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Insights into knowledge, attitude and practices on early complementary feeding of infants among Saudi mothers

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ABSTRACT

Background: The World Health Organization recommends that mothers avoid early complementary feeding of infants before the age of 6 months, to promote maximum growth and health. However, this practice is still high among Saudi mothers. This study aimed to assess knowledge, attitude and practices (KAP) towards early complementary feeding among Saudi mothers in Riyadh. **Methods**: A cross-sectional study was conducted in Riyadh city among 771 mothers of children, aged 6-24 months. Data was collected through an online questionnaire that assessed KAP aspect regarding early complementary feeding among mothers. **Results**: More than one-third of mothers (37.4%) had introduced early complementary feeding, out of which 83.3% later stated that the main reason for this was because they thought that the baby was old enough to receive complementary foods. The two most common types of complementary foods given to the baby before 6 months were liquids (83.0%) and mashed foods (72.9%). The mothers who introduced complementary feeding before 6 months of age compared to those who initiated complementary feeding after 6 months were observed to have a higher percentage of medium knowledge and neutral attitude (76.0% versus 54.4% and 55.2% versus 62.5%, (p<0.05), respectively). Mothers' knowledge and attitude significantly influenced their practices in relation to early complementary feeding (p<0.05). **Conclusion**: The findings demonstrated that the appropriate knowledge and attitude are important to promote the introduction of complementary feeding at 6 months in the population that was studied. Thus, education on complementary feeding should be promoted.

Keywords: Knowledge-attitude-practices, complementary feeding before 6 months, Saudi mothers

INTRODUCTION

Nutrient adequacy is crucial in the periods of infancy and early childhood, as it is necessary for ideal growth, health and development. The World Health Organization (WHO, 2003), has stated that complementary feeding should start when breast milk alone is no longer sufficient to meet the nutritional requirements of infants, and therefore other food and liquids are needed, along with breast milk. It has recommended that mothers breastfeed their infants from birth until they reach the age of 2 years and that complementary feeding should not be introduced before 6 months of

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age. Thus, early complementary feeding is the introduction of foods other than breastmilk to infants before the age of 6 months (WHO, 2003).

Infants who had been exposed to early complementary foods (before 6 months) were at higher risk of consuming foods and fluids that had microbial contamination (Tang, Lee & Binns, 2015). According to a study conducted in India, infants under 6 months of age were showed to have gastrointestinal system, kidneys and neurodevelopment that were not fully developed (Ip *et al.*, 2009). Another study concluded that infants who were fed exclusively with formula had a higher risk of developing acute otitis media compared to those infants who were exclusively breastfed (Rao *et al.*, 2011). In several countries of Middle East and North Africa region (the so-called MENA region), such as United Arab Emirates (UAE), Lebanon, Kuwait, Libya, Egypt, Bahrain and Yemen some mothers introduce non-milk fluids such as sweetened water and herbal teas to their infants who are under 6 months. Such a practice also appeared to be related to diarrhoea in infancy (Radwan, 2013; Batal, Boulghourjian & Akik, 2011; Al-Awadi & Amine, 1997; Shembesh, Balo & Singh, 1997; El Mougi *et al.*, 1981; Al-Sairafi & Al-Dallal, 2002; Central Statistical Organization, 1994). In addition, a systematic review revealed that infants who had been exposed early to solid foods were at higher risk of being overweight in childhood (Pearce, Taylor & Langley-Evans, 2013). The knowledge of appropriate nutrition of mothers has been demonstrated to have an important role on how the child will be fed. However, a study done in Kosova showed that although 88.4% of mothers had sufficient knowledge of complementary feeding, only 38.4% of them were willing to apply that knowledge (Berisha *et al.*, 2017).

In terms of practice, research studies on complementary feeding conducted in the Kingdom of Saudi Arabia (KSA) and Kuwait showed that the recent feeding practices were falling behind in their compliance with the WHO recommendations (El Mouzan *et al.*, 2009; Scott *et al.*, 2015). An earlier study done in the city of Riyadh in the KSA found that 51.4% of infants were formula fed by 1 month of age and 90% by 6 months of age, while 80.8% were introduced to solid food at the age of 4-6 months (El Mouzan *et al.*, 2009).

