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Factors Responsible for Inappropriate Complementary Feeding Practices

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Abstract

Background: *Appropriate complementary feeding is critical for a child's growth and development, particularly from 6 months of age when breast milk alone is no longer sufficient to meet nutritional needs. However, complementary feeding practices remain suboptimal in many settings.*

Objective: *To identify the factors responsible for inappropriate complementary feeding practices among mothers of young children.*

Methods: *This cross-sectional study was conducted in the inpatient and outpatient Paediatrics departments of Dhaka Shishu Hospital and the Institute of Child Health & Shishu Sasthya Foundation Hospital (ICH & SSFH), Dhaka, Bangladesh, from September 2009 to December 2009. In this study, we included a total of 400 mothers who were enrolled in the study 200 from Dhaka Shishu Hospital and 200 from ICH & SSFH attending the inpatient and outpatient departments.*

Results: *The mean age of the children was 14.08 ± 3.755 months, with a slightly higher proportion of female participants (54.8%). A majority of mothers were housewives (85.2%) and had only primary education (61%). Most mothers (71.0%) did not receive any counseling on infant feeding during antenatal visits. While 87.0% initiated breastfeeding within the first hour of delivery, only 44.0% began complementary feeding at the recommended age of 6 months. Thin consistency and inadequate quantity of food were common, observed in 74.0% of cases. Family members and media influenced feeding choices in nearly half of the households. Only 21.5% of mothers had correct knowledge about timing, consistency, and quantity of complementary feeding. A statistically significant association was found between maternal education and knowledge of appropriate feeding practices ($\chi^2 = 20.008$, $p < 0.001$).*

Conclusion: *Complementary feeding practices were found to be largely inappropriate in this population. Contributing factors included low maternal education, lack of counseling during antenatal and immunization visits, external influences, and limited awareness of feeding guidelines. Strengthening health education and counseling during routine maternal and child health services is essential to improve complementary feeding practices.*

Keywords: *Complementary feeding, Breastfeeding, Maternal education, Infant nutrition, Feeding practices*

1. INTRODUCTION

Adequate nutrition during infancy and early childhood is essential for every child's full physical and cognitive development[1].The first two years of life are considered a "critical window" during which optimal growth, health, and behavioral development must be supported[1] Any linear growth retardation acquired during this period is often irreversible beyond the second year[2]

Poor nutrition during these formative years leads to immediate consequences such as increased morbidity and mortality, along with delays in mental and motor development[1] Malnutrition is frequently linked to the timing and quality of complementary feeding[3] Suboptimal breastfeeding and inappropriate complementary feeding practices, combined with a high burden of infectious diseases, are among the key causes of malnutrition in early childhood[1, 4]

The World Health Organization (WHO) recommends exclusive breastfeeding for the first six months of life, followed by the introduction of appropriate complementary foods while continuing breastfeeding up to at least two years of age.[1,5,6] Complementary feeding is defined as the process of introducing nutrient-rich foods and liquids alongside breast milk, beginning at around six months.[7] Terms like "weaning," "weaning foods," and "Beikost" are also used to describe this transition.[1] As infants grow, breast milk alone no longer meets their increasing nutritional needs, especially for energy, vitamin A, and iron[6, 7] Complementary foods are necessary to bridge these nutritional gaps. These foods must be introduced promptly and should be safe, age-appropriate in texture, and nutritionally adequate.[8]

According to WHO guidelines, complementary feeding should start at six months of age. Infants should be fed 2–3 times daily from 6 to 8 months, increasing to 3–4 times a day from 9 to 24 months, with 1–2 additional nutritious snacks as needed[9] In settings with poor sanitation, early introduction of complementary foods can increase the risk of diarrheal diseases and malnutrition[10, 11]

Challenges during weaning can lead to both short- and long-term health issues. Short-term issues include reduced breastfeeding frequency, iron deficiency (especially if iron-fortified cereals are not used), dehydration, diarrhea, constipation, and colic.[12] In the long term, inappropriate complementary feeding can contribute to malnutrition, including conditions like kwashiorkor in low-income settings, or obesity and associated non-communicable diseases such as hypertension and atherosclerosis in more affluent populations.[12] Cultural beliefs, parental knowledge, and household practices also strongly influence feeding behaviors.[6]

