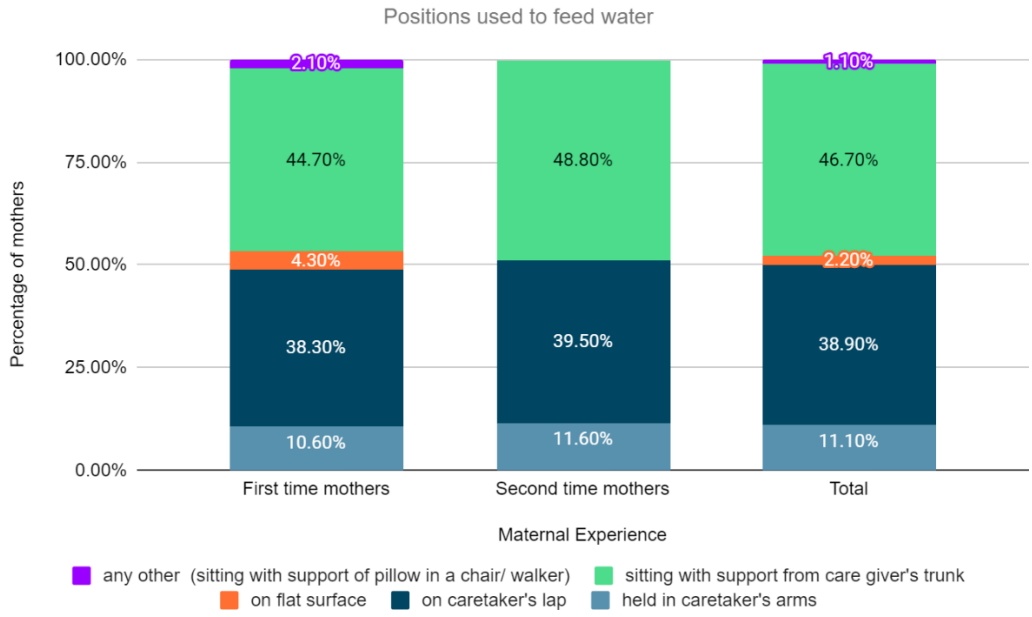


b) Comparison between first-time mothers and second time mothers:

The results revealed a similar trend among mothers in both the groups. However, greater percentage of second time mothers (n=21,48.8%) used sitting with a support position while introducing water to their infants, as compared to first time mothers. This is shown in Figure 4.24.

Figure 4.24

Distribution of participants (first-time and second time mothers) using different positions to feed water



4.5 Age of introduction of various tastes

4.5.1 Age of introduction of sweet taste: The first question under this section extracted information about the age at which sweet taste was introduced. Among the total participants, 70.0% (n=63) of the mothers introduced sweet taste to their infants between 6-8 months of age.

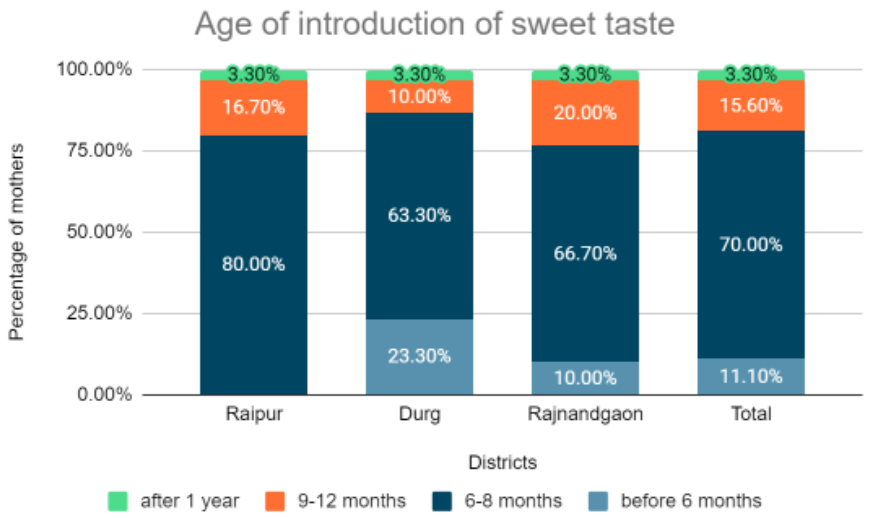
a) Comparison across districts:

As shown in Figure 4.25**,** the majority of mothers from all three districts followed a similar trend and introduced sweet taste in the age range of 6-8 months. However, a greater percentage of mothers (n=2, 80.0%) from Raipur district introduced sweet taste at 6-8 months of age as compared to Durg (n=13, 63.3%) and Rajnandgaon (n=20, 66.7%)

district. Also, greater percentage of mothers (n=7, 23.3%) from Durg district introduced sweet taste before 6 months of age, in comparison to other two districts. Sweet taste was commonly introduced through kheer, halwa, fruits, and cerelac.

Figure 4.25

Age of introduction of sweet taste across districts



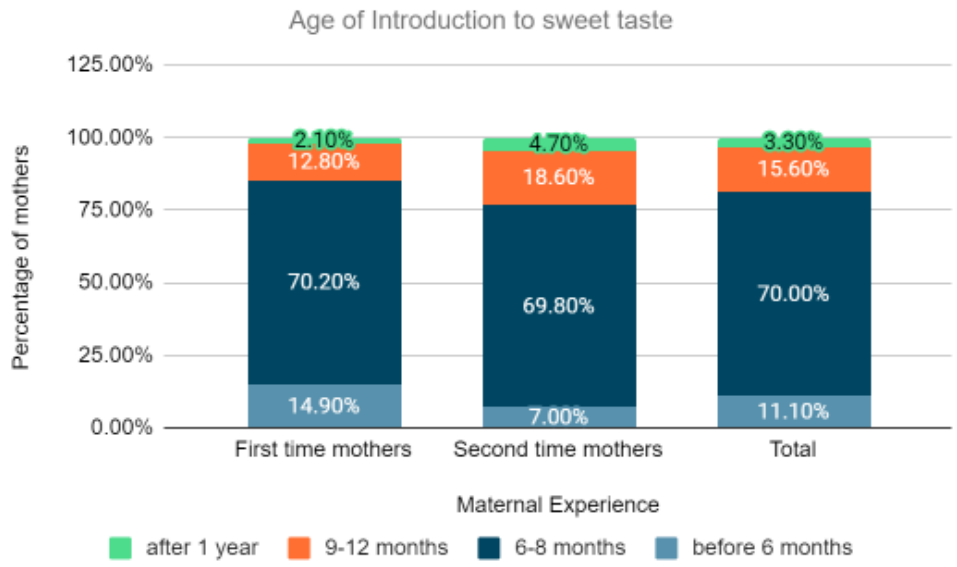
The results are supported by the evidence that though infants can discriminate between sweet and bitter tastes throughout the first three months of life, however they favor sweet tastes (Dasher, 2022). Thus, the results revealed that though the similar trend of introducing the sweet taste between 6-8 months was seen across all the districts.

b) Comparison between first-time mothers and second time mothers:

The results revealed a similar trend across both the groups irrespective of mother's experience. In both the groups greater percentage of mothers introduced sweet taste at the age of 6-8 months for their babies. Most commonly, sweet taste was introduced through kheer, halwa, fruits, cerelac, and chocolates.

Figure 4.26

Age of introduction of sweet taste by first-time and second time mothers



4.5.2 Age of introduction of savory taste: The second question under this section extracted information about the age at which savory taste was introduced. The data revealed that out of 90 mothers, 33 mothers (36.7%) introduced savory taste before 12 months.

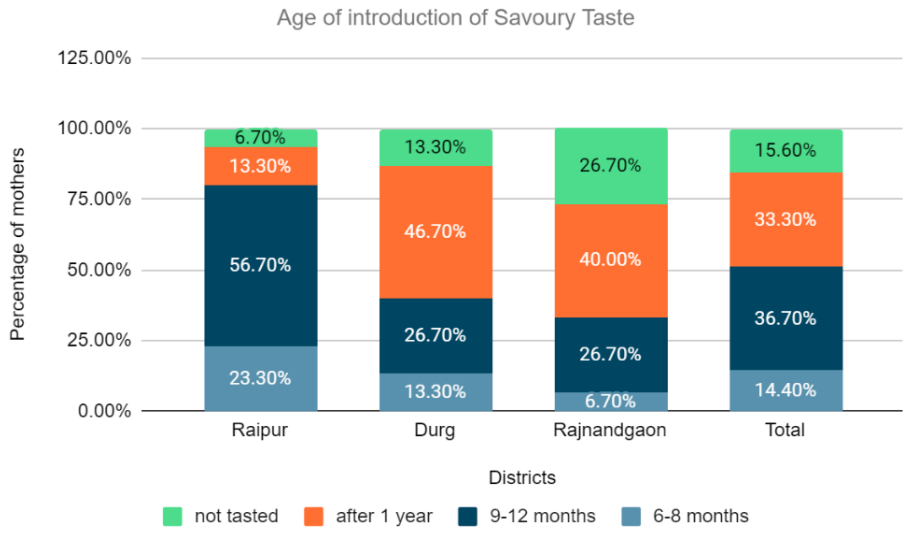
a) Comparison across districts:

The results revealed a difference in trend across districts. As shown in Figure 4.27**,** majority of mothers (n=17, 56.7%) from Raipur district introduced savory taste between 9-12 months as compared to (n=8, 26.7%) mothers from both Durg and Rajnandgaon districts who introduced the savory taste after 1 year. Also, the majority of mothers (n=8, 26.7%) from Rajnandgaon district did not introduce savory taste as compared to other two districts because of the notion that spices might be harmful for their infants. Most commonly given food items to introduce savory taste was through Dal, sabji, pickle, and

homemade snacks. The findings are in line with the recommendation made by Lake (2022) that infants can be introduced to spices and herbs around 8-10 months.

