

2023 Abstracts

Degree Project in 1 year Master programme in medical microbiology, with specialization in infection prevention and control, 15 hp

Institute of Biomedicine, Sahlgrenska Academy, University of Gothenburg

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Abstract

Degree Project in 1-year Master programme in medical microbiology, with specialization in infection prevention and control, 15 hp
Titel: Healthcare workers' experience of being observed performing hand hygiene – A quantitative study
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Supervisor: Bente Olesen, Overlæge, dr.med. & ph.d., Klinisk Mikrobiologisk Afd., Herlev/Gentofte Hospital, Danmark
Background: It is known that hand hygiene (HH) compliance worldwide is low. To achieve best possible effect of the monitoring of HH, it is important to know health care workers (HCW) experience of direct observation (DO) as a method. Research question: <ul style="list-style-type: none">- Does profession and seniority have an impact on how HCW perceive their own knowledge of HH?- Does profession and seniority influence HCW perception of whether DO of HH leads to practice change?- Does profession and seniority affect how HCW perceive DO as method, when being observed in HH?- Do HCW experience receiving feedback during and after DO at HH, and does profession and seniority affect their experience? Materials and methods: A questionnaire survey for HCW with patient contact, who are used to being monitored in HH. Results: The study included 323 respondents belonging to professional groups with >10% responses, including nurses (208), bioanalysts (65) and doctors (50). The majority had a great deal of knowledge about HH guidelines, but the proportion was significantly higher among nurses than among physicians. Only 10% reported that DO as an audit tool would improve their HH skills. Few experienced a change in practice during DO and less in practice afterwards with a significant difference between HCW with >21 years of seniority versus < 6-20 years of seniority. Few experienced getting feedback in the situation, while less than a quarter experienced feedback after DO. Significantly more medical laboratory scientists reported received feed-back than physicians. Conclusion and implications: Regardless of professional group and seniority, few experience an improvement in their HH at DO. To be able to learn from DO, feedback is important. A new study could investigate how DO is experienced by both the observer and the observed to gain insight into how meaningful feedback is in relation to learning.



SAHLGRENSKA ACADEMY

Degree Project in 1 year Master programme in medical microbiology, with specialization in infection prevention and control.

Effect of UV-C disinfection in a dialysis unit – an intervention study

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SAHLGRENSKA AKADEMIN

Abstract

Introduction

UV-C light has a well-known bactericidal effect. Microorganisms in patient areas can cause infections in patients, even if the patient area is cleaned. Dialysis patients have a weakened immune system and frequent hospital contacts, putting them at risk of severe infections and bacteremia. This study aims to investigate:

Scientific question

Will cleaning and disinfection according to current standards in dialysis rooms at Rigshospitalet, Denmark, followed by UV-C disinfection 5 nights a week,

1: Reduce the occurrence of bacteria on contact points and surfaces in dialysis rooms?

2: Reduce the incidence of bacteremia in dialysis patients?

Method and materials

A pragmatic crossover intervention study was conducted, where an automatic UV-C Disinfection robot model C from Blue Ocean Robotics disinfects surfaces and contact points after regular cleaning. For 3 months, the UV-C robot operated in 2 dialysis rooms, while 2 corresponding dialysis rooms served as controls, and vice versa for the following 3 months. TSA agar plates were swabbed on 14 surfaces and contact points before and after cleaning and after UV-C, resulting in a total of 574 swabs. Data on bacteremia were obtained from the hospital's microbiology database. Statistical analyses were performed using Excel and the Python statistical software

Results

There was a statistically significant reduction in Colony Forming Units (CFU) when the dialysis rooms were fully disinfected with UV-C light. The reduction was not statistically significant on certain contact points, which may be attributed to shadow effects. The reduction in the occurrence of bacteremia was not statistically significant.

Conclusion and significance

UV-C light from a UVD-robot model C from Blue Ocean Robotics, as a supplement to cleaning according to current standards, significantly reduces the occurrence of bacteria on contact points and surfaces. However, the intervention does not result in a reduction in the occurrence of bacteremia in dialysis patients.