In Bangladesh, complementary feeding often begins either too early or too late, and the foods provided are frequently of poor nutritional quality.[13] Growth faltering is common due to infrequent feeding, inappropriate food choices, and inadequate quantities.[14] Low-quality complementary foods combined with inappropriate feeding practices put under-twos in developing countries at high risk for under nutrition and its associated outcomes.[15] In rural areas of Bangladesh, the rate of underweight children increases drastically from 22% at six months to 60% by one year of age.[16]

Despite the availability of nutrient-dense local foods like fish, dal, and eggs, these are rarely included in infants' diets[16] This may be due to limited household access or cultural feeding practices. In many cases, even when these foods are available, they are not prioritized for young children[16] The problem is compounded by poverty and maternal undernutrition[17]

Improving complementary feeding remains a global challenge, particularly in low-resource settings[3] In Bangladesh, the issue is exacerbated by a lack of awareness among caregivers regarding the importance of good complementary foods[16] However, evidence shows that it is possible to improve infant feeding behaviors in the short term by promoting increased food intake, meal frequency, energy density, and micronutrient consumption[18]

Utilizing existing health services effectively can support better complementary feeding practices.[19,20] Missed opportunities, such as routine immunization visits, should be leveraged to counsel caregivers on proper feeding practices.[21] Long-term strategies should include socioeconomic interventions, especially improving girls' education and caregiver knowledge about the timing, consistency, and quantity of complementary feeding.[22] Therefore, in this study, we aimed to identify the factors responsible for inappropriate complementary feeding practices among mothers of young children.

2. METHODOLOGY & MATERIALS

This cross-sectional study was conducted in the inpatient and outpatient Paediatrics departments

of Dhaka Shishu Hospital and the Institute of Child Health & Shishu Sasthya Foundation Hospital (ICH & SSFH), Dhaka, Bangladesh, from September 2009 to December 2009. In this study, we included a total of 400 mothers who were enrolled in the study—200 from Dhaka Shishu Hospital and 200 from ICH & SSFH attending the inpatient and outpatient departments.

These are the following criteria to be eligible for enrollment as our study participants:

2.1. Inclusion Criteria

Mothers were eligible to participate if they had children aged between 6 months and 2 years, of either sex.

2.2. Exclusion Criteria

Mothers were excluded from the study if their children had congenital anomalies such as cleft lip, cleft palate, or congenital heart disease, or if the child suffered from chronic conditions such as cerebral palsy or mental retardation.

Mothers who were unwilling to participate were also excluded from the study.

2.3. Data Collection Procedure

Informed written consent was taken after an explanation of the study procedure. Data were collected through face-to-face interviews using a pre-tested, structured questionnaire. The questionnaire gathered information on multiple aspects of complementary feeding practices, including the age of initiation, types of food offered, feeding frequency, food consistency, continued breastfeeding, and challenges faced during the complementary feeding period. It also explored factors associated with inappropriate complementary feeding.

Food consistency was assessed as appropriate if the food was thick enough to remain on a spoon and hold its shape on a plate. Foods that were runny and flowed off the spoon, failing to hold shape on a plate, were categorized as thin and considered inappropriate. Food quantity was evaluated by demonstrating a 250 ml measuring cup. The recommended quantities were:

- For children 6–8 months: gradually increasing to approximately ½ cup per meal
- For children 9–11 months: approximately ½ cup per meal
- For children 12–23 months: approximately ¾ to 1 cup per meal

Complementary feeding was considered appropriately timed if initiated at 6 months of age.

2.4. Statistical Analysis

All data were recorded systematically in a pre-formatted data collection form. Quantitative data was expressed as mean and standard deviation, and qualitative data was expressed as frequency distribution and percentage. Descriptive statistics were used to summarize demographic variables and feeding practices. Associations between variables were evaluated using the chi-square (χ^2) test. A p-value <0.05 was considered significant. Statistical analysis was performed by using SPSS 12 (Statistical Package for Social Sciences) for Windows version 10. This study was ethically approved by the Ethical Review Committee of Dhaka Shishu Hospital.

