Introduction

The neonatal period refers to the period less than 28 days after birth [1]. The Global Health Observatory reported that 2.6 million neonatal deaths occurred during 2016, which represents 46% of all deaths under 5. Additionally, the majority of deaths among newborns occur during the first day and week of birth [2].

Those who die in the infancy period experience conditions and diseases that can be managed with adequate and rapid quality care after delivery [3]. Possible aetiologies of such rising neonatal deaths include prematurity, birth-related complications, neonatal sepsis, and, in older children, pneumonia and diarrhoea [4]. Moreover, lack of exclusive breastfeeding in the first five months of life increases the risk of death from diarrhoea sevenfold and from pneumonia fivefold [5].

Background: Infant mortality rates are highest in the southern regions of Saudi Arabia, compared to other regions in the kingdom.

Objective: To measure demographic factors associated with mothers’ levels of knowledge and practice of care for their newborns in Jazan region, south of Saudi Arabia.

Methods: This is a cross-sectional study conducted between November and December 2018 in Jazan region, Saudi Arabia, on the northern borders of Yemen. A questionnaire was utilised to measure mothers’ level of knowledge and practice of newborn care. Data was collected via interviews, and a scoring system was developed to classify knowledge level and practice adequacy. Logistic regression was used to assess the presence of statistically significant associations between demographic factors and level of knowledge and practice adequacy.

Findings: A total of 450 mothers participated in the current investigation. A majority of participating mothers were able to give correct answers, where the mean level of knowledge was 11.85/16 [SD: 2.6]. Additionally, the mean score for practice adequacy was 7.11/10 [SD: 1.45]. However, 122 mothers (27%) reported using alternative treatments to treat their newborns instead of seeking professional health care from available health services. Additionally, 42 mothers (9.3%) reported not attending any antenatal visits during their pregnancy. Factors which were found to be statistically associated with knowledge were education level, employment status, and adherence to antenatal visits during pregnancy (p < 0.05). Age and employment status appeared to be associated with practice where older and employed mothers had higher odds of competency (p < 0.05).

Conclusions: The proportions of correct answers measuring knowledge and practice adequacy concerning newborn care varied between 40% to 93%. Knowledge and practice appeared to be associated with demographic factors, such as level of education, age, and attending antenatal care visits.

According to the World Health Organization (WHO), neonatal mortality rates in Saudi Arabia dropped from 22 per 1,000 live births in 1990 to 7 in 2016. Additionally, in a national survey conducted in Saudi Arabia involving 10,931 ever married women, it was concluded there had been a reduction in the infant mortality rate from 29 to 20 deaths per 1,000 live births between 1994 and 2004 [6].

Variations in infant mortality between different regions in Saudi Arabia are apparent. According to Al-Mazrou et al. infant death rates were highest in the southern regions of Saudi Arabia [6]. Additionally, the Saudi General Authority for Statistics reported that neonatal mortality rates were highest in Najran region (5.91) and third highest in Jazan region (3.85); both these regions are in the south of Saudi Arabia [7].

Variations in neonatal mortality rates in different regions of Saudi Arabia can be explained by variations in the availability and quality of care provided during and after delivery. Furthermore, variations in the level of knowledge of mothers concerning neonatal care may induce variations in practice and appropriate utilisation of available health services.
Appropriate knowledge about newborn care is crucial to enhance practice and reduce the risk of neonatal problems and death. According to the Saudi Ministry of Health Statistics Book of 2017, Jazan region was ranked fourth in the number of total deliveries in hospitals of the ministry [8]. The high number of births and high neonatal mortality rate in Jazan region mandates investigating the factors associated with mothers’ care of newborns in Jazan. The level of knowledge among mothers and their practice concerning newborn care in Jazan is currently unknown. This study was conducted to help fill that gap.

Methods

Study Settings and Participants
This is a cross-sectional study conducted in Jazan region of Saudi Arabia between November and December of 2018. The study was performed in 11 Primary Health Care Centres (PHCs) in Jazan region, including the 5 largest cities: Gizaan, Sabha, Abu-Arish, Al-Ahad, and Samta. Ethical approval to conduct the study was granted by Jazan Hospital Institutional Review Board, Ministry of Health (approval number 1833 dated 28/06/2018). Informed consent to participate was obtained from mothers before their recruitment.

