The Awareness Level of Saudi Mothers Towards Common Neonatal Danger Signs

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ABSTRACT

Study Design: Cross sectional

Introduction: In developing countries like Saudi Arabia, most of the newborn deaths are reported to take place at home. Majority of such deaths have been caused due to lack of awareness, late detection of symptoms of critical infection by caregivers and mothers, and late decision-making in seeking healthcare services. Mothers' familiarity on symptoms recognized by the WHO is very important for health-seeking behavior of mothers.

Objective: This study is aimed to investigate the awareness, health-seeking behavior and knowledge of caregivers and mothers about neonatal danger signs in Saudi Arabia.

Methodology: A "community-based, cross-sectional study" was conducted on awareness level of mothers in Saudi Arabia on neonatal danger signs suggested by WHO. The sample size consists of 4518 mothers who have delivered the baby over the past two years and nurtured a baby. A self-structured questionnaire was designed to share online to gather the data. The data was analyzed through IBM SPSS v20.0 to evaluate awareness and experience of mothers about danger signs with one-sample t-test with confidence interval of 95%.

Results: In this study, 1265 (28%) participants recognized yellow palms/sores as a danger sign in newborn child. Additionally, 19.4% and 18.8% women recognized fast breathing and convulsion as danger signs, respectively. Child not feeding since birth or stopped feeding is another sign recognized by 7.7% participants, weakness or lethargy was recognized by 4% participants, excess crying was recognized by 3.8% participants and weight gain was recognized by 2.3% participants. After performing one sample t-test with confidence interval of 95%, it was observed that there is a significant impact of participants' familiarity on recognizing "neonatal danger signs (p<0.05)."

Keywords: Neonatal danger signs, WHO, Saudi Arabia, Caregivers, Mothers, Newborn deaths, Awareness, Knowledge, Health-seeking behavior

INTRODUCTION

The early period is the most sensitive period for a newborn to survive, as reported by the WHO[1]. Around 5.9 million deaths were recorded across the world of children in 2015 before they turn 5 years old[2]. These deaths took place mostly in developing nations and due to preventable causes[3]. Over 45% of all children under 5 years old are neonatal. In the first week of birth, around 3/4th of deaths took place and 25% to 45% of child mortality is recorded within the first 24 hours of birth[4].

Most of the deaths of newborns took place at home in developing countries and around 2/3rds of deaths could be prevented with efficient and timely health measures[5]. Most of these deaths took place because symptoms of severe illness were not recognized by caregivers and

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parents and they were too late to seek medical aid at the earliest[6-8]. UNICEF and WHO have developed an initiative "Integrated Management of Childhood Illness (IMCI)" which was aimed to prevent deaths by improving children's health as part of the community in 1992 and detect and treat major causes of childhood mortality[9].

The IMCI program has adopted a "cross-cutting approach" given that there are multiple causes of child illness in many cases. This initiative is aimed to combine the experiences from several national preventive programs and to come up with a proven approach to take care of sick child. It works to reduce illness and death rates in childhood by improving community and family practices for domestic illness management[10].

The first and foremost clue is quick recognition of danger signs as given in IMCI for a caregiver or mother to seek medical help. WHO has recognized the danger signs of severe illness or infection. Some of the danger signs to look for are convulsions, child refusing to eat, fever, constant breathing, extreme "chest in-drawing", reduced body temperature, and lack of movement due to severe disease. Draining pus, umbilical redness, and skin pustules are the signs of infection[10]. Around 13 children out of 1000 were died in 2015 in Saudi Arabia[5]. The death rate of children under 5 years in Saudi Arabia crossed the threshold of the "Millennium Development Goal-4" with 2/3rd reduction in the rate of newborn mortality by the year 2015. However, Saudi Arabia still has a higher mortality rate in infants than most of the developed and "Gulf Cooperation Council (GCC)" countries[5].

Usually, the first 28 days are the most crucial days for neonatal life[11]. According to the factsheet by WHO, "5.3 million children under 5 years old in 2018 were died, and around 2.5 million children died during the first four weeks, which means roughly around 7000 newborn deaths per day[12]. The "Saudi General Authority of Statistics" conducted a survey in 2016 and found that 2.71% children died in Aseer region, while 2.75% died in 30 days of birth across the Kingdom of Saudi Arabia[13].