Degree Project in 1 year Master program in medical microbiology, with specialization in infection prevention and control, 15 hp

Antifungal resistance in clinical isolates of *Aspergillus* spp. - an epidemiological change?

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Supervisor: Kondori Nahid, Department of Clinical Microbiology

ABSTRACT

Introduction

Aspergillus is a fungus that can cause serious invasive infections in immunocompromised patients. The clinical picture can variate from an allergic reaction to a life-threatening invasive lung disease. The species *Aspergillus fumigatus* occurs in various environments, mainly in the developing countries.

Research question

The aim of this study was to determine the prevalence of *Aspergillus* species in clinical specimens. And also, the antifungal resistance pattern of *Aspergillus* spp have been studied during a period of ten years (2013-2017 and 2018-2022).

Materials and methods

The *Aspergillus* isolates (n=1 850) were collected from patients suspected with fungal infection in Västra Götaland region. The antifungal susceptibilities of fungal isolates were analyzed by microdilution methods against Itraconazole, Voriconazole, Posaconazole, Amphotericin and with Etest against Caspofungin.

Results

The results showed that *A. fumigatus* was the most common species followed by *A. niger*, *A. flavus* and *A. terreus*. The prevalence of *A. niger* increased significantly (<0.0001) during the second period of the study (2018-2022). Also, this study found that the sensitivity to Amphotericin decrease slightly for *A. fumigatus* over a 10-year period.

Conclusion

It is crucial to understand the epidemiological changes of infections and the susceptibility to antifungal drugs in order to quickly offer the right treatment to patients with fungal infections. The knowledge is important for identifying and adapting effective therapies and preventive measures. By keeping abreast of the latest epidemiological trends and fungal resistance patterns, health care professionals can make informed decisions that lead to early diagnosis, adequate treatment, and improved patient survival.

Implications

By identifying and adapting effective therapies and preventive measures, one can also contribute to reducing the spread of fungal infections and improving health outcomes for the population as a whole.

Examensarbete för 1-årig Magisterutbildning i medicinsk mikrobiologi, med inriktning mot smittskydd och vårdhygien, 15 hp

Kartläggning av vårdrelaterade infektioner och antibiotikaanvändning i hemsjukvården /
Point-prevalence survey of healthcare-associated infections and use of antibiotics in a home care setting in Gothenburg, Sweden.

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Handledare: Ingemar Qvarfordt

Point-prevalence survey of healthcare-associated infections and use of antibiotics in home healthcare in Gothenburg, Sweden.

Introduction: Healthcare-associated infection (HAI) causes unnecessary patient suffering, longer treatment times and increased financial costs of care. Today, home healthcare is a common form of care and is expected to grow. There are annual measurements of HAI and antibiotics in both hospitals and nursing homes, how common HAI is in home healthcare in Sweden is however unknown.

Research question:

1. What is the prevalence of HAI in patients in home healthcare?
2. How common is it for patients in home healthcare to be on antibiotic treatment?
3. Can known risk factors of HAI be associated with infections in home healthcare?

Materials and methods: A descriptive study with a focus on HAI and antibiotics and a correlation analysis of risk factors for HAI. The data collection is carried out by nurses who work in home healthcare in central district of Gothenburg. The patients who were included had a visit by a nurse during week 10, 2023. The survey has concentrated on the following types of HAI: Drug-related infection, postoperative infections, and other procedure-related infections.

Results: The study managed to screen 302 patients which was 72% of the total visits made during the study period. A total of 10 patients had a HAI and a total of 29 patients had some kind of infection. 18 patients were treated with antibiotics, where flucloxacillin treatment for wound infection was the most common prescription. The association analysis showed that urinary catheter ($p=0.002$) and surgery in the last 30 days ($p=0.004$) associated with HAI.

Conclusion: Risk factors such as urinary catheter and surgical intervention in the past 30 days are associated with HAI. HAI seems to be more common at home healthcare compared to nursing home. The study measures HAI and antibiotic use in home healthcare and can be seen as a basis to further research.

