

Saudi mothers' knowledge and awareness of infant developmental milestones.

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Abstract

Background: Parents' knowledge of childrearing is essential for children. Parent's knowledge is considered the reference for their interpretations of their children's behaviours and provides the basis for having the appropriate expectation of the child's developmental stage.

Objective: To assess the Saudi mother's knowledge of infants' childrearing and developmental milestones, the socio-demographic variables of relevance to knowledge, and the source of information about developmental milestones.

Method: A cross-sectional study using a modified version of the Knowledge of Infant Development Inventory' questionnaire among 203 Saudi in Riyadh, Saudi Arabia.

Results: Saudi mothers were highly knowledgeable about physical safety issues including attending an infant in the tub (99%), and infant position in bed (82.3%). Vast majority (90.6%) knows that they should feed the solid foods and ensure to increase fluid intake for infant when having diarrhea. Majority (81.8%) of the mothers correctly knows the suitable age for introducing complementary food to infants, and 92.1% know that some healthy babies spit out almost every new food until they get used to it. There was a moderate knowledge about parent-infant relationship. For developmental milestones, more than 80% of the participated mothers have the correct knowledge about the age of smiling, and recognizing mother face at 87.7% for each. A total of 6 out of 22 questions correctly answered by more than half of the mothers. The poorest knowledge score (13.8%) was for the age at which the baby's personality or temperament is set.

Parental age, educational level, working status, occupation, and monthly income were significantly correlated with developmental milestones knowledge. The most commonly scored knowledge resources were physicians/nurses, mother's family, experience from rising up elder children.

Conclusion: Saudi mothers were highly knowledgeable about certain aspects of childrearing, mainly physical safety measures, while they are lacking knowledge in other parenting skills such as baby's personality and temperaments. It is recommended that nurses/physicians provide teaching and support to families through offering parenting instructions across all developmental stages of children.

Keywords: Developmental age, Learning disability, Mother's knowledge, Children behaviour.

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Introduction

Parents' knowledge and awareness of child development influence their expectations of, and interactions with, their children [1-5]. It has been reported in the literature that a good start at the beginning of the child's life helps in creating an efficient person in the future society, as the first five-years in a child's growth is an important period especially for the development of the brain [6].

In developed countries, studies showed that a mother's knowledge of child development has been positively correlated with her ability to enhance her child development [5,7,8]. On the other hand, evidence suggests that parents with poor

knowledge of child development overestimate the development rate, potentially leading to inappropriate expectations, intolerance, and impatience [3,9].

The term "Milestone" (MS) is used to denote a specific level of achievement by the child at a particular stage. Since children vary in their development progress, milestones are not fixed and have a normal variation range. It may be difficult to predict exactly when a child will acquire a particular skill, but the developmental milestones give a general idea of when to expect specific changes as a child grows older [10]. Developmental milestones, for example neck control, sitting without support, crawling, standing, walking are generally understood to be vital stages of neurological development [11].

Benasich and Brooks-Gunn defined parental knowledge as parents understanding of the developmental norms and milestones, processes of child development, and caregiving skills familiarity, and such knowledge is conceptualized as a result of personal experience with children and social interactions [5]. It was found that an unrealistic matching between both expectations and actual behaviours can cause higher stress levels among parents [12]. Additionally; Lack of or inadequate adult supervision, can increase the risk of social or behavioural problems in children [13].

There is an evidence that parents, particularly mothers have some knowledge of factors that support optimal child development [14] while other evidence suggested that parental knowledge of children's development is limited in many areas including the beneficial forms of play, motivations for children's behaviours, discipline and spoiling [15]. Developmental delay occurs when a child has a delayed achievement of one or more of his/her milestones. Mothers in their care should recognize signs of developmental delay of the children especially language and communication delays which can be even more difficult than identifying physical delays. Missed milestones can be symptoms of developmental delays that could be associated with more serious medical conditions. When parents suspect missed milestones they should go to health care clinician for developmental screening test, as children who are identified and treated earlier have better outcomes in development, school performance and social skills [16].

Developmental expectations and mother's knowledge of developmental milestones has been pervasive in the Western literature and this is rather not recent, it was the concern of child psychologists during the 1980s and 1990s of the last century [17,18]. In contrast, studies from the Arab world are scarce, and Saudi Arabia is not an exception of this. Therefore, we conducted this study aiming to assess the Saudi mother's knowledge and awareness regarding children's developmental milestones, the socio-demographic variables of relevance to knowledge, and the source of information about developmental milestones.