The theory of planned behaviour describes the linkage between knowledge, attitude and practices (KAP) among people in health studies (Manderson & Aaby, 1992; Launiala, 2009). There are a few studies on early complementary feeding in Saudi Arabia but none on early complementary feeding that have explored KAP of mothers in Saudi Arabia. This study was conducted to investigate the KAP of early complementary feeding among mothers in Riyadh.

MATERIALS AND METHODS

Study design and subjects

This cross-sectional study was undertaken in Riyadh city, from January to March 2019. A total of 771 Saudi mothers participated in the study. They fulfilled the following inclusion criteria: resident in Riyadh, were at procreative age (18-45 years old), have had a child age 6-24 months, have had infants without chronic diseases or metabolic disorders or health complications and were mothers of full-term infants. Ethical approval was obtained from the Institutional Review Board of Princess Nourah Bint Abdulrahman University (H-01-R-059/ 18-0364). All participants were fully aware of the requirements for participation and were informed that their participation was voluntary.

Data was collected using a convenient sampling technique through an online questionnaire.

Research tools

The KAP questionnaire was adapted from a previously validated questionnaire (Kittisakmontri *et al.*, 2018) and translated to Arabic and then translated back to English. It was modified before the back translation to meet the objectives of this study. To guarantee clear and ease of understanding by the participants, the questionnaire was tested among 23 individuals. Section 1 of the questionnaire contained questions about general information of mothers and demographic characteristics of the infants, such as mother's age, number of children level of education, occupation, income, child's gender, and age. Section 2 of the questionnaire focused on measuring KAP, as follows:

- Knowledge: questions on the knowledge of the mothers on the appropriate age for the introduction of complementary foods, the types of foods introduced prior to 6 months and their source(s) of information.
- Attitude: questions that assessed the attitude of mothers towards the introduction of liquids and semi-solid foods, and the sufficiency of breast milk to their infants before the age of 6 months.
- Practices: this assessment contained questions on the age of the infant at which mothers started the introduction of complementary foods, reasons that drove them to initiate early complementary feeding, the texture and characteristics of the early foods that were introduced.

To assess the interrelationship between the three aspects of KAP, a score was assigned for each of them.

Both knowledge and attitude were divided into three equal levels by dividing the total score of each aspect on 33.3% for the lowest level, 33.4-66.6% for medium level and 66.7-100.0% for the highest level. Categorisation was based on the total score obtained for each aspect. For knowledge, each correct and wrong answer was scored as 1 point and 0 point, respectively. Answers for attitude ranged from strongly disagree to strongly agree. These were scored as 4 points for strongly disagree, 3 point for disagree, 2 points for neutral, 1 point for agree and zero point for strongly agree. For practices, categorisation was based on the answer to the question, "when did you introduce complementary food to your child?"**.** Score was 0 and 1 for introducing the complementary feeding before and after 6 months of age of the infant, respectively.

Statistical analysis

The data was collected from the questionnaire, entered and analysed using the SPSS programme version 21. The total population was divided into two groups, based on the time complementary feeding was initiated: Group 1 (<6 months) defined as mothers who started introducing complementary feeding before 6 months of infant's age (n=288); and Group 2 (>6 months), defined as mothers who started introducing complementary feeding after 6 months of infant's age (n=483). Descriptive statistics were presented as percentage (%). To assess the differences between the two groups and the interrelationship between KAP variables, the Pearson correlation and chi-square tests were used. The results were considered statistically significant when p-value <0.05.

RESULTS

Social demographic

Of a total of 771 mothers who participated in the study, 37.4% (288)

had introduced early complementary feeding while 62.6% (483) had introduced complementary feeding after 6 months of the infant's age. In terms of the socio-demographic data, results showed that majority of mothers who introduced early complementary feeding were those with diploma or bachelors degree educational level (71.9%) and mothers with first-born infant (28.5%). However, there was no significance in the socio-demographic data between mothers who introduced complementary feeding before and after 6 months of age (Table 1).

