ORIGINAL ARTICLE

Clinical Risk Index Score (CRIB II) as a Predictor of Neonatal Mortality among Premature Babies

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ABSTRACT

Aim: To determine predictive accuracy of CRIB II score in predicting mortality among premature with low birth weight neonates.
Study design: Cross-sectional study.
Place and duration of study: Paediatric NICU, Services Hospital Lahore from 2nd June 2017 to 2nd December 2017.
Methodology: Two hundred and forty preterm new-born born before 32 weeks and birth weight from 600-1500grams were enrolled. Temperature was measured using rectal thermometer. Arterial blood gas sample was taken using standard sampling technique for base excess. Premature infants were evaluated for CRIB-II Score within 1 hour of arrival. Neonates were followed for 28 days to assess for their survival status.
Results: The mean CRIB-II score was 10.95±2.79, mean gestational age was 29.16±1.58 weeks and mean weight was 1111.13±202.28 grams. There were 123(51.25%) males and 117(48.75%) were females. Actual neonatal mortality was 82(34.17%). Predictive accuracy of CRIB II score in predicting mortality among premature and very low birth weight neonates admitted to NICU was 92.68% for sensitivity, 94.94% specificity, 90.48% positive predictive value and 96.15% had negative predictive value.
Conclusion: The predictive accuracy of CRIB II score is higher in prediction of mortality among premature and very low birth weight neonates.
Keywords: Neonates, Premature, Very low birth weight, Mortality, CRIB II score, Prediction

INTRODUCTION

The illness severity and mortality risk measurement among newborns admitted to neonatal intensive care units (NICUs) is attaining an increasing level of importance[1]. Worldwide statistics proved that severity in neonatal illness is one of the main cause of in-hospital mortality in pediatric unit.[2] Medical staff should be qualified enough and appropriate facilities should be present in hospital for premature and extremely low birth weight children[3]. A unique group of assessment should be formulated for neonatal assessment due to their higher chances of mortality[4]. Several scores has been formulated and devised for the assessment of survival and long term associated complications. One of the score which is widely accepted is clinical risk index for babies (CRIB)[3]. Such type of scoring system help in morbidity and mortality prediction among premature neonates. CRIB II is a validated scoring system that noted body temperature, birth weight, sex, base excess and age for determining mortality chances[6].

Ezz-Eldin et al[7] reported that used CRIB as a model score for the evaluation of mortality risk in premature neonates who had birth weight in the range of 700-1500g and gestational period in 25-32 weeks range, it showed almost 34% mortality.

Present study was designed for the evaluation and assessment of CRIB-II score in preterm and low birth weight neonates. Finding of the present study would prove beneficial for pediatricians for choosing this tool in their future studies and routine assessment.

MATERIALS AND METHODS

This cross sectional study was performed after approval of Ethical Committee at Services Hospital Lahore from 2nd June 2017 to 2nd December 2017. Premature neonates were enrolled in present study who had <32 weeks gestation period and their birth weight was in the range of 600-1500g. Two hundred and forty infants were taken. Neonates who had other complications including genetic disorders and congenital anomalies were excluded from the study.

Demographic details of preterm (name, age, gender, address) were obtained. Gestational age was calculated using antenatal obstetric ultrasound (on history medical record). Birth weight was measured in grams using electronic weighing scale. Temperature was measured using rectal thermometer.Arterial blood gas sample was taken using standard sampling technique for base excess. Premature infants were evaluated for CRIB-II Score within 1 hour of arrival. All the data was noted. Neonates were followed for 28 days to assess for their survival status. The data was entered and analyzed through SPSS-20. Chi square was applied to check the association between CRIB-II Score and infant mortality.

RESULTS

Mean CRIB-II score was 10.95±2.79, mean gestational age was 29.16±1.58 weeks and mean weight was 1111.13±202.28g (Table 1).

Table 1: Descriptive statistics of the neonates (n=240)

Variable	Mean±SD
CRIB II score	10.95±2.79
Gestational age (weeks)	29.16±1.58
Weight (grams)	1111.13±202.28

Table 2: Demographic information of the neonates (n = 240)

Variable	No.	%
Gender		
Male	123	51.25
Female	117	48.75
Neonatal mortality according to CRIB II score		
Yes	84	35.0
No	156	65.0
Actual neonatal mortality		
Yes	82	34.17
No	158	65.83

There were 123(51.25%) males and 117(48.75%) were females. The neonatal mortality according to CRIB-II score was 84(35%)

whereas 156(65%) were alive and actual neonatal mortality was 82(34.17%) whereas 158(65.83%) were alive (Table 2).

