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Research Article

BIRTH PREPAREDNESS AND COMPLICATION READINESS AMONG PREGNANT WOMEN ATTENDING A MATERNAL AND CHILD CARE HOSPITAL OF GOVERNMENT MEDICAL COLLEGE IN SOUTH KASHMIR, INDIA: A CROSS-SECTIONAL STUDY

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ABSTRACT

Objective The objective of the study was to assess BPCR status and its associated factors among pregnant women attending an antenatal clinic in a rural tertiary care hospital.

Maternal death is an issue of great concern especially when these deaths can be prevented by appropriate management of the delays causing it. To prevent these delays, the Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO) has put forward the concept of Birth preparedness and complication readiness (BPCR). BPCR matrix comprises several core elements covering antenatal, intrapartum, postpartum, and neonatal care.

Methods: A hospital-based cross-sectional study was conducted among 568 pregnant women attending antenatal clinic of Department of Obstetrics and Gynecology of GMC, Anantnag from October 2021 to March 2022. After giving informed consent, participants were interviewed regarding BPCR using a questionnaire adapted from the JHPIEGO.

Results: BPCR index in our study was 42.34%. Almost half of the pregnant women (49.8%) were "well prepared" and remaining half (50.2%) were "less prepared". The association between level of preparedness was statistically significant with educational status of mother (p=0.017), primi parous (p=0.04), and multiple ANC visits (p=0.014).

Conclusion: Overall BPCR index was on the lower side with knowledge regarding various key danger signs, identification of a skilled health care provider and a health-care facility being very unsatisfactory.

Keywords: Birth preparedness and complication readiness, Danger signs, Anantnag.

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INTRODUCTION

Pregnancy as well as childbirth is a major reason for joy and celebration for thousands of women each day. However, the circumstances under which a child is conceived and born bear a huge impact on the survival of both mother and her newborn. Pregnancy and childbirth are considered normal physiological process. However, every pregnancy faces definite amount of threat from various unpredictable complications; and often lack of knowledge on the part of the woman and her family as well as various socio-cultural beliefs play a decisive role in management of these complications [1].

Despite the various targets set in sustainable development goals (SDG) focusing to curb maternal and neonatal mortality, it still remains an ongoing major public health problem in developing countries. An estimated 295000 maternal deaths occurred in 2017 globally, yielding an overall maternal mortality ratio (MMR) of 211 maternal deaths per 100,000 live births [2,3]. MMR in India has declined from 130 in 2014–2016 to 103 in 2017–2019, although better but still far away from the goal of achieving SDG target of 70/100,000 live births by 2030 [4]. Maternal death is an issue of great concern especially when these deaths can be prevented by appropriate management of the delays causing it. Thaddeus and Maine [1] outlined three delays: (a) Delay in deciding to seek care if complication occurs; (b) delay in reaching care; and (c) delay in receiving care. To accomplish this, the Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO) has put forward the concept of Birth preparedness and complication readiness (BPCR) [5]. There is also clear cut evidence that BPCR plays an important role in reducing maternal and neonatal mortality [6].

BPCR matrix comprises of several core elements covering antenatal, intrapartum, postpartum and neonatal care and serves as comprehensive strategy to reduce the delays in seeking health care and prevent the wastage of time that happens to play a crucial role in saving the life of both mother and her child [7-9]. It also forms a crucial component of safe motherhood program and demarcates the roles at level of individual, family, community, and policy makers in ensuring appropriate and timely attention to women and her newborn [5]. Despite the role BPCR plays in improving the maternal and neonatal health, little is known about its status and associated factors in rural setting of District Anantnag, J&K. This study aimed to assess BPCR status and its associated factors among pregnant women attending the Maternal and Child Care Hospital of GMC, Anantnag, J&K.

METHODS

Study design, setting, and study period

A hospital-based cross-sectional study was conducted among pregnant women attending antenatal clinic of Department of Obstetrics and Gynecology of Government Medical College, Anantnag from October, 2021 to March, 2022.

Study population and selection criteria

All pregnant women attending the outpatient department of Obstetrics and Gynecology of Government Medical College, Anantnag who were willing to participate were eligible for the study. Pregnant women who were unable to respond and were severely ill were excluded from the study.