Research Methodology

Study design and population

This was a cross sectional study. The population were Saudi mothers of normally delivered singleton infants equal or less than the first year of infancy. Mothers with different age groups and parity were included. Non Saudi mothers and mothers of infants with abnormalities including chronic or neurological illness were excluded as these may affect mothers' knowledge and attitude toward parenting. Participants were recruited from the outpatient pediatric clinics at King Saud University Medical City (KSUMC), Riyadh, Saudi Arabia.

Data collection

Data was collected by a questionnaire composed of three sections. The first section was for the sociodemographic data, and the second was for a knowledge instrument tool known as

'Knowledge of Infant Development Inventory (KIDI), that had been developed by David McPhee [19]. The KIDI consisted of two parts: childrearing practices and developmental milestones. The third section was a modified version of the Maternal Sources of Information Questionnaire that have been used in a previous similar study conducted in Jordon [20]. The questionnaire was used after taking the approval of the authors [19,20]. The study was conducted after taking the ethical approval from the Institutional Review Board (IRB), faculty of medicine, King Saud University. A consent form was given to eligible mothers after explaining the study purpose, procedures and benefits, and they were informed that they have the right to refuse or withdraw from the study without any adverse consequences on their healthcare provision. The questionnaire was filled using face to face methods by the authors with the help of well-trained research assistants.

Statistical analysis

Data were analyzed by using Statistical Package for Social Studies (SPSS 22; IBM Corp., New York, NY, USA). Continuous variables were expressed as mean \pm standard deviation and categorical variables were expressed as percentages. The t-test was used for continuous variables and Chi square test was used for categorical variables. The Cronbach's alpha was used to assess reliability and internal consistency of the items in the questionnaire. Univariate and Multivariate logistic regression were used to assess the risk factors for poor knowledge. A p-value <0.05 was considered statistically significant.

Results

The total number of the current study participants was 203 Saudi mothers, and their socio-demographic characteristics are shown in Table 1. The highest percentage (38.9%) of the participants was in the age group of 26-30 year, vast majority (87.2%) of them were married, and 62.6% have a university educational level. More than half (55.2%) of the mothers were working, and 59.1% having somebody helps them taking care of the baby; mostly mothers (34.5%), while husbands provided the lowest level of assistance (1.5%).

Table 1. Characteristics of the participants.

| Variables | Parameters | Number | % |
|-----------------|------------------|--------|------|
| Mother age | 20-25 | 70 | 34.5 |
| | 26-30 | 79 | 38.9 |
| | 31-35 | 26 | 12.8 |
| | 36-40 | 17 | 8.4 |
| | 41-45 | 10 | 4.9 |
| | >45 | 1 | 0.5 |
| Marital status | Married | 177 | 87.2 |
| | Divorced | 16 | 7.9 |
| | Widow | 10 | 4.9 |
| Education level | \leq 6 y study | 4 | 2 |
| | From 7-11 y | 22 | 10.8 |
| | Secondary | 11 | 5.4 |
| | Diploma | 7 | 3.4 |

| | | | |
|------------------------------|-------------------------|-----|------|
| | University | 127 | 62.6 |
| | Postgraduate | 32 | 15.8 |
| Do you work? | Yes | 112 | 55.2 |
| | No | 91 | 44.8 |
| Mother occupation | Teacher | 39 | 19.2 |
| | Student | 37 | 18.2 |
| | Private sector employee | 7 | 3.4 |
| | Administrator | 28 | 13.8 |
| | Nurse | 4 | 2 |
| | Lawyer | 7 | 3.4 |
| | Physician | 5 | 2.5 |
| | Others | 13 | 6.4 |
| | Missing | 63 | 31 |
| Husband's age | 20-25 | 18 | 8.9 |
| Husband's level of education | 26-30 | 66 | 32.5 |
| Husband occupation | 31-35 | 73 | 36 |
| | 36-40 | 10 | 4.9 |