Knowledge

Our results in Table 2 showed that the majority of the participants (65.5%) had chosen 6 months or later as an appropriate age for the introduction of complementary feeding among all mothers, indicating that they possessed knowledge that matched the WHO recommendation. In addition, 73.9% agreed that the most important factor to promote infant growth was exclusive breastfeeding for at least 6 months. Among the total of 483 (62.6% of all mothers) who introduced complementary feeding after 6 months or later, 90.9% of them chose 6 months as the appropriate age to start. Of a total of 288 mothers (37.4% of all mothers) who had introduced early complementary feeding, 40.9% of them had chosen 4 months as an appropriate age to start introducing complementary food.

There was a significant difference in the knowledge of mothers about the time for the introduction of semi-solid foods. The proportion of mothers who chose semi-solid as an appropriate food to be added before 6 months of age was 63.2%, whereas 34.0% chose semi-solid food as an inappropriate food to be added before 6 months of age (p=0.000).

There was no significant difference in knowledge in the introduction of liquid (p=0.290) and solid foods (p=0.175) between the two groups. On the introduction of liquid and semi-solid food during the first six months of infant's age, differences were observed based on the different types of complementary food: for example, juice, yoghurt, cereals and mashed foods were 55.6%, 56.9%, 81.9% and 74.0%, respectively. Most answers of mothers indicated that sugar and salt should not be added to the infant's complementary food before the age of 6 months based on their knowledge by 83.7% and 90% respectively. Notably, 54.2% of the first group (<6 months) and 58.4% of the second group (>6 months) were aware that healthcare professionals were the most reliable source of information about early complementary feeding (Table 2).

Attitude

Among the first group (<6 months), 57.2% (the total percentage of agree and strongly agree) had a positive attitude towards starting early complementary feeding, while in the second group (>6 months), 67% (the total percentage of disagree and strongly disagree) had a negative attitude towards starting early complementary feeding. Of the first group (<6 months) 26.7% indicated that breast milk alone was not enough to meet the infant's nutritional requirements and 40.0% felt that it did not meet the water requirement as well. In contrast, 74.3% of the second group (>6 months) agreed that it (breast milk) was enough to cover the infant's nutritional requirement and 59.6% of them believed that water should not be introduced before 6 months of age. Similarly, on mothers' knowledge, both groups agreed that sugar and salt should not be added to an infant's complementary food before 6 months by 80.6% and 81.5 %, respectively (Table 3).

Table 1. Socio-demographic characteristics of mothers and infants based on the time of introducing complementary feeding before and after 6 months

Characteristic	*Percentage (%)*[‡]			*p-value*[§]
	Total population (n= 771)	*Before 6 months (n= 288)*	*After 6 months (n= 483)*	
Age of mothers				
18-25	11.8	13.9	10.6	0.608
25-30	32.4	31.9	32.7	
30-35	26.5	25.3	27.1	
35-40	20.4	19.8	20.7	
40-45	8.9	9.0	8.9	
Educational level of mother				
Primary school	0.5	0.7	0.4	0.612
Secondary school	2.3	1.4	2.9	
High school	10.9	13.2	9.5	
Bachelor/diploma degree	72.2	71.9	72.5	
Higher degree	14.0	12.8	14.7	
Occupation of mothers				
Employed	45.9	45.1	46.4	0.735
Housewife	54.1	54.9	53.6	
Monthly household income (SAR)[†]				
< 5000	17.6	22.5	14.7	0.411
6000-10000	38.1	37.2	38.7	
11000-20000	33.1	29.2	35.4	
> 21000	11.2	11.1	11.2	
Age of infants				
6-12 months	36.6	32.6	38.9	0.262
13-18 months	24.4	25.3	23.8	
19-24 months	39.0	42.0	37.3	
Infant gender				
Female	48.6	50.0	47.8	0.856
Male	51.4	50.0	52.2	
No of children in the family				
1	27.5	26.7	27.9	0.667
2	25.0	26.4	24.2	
3	19.3	17.4	20.5	
4	14.1	15.3	13.5	
≥5	14.0	14.2	13.9	
Child order				
1st child	30.2	28.5	31.3	0.964
2nd child	23.0	25.0	21.7	
3rd child	16.7	16.3	16.9	
4th child	16.7	17.0	16.6	
Other	13.4	13.2	13.5	