The target population of this investigation was Saudi mothers attending PHCs whose youngest child was younger than 5 years. Mothers whose youngest child was older than 5 years were not targeted to reduce the magnitude of recall bias concerning newborn practice. Several PHCs were targeted in different sectors of Jazan region to enhance the generalisability of the findings.

The sample size for this study was calculated based on a mother’s knowledge regarding child healthcare. Al-Ayed conducted a study in Riyadh, Saudi Arabia, to measure mothers’ knowledge regarding child health [9]. In Al-Ayed’s study, several questions were asked to assess the mother’s knowledge, where the lowest proportion of mothers able to give the correct answer to a question was 16%. This prevalence was taken into consideration for calculating the sample size for the current study to increase the study’s power to detect true prevalence of knowledge. A sample of 460 subjects was estimated using the formula for a prevalence assessment, 

\[ n = \left( \frac{z^2 \times p \times q}{d^2} \right) \]

where \( z \) = 95% confidence interval, \( p \) = prevalence of knowledge, \( q \) = 1 – \( p \), \( d \) = error ≤5% and a 30% non-response rate.

Study Instrument and Measures
A questionnaire was utilised to measure the level of knowledge and practice of mothers concerning newborn care. The contents of the questionnaire were adopted from similar studies conducted in Nepal [10] and Kenya [11], assessing newborn care knowledge and practice. The questionnaire was composed of three sections. The first section involved the demographics of the study participants. The second section asked mothers about their awareness of the newborn screening programme, normal birth weight, breastfeeding, sanitation, and hygiene, as well as their knowledge about vaccinations. The third part asked the participants about their actual practice with their newborn, including breastfeeding behaviour, vaccination status, and utilisation of health services. Additionally, utilisation of alternative treatments provided by a traditional healer, such as cautery or inadequate practice and those who scored higher than cut-off points were labelled as subjects with high knowledge or adequate practice. Logistic regression, Chi square test, and Fisher Exact test were used to assess the presence of statistically significant associations between demographic factors and level of knowledge and practice adequacy. A p-value of less than 0.05 was presumed statistically significant for the applied statistical tests.

Results

Summary of Study Participants
A total of 450 mothers participated in the current investigation. Table 1 illustrates demographics of the included mothers. Ages ranged between 17 and 46 years, where a majority of mothers were over 32 years old. The mean age of the youngest child varied between 1 month to 48 months, and a majority of youngest children were over 24 months old. A majority of mothers had one child or two at the time of recruitment, had a university degree, were housewives, and had a monthly income between 5000 and 10,000 Saudi Riyals. About 91% of participating mothers declared they utilized antenatal care during their pregnancies, and 99% of the mothers reported having their last child born at a hospital.
Table 1: Demographic characteristics of 450 mothers in Jazan region.

| Variables*          | Frequency | Percent |
|---------------------|-----------|---------|
| Age                 |           |         |
| <26 years           | 142       | 31.8%   |
| Between 26 and 32 years | 145     | 32.5%   |
| >32 years           | 159       | 35.7%   |
| Age of the youngest (in months) |        |         |
| <10                 | 147       | 32.7%   |
| Between 10 and 24   | 123       | 27.3%   |
| >24                 | 180       | 40.0%   |
| Parity              |           |         |
| 1–2                 | 223       | 49.6%   |
| 3–4                 | 127       | 28.2%   |
| 5 or more           | 100       | 22.2%   |
| Level of education  |           |         |
| Illiterate          | 19        | 4.2%    |
| Primary school      | 30        | 6.7%    |
| Intermediate school | 32        | 7.1%    |
| Secondary school    | 123       | 27.3%   |
| University          | 246       | 54.7%   |
| Occupation          |           |         |
| Housewife           | 224       | 52.1%   |
| Employed            | 123       | 28.6%   |
| Student             | 83        | 19.3%   |
| Monthly income (Saudi Riyals) |       |         |
| Less than 5000      | 154       | 34.5%   |
| Between 5000 and 10,000 | 170  | 38.1%   |
| More than 10,000    | 122       | 27.4%   |
| Antenatal care visits |          |         |
| Yes                 | 408       | 90.7%   |
| No                  | 42        | 9.3%    |

* Missing 4 cases for age, 20 cases for occupation, and 4 cases for monthly income.