3. RESULTS

Table 1. *Demographic characteristics of the patients (n = 400)*

Demographic characteristics	Frequency	Percentage (%)
Age (months)		
Mean ± SD (Min, Max)	14.08 ±3.755 (7,24)	
Gender		
Male	181	45.2
Female	219	54.8
Residence		
Rural	182	45.5
Urban	129	32.2
Slum	89	22.2

This table summarizes the demographic characteristics of the 400 children included in the study. The mean age of the participants was 14.08 months (±3.755), with ages ranging from 7 to 24 months. In terms of gender distribution, 45.2% were male (n=181) and 54.8% were female (n=219). Regarding residence, the majority of the children were from rural areas (45.5%), followed by urban (32.2%) and slum areas (22.2%).

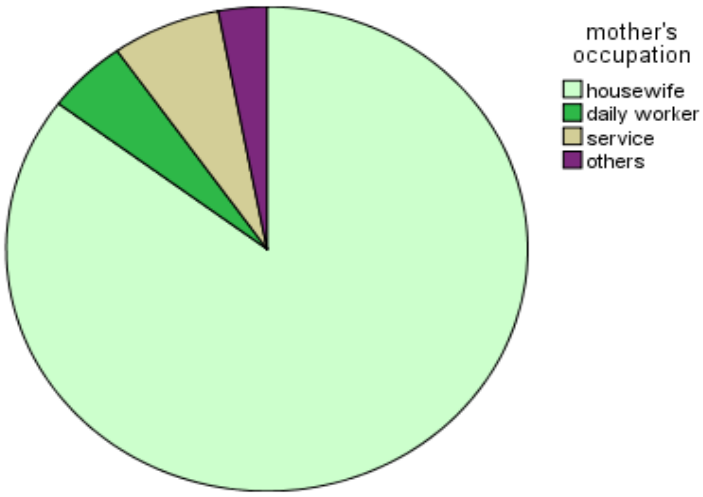

Figure 1. *Distribution of children by mothers' occupation*

The pie chart shows the distribution of mothers' occupations. Most of the mothers were housewives (85.2%), which is higher than other patterns of occupation, such as daily workers, services, and others.

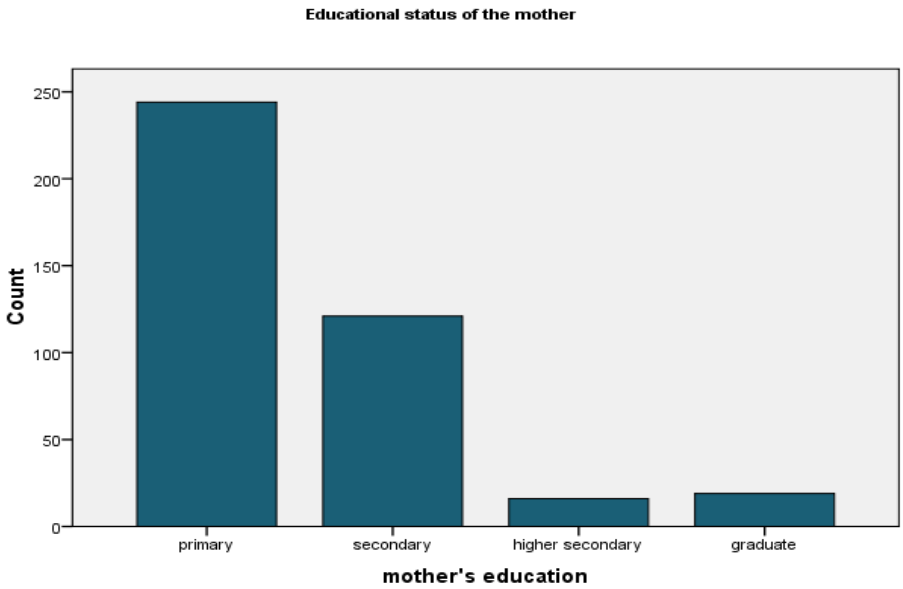

Figure 2. *Mother's educational status of study patients*

Figure 2 illustrates the educational status of the mothers. The majority had primary education, accounting for 244 (61%) of the respondents. This was followed by 121 (30%) mothers with secondary education, 16 (4%) with higher secondary education, and only 19 (4.8%) who were graduates.