[†]SAR = Saudi Riyals; 1 Saudi Riyal = 0.26 $US
[‡]Percentages were calculated based on total population of each group
[§]p-value was calculated by chi-square test

Table 2. Comparison of knowledge of mothers regarding early complementary feeding between mothers who introduced complementary feeding before and after 6 months of infant's age

Questions	*Percentage (%)*†			*p-value*‡
	Total population (n= 771)	*Before 6 months (n= 288)*	*After 6 months (n=483)*	
What is the appropriate age to start introducing complementary foods				
<3 months	1.0	2.1	0.4	0.000
3 months	2.6	6.3	0.4	
4 months	17.6	40.9	3.7	
5 months	13.2	27.8	4.6	
≥6 months	65.5	22.9	90.9	
What kind of food can be introduced before 6 months to the infant				
Liquid food				
Yes	92.6	94.4	91.5	0.290
No	7.4	5.6	8.5	
Semi solid food				
Yes	44.9	63.2	34.0	0.000
No	55.1	36.8	66.0	
Solid food				
Yes	2.9	4.5	1.9	0.175
No	97.1	95.5	98.1	
What kind of the following liquids can be introduced during the first 6 months				
Tea				
Yes	5.3	6.3	4.8	0.234
No	94.7	93.7	95.2	
Water				
Yes	79.1	83.3	76.6	0.157
No	20.9	16.7	23.4	
Herbal (infusion)				
Yes	58.6	61.5	56.9	0.487
No	41.4	38.5	43.1	
Bottle formula				
Yes	95.7	95.8	95.7	0.114
No	4.3	4.2	4.3	
Juice				
Yes	38.0	55.6	27.5	0.000
No	62.0	44.4	72.5	

What kind of the following semi-solid foods can be introduced during the first 6 months				
Yogurt				
Yes	42.2	56.9	33.3	0.000
No	57.8	43.1	66.7	
Cereals (Cerelac)				
Yes	65.6	81.9	55.9	0.000
No	34.4	18.1	44.1	
Mashed food (potato, apple...)				
Yes	54.0	74.0	42.0	0.000
No	46.0	26.0	58.0	
Pudding (Jelly)				
Yes	8.4	11.1	6.8	0.060
No	91.6	88.9	93.2	
What is the most reliable source of information regarding early complementary feeding				
Health care professionals	56.8	54.2	58.4	0.342
Social media (WhatsApp, Instagram...etc.)	6.1	6.6	5.8	
Family and friends	23.9	26.4	22.4	
General websites and blogs	10.4	9.7	10.8	
Other	2.9	3.1	2.7	
What is/ are the most important factor/s to promote infant's growth				
Exclusive breastfeeding at least 6 months	73.9	64.9	79.3	0.001
High quality infant formula feeding	12.6	14.9	11.2	
An appropriate practice of complementary feeding	10.0	14.9	7.0	
Vitamins and minerals supplementation	2.3	2.8	2.0	
Other	1.2	2.4	0.4	
What kind of the following spices can be added to complementary foods before 6 months				
Sugar				
Yes	16.3	22.2	12.8	0.000
No	83.7	77.8	87.2	
Salt				
Yes	10.0	15.6	6.6	0.002
no	90.0	84.4	93.4	

†Percentages were calculated based on total population of each group
‡*p*-value was calculated by the chi-square test

Table 3. Comparison of attitude of mothers towards early complementary feeding between mothers who introduced complementary feeding before and after 6 months of infant's age