Figure 4.27

Age of introduction of savory taste across districts

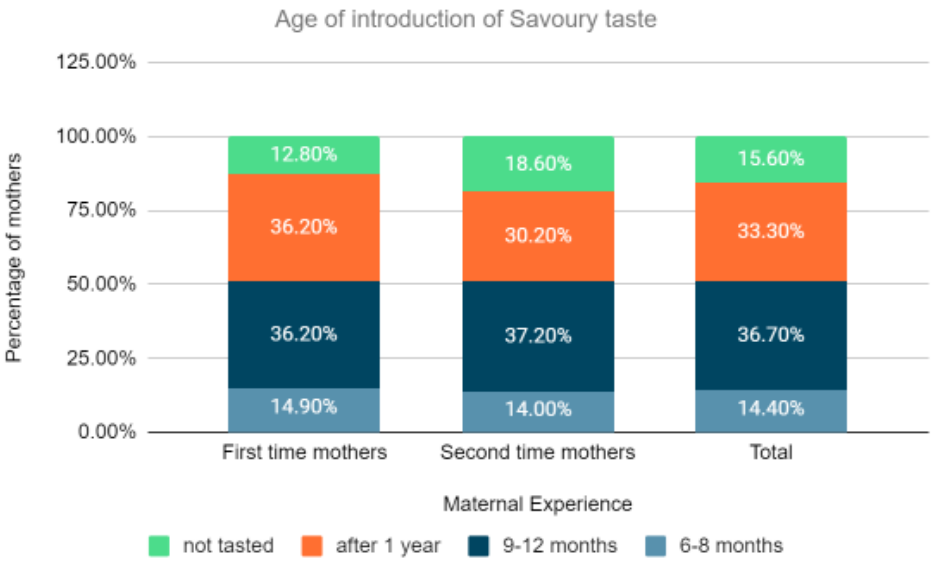


b) Comparison between first-time mothers and second time mothers:

As depicted in Figure 4.28, most mothers from both the groups introduced savory food at 9-12 months. However, equal percentage of first-time mothers introduced savory taste between 9-12 months and after 1 year of age. Thus, the results revealed that though mothers from both the groups followed the same trend of introducing the savory taste at 9-12 months, the percentage of mothers doing this, varied.

Figure 4.28

Age of introduction of savory taste by first-time mothers and second time mothers



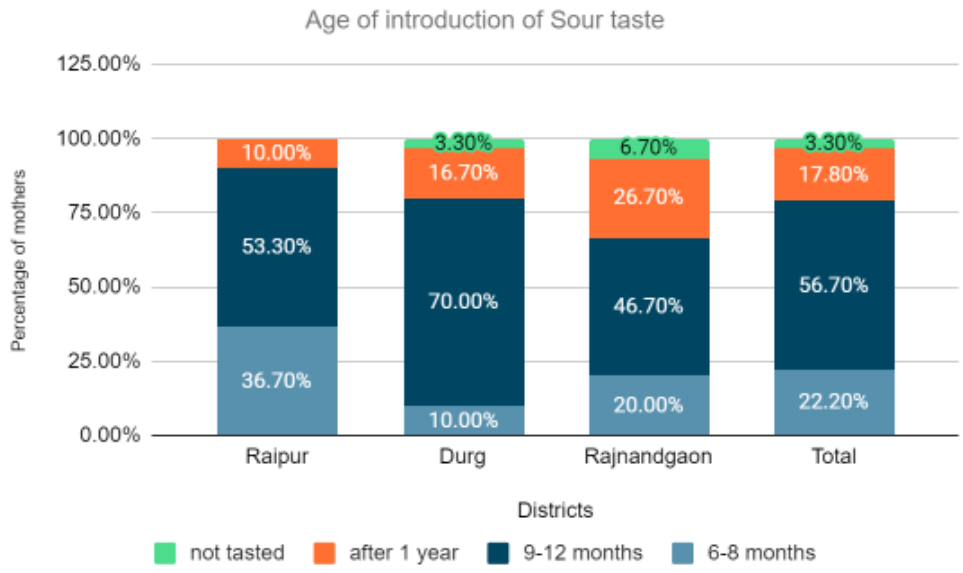
4.5.3 Age of introduction of sour taste: The third question under this section extracted information about the age at which sour taste was introduced. The data revealed that out of 90 mothers, 56.7% (n=51) of the mothers introduced sour taste.

a) Comparison across districts:

The results revealed that greater percentage mothers across all districts introduced sour taste at 9-12 months and hence there was a similar trend observed. However, greater percentage of mothers from Durg (n=21, 70.0%) as compared to Raipur (n=16, 53.3%) and Rajnandgaon (n=14, 26.7%) introduced sour taste at 9-12 months of age. However, a small percentage of mothers from Durg and Rajnandgaon districts did not introduce sour taste, as shown in Figure 4.29**.** Most commonly used food items were lemon, pickle, curd and orange to introduce sour taste across all the districts.

Figure 4.29

Age of introduction of sour taste across districts

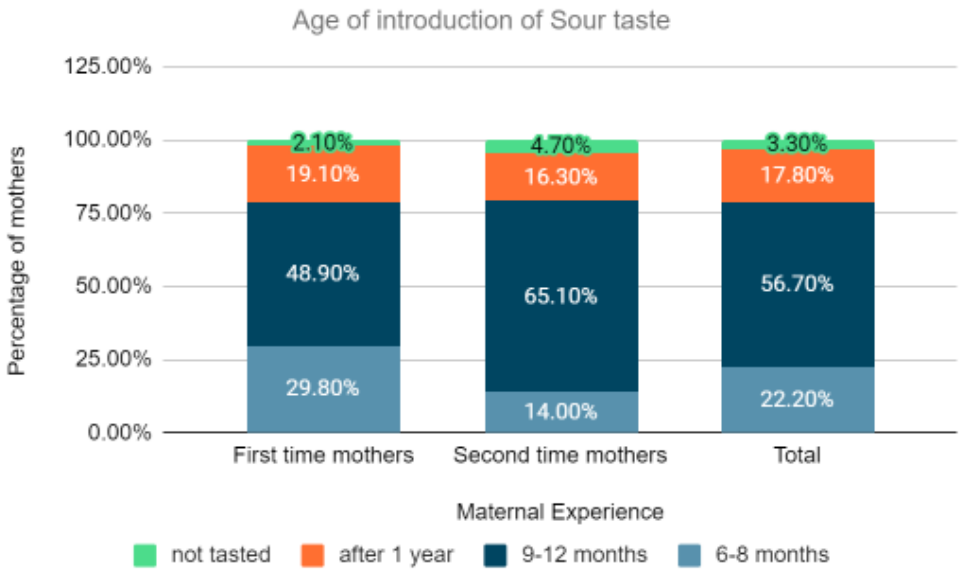


b) Comparison between first-time mothers and second time mothers:

The results revealed that there was a similar trend as the majority of mothers from both the groups introduced sour taste at the age of 9-12 months. However, as shown in Figure 4.30, a greater percentage of second time mothers (n=28, 65.1%) as compared to (n=23, 48.9%) first-time mothers introduced sour taste at 9-12 months of age. Thus, the age of introduction of sour taste varied across maternal feeding experience. The findings are in line to the suggestion made by Dasher (2022) that sour taste can be introduced as early as 3 months.

Figure 4.30

Age of introduction of sour taste by first-time mothers and second time mothers



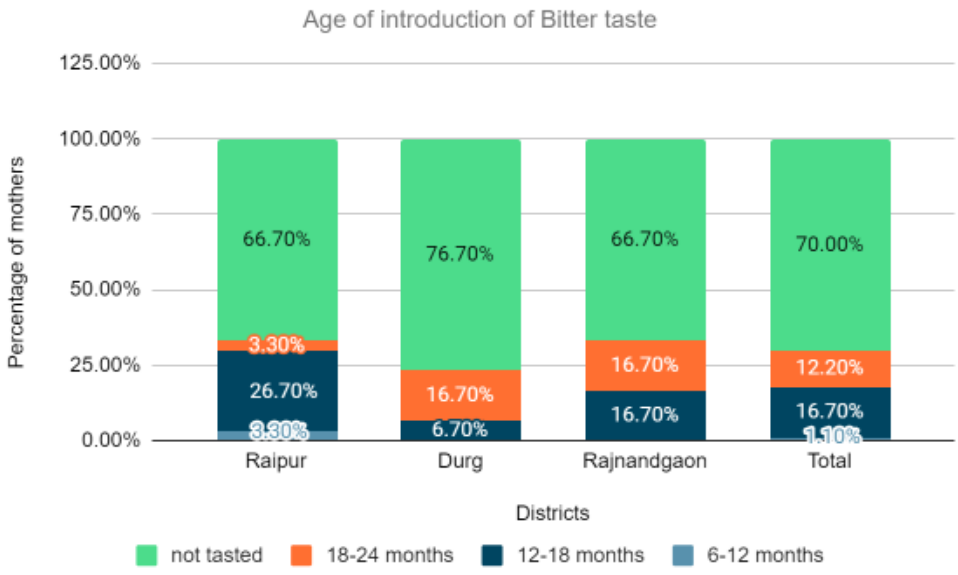
4.5.4 Age of Introduction of bitter taste: The fourth question under this section extracted information about the age at which sour taste was introduced. The data revealed that among 90 mothers, 70% (n=63) did not introduce bitter taste.

a) Comparison across Districts:

The majority of the mothers from Raipur district (n=8, 26.7%) as compared to mothers from Durg (n=2, 6.7%) and Rajnandgaon (n=5,16.7%) districts introduced bitter taste at the age of 12-18 months, as shown in Figure 4.31. However, it was a vast majority of the mothers from all the districts had not introduced bitter taste.

