Correlation of Neonatal Danger Signs at Different Times with Perinatal Obstetrical Danger Signs and Complications.

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Abstract: Background: Perinatal period encountered by risks and complications raise the risk of perinatal morbidities and mortality. **Aim**: this study aimed to determine type of correlation of neonatal danger signs at different times with perinatal obstetrical danger signs and complications. *Design*: A descriptive research design. *Setting*: This study was implemented in the Obstetrics Department at Women's Health Center, AssiutUniversity Hospital, Egypt. **Subjects**: 150 postpartum women admitted to previous mentioned setting.*Sample:*a convenient sample of 150 postpartum women.*Instrument*: Structured interview questionnaireused to collect data.*Results:*There were a positive correlation reported between maternal danger signs/morbidities during pregnancy with danger signs in their neonates at birth, early, after 7 days and late at 28 days postpartum.*Conclusions:*From our findings we can concluded that there were a positive correlation reported between maternal danger signs/morbidities during pregnancy with danger signs in their neonates at birth& early (0.682 , 0.755 &0.005 respectively)and a significant correlation was found regarding maternal postpartum period and neonatal danger signs at birth however, no significant correlation reported during early neonatal period. *Recommendations:*Implementing ongoing training programs for health care providers who care for high-risk women (preconception, antepartum, antepartum and postpartum).
Key Words: Neonatal danger signs, perinatal obstetrical danger signs.

INTRODUCTION

Neonate period is a time of comprehensive and continuing transition of the system from the intra uterine setting to the external world, including the initial period after birth which is called the perinatal era. This applies to the first 28 days and divides further into early neonates (birth to less than 7 days), and late neonatal cycles (7 days to < 28 days). It is a critical time in an individual's life and therefore neonatal health has a significant impact on future well-being and life [1] Early detection of neonatal diseases by identifying signs of neonatal vulnerability represents a significant step towards better survival of newborns[2].

Overall, almost 130 million neonates are born each year, 4 million of whom die in the first 28 days of their lives as reported by the Egyptian Demographic Health Survey (EDHS) in 2016, accounting for 40% of the deaths of children under 5 years of age [2]. Many neonatal deaths occur in low-income and middle-income countries, primarily Sub-Saharan Africa most neonatal deaths happen[3].The neonatal mortality rate in Egypt decreased steadily from 59.6 deaths per 1,000 live births in 1967 to 12.8 deaths per 1,000. Most of these newborns die at home (with the exception of the established health system) where only a few mothers and families are aware of newborn disease symptoms, which is why it is disturbing that many newborns die every year, particularly when their death is preventable [4] .Because of a variety of problems / diseases experienced by a neonate during the perinatal era affecting the date of conception, the neonatal period is considered the most hazardous time of life, from the twentieth week of gestation to the twenty-eighth day of the newborn.During

this process, high-risk mothers with warning signs like vaginal bleeding, severe headache, vision problems, high fever, swollen hands and decreased fetal activity that suggest obstetric complications eventually have negative effects on the neonate [5].Perinatal duration risk is generally defined as the risk of mother, fetus or newborn morbidity or mortality before, during or following delivery. High risk mothers are likely to give birth to compromised children, who experience several serious problems predicted by warning signs [6]. Some of those widely recognized as a symptom of neonatal threat include breastfeeding failure, low or high temperature, respiratory disease and history of constipation / diarrhea seizure. [3] The identification of such signs can result in a high overall sensitivity and specificity to predict the need to seek newborn treatment [7,8].

Among the major causes of perinatal morbidity and high-risk mortality from pregnancy is the most common of these[9]. Integrated neonatal and disease program management established by the World Health Organization (WHO) focused on the identification and prompt treatment of neonatal threat symptoms[3,10].Similarly,Bhutta et al [11] identified early detection by caregivers, whether mom or health care provider with prompt and successful referral, of signs of neonatal danger was described as the foundation stone of the Millennium Development Goal programs to reduce neonatal mortality. As an informative effect on perinatal and neonatal morbidity reductions and death is being suggested, further research efforts have begun and great emphasis has been placed on improving maternal health and antenatal care. For fact, complications for pregnancy and delivery cause more than half child deaths [6].