Predictive accuracy of CRIB II score in predicting mortality among premature and very low birth weight neonates admitted to NICU was calculated as 92.68% for sensitivity, 94.94% specificity, 90.48% positive predictive value and 96.15% had negative predictive value (Table 3).

Table 3: Predictive accuracy of CRIB II score in predicting mortality among premature and very low birth weight neonates

CRIB II score	Neonatal Mortality		Total
	Yes	No	
Positive	76	8	84
Negative	6	150	156
Total	82	158	240

Sensitivity = 92.68%   Specificity = 94.94%
PPV = 90.48%   NPV = 96.15%

DISCUSSION

Infant mortality is considered as proxy measures of public health. Neonatal mortality incidence was quite higher in preterm and very low birth weight babies. Babies who survived are greatly prone to other severe complications ranging for neurological disorders to stunted growth in future. Frequency of infant mortality was also very high in low income countries as compared to the developed nations. In this study, mean CRIB-II score was calculated as 10.95±2.79, mean gestational age was recorded as 29.16±1.58 weeks and weight of the neonates was recorded as 1111.13±202.28 grams. There were 123(51.25%) males and 117(48.75%) females. The actual neonatal mortality was 82(34.17%). Predictive accuracy of CRIB II score in predicting mortality among premature and very low birth weight neonates admitted to NICU was calculated as 92.68% for sensitivity, 94.94% specificity. Result of present study is similar to the other studies. They reported that more or less same confounding variables are found as well[7-9].

The result of our study reveal that CRIB-II score may be used as a positive measure for the prediction of neonatal morbidity and mortality in preterm and extremely low birth weight neonates admitted to NICU , however, some other studies may validate our findings[10,11].

CONCLUSION

The predictive accuracy of CRIB II score is higher in prediction of mortality among premature and very low birth weight neonates admitted to NICU of services hospital, Lahore.

Conflict of interest: Nil

REFERENCES

1. Mohkam M, Afjeii A, Payandeh P, Zadkarami M, Kazemian M, Fakhraii H, et al. A comparison of CRIB, CRIB II, SNAP, SNAPII and SNAP-PE scores for prediction of mortality in critically ill neonates. MJIRI 2011; 24: 193-9.
2. de Brito ASJ, Matsuo T, Gonzalez MRC, de Carvalho ABR, Ferrari LSL. CRIB score, birth weight and gestational age in neonatal mortality risk evaluation. Rev Saude Publica 2003; 37(5): 597-602.
3. Rautonen J, Makela A, Boyd H, Apajasalo M, Pohjavuon M. CRIB and SNAP: assessing the risk of death for preterm neonates. Lancet 1994; 343: 1272-3.
4. Smith GC, Gutovich J, Smyser C, Pineda R, Newnham C, Tjoeng TH, et al. Neonatal intensive care unit stress is associated with brain development in preterm infants. Ann Neurol 2011; 70: 541-9.
5. Manktelow BN, Draper ES, Field DJ. Predicting neonatal mortality among very preterm infants: a comparison of three versions of the CRIB score. Arch Dis Childhood Fetal Neonat 2011; 95:F9-13.
6. Schuit E, Hukkelhoven CWPM, Manktelow BN, Papatsonis DNM, de Kleine MJK, Draper ES, et al. Prognostic models for stillbirth and neonatal death in very preterm birth: a validation study. Pediatrics 2012; 129: e120-7.
7. Ezz-Eldin ZM, Hamid TAA, Youssef MRL, Nabil HE-D. Clinical Risk Index for Babies (CRIB II) scoring system in prediction of mortality in premature babies. JCDR 2015;9:SC08.
8. Parry G, Tucker J, Tarnow-Mordi W. CRIB II: an update of the clinical risk index for babies score. Lancet 2003;361(9371):1789-91.
9. Marete IK, Wasunna AO, Otieno PA. Clinical risk index for babies (CRIB) II score as a predictor of neonatal mortality among low birth weight babies at Kenyatta national hospital. East Afr Med J 2011;18-23.
10. Fowlie S, Jauniaux E, Brown R, Ramsay B. American College of Obstetricians and Gynecologist. ACOG Practice Bulletin. Clinical management guidelines for obstetrician-gynecologist. Number 43, May 2003. Management of preterm labor. Obstet Gynecol 2003; 101:1039-47.
11. Lodha A, Sauve R, Chen S, Tang S. Clinical Risk Index for Babies score for the prediction of neurodevelopmental outcomes at 3 years of age in infants of very low birth weight. Developmental Med Child Neurol 2009; 51: 895-900