Table 2. *Status of the counseling about infant feeding during the Antenatal period.*

	Frequency	Percentage (%)
Yes	116	29.0
No	284	71.0
Total	400	100.0

Table 2 presents the status of counseling received by mothers about infant feeding during the antenatal period. Out of the total 400 participants, only 116 mothers (29.0%) reported receiving counseling on infant feeding, while the majority, 284 mothers (71.0%), did not receive any such guidance during their antenatal visits

Table 3. *Distribution of patients by start of breastfeeding and first feeding after birth*

Start of breastfeeding	Frequency	Percentage (%)
Within 1st hour of delivery	348	87.0
After 1st hour of delivery	52	13.0
Total	400	100.0
First feeding after birth		
Breast milk	316	79.0
Sugar water	48	12.0
Cows milk	20	5.0
Others	16	4.0
Total	400	100.0

Table 3 presents data on the initiation of breastfeeding and the type of first feed given after birth. A majority of the mothers (87.0%) began breastfeeding within the first hour of delivery, while 13.0% initiated breastfeeding after the first hour. Regarding the first feed after birth, 79.0% of the infants received breast milk, whereas 12.0% were given sugar water, 5.0% received cow's milk, and 4.0% were fed other substances.

Table 4. *Distribution of children by complementary feeding advice during immunization and starting time of complementary feeding*

Complementary feeding advice	Frequency	Percent
Received	68	17.0
Not received	332	83.0
Total	400	100.0
Starting time of complementary feeding		
Before 6 months	128	32.0
At 6 months	176	44.0
7 month-1year	76	19.0
1-2year	20	5.0
Total	400	100.0

Table 4 shows the distribution of children based on whether mothers received complementary feeding advice during immunization and the timing of complementary feeding initiation. Only 17.0% of mothers reported receiving advice on complementary feeding during immunization sessions, while 83.0% did not. In terms of starting complementary feeding, 44.0% began at the recommended age of 6 months, 32.0% introduced complementary foods before 6 months, 19.0% between 7 months and 1 year, and 5.0% as late as 1 to 2 years of age.

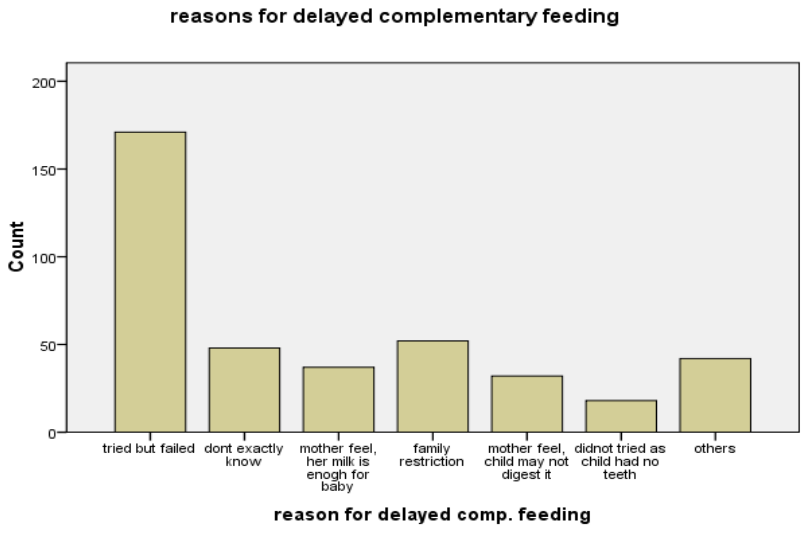

Figure 3. *Reasons for delayed complementary feeding*

The bar diagram shows the reason for delayed complementary feeding. The most common reason for delayed CF was an unsuccessful attempt in 42 (42.8%) of cases, as the child used to vomit (bring out food), so they stopped trying.

Table 5. *Reason for early complementary feeding*

	Frequency	Percentage(%)
Insufficient breast milk	80	62.5
Others	48	37.5
Total	128	100

Table 5 highlights the reasons for early initiation of complementary feeding among 128 mothers who started before the recommended time. The most common reason was perceived insufficient breast milk, reported by 62.5% of the respondents. The remaining 37.5% cited other reasons for early initiation.