Figure 4.31

Age of introduction of bitter taste across districts



b) Comparison between first time mothers and second time mothers:

It was seen that greater percentage of first-time mothers (n= 15, 31.9%) introduced bitter taste as compared to second time mothers (n=11,27.9%).

4.6 Time taken to feed the child

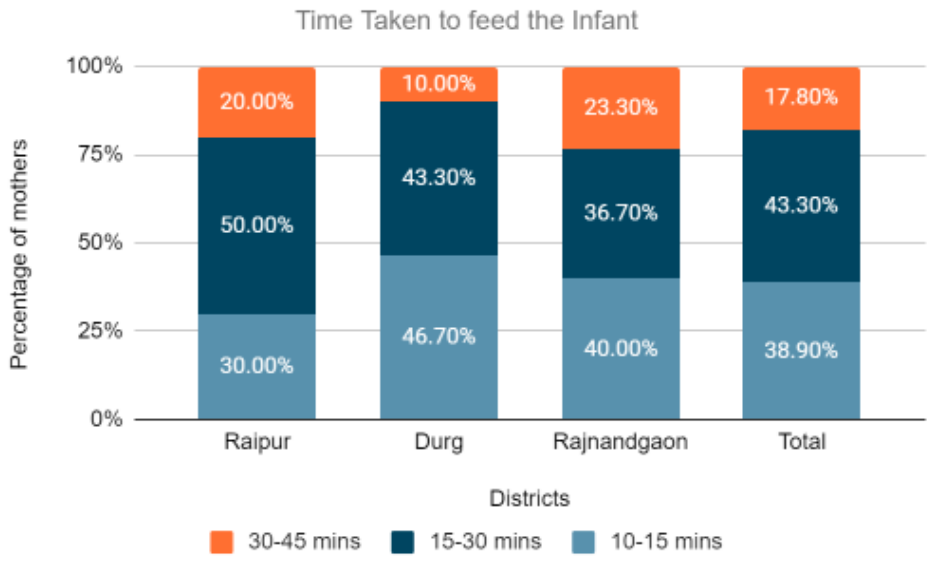
The last question of this section extracted information on time taken for an infant's meal. The data revealed that out of 90 mothers, 43.3% (n=39) took around 15-30 minutes to feed the meal to their infants. The findings correlate with suggestions made by Nationwide Children's Hospital (2011). It suggests that infants' meals should last up to 20-30 minutes.

a) Comparison across districts:

The results revealed a difference in meal time across three districts. Greater percentage of mothers (n=15, 50.0%) from Raipur district took 15-30 minutes as compared to mothers from Durg and Rajnandgaon districts, who took 10-15 minutes to feed their children. The distribution across three districts is shown in Figure 4.32.

Figure 4.32

Time taken to feed the infants across various districts



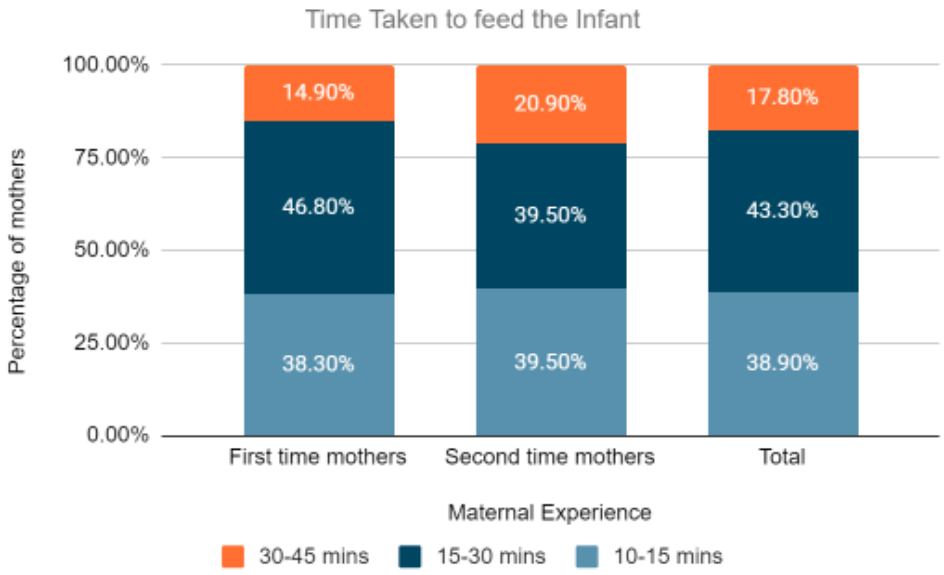
b) Comparison between first-time mothers and second time mothers:

The results revealed that greater percentage (n=22, 46.8%) of first- time mothers took 15-30 minutes to feed, as compared to (n=17, 39.5%) second time mothers, as shown in Figure 4.33. Also, equal percentage of second time mothers (n=17, 39.5%) were able to

feed their child in 10-15 minutes and 15-30 minutes. Thus, it can be suggestive of maternal feeding experience had influence on time taken by the mothers to feed.

Figure 4.33

Time taken to feed the infants by first-time mothers and second time mothers.



To summarize, there were many findings of interest that were revealed through the current study. Though it was found that 97.8% of mothers breastfed their infants from birth, only 66.7% of them carried out breastfeeding exclusively, as the remaining 33.3% of mothers introduced formula feeds majority of whom were from Rajnandgaon district. The introduction of formula feeds was also found to be more prevalent among the first-time mothers. Those who introduced since birth-1 month, did so because of their insufficient milk secretion which was seen among the mothers of Raipur and Durg districts. Thus, the age of introduction of formula milk differed across districts as well as across the maternal experience. The most prevalent type of other milk introduced was formula milk rather than cow milk. Thus, the type of other milk introduced varied across districts and maternal

experience. Feeding bottle was the most prevalent utensil used to feed the formula milk across three districts and among the first time and second time mothers, however, the percentage of mothers using it varied. The position used to feed the formula milk was similar across districts and maternal experience. Majority of mothers preferred to hold their infants in arms, however the percentage of mothers varied. Also, it was evident that breastfeeding termination age varied across districts and across maternal experience.

The age of introduction of complementary feeding differed across districts but was similar between mother's feeding experiences. Thin, slightly thick and mildly thick consistencies of feed such as dal water, rice water and patoliya, fruit puree were the common complementary foods introduced to the infants across all the districts and first time and second time mothers. Thus, the variety of food items differed slightly across districts and maternal experience. The most common utensil used for complementary feeding was steel spoon, however, the percentage of mothers using this varied across districts but was similar across maternal experience. Majority of the mothers from all the districts and maternal experience groups fed their infants by placing them in their laps, though the percentage of mothers using this position varied across districts but was similar for first-time and second time mothers.

The age of introduction of the next consistency was different across the districts wherein majority of mothers from Raipur introduced the next consistency around 7 to 8 months, mothers from Durg and Rajnandgaon introduced at 8-9 months of age. It also varied across maternal experience. Dal-rice, dal-roti and fruits and boiled vegetable, roti-sabji which were of soft and minced, soft and bite size and easy to chew consistencies were commonly used food items by mothers across all the districts and both the maternal

experience groups. All these food items were fed with spoons in all three districts as well as by first-time and second time mothers. However, there was a difference observed in usage of feeding utensils, based on type of food. Also, the percentage of mothers using spoon for feeding the next consistency varied across districts and maternal experience. Feeding the child on the mother's lap was the commonly used position across the districts and among both the maternal experience groups. Also, special seats were used by a few of the mothers. However, a nearly similar percentage of mothers used the sitting in the mother's lap position across districts, the percentage of mothers across maternal experience varied.

Age of introduction of water was mostly after 6 months in Durg and Rajnandgaon, however, in Raipur, mothers introduced water before 6 months because of the climatic conditions, and also because few of them started complementary feeding before 6 months. This did not differ across maternal experiences. Mothers from Durg used Sippy cups/open cups and mothers from Raipur and Rajnandgaon used bowls and spoons more for feeding water. Utensils used to feed water also varied across the districts, however, the same trend of using bowl and spoon was observed among the first time and second time mothers. With respect to position used, mothers from Raipur and Rajnandgaon, made their infants lay in their laps as compared to Durg mothers who fed their infants sitting on their lap. Thus, the trend differed across districts. However, the trend of making the infants sit on their laps was similar across maternal experience.

With respect to the introduction of taste, most mothers introduced sweet taste between 6-8 months and savoury taste at 9-12 months. Similar trend was seen, though the percentage of mothers following that trend varied across districts and was nearly similar

across maternal experience for both the flavours. Most of the mothers introduced sour taste at the age of 9-12 months. However, few mothers did not introduce it. Thus, the trend of introducing the sour taste was similar but the percentage of mothers following that trend varied across districts and maternal experience. Majority of the mothers did not introduce bitter taste. However, there was a difference among the small percentage of mothers who introduced bitter taste across districts but was similar across maternal experience. The trend of time taken to feed meals to the infants was different across districts and maternal experience, as it took 10-15 minutes in Raipur district and 15- 30 minutes in Durg and Rajnandgaon districts for mothers to feed their infants. Also, more second time mothers took 15-30 minutes for mealtime.