Questions	*Percentage (%)*†			*p-value*‡
	Total population (n= 771)	*Before 6 months (n= 288)*	*After 6 months (n= 483)*	
Do you think complementary foods can be added before 6 months of an infant's age				
Strongly disagree	17.6	5.9	24.6	0.000
Disagree	31.0	11.8	42.4	
Neutral	24.1	25.0	23.6	
Agree	24.4	50.3	8.9	
Strongly agree	2.9	6.9	0.4	
Breastmilk is not enough to meet the infant's nutritional requirements before 6 months				
Strongly disagree	43.8	29.5	52.4	0.000
Disagree	22.8	24.3	21.9	
Neutral	13.4	19.4	9.7	
Agree	16.5	20.8	13.9	
Strongly agree	3.5	5.9	2.1	
Breast milk is not enough to meet infant's fluid need, which means water should be introduced before 6 months of life				
Strongly disagree	30.7	21.9	36.0	0.000
Disagree	21.8	18.7	23.6	
Neutral	18.3	18.7	18.0	
Agree	21.5	29.9	16.6	
Strongly agree	7.7	10.8	5.8	
What is your attitude towards introducing liquids before 6 months				
Strongly disagree	15.4	4.2	22.2	0.000
Disagree	23.3	11.1	30.6	
Neutral	27.5	23.9	29.6	
Agree	29.1	50.0	16.6	
Strongly agree	4.7	10.8	1.0	

What is your attitude towards introducing semi-solid before 6 months				
Strongly disagree	35.9	20.1	45.3	0.000
Disagree	30.6	26.7	32.9	
Neutral	17.1	23.3	13.5	
Agree	14.3	26.4	7.0	
Strongly agree	2.1	3.5	1.2	
What is your attitude towards adding sugar to the complementary foods before 6 months				
Strongly disagree	59.1	52.1	63.4	0.012
Disagree	21.5	22.9	20.7	
Neutral	12.5	17.7	9.3	
Agree	5.2	5.2	5.2	
Strongly agree	1.7	2.1	1.4	
What is your attitude towards adding salt to the complementary foods before 6 months				
Strongly disagree	60.4	51.7	65.6	0.003
Disagree	21.1	23.3	19.7	
Neutral	11.4	16.7	8.3	
Agree	5.6	6.6	5.0	
Strongly agree	1.6	1.7	1.4	

†Percentages were calculated based on total population of each group
‡*p*-value was calculated by chi-square test

Practices

In regard to practices (Table 4), the results revealed that 37.4% of mothers introduced complementary food to their infants before the age of 6 months. Among mothers of the first group (<6 months), the majority introduced complementary food to their infants in the fourth or fifth month of age (47.5% and 45.5%, respectively). Of the reasons given, 83.3% of them stated that the main factor that drove them to initiate early complementary feeding was that they felt the baby was old enough to receive complementary foods. Among all the mothers surveyed, 55.9% gave a combination of breast milk and infants formula during the first 6 months of age. Of the most common two types of food given to the baby before 6 months, 83.0% favoured liquids and 72.9% preferred mashed foods. Vegetables and fruits, carbohydrate foods, and dairy products were the most likely food groups given to the infant before they reached 6 months of age by 85.8%, 61.1% and 54.9% respectively. On the other hand, sugar was more likely to be added than salt. The results showed 20.1% of mothers added sugar while 17.4% added salt (Table 4).

Scoring and interrelationship between knowledge, attitude and practice

As summarised in Table 5, 62.5% of the total study population appeared to possess a medium level of knowledge. The majority of both groups, viz. <6 months and >6 months, had medium knowledge with percentages of 76.0% and 54.4%, respectively. However, there was an obvious difference for those with high knowledge with only 10.0% for the first group of mothers (<6 months) showing this feature and 43.7% for the second group (>6 months).

As for attitude, the results indicated that the majority of all the mothers (55.2%) had a higher tendency towards neutral attitude towards the early introduction of complementary feeding. However, 62.5% of the mothers in the first group (<6 months) showed a neutral attitude towards initiating early complementary feeding. It was observed that 68.3% of the second group (>6 months) believed that complementary feeding should be started at the age of 6 months or later. This meant that they had a negative attitude towards early complementary feeding.