| | | | |
|--|-------------------------|-----|------|
| | 41-45 | 26 | 12.8 |
| | >45 | 10 | 4.9 |
| | <= 6 y study | 4 | 2 |
| | Secondary | 5 | 2.5 |
| | Diploma | 16 | 7.9 |
| | University | 109 | 53.7 |
| | Postgraduate | 64 | 31.5 |
| | Missing | 5 | 2.5 |
| | Banker | 12 | 5.9 |
| | Military man | 16 | 7.9 |
| | Private sector employee | 30 | 14.8 |
| | Teacher | 52 | 25.6 |
| | Policeman | 15 | 7.4 |
| | Lawyer | 20 | 9.9 |
| | Administrator | 12 | 5.9 |
| | Others | 37 | 18.2 |
| | Missing | 9 | 4.4 |

Table 2. Percentage of correct answer for the knowledge of Saudi mothers toward children's developmental milestones.

| Serial number | Variables | N | % |
|---------------|--|-----|------|
| 1 | Babies should not be held when they cry because this will make them want to be held all the time. | 86 | 42.4 |
| 2 | Babies do somethings just to make trouble for their parents, like crying all the time or pooping in their diapers. | 105 | 51.7 |
| 3 | Babies may cry for 20-30 minutes, no matter how much you try to comfort them. | 136 | 67.0 |
| 4 | Babies have little effect on how parents care for them, at least until they get older. | 23 | 11.3 |
| 5 | Infants may stop paying attention to what's going on around them if there is too much noise or too many things to look at. | 126 | 62.1 |
| 6 | Some normal kids do not enjoy being cuddles. | 105 | 51.7 |
| 7 | If baby wants a snack, give him/her nuts, popcorn or chocolate. | 157 | 77.3 |
| 8 | New foods should be given to the infant one at a time, with 4-5 days apart. | 121 | 59.6 |
| 9 | If babies are cow's milk, they need extra vitamins and iron. | 60 | 29.6 |
| 10 | Some healthy babies spit out almost every new food until they get used to it. | 187 | 92.1 |
| 11 | When an infant gets diarrhea, you should feed the solid foods like potato and ensure to increase their fluid intake. | 184 | 90.6 |
| 12 | If a baby has trouble pooping, give him/her a warm milk. | 5 | 2.5 |
| 13 | Start serving solid foods to baby during his/her seventh month. | 166 | 81.8 |
| 14 | You must stay in the bathroom when your infant is in the tub. | 201 | 99.0 |
| 15 | When putting babies in the crib for sleep, place them on their back not stomach. | 167 | 82.3 |
| 16 | Most premature babies end up being neglected. | 51 | 25.1 |
| 17 | Some parents do not bond until their baby starts smiling and looking at them. | 65 | 32.0 |
| 18 | The way the parent treats a baby in the first month of life determines whether the child will grow up to be well adjusted or a moody misfit. | 109 | 53.7 |
| 19 | The more you soothe a crying baby by holding and talking to him/her, the more you spoil them. | 136 | 67.0 |
| 20 | Newborns recognize stories, music and the recited parts of Quran they heard before they were born. | 45 | 22.2 |
| 21 | Babies cannot see and hear at birth. | 11 | 5.4 |
| 22 | A three month baby smiles when he sees an adult's face. | 178 | 87.7 |
| 23 | A three month baby can recognize his/her mother face. | 12 | 5.9 |
| 24 | Four month babies lying on their stomachs start to lift their heads. | 136 | 67.0 |
| 25 | Babies begin to laugh at things around four month old. | 60 | 29.6 |
| 26 | Babbling babies begin around five month old | 92 | 45.3 |
| 27 | Babies usually say their first real word at six month old | 86 | 42.4 |
| 28 | Infants will avoid high places like stairs by the age of 6 months. | 16 | 7.9 |
| 29 | Baby starts fearing of strangers during his/her six month of age | 99 | 48.8 |
| 30 | Six month old babies know what " No" means. | 102 | 50.2 |
| 31 | Six month old baby responds to someone differently if the person is happy or upset. | 108 | 53.2 |
| 32 | The baby's personality or temperament is set by six month of age. | 5 | 2.5 |

