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3 **Colostrum knowledge among Saudi mothers in Jeddah, Saudi**  
4 **Arabia**

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6 **Steve Harakeh<sup>1</sup>, Musab Almatrafi<sup>2</sup>, Rahma Bukhari<sup>3</sup>, Turki Alamri<sup>4</sup>,**  
7 **Salah Barnawi<sup>5</sup>, Sunil Joshi<sup>6</sup>, Mohammed Al Muhayawi<sup>7</sup>, Ghadeer**  
8 **Basunbul<sup>8</sup>, Marwana Alazraqi<sup>9</sup>, Areej Al-Khalidy<sup>10</sup>, Lamia Shaala<sup>11</sup>,**  
9 **Abdullah Alshehri<sup>12</sup>, Sultan Al Amri<sup>13</sup>, Soad Aljaouni<sup>14</sup>**

10 **1,5** Department of Special Infectious Disease, King Fahd Medical Research Center, King  
11 AbdulAziz University, Jeddah, Saudi Arabia; **2** Department of Obstetrics and Gynaecology,  
12 National Guard Hospital, Riyadh, Saudi Arabia; **3** Department of Pharmacy, Dr. Solaiman  
13 Faqeeh Hospital, Saudi Arabia; **4** Department of Family and Community Medicine, King  
14 AbdulAziz University, Jeddah, Saudi Arabia; **6** Department of Community Medicine,  
15 Kathmandu Medical College, Nepal; **7** Department of Medical Microbiology/Parasitology  
16 and Molecular Microbiology Laboratory, King AbdulAziz University Hospital, Jeddah, Saudi  
17 Arabia; **8** Department of Dentistry, King AbdulAziz University Hospital, Jeddah, Saudi  
18 Arabia; **9** King AbdulAziz University Hospital, Jeddah, Saudi Arabia; **10** Department of  
19 Applied Medical Sciences, King AbdulAziz University Hospital, Jeddah, Saudi Arabia;  
20 **11** Natural Product Unit, King Fahd Medical Research Center, King AbdulAziz University,  
21 Jeddah, Saudi Arabia; **12** Security Forces Hospital, Riyadh, Saudi Arabia; **13** Primary  
22 Health Care Sector, Al-Thagr Hospital, Ministry of Health; **14** Department of Hematology  
23 and Pediatric Oncology, King AbdulAziz University Hospital, Jeddah, Saudi Arabia

24 **Correspondence:** Steve Harakeh. **Email:** sharakeh@gmail.com

25  
26 **Abstract**

27 **Objective:** To assess the knowledge level of Saudi women about colostrum for  
28 the newborns.

29 **Methods:** The cross-sectional study was conducted from October 2015 to June  
30 2016 at the Gynecological Clinics of King Abdulaziz University Hospital,  
31 Jeddah, Saudi Arabia, and comprised lactating mothers in the community. Data  
32 was collected using a pretested questionnaire. Data was analysed using SPSS  
33 22.

34 **Results:** of the 552 mothers, 301(54.5%) were age >30 years. The source of  
35 information about colostrum was friends and family for 367(66.67%) subjects.  
36 Overall, 367(66%) had high knowledge about colostrum. A significant  
37 correlation was detected between age and knowledge about colostrum  
38 composition and duration ( $p<0.05$ ); as well as between educational level and  
39 colostrum composition, colour, and form ( $p<0.05$ ). A significant association  
40 between occupational status and knowledge about colostrum colour and form  
41 was also noted ( $p<0.05$ ).

42 **Conclusion:** Saudi mothers were found to have a good knowledge about  
43 colostrum and its benefits.

44 **Key Words:** Colostrum knowledge, Breastfeeding, Pregnancy, NewbornI,  
45 Immunity.

46

## 47 **Introduction**

48 Colostrum constitutes secretions of the mammary glands of mammals in late  
49 stages of pregnancy and just before giving birth, and remains for the first few  
50 days of early breastfeeding.<sup>1</sup> Colostrum has a higher nutritional value than  
51 milk.<sup>2,4</sup> For this reason, colostrum is a good source of nutrients for the newborns  
52 as they cannot consume a lot of milk due to their premature digestive system. It  
53 has laxative potential, helps to release the first stool, and helps to eliminate  
54 excess bilirubin which causes jaundice in babies when the level is high.<sup>5</sup> It is  
55 rich in antibodies and immunoglobulins (Igs), such as IgA, IgG and IgM, for the  
56 protection of the baby from infections.<sup>3, 6, 7</sup> There are other immune substances  
57 that are found in colostrum, such as complement and proline-rich peptide,

58 which is important in fighting against bacterial, viral infections, diarrhoea and  
59 various cancers and diseases, lacto-peroxidase, lysozyme and lacto-ferrin.<sup>8-10</sup> In  
60 addition, it has growth factors and cytokines.<sup>11</sup> Breastfeeding is very important  
61 for the newborn and is even mentioned many times in the Quran, the holy book  
62 of Islam. One of them in Surah Al-Baqarah [2:233] says: “Mothers may  
63 breastfeed their children two complete years for whoever wishes to complete  
64 the nursing.”<sup>12</sup> The importance of colostrum feeding to newborns is thus  
65 essential for better health.