It is paramount for the mothers to have knowledge about the danger signs and have positive behavior towards seeking medical help for early diagnosis and therapeutic intervention[14]. The health-seeking behavior of mothers for neonatal care relies heavily on their information on danger signs recognized by the WHO", it is vital to know these signs which should be investigated.

RESEARCH OBJECTIVES

To determine the level of awareness of Saudi mothers on common newborn danger signs.

METHODOLOGY

The researchers have conducted a "cross-sectional, community-based study" in Saudi Arabia to determine the awareness level of mothers in Saudi Arabia about danger signs of illnesses in newborn babies as suggested by the WHO.

The sampling process consists of all caregivers who have nursed a baby or mothers who delivered a child over the past two years. Caregivers consist of fathers, nannies, grandfathers, and grandmothers. Those women were excluded who couldn't provide enough details for this study.

Trained researchers designed the questionnaire and then shared online to collect the data. An in-depth literature review was done to design the questionnaire by the researchers[15-17]. Those researchers collected

sociodemographic information of mothers/caregivers and neonate, such as gender of the newborn, age, residence, monthly income, education, occupation, number of kids nursed, and number of children. Details regarding the "pregnancy history of women and their experience, knowledge, and response towards the danger signs were recorded.

Women were requested to list down the symptoms that they know and must be serious that can cause health problems and even risk the life of baby. They were also required to list the signs they personally faced with their newborn", if any, along with the medical help they sought, actions they took, and causes for not using the medical services. They were asked to remember the period when they experienced danger signs and present the same to the healthcare unit, outcome of the illness, and how prompt medical help was in the healthcare facility.

Before asking the questions, consent was taken and promised each respondent to keep their identity confidential.

IBM SPSS v.20 was used for "statistical analysis of the responses". Frequencies and percentages were calculated to define the sociodemographic profile of respondents. To analyze the mothers' experience and awareness of neonate danger signs, one-sample t-test was performed with confidence interval of 95%.

RESULTS

In this study, consent was sought before asking questions from a total of 4518 participants, out of which 4458 (98.67%) gave their consent while only 60 (1.33%) declined their acceptance (Table 1) (Figure 1).

Table 1: Acceptance to questions

| Accept to ask some questions	Frequency	Percent	Valid Percent	Cumulative Percent
Valid
Yes	4458	98.67	98.67	98.67
No	60	1.33	1.33	100.0
Total	4518	100.0		
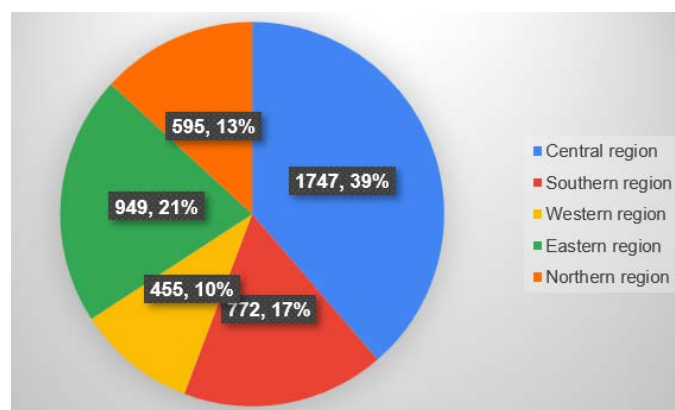
Figure 1: Region

In this study, 1747 (38.7%) participants belong to central region, 772 (17.1%) participants come from southern region, 455 (10.1%) participants come from western region, 949 (21%) participants belong to eastern region and 595 (13.2%) participants come from northern region of Saudi Arabia (Table 2) (Figure 2).

