

EDITORIALS

Spacing babies

Small gaps look less harmful than big ones

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An association between interpregnancy intervals of less than 18 months and an increased incidence of poor perinatal outcomes, including low birth weight, preterm birth, and small for gestational age infants, has been shown by strong and consistent findings over many years and in a wide range of countries. The same three poor outcomes have also been consistently associated with interpregnancy intervals of greater than five years. The strength and consistency of research findings, together with the proposal of several plausible mechanisms by which both short and long intervals could result in these poor outcomes, has led to the widely held acceptance that these associations are causal. As interpregnancy interval is a modifiable feature of pregnancy, public health organisations, including the World Health Organization, have recommended intervals of no less than two years between giving birth and another pregnancy.¹

The linked article by Ball and colleagues (doi:10.1136/bmj.g4333) seriously challenges this evidence.² By analysing several interpregnancy intervals for the same mother, rather than comparing intervals between different mothers, they show that short intervals (less than 18 months) are associated with very small, and possibly no, increase in risk of preterm, small for gestational age, or low birthweight births. Their findings do, however, reinforce the existing evidence linking increased incidence of small for gestational age and low birthweight births with interpregnancy intervals of five years or more (≥ 60 months).

The authors suggest that their findings are different because their within mother analyses control better for the unmeasured (or poorly measured) and unknown factors that confounded so many previous analyses. Mothers essentially act as their own controls. To further reinforce this point, Ball et al report findings from the same population in which analysis has been conducted in the more usual between mothers way. The results of this approach closely mirror those of the many previous studies of interpregnancy interval and perinatal outcomes, including those of rigorously conducted systematic reviews and meta-analyses.³

Although these new findings indicate that public health messages and advice to women regarding interpregnancy intervals may need to be revised, it is too early to make that call. Public health

policy should rarely, if ever, be based on a single study, and, regardless of the high quality of Ball et al's study, it represents only a single population in a single country, with the possibility that these results are due to chance rather than real. Whether the same associations would be found using the same analytical approach in other westernised, developed countries remains an open question.

Further research is definitely needed to examine the situation in developing countries, in disadvantaged populations, and in subgroups such as teenagers and women over 35 years of age, towards the extremes of reproductive age. Similarly, within mother analyses exploring maternal health outcomes are now needed, as are analyses investigating interpregnancy intervals that start with a pregnancy loss. Fortunately, no pressing need exists to revise public health messages for women. Little harm is likely to result from maintaining current advice about short intervals, and the correct messages about avoiding long intervals could be lost if we rush to revise advice.

In addition, recent research has linked closely spaced births with several outcomes that are unrelated to physiological attributes of the mother but may be related to the postnatal environment. Mental health disorders, problems with children's behaviour and development, and child abuse have been linked to short interpregnancy intervals,^{4,5} although research remains sparse so far.

The findings of Ball et al's study remind us of the many limitations of traditional observational epidemiological research, although none of them is new and several have been discussed at great length previously. Meta-analysis of observational studies has frequently been criticised as potentially adding together the results of flawed studies,⁶ a problem that was highlighted, for example, by the findings of the Women's Health Initiative trials evaluating hormone therapy for postmenopausal women.⁷ These trials reported no reduction in coronary heart disease or osteoporosis, overturning decades of observational studies consistently supporting the value of hormone therapy for preventing these and a range of other problems. Residual confounding and the effect of unknown or unmeasured confounders ("known unknowns and unknown unknowns" to quote former US Secretary of Defense Donald Rumsfeld) is a

problem that is often recognised but rarely dealt with, even though modelling has shown that small associations can be due entirely to such residual confounding.⁸

The argument that interpregnancy interval may not be the cause of poor perinatal outcomes surfaced in the early phases of research on this subject. As mentioned by Ball et al in the introduction to their article, Erikson and Bjerkedal presented data suggesting that mean birth weight was highly correlated for first and subsequent infants born to the same mother.⁹ Why this observation, and the message it carried regarding the contribution of maternal factors rather than interpregnancy intervals to poor perinatal outcomes, was lost from the subsequent examination of the role of interpregnancy interval may carry a warning for all health researchers to keep an open mind, especially regarding results that do not fit an established pattern.

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- 1 Marston C. Report of a WHO technical consultation on birth spacing. World Health Organization, 2005.
- 2 Ball SJ, Pereira G, Jacoby P, de Klerk N, Stanley FJ. Re-evaluation of the link between interpregnancy interval and adverse birth outcomes: retrospective cohort study matching two intervals per mother. *BMJ* 2014;349:g4333.
- 3 Conde-Agudelo A, Rosas-Bermúdez A, Kafury-Goeta AC. Birth spacing and risk of adverse perinatal outcomes: a meta-analysis. *JAMA* 2006;295:1809-23.
- 4 Crowne SS, Gonsalves K, Burrell L, McFarlane E, Duggan A. Relationship between birth spacing, child maltreatment, and child behavior and development outcomes among at-risk families. *Matern Child Health J* 2012;16:1413-20.
- 5 Riordan DV, Morris C, Hattie J, Stark C. Interbirth spacing and offspring mental health outcomes. *Psychol Med* 2012;42:2511-21.
- 6 Egger M, Schneider M, Davey Smith G. Spurious precision? Meta-analysis of observational studies. *BMJ* 1998;316:140-4.
- 7 Writing Group for the Women's Health Initiative Investigators. Risks and benefits of estrogen plus progestin in healthy postmenopausal women: principal results from the Women's Health Initiative randomized controlled trial. *JAMA* 2002;288:321-33.
- 8 Fewell Z, Davey Smith G, Sterne JA. The impact of residual and unmeasured confounding in epidemiologic studies: a simulation study. *Am J Epidemiol* 2007;166:646-55.
- 9 Erickson JD, Bjerkedal T. Interpregnancy interval: association with birth weight, stillbirth, and neonatal death. *J Epidemiol Community Health* 1978;32:124-30.

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