Neonatal deaths have come to gain attention on the global political agenda of the last century[12]. Reducing neonatal morbidity and mortality needs immediate caregiver identification of possible neonatal danger signs and early treatment visits to the nearest clinic[13].Mortality risk can be higher even if both the neonate and the mother show several signs of danger or complications [14].The researchers are interested in studying and analyzing the incidence of perinatal hazard signs or complications to address these variations, exploring the correlations that they observed during the perinatal period between various hazard signs and complications in neonates and their moms.

Study aims

- To determine types of neonatal danger signs noticed in neonatal period
- To identify typesof perinatal danger signs noticed in perinatal period
- To determine   relationship between neonatal and perinatal maternal   danger signs at differenttimes

Study question

Is there a relationship between neonatal danger signs and perinatal maternal danger signs and its complications?

SUBJECT

*Study design:*Adescriptive correlational design.
*Setting:*This study was carried out at in Postpartum ward - department of Obstetrics, Assiut University Hospital, Egypt.
*Sample:*This studyincluded a convenient sample of 150 postpartum women and their newborns who admitted to the Obstetrics Department during the period of study that begun from May to July 2018.

METHODS

Tool of data collection:

A structured interviewing questionnaire was used tocollect the data after reviewing the related literature, questionnaire was written in Arabic language to simplify the process of data collection and it involvedfoursections as the following:
*Section 1:*socio-demographic data such as (age, educational level, residence, occupation &mobile number of the mothers).
Section 2: Data related to obstetrics history such as (number of parity, abortions, stillbirths, neonatal deaths, number of living children and
Section 3: data related to antenatal care such as (frequency of antenatal clinic visits place of antenatal follow up).
Section 4: Maternal morbidities data such as (medical / obstetrical risk factors, types of perinatal (antenatal, intrapartum and postpartum warning signs/ morbidities
*Section 5:*neonatal data which included two subsections
1- Neonatal outcome characteristics such as(body weight, Apgar score, admission to, and duration of, Neonatal Intensive Care Unit (NICU).
2- Neonatal follow-up: list of types of neonatal warning signs /morbidities during [early neonate (1[st]week) and late neonate (from 2nd to 4th week). And maternal health seeking behavior for these problems.

Field work:*it implemented in two phases*

1- Interview and assessment phase :

Where participants were interviewed and evaluated in the postpartum ward during their hospital stay and asked about any troubling symptoms for her – either herself or her newborn indicating health problems. Then a follow-up card showing the location, the date of the first and second visits, before the women leave the hospital,, researcher's mobile number to contact her if any issues have arisen was given .

2- Follow –up phase:

During which mothers asked to attend for follow- up in out-patient clinic on the 7th and 28th postpartum days. During these 2 meetings each mother was asked regarding presence of any warning signs / problems either for her–self or her newborn during this period and what their type of seeking behavior regarding this issue. To take immediate proper action or make referral if needed accordingly as well as mothers who cannot attend clinic followed by telephone .

Ethical consideration:

- An official approval was obtained from the Ethical Committee of the Faculty of Nursing, Assiut University
- The official approval was obtained from the responsible administrative staff of the research work (the Directors of the Women's Health Center, the Chairman of the Inpatient Obstetrics Department and the Ambulance Clinic) after explaining the purpose of the study
- Oral informed consent was obtained from the participants after explanation of the purpose of the study and each of them was entitled to withdraw from the analysis at any time, whatever the reason.Participants were told that all their data remained highly confidential.

Validity and reliability:

Validity and reliability of the instrument (A) were done by panel of expertise in the field of Maternal and Newborn Health Nursing and Obstetrics and Gynecology medicine. The instruments were reviewed for simplicity of language, comprehensiveness and understandability. Test-retest reliability was applied by the researcher for testing the internal consistency of the instruments. It is the administration of the same instruments to the same participants under similar conditions on two or more occasions. The validity and reliability of the study tools which revealed a value of 0.789 for the reliability test and a value of 0.765 for CVI.

Pilot study:

A pilot study was conducted to test the feasibility, applicability and understandability of the instruments. It was conducted on 10% of the total sample (15) students were chosen. Accordingly, the necessary modifications were done in the form of reformulation of some questions and omitting of others due to unavailability to be answered accurately by the students. The sample of the pilot study was excluded from the study.

