

CONFERENCE ABSTRACT

The " Score Bebé®" as a proposal for enhancing neonatal risk stratification from an integrated care approach: a nationwide retrospective study

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Introduction

The World Health Organization has reported that neonatal mortality is part of the inconclusive agenda of the sustainable development goals, representing >50% of child mortality. In Ecuador, neonatal mortality rate has raised from 4.1 to 6.0 per 1000 live births, between 2014 to 2019. Most neonatal deaths are potentially preventable if proper risk assessment, and timely and well-coordinated stratified management is deployed. Objective: to develop and to validate a health risk assessment tool for predicting neonatal mortality and to reach a nationwide consensus on stratified management.

Theory/Methods

We retrospectively analysed all the newborns deaths registered by the Ministry of Public Health between 2014 to 2017 in Ecuador. We developed a health risk assessment tool by using the information from deceased neonates between 2014–2016; subsequently, we validated it by using the information of deceased neonates in 2017. Several perinatal predictors were tested. Neonatal death <24h, <48h, and <15 days were the outcomes. Through Cox proportional hazards models we identified significant predictors. The sum of their β -coefficients (multiplied by a factor) was the "score". After bootstrapping techniques, we calculated the Area Under the of the Receiver Operating Characteristic (AUC ROC) curve. Kaplan-Meier estimates were developed, to illustrate the difference in survival among the risk groups. The score was qualitatively validated by ~70 healthcare professionals, in five Ecuadorian cities (Esmeraldas, Portoviejo, Quito, Guaranda, and Tena), and it was transformed into a Web based calculator with stratified suggestions of care –The Score Bebé®–.

Results

The neonates of the model development population database (n=2340) had a median (P25 to P75) of 32 (28 to 37) weeks of gestation. Asphyxia, prematurity, infections, and malformations were the most prevalent disorders. Multivariate analyses showed six significant predictors of neonatal mortality at <24h, <48h and <15days of life: gestational age, birth weight, weight for gestational age centile, Apgar at 5 minutes, type of delivery, and comorbidities. The AUC ROC of the score was 0.76 (95% CI: 0.74-0.78) after the internal validation, and 0.75 (95% CI: 0.71 to 0.80) after external

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validation (n=769). Survival estimates were significantly different across risk bands. The resulting Score Bebé® is available at <https://scorebebe.com/> and includes stratified suggestions of care.

Discussion

Integrated neonatal care deployment in Ecuador could be facilitated by the implementation of the Score Bebé® in clinical workstations and its dynamic enhancement over time.

Conclusions

The Score Bebé® is an acceptably accurate tool for neonatal health risk assessment and stratification.

Lessons learned

Improving neonatal care in Ecuador is a priority. Risk assessment and stratification, as digital health tool, has the potential of reducing neonatal mortality by timely interventions and by enhancing communication and collaborative work.

Limitations

We did not include non-at-risk neonates in the analyses; therefore, it is possible that some predictors could overestimate mortality. We could not test the prediction ability of the score by including laboratory biomarkers as predictors.

Suggestions for future research

National health care authorities expressed their interest for its use at national level. It will be prospectively validated, and biomarkers will be tested as predictors.