

The influence of hospital or physician volume on quality of health care

This is an excerpt from the full technical report, which is written in Norwegian.

The excerpt provides the report's main messages in English.

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Institution Norwegian Knowledge Centre for the Health Services
(Nasjonalt kunnskapssenter for helsetjenesten)
John-Arne Røttingen, *Director*
Authors Inger Norderhaug
Unni Krogstad
Tor Ingebrigtsen
Odd Søreide
Rune Wiseth
Hans Olav Myhre

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Norwegian Knowledge Centre for the Health Services summarizes and disseminates evidence concerning the effect of treatments, methods, and interventions in health services, in addition to monitoring health service quality. Our goal is to support good decision making in order to provide patients in Norway with the best possible care. The Centre is organized under The Norwegian Directorate for Health, but is scientifically and professionally independent. The Centre has no authority to develop health policy or responsibility to implement policies.

We would like to thank all contributors for their expertise in this project. Norwegian Knowledge Centre for the Health Services assumes final responsibility for the content of this report.

Norwegian Knowledge Centre for the Health Services
Oslo, 2007

Key messages

The influence of hospital or physician volume on quality of health care

BACKGROUND

Assessing and measuring quality of care has had increasing attention during the last decades. The question whether provider volume (hospital or physician) is associated with improved quality of care had been one dimension that has received much attention. The implication of this research is important for decisions regarding accreditation of hospitals or surgeons, centralisation or decentralisation of health care.

METHODS

A systematic review of studies identified from searches in Medline until 2006. We restricted our inclusion criteria to studies with data from 1990 and forward. The review was performed according to general principles for HTA.

RESULTS

PCI: We included 37 publications. Although the results were not completely consistent, the majority of studies reported that patients treated in high volume hospitals had lower risk of mortality or emergent coronary bypass procedure compared with patients treated in low volume hospitals. This was found both for acute and elective PCI.

Carotid endarterectomy: We included 17 publications, that due to double publication represented 15 analyses. The results from these studies were not consistent, neither for risk of mortality nor for risk of stroke following carotid endarterectomy.

Abdominal aortic surgery: We included 20 publications that evaluated the volume-outcome relationship for intact or ruptured abdominal aortic aneurysms. Several publications had overlapping data material. Results from studies in Finland, Canada and the US showed lower mortality rates for patients treated by high volume surgeons. The impact of hospital volume on outcomes following surgery for abdominal aortic aneurysms were not consistent.

Intracranial aneurysm and stroke: We included four publications that assessed hospital volume and mortality for intracranial aneurysms. The results from these studies are not consistent, and insufficient for conclusions.

We included five publications on hospital volume and outcomes in the treatment of stroke patients. The results from these studies were not consistent, neither for treatment of stroke patients in general nor for the group of patients treated with thrombolysis.

CABG: We included 17 publications on coronary artery bypass graft surgery (CABG), which due to multiple publications from the same database constitute 11 analyses. Alto-

gether these studies showed lower rates of mortality and complications for patients treated in high volume hospitals and by high volume surgeons.

Heart valve surgery: We included four studies on heart valve surgery. All were from the US and three analysed the same database for overlapping period. All studies reported lower rates of mortality for high volume hospitals and high volume surgeons. But due to few unique publications more data is needed to confirm this finding.

CONCLUSION

High hospital or physician volume is associated with better outcome for some procedures. The majority of studies were from the US, and studies from other countries are needed to assess the consistency of findings across health care systems.

Executive summary

The influence of hospital or physician volume on quality of health care

BACKGROUND

Assessing and measuring quality of care has had increasing attention during the last decades. The question whether provider volume (hospital or physician) is associated with improved quality of care had been one dimension that has received much attention. The implication of this research is important for decisions regarding accreditation of hospitals or surgeons, centralisation or decentralisation of health care.

These questions are especially important to the Norwegian health care setting, with a rather decentralised health care system. The Norwegian Knowledge Centre for the Health Services was asked to update the previous SMM-report on the subject. This report assessed the literature on cardiovascular interventions

LITERATURE SEARCH

We searched for studies published in Medline 1990-December 2006, by a defined search strategy (Attachment (vedlegg) 1). We included studies that compared mortality, complications, quality of life or function for patients treated in hospitals or by physicians with different patient volume. Studies including less than 5 hospitals or surgeons, or with improper adjustment for case-mix were excluded.