Thus, age of introduction of formula feeding, age of introduction of complementary feeding, position used during complementary feeding, age of introduction of next consistency, age of introduction of water, utensils and position used for giving water, age of introduction of savoury and bitter tastes and time taken to feed the child varied across districts. Other feeding parameters like breastfeeding termination age, introduction of formula feeding, type of other milk given, utensils and positions used for feeding other milk, the consistency and type of food introduced for complementary feeding, utensils used to feed the complementary food, the next consistency and type of food introduced for feeding the next consistency, utensils and position used to feed the next consistency, age of introduction of sweet and sour taste were similar across districts. Among the similar feeding parameters, the percentage of mothers following a particular practice differed for breastfeeding termination age, introduction of formula feed, type of other milk introduced, utensils used to feed other milk, position used to feed other milk, utensils used to feed

complementary food, utensils used to feed the next consistency of food, age of introduction of sweet and sour taste. Thus, though, nearly equal similarities and differences in feeding practices were found across districts, variations were seen in percentage of mothers following a similar trend.

Between first-time and second time mothers, age of introduction of formula feeding, age of introduction of the next consistency, age of introduction of savory taste and time taken for meal time varied. However, all other feeding parameters like, breastfeeding termination age, introduction of formula feed, type of other milk introduced, utensils and position used for feeding formula milk, age of introduction of complementary feeding, consistency and type of food for introduction of complementary feeding, utensils and positions used to introduce complementary feeding, the next consistency and type of food used for introducing the same, utensils and position used to feed the next consistency, age of introduction of water, utensil and position used to feed water, age of introduction of sweet, sour and bitter taste, were all similar between the first-time mothers and second time mothers. Among the similar feeding parameters, the percentage of mothers following a particular practice varied for breastfeeding termination age, introduction of formula milk, age of introduction of formula milk, utensils and position used for feeding the formula milk, utensils and position used for feeding the next consistency, utensils and position used to feed water, and age of introduction of sour taste. Thus, across maternal experience, more similarities in feeding practices were seen, there were variations observed in the percentage of mothers following a similar trend. It can be concluded that both the geographical location of the districts across Chhattisgarh and maternal experience had an influence on feeding practices.

CHAPTER V

SUMMARY AND CONCLUSIONS

Parent feeding and child eating are central to the fabric of family life and are strongly rooted in culture and tradition. Indian food style is diverse and unique from that seen across the world and is highly influenced by these factors. Given the diversity, what, when and how food is given to infants could differ across different states and districts of India. There are higher opportunities of detailed variations in the utensils, the type of food introduced at each age, its consistency etc. Given the complexity and variation of feeding practices, such studies in a country like India are vital. Studies examining the existing feeding practices in the Indian context are limited.

The culinary culture of Chhattisgarh is also unique from other states of India. With 27 districts, it is the ninth-largest state in India. Each district has its own distinct culture, traditions, and beliefs. The land of Chhattisgarh is famous for preserving tribal culture. The landscape of this state is home to a mosaic of culinary traditions that range from taste of non-tribal and tribal foods of the state that are made with rice, maize, Bajra, etc. which precisely are considered to be the staples. Previously known as Dakshin-Kaushal, the state of Chhattisgarh in India is carved out of Madhya Pradesh. Each region's cuisine reflects the climatic and cultural diversity in its ingredients and flavor profiles. Hence it is highly likely that the parental feeding practices and beliefs vary from district to district. Keeping this in view, this study was designed to investigate the parental feeding practices in Chhattisgarh. The objectives were to compare the parental feeding practices across three districts of Chhattisgarh and between maternal experience.

This was a cross sectional survey. A survey tool was developed to assess the parental feeding practices among the mothers in Chhattisgarh. The survey tool was created using a google literature search and books about the development of feeding. After considering the items under each domain of interest, item pools for each section were developed. It was carefully maintained that the items were appropriate for the Indian environment. The items in the survey tool focused on the termination of breastfeeding, age of introduction of different food items and tastes, its consistency, utensils used and the position used to feed the infants.

Three Speech-Language Pathologists (SLPs) with at least ten years of clinical expertise in the field of feeding and associated disorders received the survey tool that had been created for validation purpose. The SLPs were asked to judge the clarity, simplicity, relevance, framing, applicability and appropriateness of the items as well as clarity, simplicity, relevance, color, appearance and iconicity of the pictures included using a Likert rating scale from 1 to 5 wherein 1 indicated "poor", 2 indicated "fair", 3 indicated "good", 4 indicated "very good" and 5 indicated "excellent". The modifications suggested by the SLPs were incorporated in the survey tool. The options under the items related to position were expanded. A few questions were reframed to resolve their ambiguity. A few questions were added based on the suggestions provided by the judges. A few pictures were replaced with other pictures better clarity. A pilot study was conducted on six participants (two from each district) after which a few age ranges in the options were modified.

Ninety mothers of children in the age range of 11-36 months (30 mothers from each of the districts- Raipur, Durg, Rajnandgaon) were included as participants. The participants of all the districts were divided into two groups based on their maternal

experience: Group 1 consisted of first-time mothers Group 2 consisted of second time mothers. The mothers were between the ages of 22 and 39 years. The average age of newborns in all the districts was 23.9 months, and there were 43 males and 47 females among them. The majority of the mothers was from the upper middle class socioeconomic status and all of the participants lived in urban areas. 72 mothers were homemakers and the rest were employed. Most of the mothers were of the Jain religion. All mothers were literate and were at least Graduated. Nearly equal number of the mothers were first time mothers (n=43) and second time mothers (n=47). 56 mothers resided in a joint family and rest belonged to nuclear family. Majority of total participants were vegetarians and only 10 were non vegetarians, few of them also followed jain and eggetarian diet. The survey tool was and administered via online mode. Before the survey, an informed consent was obtained for participation in the survey.

The current investigation revealed several interesting findings. Although it was found that a vast majority 97.8% mothers breastfed their babies from birth, only 66.7% of them did so exclusively, since the remaining 33.3% of mothers introduced formula feeds, the majority of whom were from Rajnandgaon district. Additionally, it was found that first-time mothers had a higher prevalence of the introduction of formula feeds. Those who introduced, did so at birth-1 month because of their insufficient milk secretion which was seen among the mothers of Raipur and Durg districts. Thus, the age of introduction of formula milk differed across districts as well as across the maternal experience. The most prevalent type of other milk introduced was formula milk rather than cow milk. Thus, the type of other milk introduced varied across districts and maternal experience. Feeding bottle was the most prevalent utensil used to feed the formula milk across three districts

and among the first time and second time mothers, however, the percentage of mothers using it varied. The position used to feed the formula milk was similar across districts and maternal experience. Majority of mothers preferred to hold their infants in arms, however the percentage of mothers varied. Additionally, it was clear that the average age at which breastfeeding ends varied across districts and maternal experience.

The age of introduction of complementary feeding differed across districts but was similar between mother's feeding experiences. Thin, slightly thick and mildly thick consistencies of feed such as dal water, rice water and patoliya, fruit puree were the common complementary foods introduced to the infants across all the districts and first time and second time mothers. As a result, the diversity of food items varied little between districts and between maternal experience. Steel spoons were most frequently used for supplemental feeding, but the proportion of mothers who did so varied depending on the districts and was similar across maternal experience. Majority of the mothers from all the districts and maternal experience groups fed their infants by placing them in their laps.

Majority of mothers from Raipur, and more second time mothers across maternal experience introduced the next consistency at 7 to 8 months, whereas the age of introduction varied depending on the districts and maternal experience. Dal-rice, dal-roti and fruits and boiled vegetable, roti-sabji which were of soft and minced, soft and bite size and easy to chew consistency were commonly used food items across all the districts. Across maternal experience groups, dal roti, fruits and boiled vegetables, were commonly fed by both the groups. Across all three districts and between maternal experience all of these foods were fed with spoons. However, there was a difference observed in the usage of utensils, based on type of food. Also, the percentage of mothers using spoon for feeding

the next consistency varied across districts and maternal experience. Feeding the child on the mother's lap was the commonly used position across the districts and among both the maternal experience groups. However, a nearly similar percentage of mothers used the sitting in the mother's lap position across districts, the percentage of mothers across maternal experience varied.

In Durg and Rajnandgaon, mothers often introduced water after 6 months; but due to the local climate, and early introduction of complementary feeding, mothers in Raipur often did so before 6 months. This was consistent between maternal experience. Mothers from Raipur and Rajnandgaon used a bowl and a spoon majorly, whereas mothers from Durg used sippy cups or open cups. The utensils used to feed water differed throughout the districts, but the spoon and bowl usage remained consistent between maternal experience. Mothers from Durg fed their infants while sitting on their lap, whereas mothers from Raipur and Rajnandgaon made their infants lay in their laps. As a result, the trend varied amongst districts, but the trend of making the infants sit on their laps was same between maternal experience.

Most mothers introduce sweet taste between 6-8 months and savory and sour flavor between 9-12 months when it comes to taste introduction. Similar trends were seen, although the percentage of mothers who followed them differed depending on the district and between the maternal experience of the mothers. Most of the mothers introduced sour taste at the age of 9-12 months but the percentage of mothers following that trend varied across districts and maternal experience. The small percentage of mothers who introduced bitter taste across districts differed but was similar across maternal experience in terms of age of introduction. In general, time taken to feed meals to the infants was different across

districts, in Raipur district 10-15 minutes and 15- 30 minutes in Durg and Rajnandgaon districts, but it was quite similar between the maternal experience.

A few clear differences as well as some areas of similarity in feeding practices emerged through the current research across districts and literacy levels. Age of introduction of formula feeding, age of introduction of complementary feeding, position used during complementary feeding, age of introduction of next consistency, age of introduction of water, utensils and position used for giving water, age of introduction of savoury and bitter tastes and time taken to feed the child varied across districts. Other feeding parameters like breastfeeding termination age, introduction of formula feeding, type of other milk given, utensils and positions used for feeding other milk, the consistency and type of food introduced for complementary feeding, utensils used to feed the complementary food, the next consistency and type of food introduced for feeding the next consistency, utensils and position used to feed the next consistency, age of introduction of sweet and sour taste were similar across districts. Among the similar feeding parameters, the percentage of mothers following a particular practice differed for breastfeeding termination age, introduction of formula feed, type of other milk introduced, utensils used to feed other milk, position used to feed other milk, utensils used to feed complementary food, utensils used to feed the next consistency of food, age of introduction of sweet and sour taste. Thus, though, nearly equal similarities and differences in feeding practices were found across districts, variations were seen in percentage of mothers following a similar trend.