Nurses' experiences of ethical conflicts from working at an infectious disease clinic during the covid-19-pandemic

Degree project in 1 year Master programme in medical microbiology, with specialization in infection prevention and control, 15hp

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Abstract

Introduction: The covid-19 pandemic has had a major impact on the society. Within healthcare, the daily routines and work methods rapidly changed. The workload was high and the uncertainties regarding diagnostics, treatment, optimal care and estimating risk of transmission were great. Ethical conflicts are something nurses' worldwide often face in their daily work, but due to the pandemic new situations arose where ethical conflicts could not be avoided.

Aim: The aim of this study is to increase the knowledge about nurses' experiences regarding ethical conflicts when working at an infectious disease clinic during the covid-19 pandemic with primary focus on infectious control aspects.

Method: Individual semi-structured interviews followed by transcription and qualitative content analysis.

Results: Eight interviews were conducted and analysis of the material was divided into four main categories and seven subcategories. The four main categories were; *Relatives*, *Protective equipment*, *The patient*, *The role as a nurse*. The results of the study show that ethical conflicts commonly occurred in the daily work during and in particular related to restrictions for visitors and the negative impact of personal equipment in nursing care.

Conclusion and implication: The study provides increased knowledge and understanding of ethical conflicts that can arise in case of a pandemic, the relative importance of goal conflicts and increased understanding of the ethical stress that it can entail. The study also provides an insight into the extreme work environment that can occur during outbreaks of infectious diseases. Despite this, positive aspects of increased knowledge are also described. To be able to transfer experiences into knowledge, ethical reflection is needed to be able to improve nursing care. More research on ethical aspects from both the patient's and the healthcare personnel's point of view is desirable.

Keywords: Ethical conflicts, experiences, nurse, pandemic, covid-19

Degree Project in 1 year Master program in medical microbiology, with specialization in infection prevention and control, 15 hp

Drowning and dream team –

A qualitative study of experiences district medical officers had in their role as local leaders of infection prevention during covid-19 pandemic, and the influence of organizational factors

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Supervisor: Ivan Spehar, University of Oslo

Abstract

Background: During the covid-19 pandemic, district medical officers in Norway were local leaders of the infection prevention in the municipality. Their role can differ in size and organization among municipalities, and a study from 2019 showed that many district medical officers felt invisible within their own organization. A national commission that reviewed the Norwegian management of the pandemic, concluded that district medical officers had been vital for a successful pandemic management. I therefore wanted to study the experiences of the district medical officers, and the organizational factors they thought influenced these experiences.

Research question: What experiences did district medical officers have as local leaders of infection prevention during covid-19 pandemic, and how do they assess the influence of organizational factors?

Materials and methods: We did a qualitative study with three focus group interviews. A total of 17 district medical officers attended. Data analysis was performed using a qualitative thematic analysis called systematic text condensation.

Results: We found that different organizational factors influenced the experiences of district medical officers during the covid-19 pandemic.

Conclusion och Implications: Our study suggests that different organisational measures can facilitate a better experience for district medical officers in their role as local leaders of infection prevention.

Degree Project in 1 year Master programme in medical microbiology, with specialization in infection prevention and control, 15 hp

Sequence type 131 clades has determined the increase of extended spectrum β -lactamase producing *Escherichia coli* in urinary isolates

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Abstract

Introduction: *Escherichia coli* (*E. coli*) is a gram-negative bacterium that is part of the normal gut microbiota. It has diverse genetics and can be highly pathogenic due to carrying virulence factors and antibiotic resistance genes. *E. coli* is the most prevalent cause of urinary tract infections worldwide and may also cause severe infections such as septicemia. An increasing subset of this bacteria are becoming multidrug-resistant including those producing extended spectrum β -lactamase (ESBL). One of the most globally spread and pathogenic ESBL-producing *E. coli* (ESBL-*E. coli*) lineages is sequence type (ST) 131, mostly carrying the antibiotic resistance determinant *bla*_{CTX-M}.