Level of Knowledge

Participating mothers’ knowledge concerning newborn care was summarized in Table 2. The mean level of knowledge was 11.85/16 [SD: 2.6]. A majority of participating mothers were able to give correct answers, where correct answers exceeded 70% for 11 out of 16 survey items. The question concerning importance of feeding a newborn in the first hour of life scored the highest proportion of correct answers. However, questions concerning normal frequency of newborn defecation per day, the need to postpone bathing a newborn for 24 hours after birth, and awareness about neonatal screening programs scored the lowest proportion of correct answers.

Practice Adequacy

Practice of care is described in Table 3. The mean score for practice adequacy was 7.11/10 [SD: 1.5]. Among measured newborn care practices, 93% of responding mothers indicated vaccinations according to a vaccination schedule. The practice scoring the lowest adherence was postponing bathing the newborn for 24 hours after birth. Furthermore, about 33% of mothers reported not initiating breastfeeding within the first hours after birth. Additionally, 27% of mothers declared using alternative treatments, such as herbal medication and cauterization, to treat their newborn instead of seeking professional health care from available health services.

Association with Demographic Factors

The association between demographic characteristics and level of knowledge and practice adequacy is illustrated in Table 4. The strongest association with knowledge level was apparent when comparing education level, employment status, and adherence to antenatal visits during pregnancy. These observed differences were statistically significant (p < 0.05). The odds of having a high level of knowledge was greater among mothers with university or postgraduate education in comparison to mothers with lower education levels. Similarly, the odds of having a high level of knowledge was higher among employed mothers in comparison to unemployed or student mothers.

The association between demographic characteristics and practice adequacy level seems to differ when compared to associations with knowledge. Age appeared to be associated with practice, where mothers older than 32 had greater odds of having a high level of competency (p = 0.017). Education level and attending antenatal care visits did not seem to show a statistically significant association with practice. Finally, employed mothers were found to have higher odds of adequate practice compared to housewives or student mothers (p = 0.018).

Having found that 27% of mothers utilized alternative treatments, such as cauterization and herbal medications, as a health care option for their newborn could be worth investigating. Demographic factors associated with choosing to use alternative treatments were tested. Education level appeared to be a factor: 56% of illiterate mothers and 40% of mothers with primary education sought cauterization and alternative medicine for their newborn (p = 0.009). Additionally, 50% of mothers whom did not attend antenatal care visits during their pregnancy reported using alternative treatments for their newborn (p = 0.0003).

About 60% of mothers who did not attend antenatal care visits scored a lower level of knowledge. Nonetheless, given the retrospective nature of this investigation, it is not clear whether a higher level of knowledge would increase adherence toward antenatal care visits or whether knowledge of newborn care was enhanced due to attending antenatal visits.

The univariate logistic regression revealed several associations between demographic variables and level of knowledge and practice adequacy. However, occupation and tendency to attend antenatal care visits were found to be
related to education level, which interfered with assuming these variables as independent variables in a multivariate regression. However, examining the associations between level of education, occupation, and attendance of antenatal care was performed using Fisher Exact test (Table 5). It can be observed that education level has a statistically significant association with both tendency of attending antenatal care visits and occupation. These associations may indicate that odds of having a higher level of knowledge among employed mothers and mothers attending antenatal care visits are partially explained by their higher education levels.

Table 2: Knowledge of 450 mothers from Jazan, Saudi Arabia, concerning newborn care.

| Survey item                                      | Correct answer | Frequency | Percentage |
|-------------------------------------------------|----------------|-----------|------------|
| Awareness of the neonatal screening program     |                | 255       | 56.7%      |
| Normal birth weight                             |                | 332       | 73.8%      |
| Feeding of newborn in the 1st hour of life      |                | 406       | 90.2%      |
| Importance of colostrum                         |                | 361       | 80.2%      |
| Breastfeeding interval                          |                | 393       | 87.3%      |
| Importance of pre-lactal feeding                |                | 308       | 68.4%      |
| Importance of drying newborn                    |                | 362       | 80.4%      |
| Importance of wrapping newborn                  |                | 362       | 80.4%      |
| Keeping the newborn close to his mother.        |                | 381       | 84.7%      |
| The need to postpone bathing for 24 hours after birth |            | 210       | 46.7%      |
| Hand washing by mothers before feeding baby     |                | 368       | 81.8%      |
| Nipple cleaning before breastfeeding             |                | 394       | 87.6%      |
| Awareness of the Saudi immunization schedule    |                | 389       | 86.4%      |
| Believing that vaccines can be harmful to newborns |              | 397       | 88.2%      |
| Normal frequency of newborn defection per day   |                | 180       | 40.1%      |
| Knowing that inappropriate feeding positions can cause ear and chest infection | | 266 | 59.1% |