Study size

Sample size was calculated using two-sided significance level of 95% and ratio of unexposed/exposed 1:1 and expected percentage of unexposed with outcome of 5%. Using these parameters, a sample size of 517 was obtained. After adding 10% non-response rate, the final sample size was 568.

Data collection tools and procedure

Data were collected using a pretested semi-structured interviewer-administered questionnaire. Data were collected about the sociodemographic characteristics (age, residence, family set up, marital status, duration of marriage, educational status, occupation, educational status of husband, socioeconomic status according to modified Kuppuswamy's scale, 2021 [10], etc.), obstetric characteristics (parity, registration of pregnancy, antenatal visits, Iron Folic Acid tablets use, and vaccination during pregnancy) and information regarding BPCR. An internationally validated tool adapted from the Safe Motherhood questionnaire developed by the JHPIEGO [5] was used to determine BPCR. It was modified according to local context and the objectives of the study. The modified tool comprised of components related to knowledge of danger signs, urgency in seeking care, pregnancy registration and visits, and pregnancy preparation including saving money and transport arrangements. BPCR index was calculated using a set of ten indicators which are quantifiable and expressed in percentage of women having specific characteristics. The ten indicators used are:

1. Percentage of women who attended first ANC visit with a skilled provider during first trimester
2. Percentage of women who had knowledge about three key danger signs during pregnancy
3. Percentage of women who had knowledge about four key danger signs during labor and childbirth
4. Percentage of women who had knowledge about three key danger signs during postpartum period
5. Percentage of women who had knowledge about four key danger signs in the newborn
6. Percentage of women who identified a skilled birth attendant for this childbirth to give birth with
7. Percentage of women who identified facility for this childbirth to give birth with
8. Percentage of women who arranged transport to the place of childbirth
9. Percentage of women who saved money for childbirth
10. Percentage of women who identified a blood donor for this childbirth.

The participants who fulfilled at least four BPCR practices were considered as "Well prepared" and the rest of them were "less prepared" [5,11,12].

Data processing and analysis

The collected data were entered in Microsoft Excel spreadsheet. Frequencies were obtained using descriptive statistics using appropriate statistical tool for analysis. Chi-square test was used to establish relationship between various socio-demographic variables and BPCR index characteristics. $p<0.05$ was considered statistically significant.

Ethical approval and consent to participate

Ethical clearance was obtained from the Ethical Review Committee of the Government Medical College, Anantnag with ref no. IEC/GMCA/21/021. An informed written consent was obtained from each study participant before the interview. Each participant was interviewed separately, and all precautions were taken to ensure the confidentiality of the data.

RESULTS

Characteristics of the respondent

A total of 568 pregnant women were interviewed. The mean age of the participants was 30.08±4.6 years. Participants from rural (57.9%) and urban (42.1%) areas constituted identical proportions. Most of the participants (30.8%) had completed their education up to high school level and around 98% were housewives. As per modified Kuppuswamy socioeconomic scale 2021, more than half of the participants (54.9%) belonged to the upper lower class. Majority of the respondents (69.2%) were from joint family setting with a family size of seven and more in 35.45%. Almost half of the participants (43.5%) were married for duration of 1–4 years and 11.3 were married for <1 year. Among the participants, 32% women were primi, 44.7% women had one child, and 22.7% had already given birth to more than two children (Table 1).

Antenatal care and preferences during current pregnancy

All the participants were receiving antenatal care from a health-care professional during their current pregnancies and 98.9% had their pregnancies registered. Majority of the participants (72.7%) had 5–13 antenatal checkups with their health care provider, followed by 19.3% who have had more than 13 antenatal checkups and 8.0% of the participants had 1–4 antenatal checkups during this pregnancy. The mean antenatal visits were 10.5±5.7. Around 90.0% of the participants had their first antenatal checkup during their 1st trimester of the pregnancy and majority (83.0%) of the participants had their first contact in this pregnancy with a doctor and remaining (17.0%) contacted a Nurse/FMPHW/TBA/ASHA. Majority of the women had received Td vaccination (98.8%) and iron folic acid tablets (93.0%)

Table 1: Socio-demographic and obstetric characteristics of pregnant women (n=568)