| | | | |
|----|--|-----|------|
| 33 | Most babies sit on the floor without falling over by eight month old. | 13 | 6.4 |
| 34 | Babies are about seven month old before they can reach for and grab objects. | 13 | 6.4 |
| 35 | Eight month old babies act differently with familiar people than those who they haven't seen before. | 109 | 53.7 |
| 36 | Baby teeth start to appear by the age of nine month. | 58 | 28.6 |
| 37 | Babies begin to respond to their name when they are ten months of age. | 30 | 14.8 |
| 38 | One year old baby knows the difference between what's right and what's wrong. | 101 | 49.8 |
| 39 | Infants understand only words they can say. | 67 | 33.0 |
| 40 | Twelve month old babies can walk usually. | 157 | 77.3 |
| 41 | Most children are ready to be toilet trained by one year of age | 65 | 32.0 |
| 42 | Babies twelve month of age can remember toys they have watch being hidden. | 69 | 34.0 |

Cronbach's alpha was calculated and scored at 0.755 for overall items. When this was analysed to each question in turn, using the "alpha if item deleted" no significant improvement was noticed in the score thus confirming all questions were relevant and should be included, which also reflects acceptable reliability and internal consistency of the items in the questionnaire.

The percentages of correct answers for the knowledge of Saudi mothers toward infants' childrearing practices are shown in Table 2. The results revealed that the Saudi mothers were highly knowledgeable about physical safety issues including attending an infant in the tub (99%), and infant position in bed (82.3%). Similarly, vast majority (90.6%) of the respondents knows that they should feed the solid foods like potato and ensure to increase fluid intake for infant when having diarrhea. Moreover, majority (81.8%) of the mothers correctly knows the suitable age (7 months old) for introducing complementary food to infants. Additionally, vast majority (92.1%) of the participated mothers know that some healthy babies spit out almost every new food until they get used to it. On the other hand, the results revealed extremely poor knowledge levels in regards to giving warm milk to infants when having trouble pooping, where 97.5% wrongly think that it can help, while as it was correctly answered as "disagree" by only 2.5% of respondents.

For the parent-infant relationship, the results of the current study showed moderate knowledge. Since 42.4% of the mothers correctly "disagree" that babies should not be held when they cry because this will make them want to be held all the time, 48.3% wrongly perceived the reasons for the baby's crying 'to make trouble', and only 11.3% of the mothers correctly answered "disagree" to the point "Babies have little effect on how parents care for them, at least until they get older".

For infants' developmental milestones knowledge, the results are shown in Table 3. Mothers were asked to indicate whether the age indicated in the statement was the correct age for achieving this milestone, under-estimated (should happen later than indicated), over-estimated (should happen sooner than indicated) or if they were uncertain about the exact age for achieving this skill. The results showed that more than 80% of the participated mothers have the correct knowledge about some developmental milestones, especially the age of smiling, and recognizing mother face at 87.7% for each. Additionally, another 6 out 22 questions correctly answered by more than half of the mothers. The poorest knowledge score (13.8%) was for the age at which the baby's personality or temperament is set.

Table 3. Mothers' knowledge of developmental milestones.

| Variables | Correct | Under-estimating | Over-estimating | Uncertain |
|--|---------|------------------|-----------------|-----------|
| New-borns recognize stories, music and the recited parts of Quran they heard before they were born | 22.2 | | 16.7 | 61.1 |
| Babies cannot see and hear at birth | 48.2 | 5.5 | 14.1 | 32.2 |
| A three month baby smiles when he sees an adult's face | 87.7 | | 8.9 | 3.4 |
| A three month baby can recognize his/her mother face | 87.7 | 5.4 | 2.5 | 4.4 |
| Four month babies lying on their stomachs start to lift their heads | 86.2 | 5.9 | 7.4 | 0.5 |
| Babies begin to laugh at things around four month old | 67 | 19.7 | 10.8 | 2.5 |
| Babbling babies begin around five month old | 30 | 65.5 | 3.5 | 1 |
| Babies usually say their first real word at six month old | 31.5 | 20.2 | 45.3 | 3 |
| Infants will avoid high places like stairs by the age of 6 months | 30 | 7.4 | 42.4 | 20.2 |
| Baby starts fearing of strangers during his/her six month of age | 79.2 | 8.1 | 12.7 | |
| Six month old babies know what " No" means | 19.8 | 12 | 59.3 | 9 |
| Six month old baby responds to someone differently if the person is happy or upset | 50.2 | 6.9 | 18.2 | 24.6 |
| The baby's personality or temperament is set by six month of age | 13.8 | 10.3 | 53.2 | 22.7 |