Between maternal experience, age of introduction of formula feeding, age of introduction of the next consistency, age of introduction of savory taste and time taken for

meal time varied. However, all other feeding parameters like, breastfeeding termination age, introduction of formula feed, type of other milk introduced, utensils and position used for feeding formula milk, age of introduction of complementary feeding, consistency and type of food for introduction of complementary feeding, utensils and positions used to introduce complementary feeding, the next consistency and type of food used for introducing the same, utensils and position used to feed the next consistency, age of introduction of water, utensil and position used to feed water, age of introduction of sweet, sour and bitter taste, were all similar between the first-time mothers and second time mothers. Among the similar feeding parameters, the percentage of mothers following a particular practice varied for breastfeeding termination age, introduction of formula milk, age of introduction of formula milk, utensils and position used for feeding the formula milk, utensils and position used for feeding the next consistency, utensils and position used to feed water, and age of introduction of sour taste. Thus, across maternal experience, more similarities in feeding practices were seen, there were variations observed in the percentage of mothers following a similar trend. It can be concluded that both the geographical location of the districts across Chhattisgarh and maternal experience had an influence on feeding practices.

5.1 Implications of the study

This study tried to profile the feeding practices including the specifics of the food type, consistency, utensil used, posture used with young children in the districts Raipur, Durg, and Rajnandgaon. The results revealed differences in feeding practices across districts and between maternal experience. The findings of this study will facilitate an open

approach for ethno cultural inclusivity/ sensitivity during assessing and intervening the young children with feeding issues from these districts among the practicing speech-language pathologists (SLPs). The SLPs will be aware of the changes in feeding practices between different districts, therefore while evaluating the young infants, the SLP can take into account these variances before deciding if a particular behavior or food type is appropriate. The findings of this study will help the SLP understand the type of food offered in a certain district and recommend the most appropriate type of food based on the district's staple meal. For young children from these districts, a reference chart of food kind, consistency, utensils and positions used to feed, can be created, which can be used during feeding assessment and management.

5.2 Limitations of the study

One potential flaw is the study's small, restricted population and geographic confinement. The findings of this study cannot be generalized to the full state of Chhattisgarh. The cross-sectional design of the study made it impossible to determine the cause-and-effect relationship between events. In addition, because data were gathered from the mother's perspective and self-reports rather than the practice being observed, recall and social desirability biases may represent additional study limitations.

5.3 Future Directions

Future research should thus attempt to expand on the current study using a sample that is more typical of the entire population of the state in terms of the characteristics of both the parents and the children. Similar research that sheds light on typical newbom feeding and care practices should be conducted across the other states of India. A

longitudinal study can also be carried out to track the changes in feeding practices. Further research with a broader emphasis, larger sample size, and better statistical techniques is required to show the impact of variables such as socioeconomic status, type of family, feeding experience of the mother and maternal employment on the nature of the prevalent feeding practices.

REFERENCES

Aggarwal, A., Verma, S., Faridi, M. M. A., & Dayachand. (2008). Complementary feeding —Reasons for inappropriateness in timing, quantity and consistency. *The Indian Journal of Pediatrics*, *75*(1), 49–53. https://doi.org/10.1007/s12098-008-0006-9

All India Institute of Speech and Hearing. (2009). *Ethical guidelines for Bio-behavioral research involving human subjects*. http://www.aiishmysore.in/en/pdf/ethical-guidelines.pdf.

American Academy of Pediatrics Section on Breast feeding. (2008). Sample Hospital Breast feeding Policy for Newborns. Elk Grove Village, IL: American Academy of Pediatrics.

American Speech-Language-Hearing Association. (n.d.). *Pediatric Feeding and Swallowing*. ASHA. https://www.asha.org/practice-portal/clinical-topics/pediatric-feeding-and-swallowing/

Introduction to Water | Articles | Gerber Medical. (2016). Gerber. https://medical.gerber.com/tools/spotlight-on-nutrition/articles/an-introduction-to-water

Annie, J. R. (2017). Breast feeding, Cognitive and Non-Cognitive Development in Early Childhood: A Population Study. *MCN, The American Journal of Maternal Child Nursing*, 42(5), 302.

Arvedson, J. C., & Lefton-Greif, M. A. (1996, November). *Anatomy, physiology, and development of feeding.* In Seminars in Speech and Language (Vol. 17, No. 04,

pp. 261-268). © 1996 by Thieme Medical Publishers, Inc. https://doi.org/10.1055/s-2008-1064103

Arvedson, J. & Brodsky, L. (1993). *Pediatric swallowing and Feeding: Assessment and management.* San Diego: Singular Publishing Group.

Arvedson, J. C., & Brodsky, L. (2008). *Pediatric swallowing and feeding: Assessment and management*. San Diego, Calif: Singular Pub. Group.

Bahr, D., & Johanson, N. (2013). A Family-Centered Approach to Feeding Disorders in Children (Birth to 5-Years). *Perspectives on Swallowing and Swallowing Disorders (Dysphagia)*, *22*(4), 161–171. https://doi.org/10.1044/sasd22.4.161

Basnet, S., Sathian, B., Malla, K., & Koirala, D. P. (2015). Reasons for early or late initiation of complementary feeding: a study in Pokhara. *American Journal of Public Health Research*, *3*(4A), 69-75.

Behera, D., & Pillai, A. K. (2016). Intention toward optimal breast feeding among expecting mothers in Angul district of Odisha, India. *Indian Journal of Public Health*, *60*(1), 81–85. https://doi.org/10.4103/0019-557X.177350

Behera, S., Maroof, K. A., & Tiwari, P. K. (2020). Complementary Feeding Status of Children Residing in Urban Slum of East Delhi. *International Journal of Medicine and Public Health*, *10*(3).

Birch, L. L. (2006). Child feeding practices and the etiology of obesity. *Obesity* (Silver Spring, Md.), 14(3), 343–344. https://doi.org/10.1038/oby.2006.45

Blissett, J. (2011). Relationships between parenting style, feeding style and feeding practices and fruit and vegetable consumption in early childhood. *Appetite*, 57(3), 826–831. https://doi.org/10.1016/j.appet.2011.05.318

Bloom, K., Goldbloom, R. & Stevens, F. (2008). Factors affecting the mother's choice of infant feeding method. *Acta Paediatrica*. 71. 3 - 8. 10.1111/j.1651-2227.1982.tb09632.x.

Bosma, J. F. (1986). *Development of feeding. Clinical Nutrition*, 5(5), 210-218.

Breast feeding. (2019, November 11). WHO. https://www.who.int/health-topics/breast feeding#tab=tab_1

Callaghan, J. E., & Lazard, L. (2012). 'Please don't put the whole dang thing out there!': A discursive analysis of internet discussions around infant feeding. *Psychology & Health*, *27*(8), 938-955.

Carper, J. L., Orlet Fisher, J., & Birch, L. L. (2000). Young girls' emerging dietary restraint and disinhibition are related to parental control in child feeding. *Appetite*, 35(2), 121–129. https://doi.org/10.1006/appe.2000.0343 https://doi.org/10.1093/jpepsy/jsy053

Chatoor, I., & Egan, J. (1984). Non-organic failure to thrive: a developmental perspective. *Pediatric Annals*, *13*(11), 829.

Cichero, J. A., & Murdoch, B. E. (Eds.). (2006). *Dysphagia: foundation, theory and practice*. John Wiley & Sons.

Cichero, J. A., Lam, P., Steele, C. M., Hanson, B., Chen, J., Dantas, R. O., Duivestein, J., Kayashita, J., Lecko, C., Murray, J., Pillay, M., Riquelme, L., & Stanschus, S. (2017). Development of International Terminology and Definitions for Texture-Modified Foods and Thickened Fluids Used in Dysphagia Management: The IDDSI Framework. *Dysphagia*, *32*(2), 293–314. https://doi.org/10.1007/s00455-016-9758-y

Cohen, R. J., Brown, K. H., Canahuati, J., Rivera, L. L., & Dewey, K. G. (1994). Effects of age of introduction of complementary foods on infant breast milk intake, total energy intake, and growth: A randomised intervention study in Honduras. *Lancet (London, England)*, *344*(8918), 288–293. https://doi.org/10.1016/s0140-6736(94)91337-4

Collins, C., Duncanson, K., and Burrows, T. (2014). A systematic review investigating associations between parenting style and child feeding behaviours. *The Journal of Human Nutrition and Dietetics,* 27, 557–568. doi: 10.1111/jhn.12192

Confused Parent. (2018). *Baby food chart 0–6 months*. https://confusedparent.in/baby-food-chart-0-6-months/

Connolly. (2021, May 24). *How to correctly hold your baby during a formula feeding*. Bundoo. https://www.bundoo.com/articles/correct-position-for-formula-feeding-babies/#:%7E:text=Your%20bottle%2Dfeeding%20position%20should,of%20the%20body%20during%20feeding

Dar, N., Egan, J., Edgar, F., & Harkins, C. (2012). *What shapes future infant feeding choices? The views of young people from three cultural backgrounds*. Glasgow Centre for PopulationHealth. http://www.gcph.co.uk/assets/0000/3623/Infant_feeding_choices_cultural_FINAL_2012.pdf

Dasgupta, A., Naiya, S., Ray, S., Ghosal, A., Pravakar, R., & Ram, P. (2014). Assessment of infant and young child feeding practices among the mothers in a slum area of Kolkata: A cross-sectional study. *International Journal Biological and Medical Research*, *5*(1), 3855-3861.