Overall, scores for practices showed that 62.6% of the total population surveyed were good while 37.4 % had poor practices. Regarding the association between the 3 aspects (KAP) among the total population surveyed, results showed that knowledge and attitude had significantly correlated to practice (p-value=0.000) (Table 5).

DISCUSSION

This KAP study aimed to examine the current state of early complementary feeding among Saudi mothers in Riyadh. The most important result was that 37.4% of the 771 mothers who were studied had introduced early complementary feeding to their infants. This figure was lower compared reported in a study done in Tabuk which showed that 62.5% of mothers introduced complementary feeding before the child reached 4 months of age (Alzaheb, 2016). The reasons for these findings may be due to their children getting hungry, the perception that it was a good age to start complementary feeding besides other factors. Another study conducted in Saudi Arabia that included five different regions (Northern, Southern, Middle, Eastern and Western), reported that 83% of infants were introduced to early complementary feeding (Adam & Osama, 2019).

In this study, higher percentages of medium knowledge, neutral attitude

Table 4. Practice of mothers regarding early complementary feeding among mothers who introduced complementary feeding before 6 months of infant's age (n=288)

Questions	*Percentage (%)*[†]
When did you initiate complementary food to your child?	
<3 months	3.5
3 months	3.5
4 months	47.5
5 months	45.5
In case you started giving early complementary food to your baby, what was/were the reason/s that drove you?	
Baby is hungry	
Yes	43.7
No	56.3
The baby is old enough	
Yes	83.3
No	16.7
Poor weight gain	
Yes	30.9
No	69.1
Maternal illness	
Yes	6.3
No	93.7
What type of milk has been introduced during the first 6 months?	
Breast milk (breastfeeding or expressed breast milk)	23.3
Combined breast milk and infant formula	55.9
Infant formula only	20.8
What was the texture and characteristics of complementary foods introduced before 6 months?	
Soup/liquid	
Yes	83.0
No	17.0
Puree/ mashed food	
Yes	72.9
No	27.1
Chopped food/solid	
Yes	8.3
No	91.7
What is/are food groups contained in your child's diet before 6 months?	
Carbohydrate (e.g., rice, bread, cereal)	
Yes	61.1
No	38.9
Protein (e.g., egg, chicken, liver, beans, lentils)	
Yes	14.2
No	85.8
Fat (e.g., vegetable oil, butter, cheese)	
Yes	7.3
No	92.7
Vegetables and fruits	
Yes	85.8
No	14.2
Dairy products	
Yes	54.9
No	45.1
Did you add any sugar or salt to complementary food before 6 months?	
Sugar	
Yes	20.1
No	79.9
Salt	
Yes	17.4
No	82.6

[†]Percentages were calculated based on population of mothers who introduced early complementary feeding (n= 288)

Table 5. Comparison of scoring of knowledge, attitude and practice of mothers towards early complementary feeding between mothers who introduced complementary feeding before and after 6 months of infant's age

Aspects	*Percentage (%)*†			*p-value*‡
	Total population (n= 771)	*Before 6 months (n= 288)*	*After 6 months (n= 483)*	
Knowledge				
Low	6.3	14.0	2.0	Versus Attitude= 0.000
Medium	62.5	76.0	54.4	Versus Practice= 0.000
High	31.0	10.0	43.7	
Attitude				
Negative	13.6	14.5	7.25	Versus Knowledge= 0.000
Neutral	55.2	62.5	24.4	Versus Practice= 0.000
Positive	31.0	23.0	68.3	
Practice				
Poor	37.4	100.0	0.0	Versus Knowledge= 0.000
Good	62.6	0.0	100.0	Versus Attitude= 0.000

†Percentages were calculated based on total population of each group
‡*p*-value testing the interrelationship between the knowledge, attitude and practice calculated by chi-square test

and poor practices regarding early complementary feeding were observed among the group of mothers who introduced early complementary feeding to their infants compared to the mothers who had initiated complementary feeding after 6 month of age. In addition, knowledge and attitude of the mothers significantly influenced their practices in relation to early complementary feeding.