| | | | | |
|---|------|------|------|------|
| Most babies sit on the floor without falling over by eight month old | 67.5 | 6.4 | 19.2 | 6.9 |
| Babies are about seven month old before they can reach for and grab objects | 38.4 | 6.4 | 43.8 | 11.3 |
| Eight month old babies act differently with familiar people than those who they haven't seen before | 53.7 | 10.3 | 28.6 | 7.4 |
| Baby teeth start to appear by the age of nine month | 38.9 | 24.6 | 28.6 | 7.9 |
| Babies begin to respond to their name when they are ten months of age | 42.9 | 14.8 | 40.9 | 1.5 |
| One year old baby knows the difference between what's right and what's wrong | 19.2 | 25.6 | 49.8 | 5.4 |
| Infants understand only words they can say | 33 | 10.8 | 44.8 | 11.3 |
| Twelve month old babies can walk usually | 54.2 | 19.7 | 22.7 | 3.4 |
| Most children are ready to be toilet trained by one year of age | 17.2 | 14.8 | 32 | 36 |
| Babies twelve month of age can remember toys they have watch being hidden | 34 | 3 | 26.1 | 36.9 |

There was only one point with a relative high under-estimation, which was about the age at which babies begin babbling, at 65.5%. For the overestimation, the highest overestimated point was “babies are about seven month old before they can reach for and grab objects” by 43.8% of the participants.

A considerable percentage of mothers were uncertain about developmental milestone timing. Mothers were most uncertain about the age at which babies can remember toys they have watch being hidden at 36.9%, and age of toilet training (36%).

The results of the current study showed that there were statistically significant differences between mothers with good knowledge and those with poor knowledge according to age, marital status, educational level, working status, occupation, husband age education, and occupation, monthly and income, as shown in Table 4.

Table 4. Quality of life difference in mothers with good knowledge and mothers with poor knowledge of milestones.

| Variables | Parameters | Poor knowledge | | Good knowledge | | P value |
|-----------------|-------------------------|----------------|------|----------------|------|---------|
| | | Number | % | Number | % | |
| Mother age | 20-25 | 50 | 37.9 | 20 | 28.2 | <0.001* |
| | 26-30 | 64 | 48.5 | 15 | 21.1 | |
| | 31-35 | 10 | 7.6 | 16 | 22.5 | |
| | 36-40 | 3 | 2.3 | 14 | 19.7 | |
| | 41-45 | 5 | 3.8 | 5 | 7 | |
| | >45 | 1 | 1.4 | 0 | 0 | |
| Marital status | Married | 125 | 94.7 | 52 | 73.2 | <0.001* |
| | Divorced | 0 | 0 | 16 | 22.5 | |
| | Widow | 7 | 5.3 | 3 | 4.2 | |
| Education level | <= 6 y study | 0 | 0 | 4 | 5.6 | <0.001* |
| | From 7-11 y | 22 | 16.7 | 0 | 0 | |
| | Secondary | 6 | 4.5 | 5 | 7 | |
| | Diploma | 7 | 5.3 | 0 | 0 | |
| | University | 78 | 59.1 | 49 | 69 | |
| | Postgraduate | 19 | 14.4 | 13 | 18.3 | |
| Do you work? | Yes | 59 | 44.7 | 53 | 74.6 | <0.001* |
| | No | 73 | 55.3 | 18 | 25.4 | |
| | Teacher | 20 | 15.2 | 19 | 26.8 | |
| Occupation? | Student | 24 | 18.2 | 13 | 18.3 | <0.001* |
| | Private sector employee | 7 | 5.3 | 0 | 0 | |
| | Administrator | 5 | 3.8 | 23 | 32.4 | |
| | Nurse | 4 | 3 | 0 | 0 | |
| | Lawyer | 6 | 4.5 | 1 | 1.4 | |
| | Physician | 3 | 2.3 | 2 | 2.8 | |
| | Others | 4 | 3 | 9 | 12.7 | |
| | Missing | 59 | 44.7 | 4 | 5.6 | |
| Husband age | 20-25 | 18 | 13.6 | 0 | 0 | <0.001* |
| | 26-30 | 36 | 27.3 | 30 | 42.3 | |