66 Colostrum feeding improves the growth and development of neonates. The  
67 incidence of infant deaths can be drastically reduced by encouraging mothers to  
68 breastfeed.<sup>13</sup> The Saudi Arabian society includes women coming from different  
69 backgrounds. Many mothers avoid colostrums-feeding because of certain  
70 cultural beliefs, lack of knowledge, ignorance, undesirable socio-cultural  
71 beliefs, and misconceptions.<sup>14</sup> The current study was planned to evaluate the  
72 knowledge level of lactating Saudi mothers regarding the importance of  
73 colostrum in the life of newborns.

74

## 75 **Subjects and Methods**

76 The cross-sectional study was conducted between October 2015 and June 2016  
77 at the Gynaecological Clinics of King Abdulaziz University Hospital, Jeddah,  
78 Kingdom of Saudi Arabia (KSA). After approval from the institutional ethics  
79 review committee, the sample size was calculated using OpenEpi calculator to  
80 detect 50% good and excellent knowledge with a confidence level (CL) of  
81 95%.<sup>15</sup> Against the required sample size of 384, >40% more individuals were  
82 enrolled to compensate for non-respondents and incomplete data variables. The  
83 sample was raised from the community using simple random sampling method.  
84 Those included were mothers residing in Jeddah who had already delivered a  
85 baby. Those who had not give birth and visitors were excluded.

86 Data was collected using a questionnaire that was distributed to potential  
87 subjects in schools, houses, hospitals, and public places, such as malls and  
88 coffee shops. After taking written informed consent. The participants were  
89 interviewed by women, and the names of the subjects were not revealed.

90 The questionnaire was generated in the Arabic language and its content was  
91 validated and approved by experts including a paediatrician, an epidemiologist  
92 and a nutritionist. It was distributed for the purpose of pre-testing to 20  
93 respondents who were women and not part of the study. Modifications were  
94 made on the basis of feedback from them. The questionnaire included  
95 information about age, marital status, educational level, residence, type of  
96 housing, working status and salary. General information about colostrum related  
97 to composition, duration of flow, characteristics and appearance was also part of  
98 the questionnaire. Information was also sought about the source of knowledge  
99 and whether the physician had advised the mothers to breastfeed their infants  
100 with colostrum and general information about disease and family history. A  
101 certain scoring system was followed based on the correct responses to the  
102 different questions by taking symmetric interval length according to maximum  
103 and minimum score. Data was analysed using SPSS 22. Different demographic  
104 variables were associated with knowledge and related questions using cross-  
105 tabulation, Chi-square test, and multinomial logistic regression methods.  $P < 0.05$   
106 was considered significant.

107

## 108 **Results**

109 Of the 650 questionnaires distributed, 552(84.9%) mothers returned the  
110 questionnaire duly completed. Of them, 301(54.5%) were aged >30 years;  
111 369(66.8%) were housewives; 148(27%) were full-time employees;  
112 30(5.4%) were part-timers; 229(41.5%) were bachelor degree holders;  
113 168(30.4%) had secondary level education; 106(20%) respondents' family  
114 income ranged between Saudi Riyal (SR) 6,000 and SR 9,000; 102(19%)

115 respondents' family income was >SR12,000; 514 (93.1%) were married at the  
116 time of the study while the rest were divorced or widowed; 381(69%) were  
117 residing in an apartment; 124(22.5%) were residing in a villa; 42(7.6%) were  
118 residing in private houses; 5(1%) did not provide information about their  
119 accommodation; 266(48.2%) were living in a rented accommodation;  
120 261(47.3%) were in an owned accommodation; and 25(4.5%) did not answer  
121 the query.

122 Regarding the source of knowledge about colostrum, for 367(66.7%) mothers  
123 the source was family members, followed by obstetrician/gynaecologist for  
124 117(21.3%) (Table 1).

125 Overall, 525(95.1%) mothers recognised colostrum; 492(89.1%) acknowledged  
126 colostrum's benefits; 304(55.1%) knew about its availability exclusively in  
127 mother's milk; 226(41.5%) said colostrum was formed during the last trimester  
128 of pregnancy; 234(42.5%) did not reply that it was formed immediately after  
129 delivery; and 296(54.6%) did not think that colostrum was formed when the  
130 mother starts feeding her child.