Characteristics	Frequency	Percentage
Age		
<20	13	2.3
21–25	85	15.0
26–30	218	38.4
>30	252	44.4
Marital status		
Married	568	100.0
Residence		
Rural	329	57.9
Urban	239	42.1
Educational level		
Illiterate	126	22.2
Primary	33	5.8
Middle	114	20.1
High school	175	30.8
High secondary	56	9.9
Graduate	35	6.2
Postgraduate and above	29	5.1
Occupation		
Not working	560	98.6
Working	08	1.4
Socioeconomic class (modified Kuppuswamy socio economic scale 2021)		
Upper class	00	00
Upper middle	27	4.8
Lowe middle	96	16.9
Upper lower	312	54.9
Lower	133	23.4
Type of family		
Joint	393	69.2
Nuclear	175	30.8
Family size		
≤4	199	35.1
5-6	168	29.5
≥7	201	35.4
Duration of marriage		
<1 year	64	11.3
1–4 years	247	43.5
5–8 years	139	24.5
9–12 years	98	17.3
13–16 years	20	3.5
>16 years	00	00
Parity		
0	185	32.6
1	254	44.7
≥2	129	22.7

during this pregnancy. Only 3.7% of the pregnant women were advised by healthcare workers regarding where to go if any health problem arises, around half of the participants (51.2%) were advised regarding danger signs, only 1.6% were advised regarding arrangement of transportation to reach health care facility and where to deliver, 1.8% were advised about saving money for delivery and 1.2% were advised regarding arrangement of blood donor and identifying a skilled healthcare provider for the childbirth (Table 2).

BPCR practices

BPCR index as calculated from the ten indicators, shown in Table 3, came to an aggregate of 42.34%. Among 568 participants, nearly half of the participants (49.8%) were well prepared by fulfilling at least four indicators of BPCR index. Regarding ten indicators constituting the BPCR Index, 80 (14.1%) were prepared against at least one indicator, only 24 (4.2%) against two indicators, 169 (29.8%) against three indicators and 12 (2.1%) had no preparedness for this childbirth. Fulfilling at least four indicators of BPCR was considered "well prepared." Accordingly almost half of the pregnant women (49.8%) were "well prepared" for this childbirth and remaining half (50.2%) were "less prepared."

Table 2: Antenatal care services and preference of birth attendant among pregnant women (n=568)

Characteristic	Frequency	Percentage
Antenatal care attended during current pregnancy		
Yes	568	100.0
No	00	0.0
Did you register during current pregnancy?		
Yes	561	98.9
No	06	1.1
Number of ANC visits (Mean±SD; 10.5±5.7)		
1–4	45	8.0
5–13	413	72.7
>13	110	19.3
Duration of pregnancy at time of first antenatal checkup		
1st trimester	506	89.0
2nd trimester	60	10.6
3rd trimester	02	0.4
First contact with a skilled provider during pregnancy		
Doctor	471	83.0
Nurse/midwife/FMPHW	84	14.7
TBA	01	0.2
ASHA	12	2.1
Did you receive injection tetanus diphtheria during current pregnancy?		
Yes	561	98.8
No	07	1.2
Did you receive iron folic acid tablets during current pregnancy?		
Yes	528	93.0
No	40	7.0
During ANC visit, did a healthcare worker advice you on where to go if health problems happen?		
Yes	21	3.7
No	547	96.3
Advice regarding danger signs		
Yes	291	51.2
No	277	48.8
Advice on where to deliver		
Yes	10	1.6
No	558	98.4
Advice regarding arrangement of transport		
Yes	9	1.6
No	559	98.4
Advice on saving money for delivery		
Yes	10	1.8
No	558	98.2
Advice on arrangement of blood donor in case of emergency		
Yes	07	1.2
No	561	98.8
Advise on identifying skilled birth attendant		
Yes	07	1.2
No	561	98.8

Around 15.0% of the participants had not made any arrangement for this childbirth in terms of arrangement of transportation, money, blood donor, and health-care provider. Among 483 (85.0%) participants, 77.6% had arranged transportation, 75.9% had saved money for this childbirth, 56.9% had identified a blood donor in case of emergency, and only 10.9% had identified a skilled birth attendant and health-care facility for this childbirth (Table 3).