| | | | | | | |
|----------------------------|--------------|-----|------|----|------|--------|
| | 31-35 | 56 | 42.4 | 17 | 23.9 | |
| | 36-40 | 7 | 5.3 | 3 | 4.2 | |
| | 41-45 | 15 | 11.4 | 11 | 15.5 | |
| | ≥45 | 0 | 0 | 10 | 14.1 | |
| Husband level of education | ≤ 6 y study | 4 | 3 | | | 0.004* |
| | Secondary | 4 | 3 | 1 | 1.4 | |
| | Diploma | 11 | 8.3 | 5 | 7 | |
| | University | 82 | 62.1 | 27 | 38 | |
| | Postgraduate | 31 | 23.5 | 33 | 46.5 | |
| | Missing | 0 | 0 | 5 | 7 | |
| Do your husband work? | Yes | 112 | 84.8 | 54 | 76.1 | 0.585 |
| | No | 20 | 15.2 | 12 | 16.9 | |
| | Missing | 0 | 0 | 5 | 7 | |

*Significant p value

A univariate logistic regression analysis was done to assess the risk factors of poor milestones knowledge. Young age mothers (≤35 years old) are more than six folds (OR=6.51) at risk of poor knowledge compared to elder ones (>35 years old), and similar risk was also reported for married compared to divorced or widowed, with significant P value of 0.001 for both. For the educational level, mothers whose education was less than university were more than two folds (OR=2.49) at risk of lower knowledge compared to university educational level, with a significant difference (P=0.025). Mothers who were not working were 3.64 folds of poor knowledge risk compared to those who are working, with a P value of 0.001 (Table 5). When a multivariate logistic regression analysis was done, age, marital status, and educational level remained significant risk factor for knowledge of developmental milestones (Table 6).

Table 5. Univariate logistic regression for risk factors of poor knowledge of milestones.

| Risk factors | Odds ratio | 95% CI | | P value |
|--------------------------|------------|--------|-------|---------|
| | | Lower | Upper | |
| Age of the mother | | | | |
| ≤ 35 y | 6.51 | 3.3 | 12.87 | <0.001* |
| > 35 y # | 1 | | | |
| Marital status | | | | |
| Married | 6.52 | 2.59 | 16.45 | <0.001* |
| Divorced or widow# | 1 | | | |
| Educational level | | | | |
| Less than University | 2.49 | 1.12 | 5.53 | 0.025* |
| University and above# | 1 | | | |

| Working | | | | |
|---|------|------|------|---------|
| Yes# | 1 | | | <0.001* |
| No | 3.64 | 1.93 | 6.88 | |
| * Significant p-value #Used as a reference | | | | |

Table 6. Multivariate logistic regression for risk factors of poor knowledge of milestones.

| Risk factors | Odds ratio | 95% CI | | P value |
|--|------------|--------|--------|---------|
| | | Lower | Upper | |
| Age of the mother | | | | |
| ≤ 35 y | 5.05 | 2.374 | 10.741 | <0.001* |
| > 35 y # | 1 | | | |
| Marital status | | | | |
| Married | 3.237 | 1.158 | 9.044 | 0.025* |
| Divorced or widow# | 1 | | | |
| Educational level | | | | |
| Less than University | 2.721 | 1.061 | 6.977 | 0.037* |
| University and above# | 1 | | | |
| Working | | | | |
| Yes# | 1 | | | 0.209 |
| No | 1.605 | 0.767 | 3.358 | |
| *Significant p-value #Used as a reference | | | | |

Physicians/nurses, mother's family, experience from raising up elder children, and online medical education websites were identified as the most commonly resources for information about child development for mothers participated in the current study. Data is shown in Table 7.

