

Possible decrease in the prevalence of hospital acquired infections during the accreditation process in the region of Northern Jutland, Denmark

Christian Stab Jensen¹, Gorm Mørk Hansen², Lena May Østergaard³, Claus Dethlefsen², Pernille Luther⁴, Jan Jesper Andreasen²

¹National Center for Infection Control, Statens Serum Institute, Copenhagen, Denmark,

²Department of Cardiothoracic Surgery, Center for Cardiovascular Research, Aalborg Hospital, Aarhus University Hospital, Aalborg, Denmark,

³Office of planning and quality improvement, Aalborg Hospital, Aarhus University Hospital, Aalborg, Denmark,

⁴Department of Clinical Microbiology, Aalborg Hospital, Aarhus University Hospital, Aalborg, Denmark.

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BACKGROUND

In November 2011 all hospitals in the region of Northern Jutland (RN), were accredited without comments as the first overall region in Denmark. The accreditation was performed according to standards defined by the Danish Healthcare Quality Program (DDKM) ¹. The main objectives of DDKM are to enhance the quality of patient care, to promote the development of the clinical, organizational and patient-perceived quality and the visibility of quality in health care. National experience with accreditation as a tool to create quality improvements is still limited, and there is a need for scientific evaluation of the effectiveness of accreditation.

OBJECTIVE

The objective of this study was to evaluate if the accreditation process has resulted in a decrease in the prevalence of selected nosocomial infections in the region.

MATERIALS AND METHODS

Prevalence surveys

Four types of nosocomial infections were recorded: urinary tract infections (UTI), pneumonia (PNEU), deep surgical site infection (DSSI) and sepsis/bacteremia (SE/BA). Each infection was recorded separately. Local definitions for nosocomial infections produced by the regional infection control team (ICT) were used from spring 2006 to spring 2009. For the surveys for autumn 2009 onwards, National Center for Infection Control, Statens Serum Institute had made national definitions, which were Danish modifications of the U.S. Center for Disease Control and Preventions definitions. The prevalence surveys included the total number of patients in all somatic wards in RN that were hospitalized at 8.01 a.m. on a predetermined day of the survey. Infection control link staff in each ward was responsible for assessment and registration of any infections, and the ICT was responsible for data processing and analysis.

Statistical analysis

A retrospective analysis using a robust Poisson regression model was performed on prevalence ratios before and during the accreditation process ². The period from spring 2006 to spring 2009 (with reference in spring 2006) and the period from autumn 2009 to spring 2011 (with reference in autumn 2009) were estimated separately due to the above mentioned changes in the definitions for nosocomial infections. In a trend analysis, including the periods as continuous variables in a likelihood ratio test, it was examined whether the change in prevalence ratios could be assumed to be constant. Significance level: 0.05. In an additional analysis, prevalence ratios were adjusted for the change in average length of stay, as this could be a potential confounder.

RESULTS

Figure 1 shows the trend in overall prevalence of the biannual prevalence surveys in RN given as prevalence ratios with reference respectively to spring 2006 and autumn 2009. Key events in the accreditation process are listed in the figure.

From spring 2006 to spring 2009 (before accreditation), the prevalence of nosocomial infections increased slightly, although without statistical significance. From autumn 2009 to spring 2011 (during accreditation) there was a statistically significant decrease in the overall prevalence in parallel with the accreditation process.

Table 1 shows the annual percentual change in the prevalence of nosocomial infections (overall and for individual types of infections). From spring 2006 to spring 2009 there was an annual percentual increase in the overall prevalence of 4.5% (p=0.27). There were no statistically significant changes in the prevalence of PNEU, DSSI and SE/BA, but an annual increase in the prevalence of UTIs of 16.6% was statistically significant (p=0.03). From autumn 2009 to spring 2011 there was an annual percentage decrease of 21.3% (p = 0.01) in the overall prevalence. The decreases in the prevalence of UTI: 34.6% (p = 0.01) and PNEU: 29% (p = 0.02) were statistically significant, while for DSSI and SE/BA, there was no significant change.

