

Study links nurses' workload and education to patients' survival after surgery

Patients are more likely to die after common surgical procedures when they are cared for in hospitals with heavier nurse workloads and fewer nurses with bachelor's degrees, concludes the largest investigation of nursing and hospital outcomes in Europe to date, published in *The Lancet*.

The study findings, derived from more than 420000 patients in 300 hospitals across nine European countries, indicate that every extra patient added to a nurse's average workload increases the chance of [surgical patients](#) dying within 30 days of admission by 7%, but a 10% increase in the proportion of nurses holding a bachelor degree is associated with a 7% decrease in the risk of death.

"Our findings emphasise the risk to patients that could emerge in response to [nurse staffing](#) cuts under recent austerity measures, and suggest that an increased emphasis on bachelor's education for nurses could reduce hospital deaths", says Professor Linda Aiken from the University of Pennsylvania School of Nursing, USA, who led the research.

To assess whether differences in patient-to-nurse workloads and nurses' educational qualifications affect patients' survival after surgery, the researchers analysed responses from more than 26500 nurses, and reviewed medical records for 422730 patients aged 50 years or older discharged after common surgery such as hip or knee replacement, appendectomy, gall bladder surgery, and vascular procedures in nine European countries (Belgium, England, Finland, Ireland, the Netherlands, Norway, Spain, Sweden, and Switzerland).

The analysis examined the association of nursing workload and education with patient outcomes, after taking into account each individual patient's risk of death including age, sex, type of surgical procedure, type of admission, and the presence of chronic conditions such as hypertension or diabetes, as well as hospital characteristics including bed size, teaching status, and technology availability.

The overall percentage of patients who died in hospital within 30 days of admission was low, ranging by country within an average of 1.0%–1.5%. However, in every country, death rates varied significantly across individual hospitals, ranging from hospitals where less than 1% of patients died, to hospitals where more than 7% died.

Nurse staffing (workload) and education levels varied widely both between countries and between hospitals within each country. The average patient-to-nurse ratios varied from 12:7 in Spain and 10:8 in Belgium to 6:9 in Ireland and 5:2 in Norway. In Spain and Norway, all nurses had a bachelor's degree compared with an average of just 10% in Switzerland and 28% in England.

The findings suggest that patients have the highest risk of death after surgery in hospitals where nurses with lower levels of education care for more patients. For example, in hospitals where nurses care for an average of six patients each, and the proportion of nurses with bachelor's degrees is 60% or greater, the risk of hospital deaths would be almost 30% lower than in hospitals where nurses care for an average of eight patients, and in which only 30% of nurses have bachelor's degrees.

The authors note that their findings in Europe closely mirror those from the USA.

According to Aiken, "Our data suggest that a safe level of hospital nursing staff might help to reduce surgical mortality, and challenge the widely held view that nurses' experience is more important than their education."

The findings support an EU decision last year to approve nursing education within institutions of higher education starting after 12 years of general education, but challenge the decision to continue to endorse vocational nursing education after only 10 years of general education.

Writing in a linked Comment, Alvisa Palese from the University of Udine in Italy and Roger Watson from the University of Hull in the UK say: "The study by Aiken and colleagues provides evidence in favour of appropriate nurse-patient ratios and also provides support for graduate education for [nurses](#). Whether these findings are used to inform health-care policy or how they are implemented in practice will be interesting to see. We fear that the evidence here will not be tried and found wanting, but will rather be deemed too expensive to act upon."

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