Dasher. (2022). Babycenter. https://www.babycenter.com/baby/baby-development/baby-sensory-development-taste_10401107

De Amici, D., Gasparoni, A., Guala, A. *et al.* Does ethnicity predict lactation? A study of four ethnic communities. *Eur J Epidemiol* 17**,** 357–362 (2001). https://doi.org/10.1023/A:1012731713393

Delaney, A. L., & Arvedson, J. C. (2008). Development of swallowing and feeding: Prenatal through first year of life. *Developmental Disabilities Research Reviews*, 14(2), 105-117. doi:10.1002/ddrr.16

Dellow, P. G. (1976). *The general physiological background of chewing and swallowing. In Mastication and Swallowing: Biological and Clinical Correlates* (ed. B. J. Sessle and A. G. Hannam), pp. 6–9. Toronto: University of Toronto Press.

Dhami, M. V., Ogbo, F. A., Osuagwu, U. L., & Agho, K. E. (2019). Prevalence and factors associated with complementary feeding practices among children aged 6–23 months in India: A regional analysis. *BMC Public Health*, *19*(1), 1-16.

Dodrill, P. (2014). Feeding problems and oropharyngeal dysphagia in children. *Journal of Gastroenterology and Hepatology Research*, 3(5).

Esan, D. T., Adegbilero-Iwari, O. E., Hussaini, A., & Adetunji, A. J. (2022). Complementary feeding pattern and its determinants among mothers in selected primary health centers in the urban metropolis of Ekiti State, Nigeria. *Scientific Reports*, *12*(1), 1-9.

Faith, M. S., Scanlon, K. S., Birch, L. L., Francis, L. A., & Sherry, B. (2004). Parent-child feeding strategies and their relationships to child eating and weight status. *Obesity Research*, 12(11), 1711–1722. https://doi.org/10.1038/oby.2004.212

Fewtrell, M., Bronsky, J., Campoy, C., Domellöf, M., Embleton, N., Fidler Mis, N., Hojsak, I., Hulst, J. M., Indrio, F., Lapillonne, A., & Molgaard, C. (2017). Complementary Feeding: A Position Paper by the European Society for Paediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN) Committee on Nutrition. *Journal of Pediatric Gastroenterology and Nutrition*, *64*(1), 119–132. https://doi.org/10.1097/MPG.0000000000001454

Gadappa, S. M., & Behera, M. K. (2016). Nutritional status and feeding practices in relation to IYCN policy among children under 2 years of age in tertiary care centre. *Original Research*, *3*(6), 1650-2.

Galloway, A. T., Lee, Y., & Birch, L. L. (2003). Predictors and consequences of food neophobia and pickiness in children. *Journal of the American Dietetic Association*,103, 692–698.

Garg, A., & Chadha, R. (2009). Index for measuring the quality of complementary feeding practices in rural India. *Journal of Health, Population, and Nutrition*, *27*(6), 763.

Gavin. (2021). *Feeding Your 4- to 7-Month-Old (for Parents) - Inova Fairfax Hospital*. Kidshealth. https://kidshealth.org/Inova/en/parents/feed47m.html

Global strategy for infant and young child feeding. (2003, December 22). WHO. https://www.who.int/publications/i/item/9241562218

Government of India. Guidelines for enhancing optimal infant and young child feeding practices. New Delhi; Ministry of health and Family Welfare, Government of India. 2013;5-6

Greenspan, S., & Lourie, R. S. (1981). Developmental structuralist approach to the classification of adaptive and pathologic personality organizations: infancy and early childhood. *The American Journal of Psychiatry*, *138*(6), 725–735. https://doi.org/10.1176/ajp.138.6.725

Hajian-Tilaki K. O. (2005). Factors associated with the pattern of breastfeeding in the north of Iran. *Annals of human biology*, *32*(6), 702–713. https://doi.org/10.1080/03014460500272764

https://chhattisgarh.nic.in/

https://durg.gov.in/

https://raipur.gov.in/

https://rajnandgaon.nic.in/

https://www.adotrip.com/statedetail/chhattisgarh#:~:text=Food%20of%20Chhattisgarh%20includes%20delicacies,considered%20to%20be%20the%20staples.

Indian Culture. (n.d.). Indian Culture. https://www.indianculture.gov.in/

Ingram J, Johnson D, Greenwood R. Breastfeeding in Bristol: teaching good positioning, and support from fathers and families. *Midwifery*. 2002; 18:87–101. doi: 10.1054/midw.2002.0308.

Ingram, J. C., Woolridge, M. W., Greenwood, R. J., & McGrath, L. (1999). Maternal predictors of early breast milk output. *Acta paediatrica*, *88*(5), 493-499.

Ingram, J., Woolridge, M., and Greenwood, R. (2001). Breastfeeding: it is worth trying with the second baby. *Lancet* 358, 986–987.

International Institute for Population Sciences (IIPS) and Macro International. National Family Health Survey (NFHS-3), 2005–06: India: Volume I and II. Mumbai: IIPS; 2007.

International Institute for Population Sciences (IIPS). National Family Health Survey (NFHS-4), 2015-16: Mumbai 2017

Issaka, A., Agho, K., Burns, P., Page, A., & Dibley, M. (2015). Determinants of inadequate complementary feeding practices among children aged 6–23 months in Ghana. *Public Health Nutrition*, *18*(4), 669-678. doi:10.1017/S1368980014000834

Jansen, E., Williams, K. E., Mallan, K. M., Nicholson, J. M., & Daniels, L. A. (2018). Bidirectional associations between mothers' feeding practices and child eating behaviours. *The International Journal of Behavioral Nutrition and Physical Activity*, 15(1), 3. https://doi.org/10.1186/s12966-018-0644-x

Kalita, D., & Borah, M. (2016). Current practices on infant feeding in rural areas of Assam, India: A community based cross sectional study. *International Journal of Community Medicine and Public Health*, *3*(6), 1454-1460.

Kamble, B. D., Kaur, R., Acharya, B. P., Gupta, M., & 2015 Batch B (2020). Infant and young child feeding practices among mothers of children aged 6 months -2 years in a rural area of Haryana: A qualitative study. *Journal of Family Medicine and Primary Care*, *9*(7), 3392–3398. https://doi.org/10.4103/jfmpc.jfmpc_164_20

Kavitha, S., Nadhiya, C., & Parimalavalli, R. (2014). Study of Complementary feeding practices among mothers of infants aged six months to one year. *Healthline*, *5*(2), 29-35.

Khan, A. M., Kayina, P., Agrawal, P., Gupta, A., & Kannan, A. T. (2012). A study on infant and young child feeding practices among mothers attending an urban health center in East Delhi. *Indian Journal of Public Health*, *56*(4), 301.

Khan, G. N., Ariff, S., Khan, U., Habib, A., Umer, M., Suhag, Z., Hussain, I., Bhatti, Z., Ullah, A., Turab, A., Khan, A. A., Garzon, A. C., Khan, M. I., & Soofi, S. (2017). Determinants of infant and young child feeding practices by mothers in two rural districts of Sindh, Pakistan: a cross-sectional survey. *International Breast Feeding Journal*, *12*, 40. https://doi.org/10.1186/s13006-017-0131-z

Kremers, S. P., Brug, J., de Vries, H., & Engels, R. C. (2003). Parenting style and adolescent fruit consumption. *Appetite*, 41(1), 43–50. https://doi.org/10.1016/s0195-6663(03)00038-2

Kruger, R., & Gericke, G. J. (2003). A qualitative exploration of rural feeding and weaning practices, knowledge and attitudes on nutrition. *Public Health Nutrition*, *6*(2), 217–223. https://doi.org/10.1079/PHN2002419

Kummer, A. (2008). *Cleft palate & craniofacial anomalies: Effects on speech and resonance* (2nd edition). New York, NY: Cengage Learning.

Lake. (2022). Babycenter. https://www.babycenter.com/baby/solids-finger-foods/when-can-my-baby-eat-spicy-foods_1368539#:%7E:text=You%20can%20introduce%20herbs%20and,or%20sugar%20to%20their%20food

Laroia, N., & Sharma, D. (2006). The religious and cultural bases for breast feeding practices among the Hindus. *Breast Feeding Medicine: The Official Journal of the Academy of Breast feeding Medicine*, *1*(2), 94–98. https://doi.org/10.1089/bfm.2006.1.94

Larsen, J. K., Hermans, R. C., Sleddens, E. F., Engels, R. C., Fisher, J. O., and Kremers, S. S. (2015). How parental dietary behavior and food parenting practices affect

children's dietary behavior. Interacting sources of influence? *Appetite* 89, 246–257. doi: 10.1016/j.appet.2015.02.012

Lee, Ellie & Furedi, Frank. (2009). *Follow-on Formula milk: literature review.* 10.13140/2.1.2833.0885.

Liaquathali, F., Maruthupandian, J., & Govindasamy, R. (2020). An assessment of age-appropriate infant and young child feeding practices among children in Kancheepuram district, Tamil Nadu, India. *Journal of Family Medicine and Primary Care, 9*(9), 4692–4698. https://doi.org/10.4103/jfmpc.jfmpc_668_20

Lodha, S., & Bharti, V. (2013). Assessment of complementary feeding practices and misconceptions regarding foods in young mothers. *International Journal of Food and Nutritional Sciences, 2*(3), 85.

Logemann, J.A. (1998) *The Evaluation and Treatment of Swallowing Disorders. 2nd Edition,* Pro-EdInc., Austin. http://dx.doi.org/10.1097/00020840-199812000-00008

Lorenz, K. (1965). *Evolution and modification of behavior.* Chicago: Univ. Chicago Press, 1(2), 1.