Statistical analysis

The collected data were scored, tabulated and analyzed using (SPSS) version 22. Descriptive as well as nonparametric statistics were utilized to analyze the data

pertinent to the study.The level of significance was set at p < 0.05. Chi square test, Independent sample t-test, Fischer exact test (FE), Mean and repeated measure.Thecorrelation coefficient was applied using the r-Pearson test to classify the variables that may influence the frequency of hazard signs to determine whether a positive or negative correlation is present.

RESULTS

As regard socio-demographic characteristics of studied participants *table 1*showed that the mean age of participant mothers were 26.57±5.4 and nearly two-thirds of them aged 20<30 years lived in urban area respectively, and only (36% & 14%) of them had secondary school & university and above respectively lastly the majority of the participants were housewives

*Table 2:*demonstrated that less more than one third (40%) of the studied participants were multipara and nearly two-thirds of them (64%) 1 < 3 living children with no history of abortion and only (12.7%) of them had history of neonatal death with the most common cause (31.6%) linked to hypoxia, respectively.

Table 3: revealed that the majority (94.7%) of the mothers had acurrent ahistory of regularl antenatal care visit and almost three-quarters (71.3%) of them attended mainly outpatient clinics at university hospitals, But the vast minority (5.3%) have visited private clinics 3-6 times over two-thirds, and the vast minority (7.3%) visited the clinic fewer than three times.

*Figure 1:*portrayed that most common types of high risk encountered among studied mother during pregnancy were (24.7%) anemia followed by (20 %) hypertension and convulsions and vaginal bleeding (16.7%).

*Figure 2&3:*demonstrates that nearly three-quarters (75.3%) of the total sample had antenatal danger signs, categorized as continuous headaches (45.3%) edema& persistant abdominal pain (36%) , fever (15.3%) however, backache and dyspnea accounted for at least one (2.7%) for each. Regarding labor danger signs, only (5.3%) of the sample had danger signs during labor the most common were prolonged labor & dyspnea,Vaginal bleeding (22.7%) followed by premature rupture of membrane & obstructed

labor (22.7%) (35.3%, 32.4% & 32.4%) respectively more over, postnatal danger signs, encountered among more than two-thirds (67.3%) of the total sample, the most frequent one was dysuria and fever >38^{0}c (32.7% & 28.7% respectively).

*Table 4:*leared up that more than half (57.3% & 52.7%) of the overall sample their gestational age ranged between 33 - < 37 weeks and a neonatal weight ranged between (2000 - <3000 gm.) respectively as regard apgar score nearly (69.3%) were had bad Apgar score, all of them admitted to NICU due to respiratory distress followed by neonatal jaundice (36.3 % & 24.7 % respectively) and the mean duration of stay was 6.20±3.5days

Concerning early (at birth) neonatal warning signs and morbidities that reported among neonate **table 5** showed that the majority (80%) of the total sample had so early neonatal danger signs/morbidities categorized as with a most prevelent one isneonatal jaundice 69.3%, followed by too weak to suck /feed 50.7%, fever >38 ^{0}c 34.7% & difficult of breast feeding 40.5 % .respectively and the least reported one was disturbed conscious level (4%).whoever, in the first week after birth neonatal danger were more prevalent among (75.3%) of neonate in form of neonatal jaundice, eye inflamation(17%) then chest infection& colicky pain (9.8%) however almost these neonatal danger signs disappear at 28th day postpartum. While the mothers were managing these morbidities by seekin to medical care in hospitals (68.8%) , (28.8%) of them went to private clinic to seek care the least of them 2.8% did not seek for medical care and used herbs/remedies in homeon the other hand 100% of mothers seeking medical care in private clinic.

*Table 6 & Figure 4, 5&6:*revealed that there were a positive correlation reported between number of maternal danger signs/morbidities duringpregnancy with danger signs in their neonates at birth& early and a significant correlation was found regarding maternal postpartum period and neonatal danger signs at birth however, no significant correlation reported during early neonatal period. In addition, there was no significant correlation between signs of maternal danger during childbirth and signs of neonatal threat at birth, early and late.

Table 1: Socio-demographic characteristics among studied participants

	No. =150	Percentage
Mothers' age:		
< 20	22	14.6
20<30	96	63.3
30<40	26	17.3
≥40	6	4
Mean ±SD(range)	26.57±5.4(18-42)	
Residence		
Urban	102	68
Rural	49	32
Education level		
Illiterate	37	24
Basic education (primary & preparatory school)	39	25.3
Secondary school	53	35.7
University and above	21	14
Occupation		
Housewife	138	92
Employer	12	8

Table 2: Obstetrics history among studied participants.