Table 3: Practice of 450 mothers from Jazan, Saudi Arabia toward their newborns.

| Questions                                      | Appropriate practice response | Frequency | Percentage |
|------------------------------------------------|------------------------------|-----------|------------|
| Initiation of breastfeeding in the 1st hour after birth |                            | 303       | 67.3%      |
| Colostrums feeding                              |                            | 350       | 77.8%      |
| Feeding interval                                |                            | 359       | 80.5%      |
| Pre-lactal feeding                              |                            | 380       | 84%        |
| Newborn wrapped immediately after birth          |                            | 401       | 90.3%      |
| Keeping newborn close to mother                 |                            | 356       | 80%        |
| Postponing bathing newborn for 24 hours after birth |                        | 258       | 57.8%      |
| Up to date vaccination of child                 |                            | 416       | 93.3%      |
| Did not use alternative treatments to treat child |                            | 328       | 72.9%      |

Discussion
This study is a cross-sectional study assessing the level of knowledge and adequacy of practice concerning newborn care among mothers in different areas of Jazan, Saudi Arabia. The majority of mothers were not aware of the normal defection frequency of newborns, the importance of postponing newborn bathing for 24 hours after birth, and the newborn screening programme. The knowledge of mothers concerning newborn care appeared to be associated with education level, employment status, and attendance of antenatal care visits during pregnancy. More than 90% of mothers reported up to date vaccination of their children and reported immediately wrapping their children after birth. However, 42% of mothers reported bathing their newborns during the first 24 hours after birth. The age of mothers and their employment status appeared to be associated with adequacy of practice, indicating better practice among older and employed mothers.

As far as we know, studies assessing the level of knowledge and practice of mothers concerning newborn care
in Saudi Arabia are lacking. However, several studies were found investigating a particular area within newborn care, such as breastfeeding, in several cities in Saudi Arabia. The proportion of mothers who initiated breastfeeding within the first hour of birth was found to be 31% in Abha [12], 77% in Al-Hassa [13], and 24% in Al-Qasim [14].

The proportion of mothers who initiated breastfeeding within the first hour after birth was 67% in our study.

### Table 4: Association between demographic factors and level of knowledge and practice of care for 450 mothers from Jazan, Saudi Arabia.