Table 1 also shows the annual percentual change in the overall prevalence of nosocomial infections after adjusting for average length of stay. From spring 2006 to spring 2009, there was an increase of 10.2% (p = 0.24), while there was a decrease of 16.5% (p = 0.41) from autumn 2009 to spring 2011. None of the changes were statistically significant.

FACTS ABOUT NORTHERN JUTLAND

Number of inhabitants in RN: 579,829.
Health care in RN consists of mergers of hospitals geographically distributed across the region and grouped under five separate hospital managements.
Approximately 70% of the region's activity takes place at Aarhus University Hospital, Aalborg Hospital.
Aims for Hospital activity in 2011: 120,000 discharges, 833,000 outpatient visits and 75,000 operations¹.
Budget: Approx. DKr. 5.6 billion. ~ £ 0.58 billion ~ €0.73.
Total number of beds in RN: 1,862 medical, surgical and psychiatric beds².
Average occupancy of beds: 83%¹.
¹Data obtained from the patient administration system 2010 (excluding data from ICU).
²Psychiatric beds (270 beds) were not included in prevalence surveys.

Figure 1. Development in the overall prevalence percentage of the biannual prevalence studies in the region of North Jutland

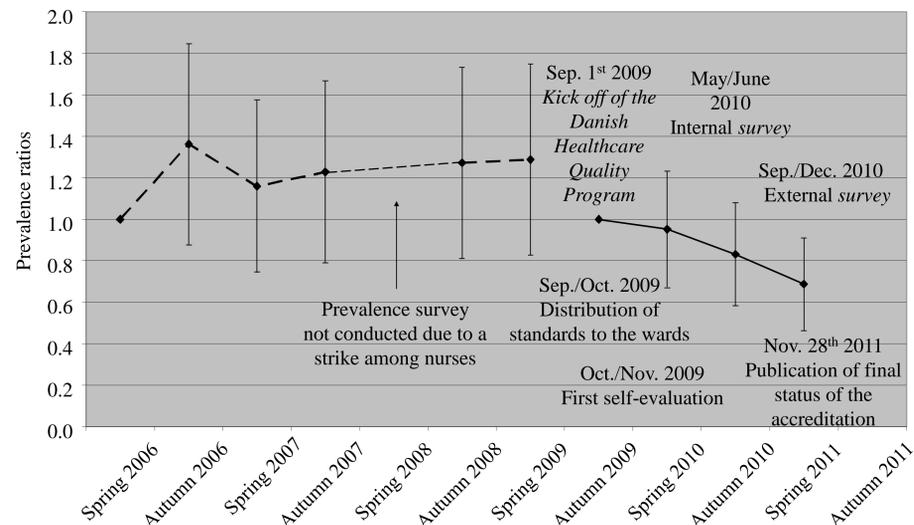


Table 1 The annual percentual change in the prevalence of nosocomial infections (overall and for individual types of infections)

	Spring 2006- spring 2009 Annual change in prevalence (95%-CI)	p-values	Autumn 2009- spring 2011 Annual change in prevalence (95%-CI)	p-values
Overall prevalence	4.5 (-3.4;13.1)	0.27	-21.3 (-33.7;-6.6)	0.01
UTI	16.6 (1.3;34.2)	0.03	-34.6 (-53.4;-8.2)	0.01
PNEU	-4.8 (-17.5;9.8)	0.50	-29.0 (-47.2;-4.5)	0.02
DSSI	10.8 (-6.2;30.9)	0.23	1.4 (-32.0;51.1)	0.95
SE/BA	-13.7 (-31.3;8.6)	0.21	-1.0 (-34.3;49.4)	0.96
Overall prevalence after adjusting for average length of stay	10.2 (-6.4;29.6)	0.24	-16.5 (-45.8;28.6)	0.41

CONCLUSIONS

The accreditation process was associated with a decreased prevalence of selected nosocomial infections compared with results from a period immediately prior to the process. However, it is not possible to conclude that there is a direct causal link between the accreditation process and the decline in prevalence, since this is a retrospective study with the risk of confounding. One potential confounder is a constant focus on reducing the average length of stay, throughout the whole study period. When adjusting for this confounder the decline in prevalence during the accreditation process was not statistically significant.

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