Obstetrics history	No. =150	Percentage
No.f parity Nullipara	17	10.7
Primipara	31	20.6
Multipara	6o	40
Grandmultipara	42	28
Mean ±SD (range)	2.36±1.57(0-7)	
No. of living child		
None	20	13.3
1 ≤ 3	96	64
>3	34	22.7
Mean ±SD(range)	2.25±1.62(0-7)	
No. of abortion		
None	104	70
1-2	37	24.7
≥ 3	9	6
Mean ±SD (range)	0.57±1(0-4)	
No. of neonatal death:		
No	131	87.3
Yes (one child)	19	12.7
Mean±SD (range)	0.1±0.3(0-1)	
Neonatal death causes : n=18		
Infection	5	26.3
Pneumonia	4	22.2
Dyspnea	4	22.2
Hypoxia	6	31.6

Table 3:Pattern of antenatal care among studied participants

Items	No.150	Percent %
Pregnancy follow up care:		
Yes	142	94.7
No	8	5.3
Antenatal care frequency		
None	8	5.3
>3	11	7.3
3 – 6	102	68.0
More than 6	29	19.3
Mean ±SD(range)	5.33±2.27(0-12)	
Setting for follow up:		
MCH	27	5.3
obstetric outpatient clinic	107	71.3
Private clinic	8	68.0

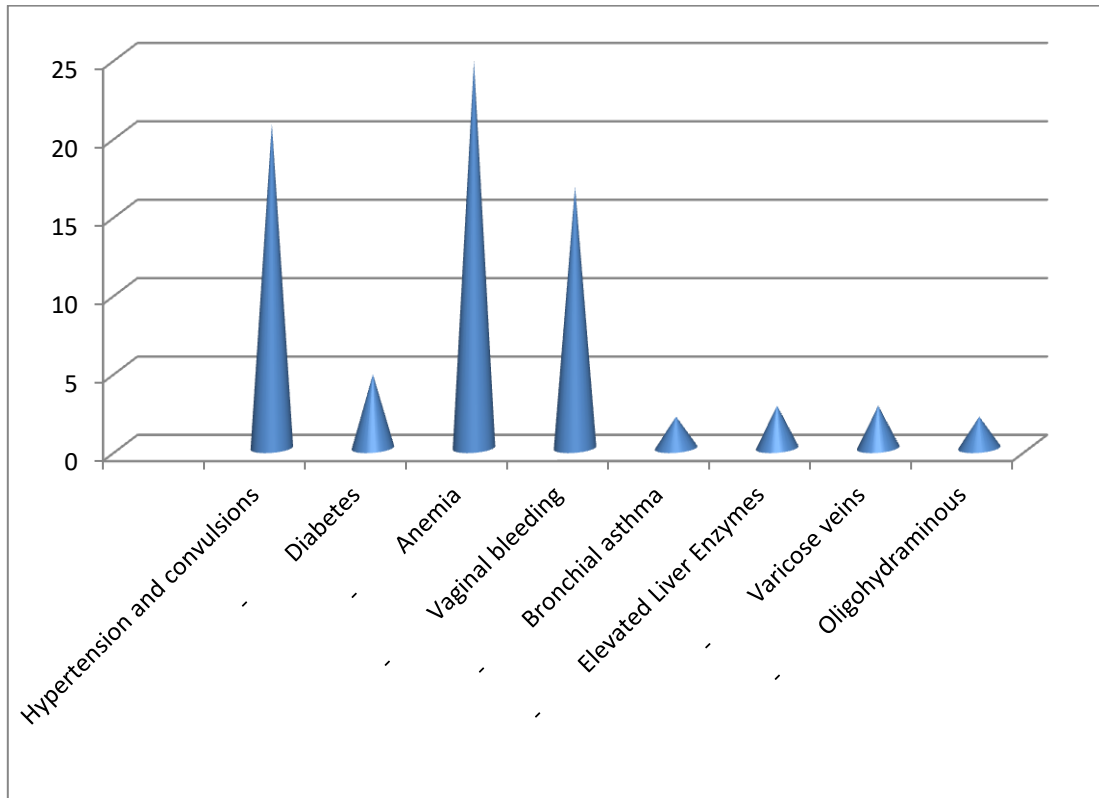**Fig. 1: types of most common high risk during pregnancy.**