Purpose: This study sought to investigate the local epidemiology of ESBL-*E. coli* in urinary sample isolates during the two time periods 2008 and 2018 in Västra Götaland Region, focusing on the establishment of ST131 and its clades/subclades (C1/C2) in comparison with other strain types. **Methods & Materials:** All isolates (n=126) in the early period and a representative subset (n=209) were analysed using Real-time PCR to determine the CTX-M group and conventional PCR for the frequency of ST131 and its clades/subclades. *fumC-fimH* (CH)-typing was used to see changes in frequency among ST131 and non-ST131 isolates. **Results:** The results show an increase in frequency of ST131. No significant change in frequency could be seen among the CH-types, but an increase in CTX-M group 9 and decrease in CTX-M group 1 could be seen.

Conclusion & implication: The epidemiology in many ways follows the global trend. The results of this study could be a good groundwork enabling faster local outbreak alerts and highlighting the steady shifts in the epidemiology for ESBL-*E. coli*.

Oral hygiene in nursing home residents in an IPC perspective – a qualitative study among care workers in Copenhagen Municipality.

Degree Project in 1 year Master programme in medical microbiology, with specialization in infection prevention and control, 15 hp

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Abstract

Introduction

Absence of oral hygiene (OH), combined with various risk factors, are associated with pneumonia and risk of hospital admission. Denmark has a relatively high incidence of pneumonia as preventable admission amongst elderly. Despite preventive dental care, problems with plaque and bleeding gums are seen in 18-23% of Copenhagen's nursing home residents. OH is estimated to be a daily care need for 75%. Care workers are responsible for their daily care, including OH. It is therefore investigated to which extent this group consider OH as an infection prevention and control (IPC) tool.

Aim

What knowledge and opinions do care workers have regarding OH as an IPC tool amongst care home residents?

Which factors do care workers consider as facilitators or barriers to support og perform OH?

Method

Individual semi-structured qualitative interviews with six care workers in nursing homes in Copenhagen.

Results

OH is considered an important IPC tool and an activity enhancing wellbeing. Personal relationship and collaboration with the resident are important preconditions, supporting possibility for good OH, whereas resistance and lack of collaboration are barriers. Inappropriate work positions and poor lighting are reported as obstacles, and partial dentures are seen as complicated to handle. Inhouse dentistry is considered the most important partner to give knowledge and feedback.

OH is also viewed in an ethical perspective, where care workers are responsible for the residents health and also obliged to protect the residents autonomy.

Conclusion and implications

Care workers understand OH as an IPC tool. Trusting relationships, acceptance and collaboration are important preconditions, while respect for the resident's autonomy may lead to poor OH, particularly in cognitively impaired residents. Frequent barriers OH are lack of collaboration, resistance from the resident and physical conditions such as poor lighting and uncomfortable work positions, which should be considered in future initiatives improving OH.

Data-driven individual feedback is associated with increased hand hygiene compliance among healthcare workers

Degree Project in 1-year Master programme in medical microbiology, with specialization in infection prevention and control, 15 hp.

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Abstract

Introduction

Hand hygiene compliance among healthcare workers remains challenging and effective interventions are needed. The study aimed to investigate the change in hand hygiene compliance among health care workers, when they receive individualized performance feedback provided by an electronic hand hygiene monitoring system.

Research question

Is data-driven individual feedback on hand hygiene performed as a single intervention associated with increased hand hygiene compliance among healthcare workers?

Methods

A quasi-experimental study was conducted in an inpatient orthopedic ward during a six months' period. Hand hygiene compliance data was measured using an electronic monitoring system. The system collected hand hygiene compliance data via anonymous sensors on staff badges, dispensers, and patient beds. The study included a 3-months' baseline, followed by a 3-months' intervention period. During the intervention period the staff received weekly performance feedback reports by email showing their hand hygiene compliance levels in different rooms, relative to their colleagues. We used paired t-tests to assess the differences in hand hygiene compliance in patient rooms, clean rooms, and unclean rooms.

Results

Nineteen staff members (17 nurses and 2 doctors) were included in the final analysis. During the intervention period the staff hand hygiene compliance increased significantly across all rooms compared with baseline compliance. The greatest improvement was observed in patient rooms. An average of 46% of staff opened their email with their performance feedback.

