Larger newborn care units provide better protection for very preterm babies

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Preterm babies admitted to high volume neonatal units are less likely to die compared to those admitted to low volume units, according to researchers. A study, published in *BMJ Open*, has provided new estimates to assess how organisational factors in England impact clinical outcomes of infants born preterm.

Results demonstrated that for preterm babies born at less than 33 weeks gestation, the odds of dying in hospital were 32 per cent less if they were admitted to high volume units at the hospital of birth than if they were admitted to low volume units (odds ratio 0.68). For babies born at less than 27 weeks the effect was greater, with the odds of dying almost halved when they were admitted to high volume neonatal units at the hospital of birth compared to when they were admitted to low volume units (odds ratio 0.51).

Full term babies are those born at 37 weeks gestation and above. The analysis does not include those preterm babies who died on obstetric wards before being admitted to neonatal units.

Senior researcher Professor Neena Modi from the Department of Medicine, Imperial College London says: "Our research shows that neonatal units that are larger and busier in terms of the amount of care they provide to preterm babies are more likely to show better clinical outcomes for these vulnerable infants. This supports the networked approach that centralises the delivery of specialised neonatal care in high volume units and enables women at risk to be transferred to these units

to receive the care they need."

Using data from 165 of the 174 neonatal units in England for a three-year period from 2009 to 2011, the researchers analysed a range of clinical outcomes for preterm babies admitted to high volume neonatal units and compared them to outcomes for preterm babies admitted to those units not classified as high volume. For this study high volume neonatal units were defined as those that provide more than 3,480 care days to preterm babies per year. Several possible factors that could influence the statistical analysis were taken into account including age, birth weight and sex of the baby.

Data were analysed for 20,554 babies born at less than 33 weeks and for 2,559 babies born at less than 27 weeks. Twenty-four per cent of the neonatal units were classified as high volume and 46.4 per cent of infants born at less than 33 weeks were born in hospitals with a high volume neonatal unit. The majority (78 per cent) of high volume units were also specialised Neonatal Intensive Care Units (NICUs). The data was collected from neonatal units participating in the Neonatal Economic, Staffing and Clinical Outcomes Project (NESCOP).The research was conducted by researchers from Imperial College London, University of Warwick, University of Leicester and University College London.

Researchers showed that, although the odds of dying in hospital were 15 per cent lower if babies were admitted to specialist units compared to non-specialist units (odds ratio 0.85), this was not a statistically significant reduction. This indicates that although many high volume units are also specialist NICUs, it is the amount of care rather than the designation of the unit that seems to be the key determining factor.

First author Sam Watson, PhD student from the University of Warwick says: "One possible explanation for our results could be that those

neonatal units delivering a greater volume of care provide the clinicians who work there with more experience. The first hours of these babies' lives can be crucial, which means it is essential to give them expert care at this time. It is also possible that economies of scale play a role, in that the larger and busier units have more resources to invest in technology and facilities. However more research is needed to tease out the possible explanations and inform policy effectively."

There has been much debate about the organisation of critical care services for newborn babies, especially in relation to the volume and intensity of care units. In 2003 the UK created a model of networked, regionalised units to facilitate the transfer of preterm babies to higher care specialist units (NICUs), whilst also maintaining access to less specialist low volume units for those mothers and babies less at risk. These are now known as English Operational Delivery Networks. The results of this study support this approach, but the researchers call for a need to further evaluate the effect of the transfers and to consider ways to improve procedures surrounding them.

"It is already established best practice to transfer women who are at risk of preterm birth prior to delivery," says Professor Modi. "This is known to be safer than transferring vulnerable babies after birth. Currently there are a large number of requests for this type of transfer, but sadly very many do not take place because of organisational barriers and lack of cots. Our study suggests that, given the benefit of giving birth in a hospital with a high volume neonatal unit, there should be a greater push to improve the situation and review current procedures in a systemic fashion."

Sam Watson adds: "Our study indicates that ensuring very preterm babies, particularly those born at less than 27 weeks, are delivered in hospitals with high volume neonatal units improves their outcome, but there could be a knock-on effect on other patient groups if smaller

neonatal units are closed. Babies who are not born so early but who are still vulnerable may have to travel far from home as a consequence and this is why further research is urgently needed."

More information: Watson et al. 'The effects of designation and volume of neonatal care on mortality and morbidity outcomes of very preterm infants in England: retrospective population-based cohort study.' *BMJ Open* 2014. bmjopen.bmj.com/lookup/doi/10. … /bmjopen-2014-004856

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