| Demographic variables          | Total | Odds of high knowledge | Odds of competent practice |
|-------------------------------|-------|------------------------|---------------------------|
|                               |       | OR* [95%CI]            | P value                   | OR* [95%CI]            | P value                   |
| **Age**                       |       |                        |                           |                          |                           |
| <26 years                     | 142   | Reference              | Reference                 |                           |                           |
| Between 26 and 32             | 145   | 1.31 0.81–2.11         | 0.266 1.50 0.91–2.46       |                           |                           |
| >32 years                     | 159   | 1.05 0.66–1.66         | 0.820 1.82 1.11–2.98       |                           | 0.017                      |
| **Education level**           |       |                        |                           |                          |                           |
| Illiterate/primary            | 49    | Reference              | Reference                 |                           |                           |
| Intermediate/secondary        | 155   | 2.02 1.04–3.89         | 0.036 2.59 0.78–8.53       |                           | 0.110                      |
| University and above          | 246   | 3.67 1.94–6.93         | 0.000 1.85 0.58–5.85       |                           | 0.294                      |
| **Occupation**                |       |                        |                           |                          |                           |
| Housewife                     | 244   | Reference              | Reference                 |                           |                           |
| Employee                      | 123   | 2.97 1.82–4.86         | 0.000 1.83 1.10–3.02       |                           | 0.018                      |
| Student                       | 83    | 1.54 0.92–2.58         | 0.095 1.01 0.59–1.71       |                           | 0.963                      |
| **Monthly income (Saudi Riyals)** |       |                        |                           |                          |                           |
| less than 5000                | 158   | Reference              | Reference                 |                           |                           |
| 5000–10,000                   | 170   | 1.103 0.70–1.71        | 0.664 1.52 0.95–2.44       |                           | 0.079                      |
| more than 10,000              | 122   | 1.52 0.93–2.50         | 0.094 1.26 0.76–2.09       |                           | 0.368                      |
| **Antenatal care visits**     |       |                        |                           |                          |                           |
| No                            | 42    | Reference              | Reference                 |                           |                           |
| Yes                           | 408   | 2.61 1.36–4.99         | 0.004 1.8 0.94–3.43       | 0.075                      |
| **Age of youngest (months)**  |       |                        |                           |                          |                           |
| <10                           | 147   | Reference              | Reference                 |                           |                           |
| Between 10 and 24             | 123   | 0.70 0.43–1.15         | 0.169 0.89 0.54–1.48       |                           | 0.675                      |
| >24                           | 180   | 0.75 0.47–1.18         | 0.215 1.50 0.92–2.42       |                           | 0.090                      |
| **Number of children**        |       |                        |                           |                          |                           |
| 1–2 children                  | 223   | Reference              | Reference                 |                           |                           |
| 3–4 children                  | 127   | 1.04 0.66–1.64         | 0.852 1.44 0.89–2.33       |                           | 0.135                      |
| 5 or more                     | 100   | 0.78 0.48–1.27         | 0.325 1.42 0.847–2.40      |                           | 0.182                      |

* Odds ratio.

### Table 5: Association between education level, attendance of antenatal care visits, and occupation in a sample of 450 mothers from Jazan, Saudi Arabia.

| Education level              | Antenatal care visits | Occupation |
|------------------------------|-----------------------|------------|
|                              | Yes | No    | P value | Housewife | Employee | Student | P value |
| Illiterate/primary           | 35 (71.4%) | 14 (28.6%) | <0.001* | 48 (98%) | 0 (0%) | 1 (2%) | <0.001* |
| Intermediate/secondary       | 139 (89.6%) | 16 (10.4%) | 126 (81.3%) | 11 (7.1%) | 18 (11.6%) |
| University and above         | 229 (93%) | 11 (7%) | 70 (28.5%) | 112 (45.5%) | 64 (26%) |

* Fisher Exact test.
which is similar to the findings of the Al-Hassa study, but much higher than the findings in the Abha and Al-Qasim studies. A possible explanation for this marked variation is related to sampling; unlike our sample, which recruited a wide spectrum of mothers with a wide distribution of demographic variables, the Abha and Al-Qasim studies were limited to school teachers and not the general community.

A study by Al-Ayed assessed the level of knowledge of mothers concerning child health matters, including topics related to children older than one year [9]. In the Al-Ayed study, an overall satisfactory level of knowledge of mothers was reported, which is similar to our findings, where the majority of mothers were able to give correct answers to survey items.

Within our sample, 42% reported a lack of awareness of newborn screening programmes. This notion is supported by the findings of the study by Al-Sulaiman et al. which assessed the knowledge and attitude of Saudi mothers towards newborn screening. Their investigation reported an overall positive attitude but with limited awareness about the screening tests [15].

Several international studies have assessed the knowledge and practice of mothers concerning newborn care in South Asian and African countries, such as India [16], Ethiopia [17], Nepal [10], Kenya [11], Pakistan [18], Sri Lanka [19], and Bangladesh [20]. It can be observed that a majority of studies assessing knowledge and practice of mothers concerning newborn care are mainly performed in underdeveloped or developing countries. This can be explained by the fact that the highest rates of neonatal mortalities are reported in South Asian, African, and Latin American countries [21]. However, variations in the magnitude of knowledge and the practice of mothers between these societies are expected given the variations in sociodemographic factors and the quality of healthcare services. For example, the proportion of home deliveries in the study conducted in Pakistan was 18%, while only 1% reported giving birth to their last child at home in our sample.

The associations between demographic variables and the levels of knowledge and practice of care assessed in international studies is similar to the findings of our investigation. For example, a study conducted in Sri Lanka [19], including a sample of 446 mothers, reported lower levels of knowledge among unemployed mothers and mothers with delayed antenatal care visits. Nonetheless, a large scale study conducted in Bangladesh [20], including a sample of 6150 mothers, reported that mothers with higher education levels were likely to report adequate newborn care practice, which was not observed in our sample.