Conclusion

Healthcare workers' hand hygiene compliance improved significantly during the intervention with individualized performance feedback via weekly email, provided by an electronic hand hygiene monitoring system.

Implications

The individualized performance feedback supports healthcare workers in taking ownership of their hand hygiene compliance, providing a cost-effective method for improving hand hygiene levels. The improvement over the 3-months' intervention period indicates that regular exposure to the intervention could lead to even greater effects.

The care staff's knowledge of basic hygiene in nursing homes in Region Kalmar County

Degree Project in 1 year Master programme in medical microbiology, with specialization in infection prevention and control, 15 hp

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ABSTRACT

Introduction: Healthcare associated infections are a major threat to patient safety. One of the care staff's important tasks is to provide safe care, which includes having knowledge of how to prevent the spread of infections. This involves the concept of basic hygiene, which consists of basic hygiene routines and dress code.

Question: What is the knowledge level of basic hygiene routines and dress code among staff who work close to recipients in nursing homes in Region Kalmar County? Is there any relationship between the staff's knowledge of basic hygiene and i) number of years worked in the profession, ii) level of education and iii) previous education in basic hygiene?

Method: The study is a quantitative descriptive observational study. Data has been collected using a questionnaire with closed questions about basic hygiene and education. The data analysis included mapping of the knowledge level of the entire group (N=168), and a comparison at the individual level of the knowledge in relation to professional experience, education, and previous education.

Results: The group's knowledge of basic hygiene routines and dress code was relatively good. Areas where knowledge was poorer include routines regarding work with wounds on hands and forearms as well as adequate protective equipment when caring for residents with multi-resistant bacteria. The study shows that age, experience, and education are important factors for knowledge of basic hygiene.

Conclusion: There are areas where the care staff does not have sufficient knowledge to prevent the spread of infections. Even when the participants showed good knowledge, there is still room for improvement. More training is needed to raise the staff's basic knowledge level of how to prevent infections in nursing homes.

Eksamensarbejde for 1-årig Magisteruddannelse i medicinsk mikrobiologi, med speciale i forebyggelse og infektionshygiejne, 15 hp

- **Title: A jab for the others – A Fairclough inspired Critical Discourse Analysis of the Danish Health Authorities' recommendations on Influenza vaccination in Health Care Workers and of interviews from Health Care Workers employed in Long Term Care Facilities and Home Care Units**

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Supervisor: Kirsten Frederiksen, ph.d., associate professor, Aarhus University

Abstract

Background: The Danish Health Authorities has long recommended annual influenza vaccination for people over 65 and other risk groups. Following the COVID-19 pandemic, children between 2-6 years of age and employees in the health and care sector have been added to the national Influenza Vaccination Programme. Healthcare Workers (HCW) are offered vaccination to prevent cases of influenza among the care staff as well as patients. The Danish Health Authority's goal is for 95% of the HCW to be vaccinated - in the current season, less than 25% of the target group are vaccinated. The project is based on the low adherence to influenza vaccination among HCW.

Research question: Which discourses does the Danish Health Authority draw on in their campaign material, and how are these discourses constituted by HCW?

- which discursive struggles arise in these articulations?
- what consequences can the discursive battles have for the adherence to the influenza vaccine among HCW?

Material and methods: A Fairclough-inspired critical discourse analysis of the Danish Health Authority's influenza campaign as well as interviews with HCW in a Danish municipality examines and identifies which discourses the Danish Health Authority and informants respectively draw on and whether these are ideologically invested.

Results: Conflicting discourses are identified to a certain extent between the HCW and The Danish Health Authorities. The discourses are not necessarily ideologically invested, but it is assessed that the national influenza campaign does not hit this target group clearly enough.

Conclusion and implication: The relation between the analyzed texts shows that authorities cannot take for granted that the knowledge and meaning systems they inform on the basis of are perceived

in the same way by the target group. This may have consequences for adherence to influenza vaccination.