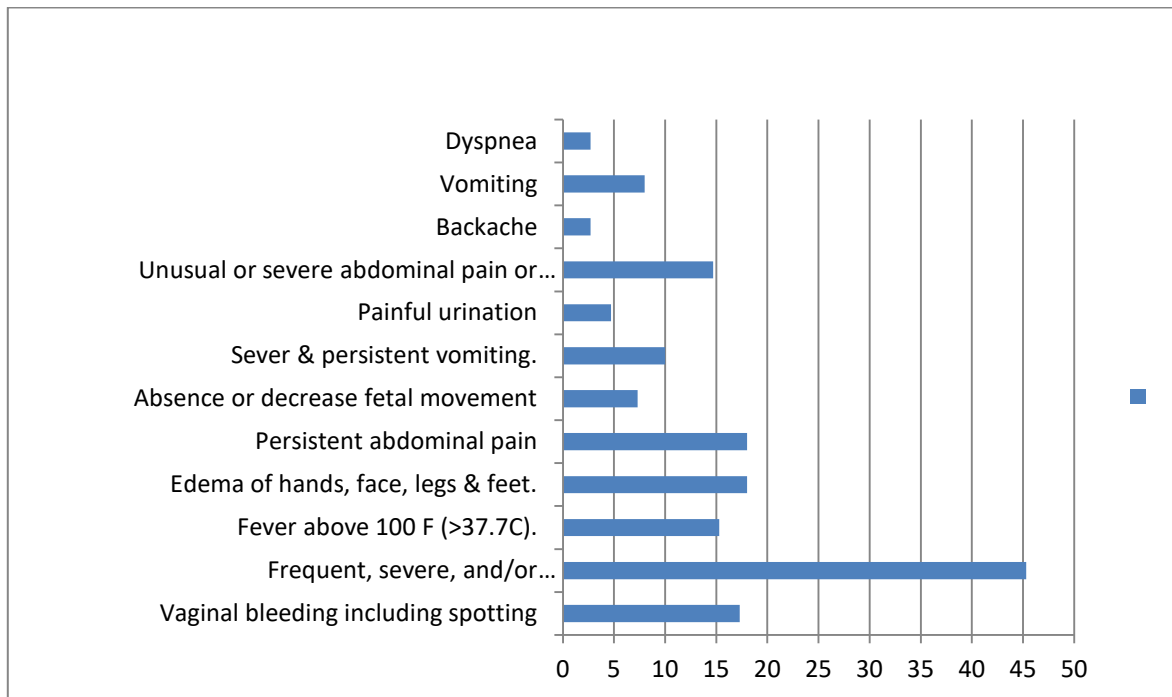**Figure 2: Perinatal obstetrical danger signsamong studied participants**
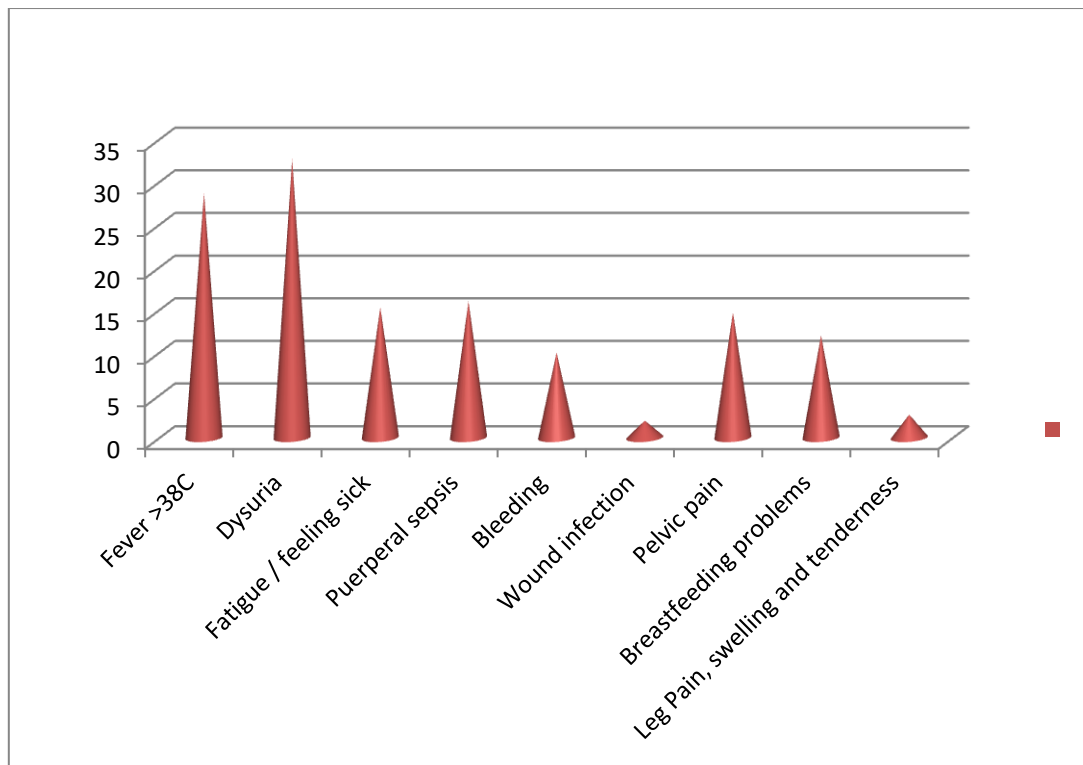