Mahmood, S. E., Srivastava, A., Shrotriya, V. P., & Mishra, P. (2012). Infant feeding practices in the rural population of north India. *Journal of Family & Community Medicine*, *19*(2), 130–135. https://doi.org/10.4103/2230-8229.98305

Mallan, K. M., Jansen, E., Harris, H., Llewellyn, C., Fildes, A., & Daniels, L. A. (2018). Feeding a fussy eater: Examining longitudinal bidirectional relationships between child fussy eating and maternal feeding practices. *Journal of Pediatric Psychology, 43*(10), 1138-1146.

Mealtime Routines and Tips. (2021, July 23). Centers for Disease Control and Prevention. https://www.cdc.gov/nutrition/infantandtoddlernutrition/mealtime/mealtime-routines-and-tips.html

Mehlawat, U., Puri, S., & Rekhi, T. K. (2020). Breast feeding practices among mothers at birth and at 6 months in urban areas of Delhi-Ncr, India. *Jurnal Gizi dan Pangan*, *15*(2), 101-108.

Mennella, J. A., Jagnow, C. P., & Beauchamp, G. K. (2001). Prenatal and postnatal flavor learning by human infants. *Pediatrics*, *107*(6), E88. https://doi.org/10.1542/peds.107.6.e88

Mondal, T., Sarkar, A. P., Shivam, S., & Thakur, R. P. (2014). Assessment of infant and young child feeding practice among tribal women in Bhatar block of Burdwan district in West Bengal, India. *International Journal of Medicine Science and Public Health*, *3*(1), 324-6.

Monte, Cristina & Giugliani, Elsa. (2004). Recommendations for the complementary feeding of the breastfed child. *Jornal de Pediatria*. 80. S131-S141. 10.2223/JPED.1245.

Morris, S. E., & Klein, M. D. (2000). *Pre-Feeding Skills: A comprehensive resource for mealtime development (2nd edition).* Tucson, Arizona: Therapy Skill Builders.

Morris, S., & Klein, M. (1987) *Pre-feeding skills: A comprehensive resource for feeding development.* United States: Therapy Skill Builders.

Nawaz-Khan, G., Ariff, S., Khan, U., Habib, A., Umer, M., & Suhag, Z. & Soofi, S.(2017). Determinants of infant and young child feeding practices by mothers in

two rural districts of Sindh, Pakistan: A cross-sectional survey. *International Breast Feeding Journal, 12*, 40.

Neifert MR. Breastmilk transfer: positioning, latch-on and screening for problems in milk transfer. *Clin Obstet Gynecol.* 2004; 47:656–75. doi: 10.1097/01.grf.0000136183.12304.96.

Olatona, F. A., Adenihun, J. O., Aderibigbe, S. A., & Adeniyi, O. F. (2017). Complementary Feeding Knowledge, Practices, and Dietary Diversity among Mothers of Under-Five Children in an Urban Community in Lagos State, Nigeria. *International Journal of MCH and AIDS*, 6(1), 46–59. https://doi.org/10.21106/ijma.203

Patel, A., Pusdekar, Y., Badhoniya, N., Borkar, J., Agho, K. E., & Dibley, M. J. (2012). Determinants of inappropriate complementary feeding practices in young children in India: secondary analysis of National Family Health Survey 2005-2006. *Maternal & Child Nutrition*, 8 Suppl 1(Suppl 1), 28–44. https://doi.org/10.1111/j.1740-8709.2011.00385.x

Paul, I. M., Bartok, C. J., Downs, D. S., Stifter, C. A., Ventura, A. K., & Birch, L. L. (2009). Opportunities for the primary prevention of obesity during infancy. *Advances in Pediatrics*, *56*(1), 107–133. https://doi.org/10.1016/j.yapd.2009.08.012

Pradhan, R., Arora, A., & Pradhan, R. (2016). Infant and young child feeding (IYCF) practices amongst mothers in Chandigarh, India. *Journal of Indian Dietetic Association, 39*, 41-50.

Pregnancy, Birth and Baby. (n.d.-b). Pregnancy Birth and Baby. https://www.pregnancybirthbaby.org.au/

Priti Kogade, Abhay Gaidhane, Sonali Choudhari, Mahalaqua Nazli Khatib, Umesh Kawalkar, Shilpa Gaidhane, Quazi Syed Zahiruddin. (2019). Socio-cultural determinants of infant and young child feeding practices in rural India. *Medical Science*, 23(100), 1015-1022

Rao, S., Swathi, P. M., Unnikrishnan, B., & Hegde, A. (2011). Study of complementary feeding practices among mothers of children aged six months to two years-A study from coastal south India. *The Australasian Medical Journal*, *4*(5), 252.

Rathaur, V. K., Pathania, M., Pannu, C., Jain, A., Dhar, M., Pathania, N., & Goel, R. (2018). Prevalent infant feeding practices among the mothers presenting at a tertiary care hospital in Garhwal Himalayan region, Uttarakhand, India. *Journal of Family Medicine and Primary Care*, *7*(1), 45.

Roess, A. A., Jacquier, E. F., Catellier, D. J., Carvalho, R., Lutes, A. C., Anater, A. S., & Dietz, W. H. (2018). Food consumption patterns of infants and toddlers: findings from the Feeding Infants and Toddlers Study (FITS) 2016. *The Journal of Nutrition*, *148*(suppl_3), 1525S-1535S.

Rosenkranz, R. R., & Dzewaltowski, D. A. (2008). Model of the home food environment pertaining to childhood obesity. *Nutrition Reviews*, *66*(3), 123–140. https://doi.org/10.1111/j.1753-4887.2008.00017.x

Ross, M. G., & Nijland, M. J. (1998). Development of ingestive behavior. *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology*, *274*(4), R879-R893.

Sapra, D., Ray, S., Jindal, A. K., & Patrikar, S. (2015). Infant and young child feeding practices amongst children referred to the paediatric outpatient department. *Medical Journal Armed Forces india, 71*(4), 359-362.

Scaglioni, S., Salvioni, M., &Galimberti, C. (2008). Influence of parental attitudes in the development of children eating behaviour. *British Journal of Nutrition*, 99(S1), S22-S25. doi:10.1017/S0007114508892471

Schwartz, C., Scholtens, P. A., Lalanne, A., Weenen, H., & Nicklaus, S. (2011). Development of healthy eating habits early in life. Review of recent evidence and selected guidelines. *Appetite*, 57(3), 796–807. https://doi.org/10.1016/j.appet.2011.05.316

Selzam S, McAdams TA, Coleman JRI, Carnell S, O'Reilly PF, Plomin R, et al. (2018) Evidence for gene-environment correlation in child feeding: Links between common genetic variation for BMI in children and parental feeding practices. *Public Library of Science Genetics* 14(11): e1007757. https://doi.org/10.1371/journal.pgen.1007757

Semahegn, A., Tesfaye, G., & Bogale, A. (2014). Complementary feeding practice of mothers and associated factors in Hiwot Fana Specialized Hospital, Eastern Ethiopia. *The Pan African Medical Journal*, *18*, 143. https://doi.org/10.11604/pamj.2014.18.143.3496

Sheikh & Jan, Shah Sumaya. (2021). Modified Kuppuswamy socioeconomic scale updated for the year 2021. *Indian Journal of Forensic and Community Medicine*. 8. 1-3. 10.18231/j.ijfcm.2021.001.

Srikanth, L., Subbiah, K., & Srinivasan, S. (2017). Beliefs and practices of newborn feeding in tribal areas of India: a decennary review. *International Journal of Community Medicine and Public Health*, *4*(2), 281-5.

Stang, J., and Loth, K. A. (2011). Parenting style and child feeding practices: potential mitigating factors in the etiology of childhood obesity. *Journal of the American Dietetic Association* 111, 1301–1305. doi: 10.1016/j.jada.2011.06.010

Sullivan, S. A., & Birch, L. L. (1994). Infant dietary experience and acceptance of solid foods. *Pediatrics, 93*(2), 271–277. https://pubmed.ncbi.nlm.nih.gov/8121740/

Swetha, R., Ravikumar, J., & Rao, R. N. (2014). Study of breast feeding practices in coastal region of South India: a cross sectional study. *International Journal of Contemporary Pediatrics*, *1*, 74-8.

Taye, A. A., Asegidew, W., Taderegew, M. M., Bizuwork, Y. G., & Zegeye, B. (2021). Formula feeding practice and associated factors among mothers with infants 0–6 months of age in Addis Ababa, Ethiopia: a community-based cross-sectional study. *Italian Journal of Pediatrics*, *47*(1), 1-9.

Törölä, H., Lehtihalmes, M., Yliherva, A., & Olsén, P. (2012). Feeding skill milestones of preterm infants born with extremely low birth weight (ELBW). *Infant behavior & Development, 35*(2), 187–194. https://doi.org/10.1016/j.infbeh.2012.01.005

United States Department of Agriculture (USDA). (2009). Complementary feeding. In: U. S. (USDA), editor. *Infant Nutrition and Feeding*. Washington, DC: United States Department of Agriculture (USDA). p. 101–28.

Vaughn, A. E., Ward, D. S., Fisher, J. O., Faith, M. S., Hughes, S. O., Kremers, S. P., Musher-Eizenman, D. R., O'Connor, T. M., Patrick, H., & Power, T. G. (2016).