A study by Amolo et al. assessed mothers' levels of knowledge according to attending antenatal care and receiving newborn care education during pregnancy in Kenya [22]. The study found that mothers who attended antenatal care visits and received education concerning newborn care during pregnancy scored higher levels of knowledge. Furthermore, in an international investigation including 57,643 infants/mothers from Argentina, Democratic Republic of Congo, Guatemala, India, Pakistan, and Zambia, it was observed that maternal level of education impacted knowledge regarding newborn care, where training mothers with a lower education was associated with reduction of stillbirth rates [23]. These findings are similar to our finding concerning the association between education level and knowledge regarding newborn care.

This study had multiple areas of strength and weakness. This study was able to assess the gaps in knowledge and inadequacy in practice of mothers in Jazan concerning newborn care. Sampling mothers with different demographic backgrounds enabled assessment of the associations between demographics and knowledge and practice levels. Although excluding mothers with children older than 5 years was done to reduce practice recall bias, we cannot ignore the possibility of its occurrence given the subjective nature of the assessment tool. Finally, limiting this study to mothers in Jazan region hinders the ability to generalise the findings to other regions of Saudi Arabia.

Finding several gaps in the knowledge and adequacy of practice of mothers in Jazan region concerning newborn care mandates the development of strategies and the commencement of initiatives to enhance the quality of newborn care. Attending antenatal care visits during pregnancy appears to be associated with the level of knowledge and the adequacy of practice concerning newborn care. However, 42 mothers from our sample reported not attending antenatal care visits during their pregnancies. The factors influencing attendance is an area for further research. Additionally, 122 mothers reported using herbal medications or cauterisation for their newborns; a majority of these mothers reported lower levels of education. It is worth investigating why these mothers did not favour seeking conventional health services and the possible harm caused to the well-being of the newborn.

Conclusions
Proportions of correct answers measuring knowledge and practice adequacy varied between 40% to 93%, indicating variability of mothers' knowledge and practice concerning newborn care in Jazan region. Knowledge and practice appeared to be associated with demographic factors, such as levels of education, age, and attending antenatal care visits. Further assessment is needed to examine the factors associated with attendance, antenatal care visits during pregnancy, and the factors associated with mothers' choices to opt for alternative treatments for their newborns.

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Competing Interests
The authors have no competing interests to declare.

Author Contribution
All authors had access to the data and a role in writing the manuscript; article type; key words; and running head.
References

1. World Health Organization. Neonatal – Perinatal Database. https://www.newbornwhocc.org/pdf/database.pdf. Accessed February 1, 2019.

2. World Health Organization. Global Health Observatory: Neonatal Mortality. https://www.who.int/gho/child_health/mortality/neonatal_text/en/. Accessed February 1, 2019.

3. World Health Organization. Newborns: Reducing Mortality. https://www.who.int/news-room/fact-sheets/detail/newborns-reducing-mortality. Accessed February 1, 2019.

4. Liu L, Johnson HL, Cousens S, et al. Global, regional, and national causes of child mortality: An updated systematic analysis for 2010 with time trends since 2000. Lancet. 2012; 379(9832): 2151–61. DOI: https://doi.org/10.1016/S0140-6736(12)60560-1

5. Black RE, Morris SS and Bryce J. Where and why are 10 million children dying every year? Lancet. 2003; 361(9376): 2226–34. DOI: https://doi.org/10.1016/S0140-6736(03)13779-8

6. Al-Mazrou YY, Alhamdan NA, Alkotobi AI, Nour OM and Farag MA. Factors affecting child mortality in Saudi Arabia. Saudi Med J. 2008 Jan; 29(1): 102–6.

7. General Authority of Statistics. Saudi Neonatal Mortality Rates by Administrative Region. https://www.stats.gov.sa/sites/default/files/saudi_neonatal_mortality_rates_by_administrative_region2016en.pdf. Accessed February 1, 2019.

8. Saudi Ministry of Health. Annual Statistical Book. https://www.moh.gov.sa/en/Ministry/Statistics/book/Documents/ANNUAL-STATISTICAL-BOOK-1438H.pdf. Accessed February 2, 2019.