Figure 3: Types of most common postnatal danger signs

Table 4: Neonatal characteristics of neonate

	No. =150	Percentage
Gestational age		
<30	3	2
30<33	5	3.9
33<37	86	57.3
37<40	51	34
≥40	5	3.3
Mean± SD (range)	36.36±4(13-40)	
Neonatal body weight / grams		
<1000	5	3.3
1000<2000	20	13.3
2000<3000	79	52.7
≥3000	46	30.7
Mean± SD(range)	2744±557.08(900-3500)	
Apgar score outcome		
Good	46	31.7
Bad	104	69.3
Admission to NICU		
Yes	102	68
No	48	32
Reasons for admission to neonatal intensive care unit		
Apnea	15	14.7
Preterm	13	12.7
Neonatal jaundice	24	24.7
Respiratory distress	37	36.3
Respiratory distress and neonatal jaundice	13	12.7
Length of stay at NICU		
1>3 days	20	19.6
3≤7 days	49	48
>7 days	33	32.3
Mean ±SD (range)	6.20±3.5(0-14)	

Table 5: Neonataldangersigns during neonatal period

Nneonatal danger signs / morbidities (at birth)	No. =150		Percentage	
Yes	120		80	
No	28		18.7	
Too weak to suck /feed	76		50.7	
Difficult of breast feeding	50		30.3	
Jaundice	104		69.3	
Fever >38 C	52		34.7	
Severe continuous vomiting	17		11.3	
Abdominal distention	33		22	
Diarrhea & constipation	31		20.7	
Odor, drainage, or bleeding from the umbilical cord	9		6	
Excessive crying & irritability	11		7.3	
Cyanosis	30		20	
Disturbed conscious level	6		4	
Convulsion	33		22	
Neonate danger signs	**Early Neonatal danger signs (1st to week)**		**Late Neonatal danger signs (2nd to 4th week)**	
	No	**%**	**No**	**%**
Yes	112	75.3	19	12.0
No	38	24.7	131	88.0
Frequency of neonatal danger signs				
Dyspnea and jaundice	12	10.7	0	0.0
Vomiting and fever	9	8	0	0.0
Neonatal jaundice	21	18.7	0	0.0
Eyes inflammation	19	17	0	0.0
Continuous vomiting	12	10.7	0	0.0
Abdominal distention	10	9	0	0.0
Difficult breast feeding	9	8	0	0.0
Colicky pain	11	9.8	13	8.0
Neonatal chest infection	10	8.9	13	8.0
Maternal health seeking for danger signs for their neonates				
Go to hospital for medical treatment	77	68.8	0	0.0
Go to private clinic for medical treatment	32	28.8	26	100.0
Used herbs/remedies in home	3	2.8	0	0.0

Table 6: Correlation analysis of neonate danger signs at different times with perinatal obstetrical danger signs and complications among study participants

Maternal danger signs and complications	Neonatal Danger Signs		
	At birth	**Early (at day 7th postpartum)**	**Late (at day 28th postpartum)**
- **Antenatal maternal danger signs and Complications** - r P	0.682 0.001**	0.755 < 0.001**	0.005 0.948
- **Maternal danger signs and Complications during Labor** - r P	0.018 0.834	0.037 0.523	0.152 0.066
- **Postpartum maternal danger signs and Complications** r P	0.886 < 0.001**	0.031 0.085	0.137 0.095

Correlation analysis measured by r /Pearson test.