Fundamental constructs in food parenting practices: a content map to guide future research. *Nutrition Reviews*, 74(2), 98–117. https://doi.org/10.1093/nutrit/nuv061

Velusamy, V., Premkumar, P. S., & Kang, G. (2017). Exclusive breast feeding practices among mothers in urban slum settlements: pooled analysis from three prospective birth cohort studies in South India. *International Breast Feeding Journal, 12*, 35. https://doi.org/10.1186/s13006-017-0127-8

Ventura, A. K., & Birch, L. L. (2008). Does parenting affect children's eating and weight status?. *The International Journal of Behavioral Nutrition and Physical Activity*, 5, 15. https://doi.org/10.1186/1479-5868-5-15

Walsh, A., Kearney, L., & Dennis, N. (2015). Factors influencing first-time mothers' introduction of complementary foods: a qualitative exploration. *BMC Public Health*, *15*(1), 1-11.

Webber, L., Cooke, L., Hill, C., & Wardle, J. (2010). Associations between Children's Appetitive Traits and Maternal Feeding Practices. *Journal of the American Dietetic Association*, 110(11), 1718-1722.

World Health Organization & United Nations Children's Fund (UNICEF). (2003). Global Strategy for Infant and Young Child Feeding. World Health Organization. https://apps.who.int/iris/handle/10665/42590

World Health Organization. Guiding Principles for Complementary Feeding of the Breastfed Child. Geneva: WHO Press (2001). Available from: http://www.who.int/nutrition/publications/guiding_principles_compfeeding_breastfed.Pdf

Yadavannavar, M. C., & Patil, S. S. (2011). Socio-cultural factors affecting breast feeding practices and decisions in rural women. *International Journal of Plant, Animal and Environmental Sciences*, *1*(2), 46-50.

Yu, C., Binns, C. W., & Lee, A. H. (2019). The Early Introduction of Complementary (Solid) Foods: A Prospective Cohort Study of Infants in Chengdu, China. *Nutrients*, 11(4), 760. https://doi.org/10.3390/nu11040760

Zahiruddin, Q. S., Kogade, P., Kawalkar, U., Khatib, N., & Gaidhane, S. (2016). Challenges and Patterns of Complementary Feeding for Women In Employment: A Qualita-tive Study from Rural India. *Current Research in Nutrition and Food Science Journal*, *4*(1), 48-53.

Zuppa, A. A., Tornesello, A., Papacci, P., Tortorolo, G., Segni, G., Lafuenti, G., ... & Carta, S. (1988). Relationship between maternal parity, basal prolactin levels and neonatal breast milk intake. *Neonatology*, *53*(3), 144-147.

APPENDIX

I

SURVEY TOOL TO ASSESS FEEDING PRACTICES

Section I- Demographic Data

Name of the child: Age/Gender:

Date of Birth: Date of evaluation:

Present address: Permanent address:

District:

Mobile no: Email id:

Mother's Name: Mother's Age:

Mother's Education: Employment:

Father's Name: Father's Age:

Father's Education: Employment:

Socioeconomic Status

Modified Kuppuswamy socioeconomic scale updated for the year 2021

Sl. No.	**Occupation of the Head Score**	**Score**
1	Legislators, Senior Officials & Managers	10
2	Professionals	9
3	Technicians and Associate Professionals	8
4	Clerks	7
5	Skilled Workers and Shop & Market Sales Workers	6
6	Skilled Agricultural & Fishery Workers	5
7	Craft & Related Trade Workers	4
8	Plant & Machine Operators and Assemblers	3
9	Elementary Occupation	2
10	Unemployed	1

Sl. No.	**Education of the Head Score**	**Score**
1	Profession or Honours	7
2	Graduate	6
3	Intermediate or diploma	5
4	High school certificate	4
5	Middle school certificate	3
6	Primary school certificate	2

7	Illiterate	1

Sl. No.	Updated Monthly Family Income in Rupees (2021)	Score
1	>123322	12
2	61663-123321	10
3	46129-61662	6
4	30831-46128	4
5	18497-30830	3
6	6175-18496	2
7	<6174	1

Sl. No.	Socioeconomic Class	Score
1	Upper (I)	26-29
2	Upper Middle (II)	16-25
3	Lower Middle (III)	11-15
4	Upper Lower (IV)	5-10
5	Lower (V)	<5

Religion: Caste:

Mother tongue:

Rural/Urban: No. of children in the family:

First time mother/ second time mother:

Type of family: Nuclear/Joint

No. of persons in the family: No. of elders in the family:

Type of diet:

a. Vegan (No milk and milk products. Includes fruits, vegetables, cereals and pulses)
b. Vegetarian (Includes milk and milk products, fruits, vegetables, cereals and pulses)
c. Eggetarian (Include eggs, milk and milk products, fruits, vegetables, cereals and pulses)
d. Non-veg.(Include eggs, fish, meat, milk and milk products, fruits, vegetables, cereals & pulses)
e. Jain (Completely lacto-vegetarian, no roots and underground vegetables such as onion, potato, garlic etc)

Who is the main feeder?

a. Mother
b. Father
c. Grandmother
d. Guardian

e. Maid

How often does the main feeder feed the child?

a. Always
b. Often
c. Sometimes

How often do you let the child feed him/her?

a. Always
b. Often
c. Sometimes

What is the time taken by the caregiver to feed the child?

a. 10-15 mins
b. 15-30 mins
c. 30-45 mins
d. More than 45 mins

Section II- General Health, Behavior and Feeding Behavior

1. How would you rate your child's health?

a. My child seems to be less healthy than other children I know
b. My child has never been seriously ill
c. When there is something going around my child usually catches it; I expect my child will have a very healthy life
d. I worry about my child's health more than other people worry about their children's health

2. Considering your child's age and abilities, has he/she been limited in any of the following because of health or learning problems?

Sr.No		YES	NO
1	Feeding		
2	Eating		
3	Sleeping		
4	Grasping		
5	Rolling over		
6	Playing		
7	Taking steps		
8	Understanding and talking		

3. How much bodily pain or discomfort (due to gas, teething, injury, illness) has your child had anywhere in his/her body?

4. How much do you agree/disagree with each statement about your child's general behavior?

Sr.No		AGREE	DISAGREE
1	My child's behaviour is sometimes difficult to manage		
2	My child seems to misbehave more often than other children I know		
3	People have complimented me on my child's behaviour		
4	Others have complained about my child's behaviour		

5. How much do you agree/disagree with each statement about your child's eating behaviour?

Sr.No		AGREE	DISAGREE
1	My child is easy to feed, compared to children of similar age		
2	My child is not a picky or a fussy eater		

Does the child have any food allergy? If yes specify

Section III- Particulars Regarding Introduction of Food

A) Breast feeding

1. Was the child breastfed? Yes / No

2. At what age was breast feeding terminated?

B) Introduction to Formula milk/ any other source of milk

1. Was any kind of milk other than breast milk introduced to the child within the first 3-4 months of life? Yes/ No

2. If yes, what was it?

a. Cow milk
b. Formula milk

3. What was the reason for introducing other type of milk?

a. insufficient milk secretion
b. inability to suck during breast feeding
c. any other

4. At what age was the other type of milk introduced to the child?

a. Birth to 1 month
b. 1-2 months

c. 2-3 months
d. 3-4 months
e. Any other

5. Which type of utensil was mostly used to feed the child?

a. Olle/paladai/nifty cup

b. Spoon

c. Feeding Bottle with specific nipple size

d. Syringe/Dropper

d. Any other

6. In which position was the child was fed during feeding the other type of milk most of the times?

a. Held in caretaker's arms

b. On caretaker's lap

c. On flat surface

d. Sitting with support from caregiver's trunk

e. Any other

C) Introduction to Complementary feeding

1. When was the next type of food?
(e.g., pureed food like ragi porridge, cerelac etc.) Introduced? (Specify food given)

a. 4-5 months
b. 5-6 months
c. 6-7 months
d. Any other

2. What was the consistency of the food introduced?

a. 0- Thin

b. 1- Slightly Thick

c. 2- Mildly Thick

d. 3- Moderately Thick

e. 4-Extremely Thick

3. What utensil was used to introduce the food?

a. Spoon

b. Feeding bottle with spoon attached

c. Sippy cup or open cup

d. Nifty cup

e. Special spoons

f. Any other

4. In which position was the child was fed?

a. Held in caretaker's arms
b. On caretaker's lap
c. On flat surface
d. Sitting with support from care giver's trunk
e. Any other

<u>D) Transition to other food consistencies</u>

1. When was the next type of food consistency introduced? (Specify food items given)

a. 6-7 months
b. 7-8 months
c. 8-9 months
d. Any Other

2. What was the consistency of the food?

a. Soft and minced

b. Soft and bite sized

c. Easy to chew

d. Any other

3. How was this consistency fed to the child?

a. Mother's fingers
b. Spoon
c. Nibbler

d. Any other

4. In which posture the child was usually fed?

a. Caretaker's lap with infant in sitting position

b. Special seat/high chair

c. Any other

E) Introduction of water in child's diet

1. When was water first given to the child?

a. 4-5 months
b. 5-6 months
c. After 6 months
d. Any other

2. What was usually used to feed water?

a. Glass with or without rim

b. Steel glass with attached straw

c. Sippy cup or open cup
d. Bowl and spoon
e. Olle/ nifty cup
f. Any other

3. Which posture was used usually to feed water?

a. Held in caretaker's arm
b. On caretaker's lap
c. On flat surface
d. Sitting with support from care giver's trunk
e. Any other

F) Textures introduced in the child's diet

1. What other foods were provided? Specify under each the type of texture/consistency and age at which it was introduced along with utensils used.

Type of food	**Age of Introduction**	**Through which food item**
Cereals		
Pulses		

Eggs		
Any other		

G) Flavours introduced to the child

1. What tastes have been exposed to the child and at what age?

Taste	**Age of introduction**	**Through what food**
Sweet		
Spicy		
Sour		
Bitter		

Image sources:

https://pixabay.com/

https://iddsi.org/framework/