Degree Project in 1 year Master programme in medical microbiology, with specialization in infection prevention and control, 15 hp

Title: Hospital outbreaks of carbapenemase-producing organisms among patients – the effect of disinfection of toilet bowls and shower drains in patient rooms

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Supervisor: Susanne Gundersborg Sandbøl, Infection Control Nurse, Can.scient.san., PhD, Department of quality, Godstrup Hospital, Denmark

Abstract

Background: An outbreak with two different carbapenemase-producing organisms (CPO) in the Department of Hematology entailed that toilet bowls and drains from showers and sinks were investigated to exclude these as reservoirs. CPO are bacteria that are resistant to the type of antibiotics normally used to treat infections. Carrier status with CPO is considered lifelong.

Aim: To investigate whether CPO can be eliminated from toilet bowls and shower drains, using disinfection with peracetic acid and whether the number of patients found positive for CPO decreases if we eliminate CPO from toilets and shower drains.

Material and methods: The study is a retrospective study with prospectively collected data from the period January 2020 to December 2021 at two medical departments. An intervention consisting of 1) disinfection with peracetic acid (Sekusept™ aktiv) of toilet bowls and shower drains, 2) monitoring of the occurrence of CPO in toilet bowls and shower drains by microbiologically analyzed samples from toilet bowls and shower drains, respectively, and 3) weekly examination of patients admitted to the Hematology Department with faecal samples. The intervention was divided into two periods: *Pre-intervention* and *post-intervention*. Data are presented in those two periods and compared descriptively to find correlations that can answer the research questions.

Results: The number of CPO-positive toilet bowls and shower drains decreased from *pre-intervention* to *post-intervention*.

Conclusion: The number of patients diagnosed with CPO during hospitalization decreases when CPO is eliminated from the water environment in toilet bowls and shower drains.

Degree Project in 1 year Master programme in medical microbiology, with specialization in infection prevention and control, 15 hp

Bacterial contamination of equine dentistry equipment – Do we reach high enough cleanliness with manual decontamination?

Johanna Persson, 2023

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Supervisor: Johanna Penell, docent, Department of Clinical Sciences, SLU

Abstract

Background

Equine dentistry is a field that has developed immensely over the last decades and more and more advanced equipment are being used. Part of the equipment, e.g. handpieces, are difficult to clean and disinfect manually and it is therefore difficult to reach high enough cleanliness, especially in the ambulatory practice. This leads to a potential risk of spread of pathogenic microorganism, e.g., *Streptococcus equi* subspecies *equi*, MRSA and equine influenza virus.

Aim

Investigate the level of bacterial contamination of dental equipment used in the ambulatory equine dentistry practice and if high enough level of cleanliness was reached after decontamination.

Material and methods

Sampling of equine dental equipment, e.g., handpiece, drill, mirror, and head support, before dental procedures of the first horse in the stable, after dental procedures of the last horse in the stable and after cleaning and/or disinfection of the equipment. The samples were cultured on 3M PetrifilmTM, incubated for 30±1°C and then analysed for total aerobic colony count.

Results

According to the Swedish guidelines of Infection control in equine medicine the handpieces, drills and mirrors are semi-critical equipment and should be free from pathogenic microorganisms and less than one microorganism on 1000 equipment (4). From the samples in this study collected after cleaning and/or disinfection only few equipment was clean enough. Head supports should be visible clean, and a high number reached this level of cleanliness.

Conclusions Impact / Implications

The level of bacterial contamination of dental equipment were high after dental care and did not reach the set level of cleanliness after cleaning and/or disinfection. This leads to a risk of spreading pathogenic microorganisms between horses and stables. This highlights the need of evidence-based guidelines on hygiene in equine dentistry.

Examensarbete för 1-årig Magisterutbildning i medicinsk mikrobiologi, med inriktning mot smittskydd och vårdhygien, 15 hp

Samband mellan sociodemografiska faktorer i befolkningen och covid-19 relaterad mortalitet på särskilda boenden för äldre – en jämförelse på kommunnivå

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Marie Jansson Mörk, epidemiolog, Agr.Dr

Abstract

Introduction: Studies have shown that factors such as old age and country of birth affect the risk of severe COVID-19. People living in long-term care facilities accounted for nearly half of the deceased covid-19 cases in 2020. A low staff turnover and having access to a registered nurse were associated with a lower risk of COVID-19 related death in such facilities.

