

Nurse staffing levels, missed vital signs and mortality in hospitals: retrospective longitudinal observational study

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Plain English summary

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Shortages of nurses have been linked to poor care in hospitals but it is hard to specify the number and type of staff needed, or to be sure that staff levels are really the cause of the problem. Higher staffing levels cost more, so there are financial perspectives to consider. The aim of our study was to see if observations of 'vital signs' (such as pulse and blood pressure) were affected by low staffing levels, and whether or not this might explain higher death rates when staffing is low. If this is the case, nurses' ability to complete the necessary observations might be used to see how safe staffing levels are.

We used hospital records about nurses on duty, patient records and patients' observations from 32 wards over 3 years. We used statistical models to see if patients were more likely to die, have a longer stay and have observations missed if they were on wards where there were fewer nurses than if they were on wards with more nurses. We used the results to estimate what might happen if staffing levels were changed and what the costs would be.

We found that patients who spent time on wards with fewer than the usual number of fully qualified nurses were more likely to die, or to stay in hospital for longer. When staffing was lower, more observations were missed, and this was related to higher death rates, but low staffing could not explain why most observations were being missed. Levels of health-care assistants, who provide support to nurses, were also important, but deaths could be reduced at lowest cost by replacing some assistants with qualified nurses, although our design means that we cannot be certain of cause and effect.

Although missed observations explain some of the links between nurse staffing levels and hospital death rates, these records cannot easily show that staffing levels are safe. Assistants are unlikely to make up for a shortfall of qualified nurses.

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