9. Al-Ayed I. Mothers’ knowledge of child health matters: Are we doing enough? J Fam Community Med. 2010; 17(1): 22. DOI: https://doi.org/10.4103/1319-1683.68785

10. Shrestha T, Bhattarai SG and Silwal K. Knowledge and practice of postnatal mother in newborn care. JNMA J Nepal Med Assoc. 2013; 52(190): 372–7. DOI: https://doi.org/10.31729/jnma.2117

11. Kamau-Thuita F, Omwega AM and Muita JWG. Child care practices and nutritional status of children aged 0–2 years in Thika, Kenya. East Afr Med J. 2002 Oct; 79(10): 524–9. DOI: https://doi.org/10.4314/eamj.v79i10.8814

12. Al-Binali AM. Breastfeeding knowledge, attitude and practice among school teachers in Abha female educational district, southwestern Saudi Arabia. Int Breastfeed J. 2012; 7(1): 1. DOI: https://doi.org/10.1186/1746-4358-7-10

13. Amin T, Hablas H and Al Qader AA. Determinants of Initiation and Exclusivity of Breastfeeding in Al Hassa, Saudi Arabia. Breastfeed Med. 2011; 6(2): 59–68. DOI: https://doi.org/10.1089/bfm.2010.0018

14. Alwusaydi F, Bilal J, Alawad M and Alharbi A. Knowledge, Attitudes and Practices Regarding Breastfeeding Among Female School Teachers At Qassim Region. Int J Adv Res. 2016; 4(12): 1259–67. DOI: https://doi.org/10.21474/IJAR01/2517

15. Al-Sulaiman A, Kondkar AA, Saeedi MY, Saadallah A, Al-Odaib A and Abu-Amero KK. Assessment of the Knowledge and Attitudes of Saudi Mothers towards Newborn Screening. Biomed Res Int. 2015; 2015: 718674. DOI: https://doi.org/10.1155/2015/718674

16. Castalino F and Nayak DA. Knowledge and practices of postnatal mothers on newborn care in tertiary care hospital of Udupi District. Nitte Univ J Heal Sci. 2014; 4(2). http://nitte.edu.in/journal/June2014/98-101.pdf

17. Misgna HG, Gebru HB and Birhanu MM. Knowledge, practice and associated factors of essential newborn care at home among mothers in Gulomekada District, Eastern Tigray, Ethiopia, 2014. BMC Pregnancy Childbirth. 2016 Jun; 16(1): 144. DOI: https://doi.org/10.1186/s12884-016-0931-y

18. Gul S, Khalil R, Yousafzai MT and Shoukat F. Newborn care knowledge and practices among mothers attending pediatric outpatient clinic of a hospital in Karachi, Pakistan. Int J Health Sci (Qassim). 2014 Apr; 8(2): 167–75. DOI: https://doi.org/10.12816/0006083

19. Senarath U, Fernando DN, Vimpani G and Rodrigo I. Factors associated with maternal knowledge of newborn care among hospital-delivered mothers in Sri Lanka. Trans R Soc Trop Med Hyg. 2007 Aug; 101(8): 823–30. DOI: https://doi.org/10.1016/j.trstmh.2007.03.003

20. Shahjahan M, Ahmed MR, Rahman MM and Afroz A. Factors affecting newborn care practices in Bangladesh. Paediatr Perinat Epidemiol. 2012 Jan; 26(1): 13–8. DOI: https://doi.org/10.1111/j.1365-3016.2011.01239.x

21. UNICEF. Neonatal mortality. https://data.unicef.org/topic/child-survival/neonatal-mortality/. Accessed April 10, 2019.

22. Amolo I, Irimu G and Njai D. Knowledge of postnatal mothers on essential newborn care practices at the Kenyatta National Hospital: A cross sectional study. Pan Afr Med J. 2017; 28: 97. DOI: https://doi.org/10.11604/pamj.2017.28.97.13785

23. Chomba E, Carlo WA, Goudar SS, et al. Effects of Essential Newborn Care Training on Fresh Stillbirths and Early Neonatal Deaths by Maternal Education. Neonatology. 2017; 111(1): 61–7. DOI: https://doi.org/10.1159/000447421