Research question: Is there a municipality-level association between COVID-19 related death among people living in long-term care facilities during 2020 and sociodemographic factors in the in the population at the municipality level?

Materials and methods: This is a quantitative ecological study. The municipalities' COVID-19-related mortality in long-term care facilities were classified as high if the mortality was above the 60th percentile, or low if the mortality was below the 40th percentile, among all municipalities within one region. The association between sociodemographic factors and mortality in long-term care facilities was estimated using logistic regression.

Results: The median COVID-19 related mortality was 4.5 deaths per 100 residents. Municipalities with high mortality in long-term care facilities were more likely to have a high proportion of its population born outside the Nordic region (adjusted odds ratio: 2.9 95% confidence interval 1.2-6.9).

Conclusion: The results suggest that a high COVID-19 related mortality in long-term care facilities in Sweden was linked to a higher proportion of the population born outside the Nordic region, even after adjusting for the incidence of COVID-19. Similar findings have been shown in international studies.

Implications: This was an initial attempt to identify health inequalities at the municipal level in Sweden. These results can guide future studies to

identify possible measures to increase the municipalities' capacity to protect their most vulnerable inhabitants from communicable diseases.

Degree Project in 1 year Master programme in medical microbiology, with specialization in infection prevention and control 15 hp

Low compliance to guideline recommendation for head of bed elevation in order to prevent ventilator-associated pneumonia in the intensive care unit

Marit Pettersen, 2023

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Supervisor Anne Kathrine Langerud, Associate professor Oslo Metropolitan University
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Hospital

Abstract

Background: Ventilator-associated pneumonia is a healthcare-associated infection that is associated with increased morbidity, mortality, antibiotic use and health economic costs. Oslo University Hospital has implemented guidelines in line with the Centers for Disease Control and Prevention recommendation of head of bed elevation 30-45° angle to prevent gastro-pulmonary aspiration, as one of several preventive measures in mechanical ventilated patients. Several studies have shown poor compliance to the recommendation. Monitoring of compliance is important in order to gain information and knowledge of which factors can contribute to healthcare-associated infections, to identify gaps in guidelines and to be able to implement measures to achieve quality improvement in infection control programmes.

Aim: To investigate how compliance with the guideline of head of bed elevation at 30-45° angle to prevent ventilator-associated pneumonia is in patients receiving mechanical ventilation at two medical-surgical intensive care units, and whether patient diagnosis can be associated with compliance.

Methods: The chosen method for this present observational study was direct observation. Data was collected by observation of head of bed elevation in mechanical ventilated patients in the supine position. Data was recorded twice daily over 5 weeks.

Results: The main finding was that compliance with the guideline was low. The second finding showed a higher compliance in some patient groups. Moreover, there was a statistically significant difference in compliance between some patient groups ($p < .04$).

Conclusion: Compliance with the guideline of head of bed elevation to 30-45° angle was low. Although some patient groups had higher compliance compared to others, compliance was not completely in line with the guidelines.

Implications: The findings from the study, together with feedback on compliance, can provide a basis for the implementation of measures to improve the quality of care for patients receiving mechanical ventilation at the relevant intensive care units at Oslo University Hospital.

Degree project in 1 year Master programme in medical microbiology, with specialization in infection prevention and control, 15 hp

Contaminated keyboard in ultrasound – a quantitative study on bacterial occurrence on ultrasound machines

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Abstract

Background: There is an increasing number of patients undergoing ultrasound examinations at the radiologic department, Hvidovre Hospital, Copenhagen, creating several daily points of contact with patients, directly and indirectly. Neonatal and intensive care patients that cannot be transferred to the radiologic department will undergo bed-side examinations using mobile ultrasound machines. These machines have a high number of uneven surfaces making them difficult to clean according to standards risking surface contamination and potential cross-infection.