Figure 4 , 5 &6 : Correlation analysis of neonate danger signs at birth ,7 days,28 day with antenatal maternal danger signs and complications
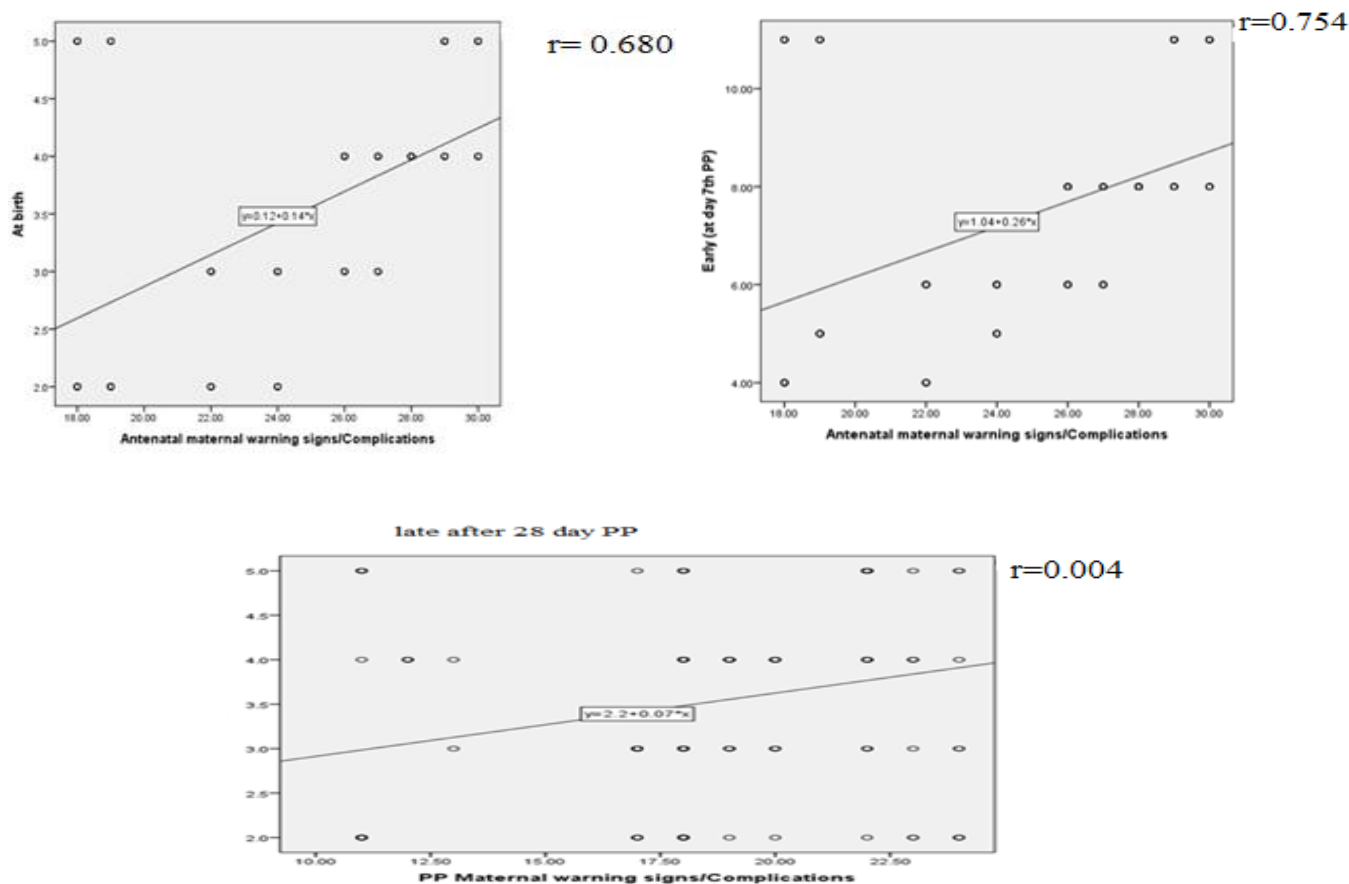
DISCUSSION