Azzeh (2017) found that the practice of complementary feeding was significantly associated with the job patterns of the mothers as well as the educational level of the parents. In contrast, there was no significant association between education and the age of mothers with the time of the introduction of complementary feeding in Kosova (Berisha *et al.*, 2017). The finding from the Kosova study matches the result of this study, which demonstrated no significant difference between starting early or on time complementary feeding in terms of socio-demographic characteristics of mothers in both groups. This might be related to the differences in the level of knowledge. The appropriate age for the introduction of complementary feeding was known among 65.5% of the current study. Similarly, studies from Ethiopia, Abha, and India revealed that 60.3%, 89.3% and 92.5% respectively had the right knowledge about starting timely complementary feeding (Reda, Teferra & Gebregziabher, 2019; Khattab, 2000; Jain, Thapar & Gupta, 2018). As with Ethiopia, the educational level of the husbands allowed them to support their wives to delay early weaning for better health of the child. In Abha and India, the higher educational level of mothers positively influenced their knowledge.

As for knowledge, 56.8% stated that the most reliable source of information about complementary feeding were health care professionals. A study conducted in Erbil city showed mothers learnt about infant feeding from physicians (41.6%) and from nurses (54.7%), at the primary healthcare centers (Al-Azzawi, Hussein & Shaker, 2012). A study conducted in Saudi Arabia showed that

mothers learnt about breastfeeding from medical personnel (44.9%) and from their relatives (26.8%) (Al-Jassir *et al.*, 2006). Thus, the role of health care as knowledge providers should be seriously promoted in order to ensure that correct and adequate information on breast-feeding practices is provided to mothers.

In regard to attitude and practices, 83.3% of mothers in the current study and 26.6% in a previous study conducted in Tabouk showed that complementary feeding was initiated when mothers thought that the baby was old enough to receive complementary foods (Alzaheb, 2016). A study in Abha found that 63.1% of mothers believed that water and fluids were needed for the infant during the first 4 months of age (Khattab, 2000). However, only 29.2% of the current study population believed that water and fluids were needed in addition to breast milk before the age of 6 months. The majority of mothers (66.6%) in a study conducted in Nigeria added salt to the meals of their infants (Olatona *et al.*, 2017), whereas only 17.4% of mothers did so before 6 months in our study. This disparity in practices may relate to the low levels of knowledge and practice among mothers in Nigeria compared with the current study where the knowledge levels of mothers were higher. Our study and two other previous studies carried out in Tabouk and another in Mecca seemed to have comparable results regarding common types of food that were given before 6 months of age such as, baby cereals, vegetables and fruits (Alzaheb, 2016; Azzeh, 2017).

In terms of the limitations of this study, it is possible that data collection through online questionnaire could lead some participants to misunderstand some of the questions. However, the questionnaire was tested and readjusted to ensure ease of understanding before it was used. As convenient sampling technique was used, results of this study should not be generalised.

CONCLUSION

By initiating complementary feeding to their infants before 6 months of age, more than one-third of Saudi mothers who participated in the study were shown to have not followed the relevant WHO recommendation on this matter. As clearly demonstrated, a significant association existed between various KAP aspects in the introduction of early complementary feeding. The knowledge of mothers who practised early complementary feeding had an impact on their attitude and practice as well. Therefore, health care providers should focus on educating mothers to correct their understanding of early complementary feeding and its consequences. It is recommended that further research be undertaken in the different regions of Saudi Arabia in order to obtain better knowledge of the current status of infant feeding among Saudi mothers.

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Authors' contributions

AA, DA, GA., SA and YA, drafted the article; NB critically revised the article. All authors made a substantial contribution to the design of the work and in the acquisition, analysis and interpretation of data. All authors approved the version that was submitted for publication and participated sufficiently in the work to take public responsibility for appropriate portions of the content.

Conflict of Interests

The authors declared that there is no conflict of interest.

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