The bivariate logistic regression analysis showed that women with primary (AOR=1.504, 95% CI=0.599, 3.775) and middle (AOR=1.502, 95% CI=0.806, 2.801) education level were 1.5 times and more well prepared as compared to illiterate women. Similarly, women with high school (AOR=1.647, 95% CI=0.920, 2.947) and high secondary (AOR=1.604, 95% CI=0.735, 3.502) were 1.6 times more prepared for this childbirth as compared to illiterate women. Women with graduate and above education level (AOR=8.258, 95% CI=2.832, 24.079) were 8 times more prepared as compared to illiterate women. Spouses of the women with primary (AOR=6.918, 95% CI=1.421, 33.688) and postgraduate and above educational level (AOR=3.011, 95% CI=1.053, 8.609) were 6 and 3 times more well prepared as compared to husbands who were illiterate respectively. Women who were working (AOR=4.371, 95% CI=0.449, 42.154) were 4 times more likely to be prepared for this childbirth as compared to non-working participants. Participants with second pregnancy (AOR=1.840, 95% CI=1.012, 3.345) were 1.8 times more likely to be well prepared as compared to primi parous women. Women with multiple antenatal visits (AOR=2.558, 95% CI=1.051, 6.224) were found to be 2.5 times more prepared as compared to those women who had <4 antenatal visits (Table 4).

DISCUSSION

We assessed the BPCR among 568 pregnant women attending antenatal clinic of Department of Obstetrics and Gynecology of Government Medical College, Anantnag from October, 2021 to March, 2022.

Table 3: Birth preparedness and complication readiness among pregnant women (n=568)

Level of birth preparedness and complication readiness	Number	Percent
Women who attended first ANC visit with a skilled provider during first trimester	555	97.7
Women who had knowledge about three key danger signs during pregnancy	161	28.3
Women who had knowledge about four key danger signs during labor and childbirth	120	21.1
Women who had knowledge about three key danger signs during postpartum period	112	19.7
Women who had knowledge about four key danger signs in the newborn	138	24.3
Women who identified a skilled birth attendant for this childbirth to give birth with	62	10.9
Women who identified a health care facility for this childbirth to give birth with	62	10.9
Women who arranged transport to the place of childbirth	441	77.6
Women who saved money for childbirth	431	75.9
Women who identified a blood donor for this childbirth	323	56.9
BPCR INDEX	42.34	
Number of steps taken (n=568)		
0	12	2.1
1	80	14.1
2	24	4.2
3	169	29.8
4	241	42.4
>4	42	7.4
Level o f preparedness (n=568)		
Well prepared	283	49.8
Less prepared	285	50.2

Table 4: Association between demographic and antenatal characteristics of participants and level of preparedness (n=568)

Characteristics	Level of preparedness		p-value	AOR (95% CI)
	Well prepared (n=283)	Less prepared (n=285)		
	n (%)	n (%)		
Educational level of participants				
Illiterate*	47 (37.3)	79 (62.7)	-	1.000
Primary	18 (54.5)	15 (45.5)	0.385	1.504 (0.599, 3.775)
Middle	59 (51.8)	55 (48.2)	0.200	1.502 (0.806, 2.801)
High school	92 (52.6)	83 (47.4)	0.093	1.647 (0.920, 2.947)
High secondary	25 (44.6)	31 (55.4)	0.235	1.604 (0.735, 3.502)
Graduate and above	42 (65.6)	22 (34.4)	0.000	8.258 (2.832, 24.079)
Educational level of husband				
Illiterate*	12 (28.6)	30 (71.4)	-	1.000
Primary	9 (60.0)	6 (40.0)	0.017	6.918 (1.421, 33.688)
Middle	35 (38.0)	57 (62.0)	0.598	1.272 (0.520, 3.110)
High school	92 (55.1)	75 (44.9)	0.013	2.964 (1.252, 7.016)
High secondary	53 (50.5)	52 (49.5)	0.084	2.286 (0.895, 5.844)
Graduate	43 (51.2)	41 (48.8)	0.324	1.636 (0.615, 4.350)
Postgraduate and above	39 (61.9)	24 (38.1)	0.040	3.011 (1.053, 8.609)
Occupation				
Not working	276 (49.3)	284 (50.7)	-	1.000
Working	7 (87.5)	1 (12.5)	0.204	4.371 (0.449,42.154)
Parity				
0*	87 (47.0)	98 (53.0)	-	1.000
1	135 (53.1)	119 (46.9)	0.045	1.840 (1.012, 3.345)
≥2	61 (47.3)	68 (52.7)	0.782	1.122 (0.496, 2.541)
Number of ANC visits				
1–4*	17 (37.8)	28 (62.2)	-	1.000
5–13	198 (47.9)	215 (52.1)	0.647	1.201 (0.548, 2.632)
>13	68 (61.8)	42 (38.2)	0.039	2.558 (1.051, 6.224)
Duration of pregnancy at time of first antenatal checkup				
1st trimester*	278 (54.9)	228 (45.1)	-	1.000
2nd trimester	5 (8.3)	55 (91.7)	0.000	0.041 (0.015, 0.113)
3rd trimester	0 (0.0)	2 (100.0)	0.999	-
Advice regarding danger signs				
Yes*	166 (57.0)	125 (43.0)	-	1.000
No	117 (42.2)	160 (57.8)	0.001	0.504 (0.334, 0.760)