Table 6. *Types of complementary food and use of marketed complementary foods*

Main component	Frequency	Percentage (%)
Family food	76	19.0
Gruel	36	9.0
Animal milk	76	19.0
Powder milk	108	27.0
Suzi	104	26.0
Total	400	100.0
Marketed complementary food		
Yes	180	45.0
No	220	55.0
Total	400	100.0

Table 6 presents the types of complementary foods given and the use of commercially marketed products. The most commonly used complementary food was powdered milk (27.0%), followed closely by suzi at 26.0%. Family food and animal milk each accounted for 19.0%, while gruel was used by 9.0% of participants. Additionally, 45.0% of the respondents reported using marketed/ commercial complementary foods, whereas 55.0% did not.

Table 7. *Consistency, quantity and number of complementary feeds per day*

Consistency	Frequency	Percent
Thin	296	74.0
Appropriate	104	26.0
Total	400	100.0
Quantity		
Less quantity for age	296	74.0
Appropriate for the age	104	26.0
Total	400	100.0
No. per day		
one	12	3.0
two	132	33.0
three	220	55.0
more than 3	36	9.0
Total	400	100.0

Table 7 presents data on the consistency, quantity, and frequency of complementary feeding among the study participants. A large proportion of children (74.0%) were fed foods with a thin consistency, while only 26.0% received foods with appropriate consistency. Similarly, 74.0% of children were given less than the appropriate quantity of food for their age, and only 26.0% received the recommended quantity. In terms of feeding frequency, 55.0% of children were fed three times per day, while 33.0% were fed twice daily. A smaller proportion received complementary food more than three times a day (9.0%), and only 3.0% were fed once daily.

Table 8. *Distribution of children by selection of food by mother, family /neighbors /TV /radio*

Selection of food by the mother	Frequency	Percentage (%)
Yes	372	93.0
No	28	7.0
Total	400	100.0
Advised by family members		
Yes	164	41.0
No	236	59.0
Total	400	100.0
Influenced by neighbors /TV /radio	196	49.0
Yes	196	49.0
No	204	51.0
Total	400	100.0

The table outlines the factors influencing the selection of complementary foods for children. In 93.0% of cases, mothers themselves selected the food items for their children, while in 7.0%, the selection was not made by the mother. Family members played a role in influencing food choices in 41.0% of cases, whereas 59.0% of mothers reported no such advice from family. Additionally, nearly half of the respondents (49.0%) acknowledged being influenced by neighbors, television, or radio, while the remaining 51.0% reported no such external influence.

Table 9. *Knowledge on timing, consistency, and quantity of complementary feeding*

	Frequency	Percentage (%)
Yes	85	21.5
No	315	78.5
Total	400	100.0

Table 9 shows that only 85 (21.5%) of mothers had knowledge regarding the appropriate timing, consistency, and quantity of complementary food.

Table 10. *Distribution of the children by mother's education and the knowledge of comp feeding practice*

Mother's education	knowledge of comp feeding practice		Total	Chi-Square value	P value
	yes	no			
Primary	34	210	244	20.008	.000
Secondary and above	51	105	156		
Total	**85**	**315**	**400**		

Table 10 shows the relationship between mother's education and knowledge of complementary feeding practices. Among the 244 respondents who are primary-educated mothers, only 34 knew about complementary feeding. In contrast, 51 out of the 105 secondary-educated mothers know about complementary feeding practices. This relationship is statistically highly significant (chi square value=20.008, p value=.000).

4. Discussion

The transition from exclusive breastfeeding to the introduction of family food is a critical period in a child's development. Both breastfeeding and appropriate complementary feeding are essential in preventing infant morbidity and mortality, including malnutrition.

In this study, 79% of infants received breast milk as their first feed after birth, while 12% were given sugar water and 4% were fed cow's milk or other substances. These findings align with another study that reported similar trends—76% breast milk, 15% sugar water, and 9% cow's milk as the initial feed.[23]

All infants in this study were breastfed, with 87% initiating breastfeeding within the first hour of delivery. This is consistent with data from the National Strategy Paper (NSP) 2000, which reported that 99% of children aged 6–11 months were breastfed and 93% of those aged 12–23

months continued breastfeeding. Although breastfeeding practices are largely maintained, complementary feeding often falls short, starting too early or too late, and lacking adequate frequency, quality, and quantity.[16]