Table 7. Distribution of the information sources.

| Variables | Never | | Below average | | Average | | Significant | |
|------------------|-------|------|---------------|------|---------|------|-------------|------|
| | N | % | N | % | N | % | N | % |
| Husband | 58 | 28.6 | 68 | 33.5 | 37 | 18.2 | 40 | 19.7 |
| Mother's family | 123 | 60.6 | 60 | 29.6 | 8 | 3.9 | 12 | 5.9 |
| Husband's family | 80 | 39.4 | 113 | 55.7 | 10 | 4.9 | 203 | 100 |
| Friends | 94 | 46.3 | 57 | 28.1 | 42 | 20.7 | 10 | 4.9 |

| | | | | | | | | |
|---|-----|------|----|------|----|------|-----|------|
| Physicians / Nurses | 167 | 82.3 | 29 | 14.3 | 7 | 3.4 | | 0 |
| Collogues | 50 | 24.6 | 45 | 22.2 | 62 | 30.5 | 46 | 22.7 |
| Neighbors | 38 | 18.7 | 58 | 28.6 | 42 | 20.7 | 65 | 32 |
| Child-care books | 61 | 30 | 56 | 27.6 | 14 | 6.9 | 72 | 35.5 |
| Parenting TV shows | 12 | 5.9 | 23 | 11.3 | 52 | 25.6 | 116 | 57.1 |
| Parenting classes | 60 | 29.6 | 14 | 6.9 | 4 | 2 | 125 | 61.6 |
| Online medical education websites | 101 | 49.8 | 59 | 29.1 | 15 | 7.4 | 28 | 13.8 |
| Public online search engines like Google | 98 | 48.3 | 66 | 32.5 | 25 | 12.3 | 14 | 6.9 |
| Social worker | 43 | 21.2 | 5 | 2.5 | 5 | 2.5 | 150 | 73.9 |
| Nursery supervisor | 25 | 12.3 | 4 | 2 | 5 | 2.5 | 169 | 83.3 |
| Experience from my childhood | 93 | 45.8 | 61 | 30 | 19 | 9.4 | 30 | 14.8 |
| Posters in health centers | 33 | 16.3 | 95 | 46.8 | 47 | 23.2 | 28 | 13.8 |
| Experience from raising up elder children | 103 | 50.7 | 18 | 8.9 | | 0 | 82 | 40.4 |
| Radio | 12 | 5.9 | 29 | 14.3 | 48 | 23.6 | 114 | 56.2 |
| Daily newspaper and journals | 8 | 3.9 | 20 | 9.9 | 45 | 22.2 | 130 | 64 |
| Movies | 8 | 3.9 | 12 | 5.9 | 36 | 17.7 | 147 | 72.4 |

Discussion

The current study describes the Saudi mothers' knowledge of childrearing and developmental milestones of their infants. Parenting knowledge and understanding the processes of childrearing and child development is vital to the well-being of children, parents, and the society. To the best of our knowledge such data is scarce in Saudi Arabia.

Generally, physical information is almost the only information provided by healthcare providers to mothers, with little or even no focus on the cognitive, emotional and parent–infant interactions skills [20]. Additionally, it is noticeable that physical healthcare services are mainly centered on immunizations, physical examination and infants' growth and development assessments. It has been previously reported in the literature that, in regards to pediatrician's role in mothers' parenting practices; they emphasize basic care and health maintenance, but ignore talking with them about aspects of childrearing education [21]. The current study showed high knowledge level of certain physical aspects. In line with this finding, an Indian study showed that urban and rural mothers had adequate knowledge of physical aspects of hygiene, nutrition, safety, sleep and care of illness [22]. In contrast to a similar Jordanian study which showed that mothers' have limited knowledge about the timing for introducing complementary food, the current study showed that Saudi mothers have good knowledge in this regard [20].

The Saudi mothers showed better knowledge about parent–infant relationship compared to Safadi et al. study [20]. Since a higher percentage 42.4% of our study participants refuse the idea that carrying a crying baby will spoil him/her compared to 25% in the other study [20]. Similarly, a better perception of reasons for the baby's crying was reported in our study compared to the Jordanian one, where 51.7% of the mothers in the current study disagree that babies are crying just only to make troubles vs. 29.5% of the Jordanian mothers [20].

For the developmental milestones, it was reported that some children are shy, naturally quiet or slower to socialize with others; this does not necessarily mean that they are delayed,

they may just have a calm temperament or personality [23]. In the current study, the poorest milestone knowledge was for the age at which the baby's personality or temperament is set.

Giving the evidence that parents' knowledge of developmental milestones, accurate and appropriate expectations for children's behaviour are considered key factors in parenting effectiveness, and better child outcomes [8,18]. The current study data indicates that a considerable proportion of Saudi mothers may be unfamiliar with achievement of developmental milestones and therefore may not be optimize the use of strategies that support optimal development. In an accordance with our study, previous studies have identified low educational level and parental age as risk factors for limited knowledge of child development [2,24]. Additionally, in a similar Turkish study, mother education was significantly related to maternal knowledge of child development [25].