Table 2: Region

In which province do you live?	Frequency	Percent	Valid Percent	Comulative Percent
Valid Central Region	1747	38.7	38.7	38.7
Southern Region	772	17.1	17.1	55.8
Western Region	455	10.1	10.1	65.8
Eastern Region	949	21.0	21.0	86.8
Northern Region	595	13.2	13.2	100.0
Total	4518	100.0	100.0	
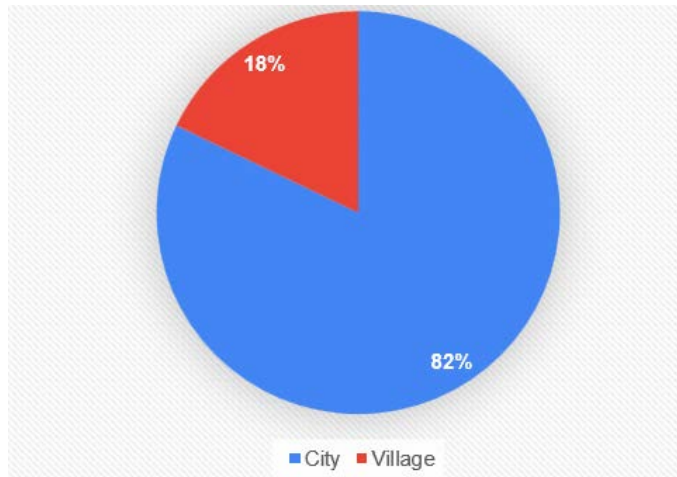
Figure 2: Residence of participants

In this study, majority of participants, i.e., 3710 caregivers and mothers (82.1%), live in city, while only 808 (17.9%) came from village (Table 3).

Table 3: Residence

Where do you live?	Frequency	Percent	Valid Percent	Cumulative Percent
Valid City	3710	82.1	82.1	82.1
Village	808	17.9	17.9	100.0
Total	4518	100.0	100.0	

In this study, a total of 94.2% participants were mothers while 5.8% participants were male caregivers of children (Table 4).

Table 4: Gender of the participants

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Male	260	5.8	5.8	5.8
Female	4258	94.2	94.2	100.0
Total	4518	100.0	100.0	

In this study, majority (96.5%) participants were Saudi residents while only 3.5% participants belong to other countries (Table 5).

Table 6: Maternal age of the participants

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
Less than 18	68	1.5	1.5	1.5
18-24	1016	22.5	22.5	24.0
25-29	1408	31.2	31.2	55.2
More than 30	2026	44.8	44.8	100.0
Total	4518	100.0	100.0	

In this study, 2955 (65.4%) participants earn from 5000 to 15,000 SR per month, 593 (13.1%) participants earn below 5000 SE per month, while 970 (21.5%) participants earn more than 15000 SR (Table 6).

Table 7: Monthly income of the participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 5000 SR	593	13.1	13.1	13.1
	5000-15000 SR	2955	65.4	65.4	78.5
	More than 15000 SR	970	21.5	21.5	100.0
	Total	4518	100.0	100.0	

Table 8: Career of the participants

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
Healthcare Worker	522	11.6	11.6	11.6
Non-Healthcare Worker	2022	44.8	44.8	56.3
Unemployed	1974	43.7	43.7	100.0
Total	4518	100.0	100.0	

Table 9: Participants' knowledge (recognition) of the neonatal danger signs

	Frequency	Valid Percent	Comulative Percent
Valid			
Not feeding since birth or stopped feeding	350	7.7	7.7
Fast Breathing	850	18.8	26.5
Fever > 37.5	880	19.4	45.9
Weakness or lethargy	540	12.0	57.9
Yellow palms/soles	180	4.0	61.9
Bulging Fontanel	1265	28.0	89.9
Diarrhea	120	2.7	92.6
Excess crying	60	1.3	93.9
Not gaining weight	170	3.8	97.7
	103	2.3	100.0
Total	4518		

One-sample t-test was performed with confidence interval of 95% to determine the level of "awareness of mothers towards common neonatal danger signs". It was found that the value of significance is $p<0.05$, which means there is a significant impact of participants' knowledge on their recognition of neonatal danger signs (Table 7,8 and 9).

In this study, majority 3354 (74.2%) participants showed immediate response after seeing the symptoms and rushed to the doctor. In addition, 1009 (22.3%) participants waited for 2-3 days when their child expressed some of the above symptoms, 113 (2.5%) participants wait for 4-5 days before going to the doctor, and only 42 (0.9%) participants wait until the symptoms are resolved spontaneously (Table 10).