Our findings reveal that complementary feeding practices were inappropriate in a significant number of cases. Only 44% of mothers initiated complementary feeding at the recommended time of 6 months. Alarmingly, 32% introduced it too early, while 24% delayed its introduction. Both early and late initiation of complementary feeding are common in developing countries and pose health risks to children.[20] These findings are comparable with other studies, such as one reporting 41% timely initiation, and another in Delhi slums showing only 16.6% appropriate timing.[21,23]

The most common reason for delayed complementary feeding in our study was unsuccessful initial attempts. Mothers often misinterpret the child's natural reaction, such as pushing food out with the tongue, as vomiting, leading them to stop feeding. In reality, this is a normal part of adaptation to new textures and tastes. Educating mothers on feeding techniques and persistence is crucial. Additional reasons for delay included a lack of knowledge about the appropriate age to start and widespread misconceptions in the community.

Among those who initiated complementary feeding early, 62.5% cited insufficient breast milk as the reason. This often results from poor breastfeeding techniques that hinder effective milk production. Addressing such misconceptions and supporting mothers with practical breastfeeding advice can help delay the introduction of solid foods until the recommended age.

In this study, only 64% of mothers fed their children three or more times a day. Additionally, 74% of the children received food of thin consistency, and the same proportion were given less than the recommended quantity. These findings are comparable to those of A. Aggarwal et al. where it was observed that 39.3% of mothers provided three or more feeds daily, with 62% using thin consistency and 75% providing insufficient quantity. Alarmingly, only 3.5% of mothers in their study practiced complementary feeding with appropriate timing, quantity, and consistency.[21]

Regarding the type of complementary food, the most commonly used in our study were powdered milk (27%), suzi (26%), family food (19%), and animal milk (19%). A previous study found suzi (70%), khichuri (27%), and fish (9%) to be the most common complementary foods.[23]

According to the NSP, infants aged 6–11 months rarely receive protein-rich Bangladeshi staples like fish, dal, or eggs. Even when available, these foods are often excluded from infant meals. [16] Mothers should be encouraged to prepare modified family meals—mashed or softened and supplemented with small amounts of oil—to ensure easy swallowing and adequate nutrition. In addition, nutritious, homemade snacks should be promoted between meals.

A major finding of concern was the low level of knowledge regarding complementary feeding. Only 21.5% of mothers had accurate information on the appropriate timing, consistency, and quantity. Similarly, A. Aggarwal et al. reported that only 8% of mothers possessed sufficient knowledge about complementary feeding.[21]

Influence from external sources also played a significant role in feeding decisions. Nearly half of the mothers (49%) were influenced by neighbors, television, or radio, and 41% received advice from family members. Both sources of influence were significantly associated with feeding practices ($p < 0.001$). Maternal education was another critical factor—more educated mothers demonstrated better knowledge and practices related to complementary feeding ($p < 0.001$). Unfortunately, only 29% of mothers reported receiving counseling on infant feeding during antenatal care, and just 17% received advice during immunization visits. Counseling at these key touch points was significantly associated with improvements in feeding practices.

Bridging this knowledge gap requires a multifaceted approach. Enhancing female literacy, promoting nutrition education, and integrating feeding counseling into routine maternal and child healthcare, especially during antenatal visits and immunization sessions, are essential. Studies from India have shown that proper use of existing health services can significantly improve complementary feeding practices.[19,20,22]

5. LIMITATIONS OF THE STUDY

Our study was a double-center study, so it does not represent the whole community. The study period was short. In the present study quality of

complementary food, exact dietary intake, feeding procedure, and active feeding practices were not assessed.

6. Conclusion

The study findings show that complementary feeding is extremely essential from 6 months, while continuing breast-feeding to meet the needs of the growing baby. Complementary feeding practices are inappropriate in a large number of children. This study highlighted the factors responsible for inappropriate complementary feeding practices. The factors were mothers' illiteracy, improper counseling about breastfeeding and complementary feeding during the antenatal period and immunization sessions, influences by others (e.g., Family members/TV/Radio), and inadequate publicity of complementary feeding practices.

7. Recommendations

Attention should be focused on women's education, utilization of counseling sessions during antenatal check-ups and immunization sessions of the children, elimination of misconceptions regarding complementary feeding by imparting proper information and knowledge, and adequate publicity of complementary feeding practices.

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