Numerous studies have investigated determinants to neonatal mortality in resource-limited settings, But a paucity of researches have concentrated on a warning signs of neonates and complications, considering these irregular health conditions that may potentially conduce to debilitating complications or death [15,16]. The current study were the first one that tried to identify the degree of correlation between neonatal and perinatal obstetrical danger signs. The current results demonstratedthat higher percentage of participants' neonate had early danger signs at birth with the frequently ordered signs included neonatal jaundice, followed by too weak sucking fever > 38 C & breast feeding difficulties (86.8%, 62%, 42.1% and 40.5% respectively).This finding was compatible with Kibaru and Otara [17] who stated that poor sucklingand fever were the frequently mentioned signs of newborn hazards. Mortality of mothers and neonate elevated during extended period from beginning childbirth through the first 28 postpartum days. Almost of maternal mortality occurs during those few weeks (with the exception of those from illegal abortion) and nearly two-thirds of infant deaths.Intra-partum period is still the most likely time fetaldeath. [18] This problem induces researchers to investigate in detail the currentstudy. Understanding the danger signs of the neonates in cases like this is one way to seek early treatment. Curent study reported that the majority (94.7%) of the mothers had a currenthistory of regular antenatal care visit and almost three-quarters (71%) of them attended mainly outpatient clinics at university hospitals, but the vast minority (5.3%) attended private clinics also around two-thirds attended the clinic 3-6 occasions as well as less than three times the lesser proportion (7.3 percent) attended the clinic.These mirrored the awareness of high-risk mothers about their neonates as many of them are searching for medical care in medical facilities and private clinics; Nevertheless, Gupta et al [19] pointed out that care seeking behavior among mothers underscored the urgent need for awareness among them to identify the signs of neonatal danger. This outcome may represent a significant recognition of mothers with neonatal signs of danger, and justify that higher than two-thirds of the participants explored seeking medical treatment in hospitals on day 7 postpartum. In this regard, Okawa et al [6].It reported that less than four Antenatal care visits contributed to a higher chance of birth of neonates with danger signs.

More than forty percentage of mothers complicated during pregnancy, whereas more than half 55% of them had the 6 recognised elements of crucial antenatal services, which suggests that reduced Antenatal care visits contribute to disrupted detection and management of potential hazards. This result was at discrepancy with our findings. Although the regular presence in the AN clinic. The proportion of neonatal danger signs was low, this may be due to poor quality of antenatal care. In comparison, one might wonder whether the Women's Health Center's obstetric care system, Assiut, needs to be preciselyevaluated. As more than two-thirds of participants complicated during pregnancy and reported during the postpartum period regarding signs of dangerNeverthe

less, for those with complications during labor and the occurrence of neonatal hazard signs no significant correlation has been reported, This could be highlighted as professional delivery care has traditionally been positively correlated levels of neonatal mortality (WHO, 2000)[20].

Nevertheless, Okawa et al,[6] disagreed with this observation, Recording that a significant proportion of maternal complications is strongly correlated with the proportion of neonatal dangerous signs ($r = 0.20$; $p < 0.001$) In addition, with respect to the related maternal risk factors Brentani & Fink [21] stated in their analysis that high-risk pregnancies are the main causes of perinatal mortality that adversely affect neonatal mortality. In addition, the literature has identified a variety of antenatal and intra-partum causes to be substantially correlated with perinatal and neonatal deaths [22].

CONCLUSION AND RECOMMENDATIONS

From our findings we can concluded that there were a positive correlation reported between maternal danger signs/morbidities during pregnancy with danger signs in their neonates at birth& early (0.682 , 0.755 &0.005 respectively) and a significant correlation was found regarding maternal postpartum period and neonatal danger signs at birth however, no significant correlation reported during early neonatal period.

RECOMMENDATIONS

Implementing ongoing training programs for health care providers who care for high-risk women (preconception, antepartum, antepartum and postpartum)and further study needed to investigate health care workers (midwives) should be carried out in order to provide a holistic mother-friendly awareness and care for all mothers, especially expectant mothers.

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