There is total 4189 (92.7%) participants who go to the doctor when they witness danger signs in their newborn baby. Only 225 (5%) wait and see if it resolves and 104 (2.3%) participants use herbal medicines to heal the symptoms (Table 11).

Table 10: One-Sample test

			Test Value = 0		95% Confidence Interval of the Difference	
	t	df	Sig.(2-tailed)	MEAN DIFFERENCE	Lower	Upper
"Participants knowledge (recognition) of the neonatal danger signs"	209.679	4518	.000	46.54	43.5	49.6

Table 11: Participants' response to danger signs

In case your child expressed some of these symptoms when you will go the doctor?	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Immediately after seeing the symptoms	3354	74.2	74.2	74.2
Wait 2 – 3 days	1109	22.3	22.3	96.6
Wait 4 – 5 days	113	2.5	2.5	99.1
Wait until symptoms resolved sponatneously	42	.9	.9	100.0
Total	4518	100.0	100.0	

DISCUSSION

In this study, majority of participants (38.7%) belong to central region while the least number of participants (10.1%) come from western region. Similarly, 3710 participants (82.1%) belong to city and 808 (17.9%) participants belong to villages. A total of 94.2% participants are female in this study and 96.5% participants are Saudi residents.

Majority (44.8%) participants in this study are aged above 30 years old while only 1.5% participants are aged less than 18 years. There are 65.4% participants who earn 5000 to 15000 SR per month, while 21.5% participants earn above 21.5% and 13.1% participants earn less than 5000 SR. When it comes to education, 70.3% participants have completed their bachelor's degree, while only 6% completed their higher education, 20% completed their secondary school, and only 1.2% participants were illiterate.

Majority (31.7%) participants were unemployed, while 27.8% participants were government employees, 23.1% participants were private sector employees, and 17.4% participants were students. When it comes to number of children, majority (44%) participants had 3 to 5 children, 16.5% participants had 1 to 2 children, 16.4% had more than 5 children and 23.1% had four children. Around 75% participants had a visit to ANC while 25% hadn't visited ANC.

When it comes to response to danger signs, 74.2% participants showed quick response to danger signs and rushed to the nearest hospital. Additionally, 22.3% participants waited for 2-3 days, 2.5% waited for 4-5 days and 0.9% waited for symptoms to recover. There are 92.7% participants in this study who go to the doctor when they see danger signs. Only 5% participants wait and see and 2.3% participants take herbal medicines. Previous visits to doctors were the major source of information of danger signs for 52.7% of participants. 24.9% participants gain knowledge from their family and friends. 13.9% participants use social media to gather information and 8.5% use internet websites to gain information.

Yellow palms/sores are the most common danger sign recognized by majority (28%) participants. Fast breathing is the next most common danger sign recognized by 19.4% participants. Convulsion is recognized by 18.8% participants. Child not feeding since birth or stopped breathing is another sign observed by 7.7% participants. Other danger signs recognized by less than 5% participants are weakness or lethargy, excess crying, bulging fontanel, diarrhea, and not gaining weight. In addition, there is a significant impact (p<0.5) of participants' awareness on their recognition of danger signs.

Around 30 days since birth is the most critical neonatal period for survival of a child. In 2017 alone, around 2.5 million newborn babies died across the world. Around 79% of such deaths were reported in South Asia and Sub-Saharan Africa where the healthcare resources are in scarce[23,24]. Even with the fact that there is a huge decline across the world, there is significantly high rate of neonatal mortality in Ethiopia over past 20 years[25]. Most of the causes behind such deaths took place because of intrapartum-related complications, preterm birth, birth defects, and infections[26]. Across the world, there are various plans to minimize neonatal mortality, such as identifying early signs of medical care and neonatal danger signs, when needed.

These symptoms are known to be recognized easily by mothers and community healthcare workers[29]. There is a diverse knowledge of mothers across the world, nation, and continent. Around 37% mothers had knowledge of more than 3 danger signs in Saudi Arabia. On the other side, less than 2 danger signs were identified among only 14.8% mothers in rural Uganda[22].