131 Regarding the duration of flow/presence of colostrum, 433(78.4%) mothers  
132 knew that colostrum was not present in the breast milk for 2 years after  
133 delivery, and 277(50.2%) agreed that colostrum stayed only for 3 days after  
134 delivery. Regarding characteristics of colostrum, 263(47.7%) subjects disagreed  
135 that colostrum was a colourless substance mixed with mother's milk; 444(80%)  
136 agreed that colostrum was a sticky yellow substance mixed with mother's milk;  
137 and 351(63.6%) did not agree that colostrum was normal blood expressed in  
138 mother's milk.

139 Overall evaluation showed that 328(60%) women had knowledge about  
140 colostrum formation; 448(81.2%) had a high or good knowledge about  
141 colostrum duration; and 211(38.2%) had a high knowledge about colostrum  
142 colour and appearance (Table 2).

143 Correlation between colostrum knowledge parameters was worked out with age,  
144 marital status and occupations stud of the subjects (Table 3). .

145

## 146 **Discussion**

147 The participants were very knowledgeable about colostrum (95.1%). These  
148 figures are much higher than the ones obtained in a study conducted in Nepal  
149 (74% colostrums).<sup>5</sup> Such a discrepancy could be related to the educational level  
150 of the participants. In the Nepalese study, the majority of those surveyed were  
151 uneducated and came from rural areas<sup>5</sup>. The sample in the current study lived in  
152 Jeddah which is a big cosmopolitan city, and were mostly educated with high  
153 monthly family income.

154 The main source of knowledge about colostrum among our sample was family  
155 and friends (66.7%), which is in contrast to only 30% reported both from Nepal  
156 and Pakistan<sup>5, 11</sup> and 21.4% as reported from Ethiopia.<sup>16</sup> In this part of the  
157 world, women depend on knowledge received from family and friends, and the  
158 antenatal clinics do not usually provide much information to the expecting  
159 mothers.<sup>17</sup> However, women in the developed countries obtain their information  
160 related to pregnancy and birth from many different sources, including doctors,  
161 midwives, family and friends, television programmes, leaflets, internet and  
162 newspapers.<sup>18</sup> A study in Dhaka indicated that pregnant women got most of  
163 their information from clinics, textbooks, media, internet and television.<sup>19</sup> The  
164 uncertainties in the responses of our participants could be attributed mainly to  
165 the fact that the sources of knowledge of the study group were family and  
166 friends who were not professional healthcare workers and as a result,  
167 misunderstandings and misconceptions are expected.

168 Data indicated decent percentage of our women participants who had high or  
169 good knowledge about colostrum formation, duration, colour and appearance. It  
170 was reported in an Ethiopian study that a lower percentage of the group (59.2%)  
171 knew that colostrum is thick, sticky and yellowish in colour.<sup>20</sup> Again, this could

172 be due to the socioeconomic status of the study group and differences related to  
173 educational level as well as the income of the participants.

174 Concerning the benefits of colostrum, 89.1% realised that colostrum is  
175 extremely beneficial to the infant. This is in contrast to a recent study conducted  
176 in Dhaka where most of the respondents had very poor knowledge regarding  
177 advantages of colostrum feeding (87%).<sup>21</sup>

178 In another study, an overall categorisation among 50 sample selected, 15 (30%)  
179 were found to have adequate knowledge regarding breastfeeding and colostrum  
180 feeding, 29(58%) had moderate knowledge compared to 6 (12%) who had  
181 inadequate knowledge; overall, only 25 (50%) subjects practised colostrum  
182 feeding.<sup>22</sup>

183 In a study in Nepal, only 25% women knew about the benefits of colostrum,  
184 which is much lower than the results obtained in the current study.<sup>5</sup> These  
185 results are much lower than those reported in an Indian study where 56%  
186 responded correctly concerning the benefits of colostrum.<sup>14</sup>

187 According to a study done in Egypt, 83.7% participants knew that colostrum  
188 increased the immunity of the baby, and 30.2% mothers reported that it is the  
189 first protection against infection.<sup>19</sup>

190 According to one study in southern Zambia, it was perceived by urban women  
191 that colostrum was highly beneficial to the child.<sup>23</sup> Only few thought it would  
192 be dirty and should not be used, and grandmothers favoured colostrum except  
193 some Muslim grandmothers who believed that it should be substituted by honey  
194 or water supplements. Similar results regarding the benefits of colostrum were  
195 reported by a study in Pakistan, where 88.8% mothers considered colostrum to  
196 be an integral part of the infant diet.<sup>24</sup>