*Variable used as reference category

Internationally validated BPCR Index among our study participants came to an aggregate of 42.3%, with almost all pregnant women seeking mandatory antenatal care during first trimester by a skilled health care provider. These results were consistent with several studies conducted in India (49.4%, 47.8%) [8,13] and Ethopia (53.1%) [14]. However, BPCR score in various studies was far higher compared to present study. In a study by Bogale [15], overall BPCR score was 62.2%. Our findings are encouraging as compared to the observations of another study by Markos and Bogale [16] who reported a very low BPCR core of 29.9%. The low BPCR score reflects on the health educators/skilled providers either lack of knowledge in these matters or lack of communication skills or lack of interest in making the subjects aware about this component.

The further analysis of parameters of BPCR Index showed that although the antenatal care was excellent in practice, the awareness regarding the key danger signs during pregnancy, labor and childbirth, postpartum period and in the newborn was not up to the mark as on an average only one third of the females were aware about these signs. Regarding the knowledge about three key danger signs of pregnancy (severe vaginal bleeding, swollen hands/face, and blurred vision), almost two third of the participants (71.7%) had no knowledge about any danger sign during pregnancy. Only 28.3% of subjects knew about the three danger signs during pregnancy which is in tune with the findings of studies conducted in India (30.0%) [17] and other developing nations (26.6%,23.3%) [18,19]. The knowledge about the four key danger signs during labor and childbirth (severe vaginal bleeding, prolonged labor, convulsions, and retained placenta) and three key danger signs during post-partum period (severe vaginal bleeding, foul smelling vaginal discharge, and high fever) was 21.1% and 19.7%, respectively, which is low but encouraging as compared to the findings of a study conducted in West Bengal, India, which reported a much lower percentage (17.9% and 17.5%), respectively [13]. However, a study in Ethopia [14] reported a much higher percentage (40.4%) regarding the danger signs during labor and childbirth. The proportion of women with the knowledge of four key danger signs in newborns (convulsion, difficult/fast breathing, very small baby, lethargy/unconsciousness, and unable to suck/drink during first 7 days of life is again very low (24.3%) but far higher as compared to the findings of a study by Tura *et al*. (2.1%) [14]. The low level of awareness to identify the danger signs, despite the fact that the precise knowledge of danger signs and the likelihood of complications that may arise during different stages of pregnancy, childbirth and thereafter is very important in motivating pregnant women to seek timely intervention at a health-care facility. Hence, educating the pregnant woman and her caretakers regarding the importance, severity, and progression of danger signs as well as seeking medical help as soon as possible must be included in the health education program during antenatal period.

Regular antenatal visits during the pregnancy play a key role in monitoring the health of the woman, her baby, foreseeing any complication, and providing timely intervention and care. It also provides an opportunity to educate and counsel a pregnant woman regarding pregnancy, labor, childbirth, and newborn care. The proportion of pregnant women who had at least 4 antenatal visits, till date of the study, with a skilled provider was 92.0% which shows the level of health awareness amongst the study participants which is in trend with the other studies conducted within and outside India [13,20]. A similar picture is reflected regarding percentage of women who visited antenatal clinic during first trimester and it comes to the tune of 97.9% which is consistent with other studies. A study by Rajesh *et al*. [12] in Karnataka, India, showed that majority

of the study participants (97.3%) had attended their first antenatal visit with a skilled person during first trimester. Mutreja and Kumar [17] in Chhattisgarh, India also reported that majority of the respondent (90.0%) had their first ANC visit within the first 3 months of pregnancy. The reason behind the high percentage of our study is attributed to the very high level of health awareness and health seeking behavior among study participants.