There are scientific studies which showed various factors affecting the knowledge of mothers on neonatal danger signs. Availability of higher education to parents, residents nearby health centers, "past experience of danger signs, ANC attendance, and access to information have positive relation with good knowledge of mothers related to neonatal danger signs[22,27,30-33]. The lack of proper clinical manifestations of several neonatal diseases caused increased newborn mortality and morbidity in developing countries[33-37]. Another study was conducted among mothers who had delivered a child within the last two years in Ghana to identify factors related to danger signs in newborns. It is observed that complications in newborn and maternal delivery in the first six weeks, lack of maternal education, maternal age below 20 years, and less than 4 visits to antenatal care were the major predictor of danger signs"[32].

When it comes to association between higher knowledge about danger signs and ANC attendance, there are mixed results. For example, ANC was a major factor in a study in Ethiopia unlike a study based in Uganda[22,31-34]. One cause of such variations may be neonatal danger signs which are included in "health education during follow-up.

CONCLUSION

Even though there is a high information of participants about "neonatal danger signs", a lot of mothers and caregivers considered their healthcare visits as their primary source of education about "neonatal danger signs". Hence, there is a need to focus on other sources like social media, television, and other mediums to increase their sources of information about those danger signs. In addition, departments who make educational and public health policies in Saudi Arabia should develop interventions to improve familiarity and consciousness of mothers on "neonatal danger signs" to control illness and death rates of infants. Those approaches should be based on educating health workers and creating a proper support management for sustained health education and quality assurance with maternal interventions and booklets.