Healthcare professionals, mother's family, presence of elder child, and medical education websites were the main source of information about development milestones in the current study. Currently, increased availability of the internet is likely to alter how information is accessed [26]. Moreover, parents rely on information from their own families and it has been noted that mothers' knowledge of child development is significantly related to her mother's knowledge [26]. In a similar Iraqi study, the source of mother's information about the developmental milestones of children was mainly from the mother experience at 71.5%, and only few percentages getting it from doctors (16.5%), and primary health care centers (5.5%), which is in contrast to our findings [16]. On the other hand, and similar to our findings, Rikhy et al. [27] revealed that over 90% of parents accessed doctors or pediatricians as a source of information, and Deepika et al. [28] study in which parents were most likely dependent on doctors/pediatricians, books and nurses as sources of their knowledge. Although mothers in the current study have indicated that physicians and nurses are their first source of information, however, such source emphasizes the biologic safety measures and it is not a readily structured service. In case if the formal structured education is absent, informal sources concerning a mother or a mother-in-

law predominates and the traditional practices are retained. It is important to highlight an important point regarding social workers being a source of information in this regard. In our study they were not one of the main sources of information about development milestones. Social workers are supposedly an integral part of the services. Their role is perceived secondary to healthcare services and scoring low on mothers' sources of information signifies mother's emphasis on the physical aspects of health care and the negligence of the integrated nature of care provision.

There are important implications for 'timing' of mothers' knowledge and beliefs. Studies have found that if mothers incorrectly believe that developmental skills should be acquired early, they may be less tolerable of infantile behaviours and that this may constitute a risk factor for child abuse [29]. On the other hand, if mothers believe that developmental skills emerge at a later age than normal, they may be less likely to expect these skills from their own children. Such 'later attribution' can have some important consequences including that mothers may not provide adequate stimulation to help emerge these skills, and the missed opportunity for the detection of developmental delay. The results of the current study revealed that only few knowledge milestones were either underestimated or overestimated highly, however, still there are considerable percentages of underestimation and overestimation in particular.

In an agreement with previously published similar studies employed mothers and educated, especially those with higher education level have good development knowledge [16,20,25].

For mother's occupation, the current study results showed a significant association with the overall development milestones knowledge. This was inconsistent with Malathi et al. study [29] in which there was a significant association between housewife mothers and motor development knowledge. However, the Iraqi study was consistent with our results in terms of motor development only, but not cognitive or vision development [16].

Regarding parity, there was no significant association between mother's knowledge on developmental milestone of children and the number of delivered babies, which was similar to a study done in 2015 where no significant association was found [20]. In contrast, Alkhazrajy et al. study from Iraq showed a significant association between parity and mother's knowledge on developmental milestone of children in the fields of motor, hearing and language [16].

Limitations

As all studies, the current study has some limitations including the small sample size, data was collected from mothers attending one health care institution at Riyadh Saudi Arabia, and therefore the results cannot be generalized to all mothers in Saudi Arabia. Mothers parenting knowledge was surveyed at one point in time: when having a 2 years old child, and we did not specify when they have this knowledge: before they have their first child, immediately afterward, or by the time their children are adolescents. To determine the full scope of

parenting knowledge, additional research with more diverse samples, fathers, and other child caregivers is needed.

Strengths

To the best of our knowledge, this research is the only study conducted in Saudi Arabia that addressed mothers' knowledge of childrearing. The instrument used for data collection (The KIDI), is valid and reliable tool, and largely used tool for parenting assessment in the West.

Conclusion

Overall, Saudi mothers' knowledge of childrearing is considered limited to certain aspects, mainly physical safety measures. Deficient knowledge in other parenting skills was highlighted. Such deficient knowledge may be attributed to the insufficient emphasis in healthcare professional– mother interactions and this may be the most important contributor especially that nurses/physicians are the first source of mother's childrearing knowledge in the current study. As a feasible intervention to such problem, it is recommended that nurses/physicians provide teaching and support to families through offering parenting instruction across all developmental stages of children.

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