RESULTS

The search gave 7540 hits, of which 115 publications on cardiovascular procedures were included. Limitations of the search strategy and the complexity of the questions make it quite likely that there are publications we have missed.

Acute and ordinary Percutaneous coronary intervention (PCI)

- We included 37 publications on emergent or ordinary PCI. Because some studies use data from the same database and overlapping time period, these publications represented 29 unique analyses. We emphasised studies with data from 1997 and onwards, due to the implementation of stents. Although the results were not completely consistent, the majority of studies reported that patients treated in high volume hospitals had lower risk of mortality or emergent coronary bypass procedure compared with patients treated in low volume hospitals. This was found both for acute and elective PCI.

The importance of hospital volume for patient outcome was documented by studies from Germany, France, Scotland and the US. Studies from Canada and Japan did not find any association between hospital volume and patient outcome.

The difference in mortality and complications between high and low volume hospitals is considered clinically important. The absolute difference in mortality varied from 0 to 1.1% for elective PCI and from 1.7 to 2.8% for acute PCI. Low volume hospitals was defined as lower than 200–400 procedures per year, and high volume hospitals had more than 600–1000 procedures per year.

Carotid endarterectomy

- We included 17 publications, that due to double publication represented 15 analyses. The results from these studies were not consistent, neither for risk of mortality nor for risk of stroke following carotid endarterectomy.

Most studies were from US, one from Australia, one from Canada and one from Finland. Mortality following carotid surgery is low, and therefore may not be the most relevant measure for assessing surgical quality. Volume thresholds in several publications were quite high compared with the volume achieved in Norwegian hospitals. In addition the patient population was quite different from patients operated in Norway, because more than half of patients treated in US were asymptomatic.

Abdominal aortic surgery

- We included 20 publications that evaluated the volume–outcome relationship for intact or ruptured abdominal aortic aneurysms. Several publications had overlapping data material, and we grouped these 20 publications into eight unique analyses. Results from studies in Finland, Canada and the US showed lower mortality rates for patients treated by high volume surgeons. The impact of hospital volume on outcomes following surgery for abdominal aortic aneurysms were not consistent.

Studies from Finland and Canada found no association between hospital volume and mortality. Studies from the US on the other hand were consistent, and reported lower mortality and complications for patients treated in high volume hospitals. This finding were found both for analysis of administrative and clinical data sources. Mortality rates for elective surgery were in the range of 3–12%, depending on population at risk. The absolute difference in mortality between low and high volume hospitals varied from 0 to 5%. Mortality for ruptured aneurysms was around 40%, and was not strongly associated with hospital volume.

Intracranial aneurysms and stroke

- We included four publications that assessed hospital volume and mortality for intracranial aneurysms. Three publications analysed clipping or coiling, all from the same database (Nationwide inpatient sample) in US. One publication assessed intracranial – extracranial bypass. The results from these studies are not consistent, and insufficient for conclusions.
- We included five publications on hospital volume and outcomes in the treatment of stroke patients. Three publications were from the same German registry and two from the US. The results from these studies were not consistent, neither for treatment of stroke patients in general nor for the group of patients treated with thrombolysis.

Heart surgery

- We included 17 publications on coronary artery bypass graft surgery (CABG), which due to multiple publications from the same database constitute 11 analyses. Altogether these studies showed lower rates of mortality and complications for patients treated in high volume hospitals and by high volume surgeons. Reported mortality rates after CABG varied from 1.7-6.1% due to variation in population studied. The difference in mortality between high and low volume hospitals was from 0-1.3%. All studies that reported a positive association between hospital volume and outcome following CABG studies were from US. One study from Taiwan did not find any such association. There is a lack of data from other countries to supplement these findings.
- We included four studies on heart valve surgery. All were from the US and three analysed the same database for overlapping period. All studies reported lower rates of mortality for high volume hospitals and high volume surgeons. But due to few unique publications more data is needed to confirm this finding.

About the Norwegian Knowledge Centre for the Health Services

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Norwegian Knowledge Centre for the Health Services

PB 7004 St. Olavs plass

N-0130 Oslo, Norway

Telephone: +47 23 25 50 00

E-mail: post@nokc.no

Full report (pdf): www.nokc.no