197 Quite a few mothers still think that colostrum was related to illness and was  
198 unsafe for consumption and should not be used. There are many factors  
199 associated with the mother's decisions for not feeding colostrum to their  
200 newborn. Such factors include the mother's lack of knowledge on when to

201 initiate breastfeeding and poor understanding on the beneficial effects of  
202 colostrum feeding on the overall well-being of the newborn.<sup>24, 25</sup> Some mothers  
203 also believe that colostrum should be thrown out because of its colour and  
204 sometimes following advices from their misinformed in-laws. It was also  
205 reported that few mothers believed that milk is not produced during the first few  
206 days after delivery.<sup>18, 19, 24</sup> Other factors included the inability of the babies to  
207 suckle breast-milk because of deformities, sickness and other delays caused by  
208 bathing and cleaning of the baby and the mother. This is an addition to family  
209 and birth attendants' discouragement of early breastfeeding to the new  
210 mothers.<sup>18, 24</sup>

211 The limitation of the current study is that the information obtained from mothers  
212 might be tainted by recall bias. Besides, the study also shares the limitation of a  
213 cross-sectional study design.

214 In the light of the findings, however, it is recommended that nationwide studies  
215 be conducted, representing the view of women from the rural areas of the  
216 kingdom for providing a deeper understanding of women's attitude toward  
217 colostrum. More educational campaigns are imperative with a focus on  
218 educating women about the importance of colostrum for the overall wellbeing  
219 of the newborn.

220

## 221 **Conclusion**

222 Saudi mothers were found to have good knowledge about colostrum and its  
223 benefits. They received their information from family members and their  
224 gynaecologists. They had good knowledge about its formation, duration, colour  
225 and appearance. Age and educational level significantly affected their  
226 knowledge about colostrum.

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228

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235

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320

Source of knowledge about "Colostrum"	Yes	%	No	%
Obstetrician	117	21.3	433	78.7
Pediatrician	37	6.7	513	93.3
Media	49	8.9	501	91.1
Scientific books	59	10.7	491	89.3
Internet	65	11.8	485	88.2
Family members	367	66.7	183	33.3
Other sources	89	16.2	461	83.8
Never had any previous knowledge	10	1.8	540	98.2

321 **TABLE 1: Sources of Information about Colostrum (n= 552 women)**

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323

324

		Frequency	Percent
<b>Colostrum Formation</b>	<b>Poor</b>	224	40.6
	<b>Good</b>	216	39.1
	<b>High</b>	112	20.3
	<b>Total</b>	552	100.0
<b>Colostrum Duration</b>	<b>Poor</b>	104	18.8
	<b>Good</b>	219	39.7
	<b>High</b>	229	41.5
	<b>Total</b>	552	100.0
<b>Colostrum Color &amp; Appearance</b>	<b>Poor</b>	188	34.1
	<b>Good</b>	153	27.7
	<b>High</b>	211	38.2
	<b>Total</b>	552	100.0
<b>Full Knowledge</b>	<b>Poor</b>	106	19.2
	<b>Good</b>	278	50.4
	<b>High</b>	168	30.4
	<b>Total</b>	552	100.0

325 **TABLE 2: Knowledge about Colostrum Formation, duration, and color and**  
 326 **appearance**

327

328

		Educational Level							Marital Status				Occupational Status			
		None	Primary	Intermediate	Secondary	Diploma	Bachelor	Higher Education	p-value	Married	Divorced	Widowed	p-value	Worker (Full time)	Worker (Part time)	House makers
Knowledge about Colostrum Composition	Poor	8	14	24	42	13	107	16	205	10	5	.452	67	17	139	.059
	Good	7	20	12	72	8	82	15	202	5	6		57	11	145	
	High	3	5	4	54	2	40	4	107	2	1		24	2	86	
Knowledge about Colostrum duration	Poor	2	9	11	32	5	42	3	95	4	1	.165	27	5	71	.980
	Good	7	21	12	73	6	86	14	198	10	7		60	11	147	
	High	9	9	17	63	12	101	18	221	3	4		61	14	152	
Knowledge about Colostrum Color and form	Poor	9	18	18	71	9	55	8	171	10	3	.236	35	7	144	.004**
	Good	7	11	11	45	6	69	4	145	3	3		41	9	102	
	High	2	10	11	52	8	105	23	198	4	6		72	14	124	
Full knowledge about colostrum	Poor	2	9	11	32	6	43	3	95	6	0	.013	25	7	73	.834
	Good	12	22	23	74	10	117	20	256	11	9		77	16	183	
	High	4	8	6	62	7	69	12	163	0	3		46	7	114	

Table 3. Distribution of educational levels, marital status and occupational status with different knowledge parameters.

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