A very critical component of BPCR is the arrangements made for the birth of the child in terms of identification of transport, blood donor, skilled health-care provider, and saving money. Among our study participants, 85.0% had made some arrangement for this childbirth which is similar to the findings of other studies [21,22]. The 2nd most mentioned BPCR indicator in present study was identification of the transport (77.6%) and saving money (75.9%) for this childbirth. These findings are consistent with the studies done in India and other developing nations [16,23-25]. However, it was very low in studies done in Tanzania (34.1%) [20], Northwest Ethiopia (10.8%) [26], and Uganda (26.7%) [27].

The high percentage of prior identification of transport in present study could be attributed to the fact that majority of the participants belonged to rural setup where the road connectivity and availability of transport in case of emergency is uncertain and has a role to play. Similarly the high proportion of the respondents belonging to lower socioeconomic class could explain the prior saving of money for this childbirth. Hence prior identification of transport as well as saving money is essential in reducing the delay in obtaining necessary intranatal heathcare. Almost half of the participants (56.9%) had actually identified a blood donor in case of emergency for this childbirth which is encouraging as compared to the several studies conducted within India and in other developing countries which reported a much lower percentage regarding awareness and arrangement of a blood donor [18,24,28]. Regarding the other BPCR indicators, the least mentioned indicator was identifying a skilled health care provider and a health care facility to give birth with (both 10.9%). This finding is very disappointing as most studies across India (98.14–99.54%) [12,29] as well as world (61.2–86.8%) [11,23,30] report a much higher percentage. The low level of prior identification of skilled health care provider and a health care facility could be due to low level of education level among study participants.

After analyzing the association between the level of preparedness and various demographic and obstetric characteristics, among the birth preparedness predictors as expected parity and educational status of both women and their spouses played an encouraging role as such women were expected to be better prepared for the birth of the child. Several other studies reported a similar association [20,31-33]. It might be related to the fact that more educated females tend to have better awareness about the benefits of preventive health care and services. They might also have higher receptivity to new health related information. Familiarity with modern medical culture, more decision-making power, increased self-worth, and self-confidence also serve as contributions to better utilization of health facility on during pregnancy. While looking at the influence of husbands' educational status on the BPCR, studies conducted in Indore, India by Agarwal *et al*. [8] and Rajesh *et al*. [12] also showed that compared to the less prepared mothers, the well prepared mothers tend to have a literate husband. The possible explanation for above findings might be that educated husbands might be more open toward health seeking and are aware of the benefits of attending a health-care provider during pregnancy and for delivery and availability of financial support by government. They are also less likely to put any constraint on their wives' mobility and decision making. Multiple antenatal visits and subsequent pregnancy are likely to result in better birth preparedness as well as reported by other studies [20,31-33].

CONCLUSION

As is evident that the substantial efforts were made by the health-care providers to ensure required number of the antenatal visits with the health-care provider, early registration, immunization of the expectant mothers, provision of IFA tablets and advice regarding danger signs during the pregnancy. The above-mentioned observations make it evident that the MCH delivery and service component among the respondents was of excellent quality. Overall BPCR index was on the lower side with knowledge regarding various key danger signs, identification of a skilled health-care provider and a health care facility being very unsatisfactory. Almost half of the participants were well prepared for this childbirth with early antenatal care by a skilled provider, identifying transport, a blood donor and saving money for this childbirth being major contributors. The study also implicated that education of the women and her husband, working women, subsequent pregnancy and multiple ANC visits have a significant impact on the level of preparedness.

CONFLICT OF INTEREST

None.

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None.

AUTHOR CONTRIBUTION

Dr. Fouzia Nazir and Mohsina Mukhtar raised the initial research question and prepared study design, Dr. Syed Tanzeela Nazir managed data collection, Dr. Mohsina Mukhtar ran statistical analysis, prepared results and tables; all the authors contributed in the final manuscript preparation and reviewed the final draft.

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