REFERENCES

1. World Health Organization, Infant, Newborn, 2016, http://www.who.int/topics/infant newborn/en/
2. World Health Organization, Global Health Observatory Data, Under-Five Mortality, 2016, https://www.who.int/gho/childhealth/mortality/mortalityunderfvetext/en/
3. Black RE, Morris SS, Bryce J. Where and why are 10 million children dying every year? lancet 2003;361(9376):2226-34.
4. World Health Organization, Newborns: Reducing Mortality, 2016, http://www.who.int/mediacentre/factsheets/fs333/en/
5. UNICEF, WHO, World Bank, and UN-DESA Population Division. Levels and trends in child mortality, 2015.
6. Jain T. Neonatal Danger Signs: Knowledge in mothers of Children Aged Less Than 1 Year in UAE. Eur J Mol Clin Med 2020;7(8).
7. Waiswa P, Kallander K, Peterson S, et al. Using the three delays model to understand why newborn babies die in eastern Uganda. Trop Med Int Health 2010;15(8):964-72.
8. Upadhyay RP, Rai SK, Krishnan A. Using three delays model to understand the social factors responsible for neonatal deaths in rural Haryana, India. J Trop Pediatr 2013;59(2):100-5.
9. World Health Organization. Integrated Management of Childhood Illness (IMCI). World Health Organization, 2016.
10. World health Organization. Integrated Management of Childhood Illness: Distance Learning Course, 2016.
11. Abu-Shaheen A, AlFayyad I, Riaz M, et al. Mothers' and caregivers' knowledge and experience of neonatal danger signs: a cross-sectional survey in Saudi Arabia. BioMed Res Int 2019;2019:1750240.
12. Baqui AH, Rahman M, Zaman K, et al. A population-based study of hospital admission incidence rate and bacterial aetiology of acute lower respiratory infections in children aged less than five years in Bangladesh. J Health Popul Nutr 2017;25(2):179.
13. Choi Y, El Arifeen S, Mannan I, et al. Can mothers recognize neonatal illness correctly? Comparison of maternal report and assessment by community health workers in rural Bangladesh. Trop Med Int Health 2010;15(6):743-53.
14. Mathur N. Status of newborns in India. J Neonatol 2005;19(1):1.
15. Ekwochi U, Ndu IK, Osuorah CD, et al. Knowledge of danger signs in newborns and health seeking practices of mothers and care givers in Enugu state, South-East Nigeria. Italian J Pediatr 2015;41(1):1-7.
16. Kabakyenga JK, Östergren PO, Turyakira E, et al. Knowledge of obstetric danger signs and birth preparedness practices among women in rural Uganda. Reprod Health 2011;8(1):1-0.
17. Mohammed F, Addisu Y, Vata PK. Assessment of knowledge of mother on danger signs of neonatal and postnatal illness and health seeking behavior among pregnant and postpartum mother in gedeo zone. Int J Curr Res 2016;8(1):25466-71.
18. Adem N, Berhe KK, Tesfay Y. Awareness and associated factors towards neonatal danger signs among mothers attending public health institutions of Mekelle City, Tigray, Ethiopia, 2015. J Child Adolescent Behav 2017;5(6):1-9.
19. Demis A, Gedefaw G, Wondmieneh A, et al. Women's knowledge towards neonatal danger signs and its associated factors in Ethiopia: a systematic review and meta-analysis. BMC Pediatr 2020;20(1):1-3.
20. Kibaru EG, Otara AM. Knowledge of neonatal danger signs among mothers attending well baby clinic in Nakuru Central District, Kenya: cross sectional descriptive study. BMC Res 2016;9(1):1-8.
21. Saaka M, Aryee P, Ali M, et al. The effect of social behavior change communication package on maternal knowledge in obstetric danger signs among mothers in East Mamprusi District of Ghana. Globalization Health 2017;13(1):1-2.
22. Sandberg J, OdbergPettersson K, Asp G, et al. Inadequate knowledge of neonatal danger signs among recently delivered women in southwestern rural Uganda: a community survey. PLoS One 2014;9(5):e97253.
23. Hug L, Alexander M, You D, et al. National, regional, and global levels and trends in neonatal mortality between 1990 and 2017, with scenario-based projections to 2030: a systematic analysis. Lancet Global Health 2019;7(6):e710-20.
24. Masquelier B, Hug L, Sharrow D, et al. Global, regional, and national mortality trends in older children and young adolescents (5–14 years) from 1990 to 2016: an analysis of empirical data. Lancet Global Health 2018;6(10):e1087-99.
25. Ethiopian Public Health Institute (EPHI) [Ethiopia] and ICF. Ethiopia Mini Demographic and Health Survey 2019: Key Indicators. Rockville, Maryland, USA: EPHI and ICF.
26. WHO. WHO Newsroom Key facts, 2019. Accessed on 25 October 2021.
27. Degefa N, Diriba K, Girma T, et al. Knowledge about Neonatal Danger Signs and Associated Factors among Mothers Attending Immunization Clinic at Arba Minch General Hospital, Southern Ethiopia: A Cross-Sectional Study. Hindawi BioMed Res Int 2019;2019:9180314.
28. Ekwochi U, Ndu IK, Osuorah CD, et al. Knowledge of danger signs in newborns and health seeking practice of mothers and care givers in Enugu state, South-East Nigeria. Italian J Pediatr 2015;41:18.
29. WHO. Newborns: reducing mortality: key fact sheets. Geneva: World Health Organization. 2018.
30. Bulto GA, Fekene DB, Moti BE, et al. Knowledge of neonatal danger signs, care seeking practice and associated factors among postpartum mothers at public health facilities in Ambo town, Central Ethiopia. BMC Res 2019;12(1):1-7.
31. Nigatu SG, Worku AG, Dadi AF. Level of mother's knowledge about neonatal danger signs and associated factors in North West of Ethiopia: a community based study. BMC Res 2015;8(1):1-6.
32. Jemberia MM, Berhe ET, Mirkena HB, et al. Low level of knowledge about neonatal danger signs and its associated factors among postnatal mothers attending at Woldia general hospital, Ethiopia. Matern Health Neonatol Perinatol 2018;4(1):1-8.

33. Anmut W, Fekecha B, Demeke T. Mother's knowledge and Practice about Neonatal Danger Signs and Associated Factors in Wolkite Town, Gurage Zone, SNNPR, Ethiopia, 2017. J Biomed Sci 2017.

34. Berhe M, Medhaniye AA, Kahsay G, et al. Essential neonatal care utilization and associated factors among mothers in public health facilities of Aksum Town, North Ethiopia, 2016. PloS One 2017;12(4):e0175902.