Research question: The aim of this study was to take samples from 5 focus points on 6 ultrasound machines after cleaning to detect the level of bacterial contamination and to see whether the findings comply with authority determined regulations.

Method: Trypticase™ Soy Agar were used to sample and detect the prevalence of bacterial contamination. Samples were incubated 24 and 48 hours and species identified were analysed using Maldi-TOF and colony forming units (CFU) measured.

Results: 90% of the focus points showed bacteria of a total samples (n=58). Most bacteria detected were coagulase negative *Staphylococcus* (54%) and other gram-positive bacteria including opportunistic pathogenic (36%) and 1 gram-negative, *Moraxella osloensis* (2%). *Staphylococcus aureus* and *Enterococcus faecalis* that may be resistant to antibiotics were detected. 24% of the

samples had higher CFU levels than allowed though not statistically significant ($p < 0.37$). 3 of 5 focus points had acceptable CFU/cm² levels ($p < 0.003$).

Conclusion: Different species of bacteria were detected including *S. aureus* which is unacceptable referring to standards. Findings show that some levels of CFU/cm² were higher than the acceptable limit set by authorities, and some levels up to 3.8 times higher than accepted.

Implications: The study shows that the ultrasound machines do not follow standards for clean surfaces and potentially conduct risks to patients. Improved cleaning guidelines and introduction programmes should be considered in order to follow authority regulations.



SAHLGRENSKA AKADEMIN

Can teaching young people lead to increased knowledge about chlamydia and give them knowledge about what protects against chlamydia.

Intervention study with control group.

Degree Project in 1 year Master programme in medical microbiology, with specialization in infection prevention and control, 15 hp.

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SAHLGRENSKA AKADEMIN

Background: Chlamydia infection is one of the most common sexually transmitted bacterial infections in Denmark. In the period 2018 - 2022, there has been an increased prevalence of Chlamydia among young people aged 15-29 years. This study was performed to assess whether educating high school students, aged 16-20 years, can lead to increased knowledge about chlamydia and provide them with knowledge about how to protect themselves against chlamydia.

Materials and methods: An intervention study with an age matched control group performed in two different high schools in Copenhagen, and a total of 329 questionnaires completed. The intervention group and the control group each completed two identical questionnaires.

The intervention group (n=87) completed the first questionnaire before the intervention, and the same questionnaire two weeks after the intervention. The control group (n=78) completed the first questionnaire followed by no intervention, and two weeks later the same questionnaire (n=77).

Results: Out of the total number of young people who answered the first questionnaire (n=165), 40% had their first sexual debut before the age of 16, and 70.9% of the young people had previously received sex education in primary school. The students in the intervention group showed an overall increase in their knowledge on chlamydia infection, which was not seen in the control group.

Conclusion: This study shows that intervention in the form of classroom education can increase young people's knowledge about chlamydia and how to protect themselves against chlamydia. Therefore, it is important to prioritize and optimize education about sexually transmitted infections before young people become sexually active.

Implications: The results of the study should be considered among policy makers because new thinking in the primary care sector, and the educational system will be needed to reduce chlamydia transmission.

Degree Project in 1 year Master programme in medical microbiology, with specialization in infection prevention and control, 15 hp

Healthcare personnels` s experience with contact tracing of mpox - a qualitative study

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Background

In May 2022, several cases of the monkeypox virus disease were detected in non-endemic areas of the world. Monkeypox is endemic in Central and West African countries and until now only a few imported cases had been registered in Europe. Chains of infection were now reported among men who have sex with men without prior travel to endemic areas. Health personnel in Oslo municipality in Norway were given the task of contact tracing infections registered. They had little or no knowledge of the disease and there were no procedures for how this should be handled.

Research question

What experiences did health personnel have when tracking monkeypox infections in the outbreak in 2022?

What did health personnel experience when tracking monkeypox as a new disease?

Materials and methods

Individual semi-structured interviews were conducted with six health personnel employed in various districts in Oslo municipality. The material was transcribed and analyzed using Malterud's qualitative method; Systematic text condensation.

Results

The interviewees thought that contact tracking of monkeypox went relatively smoothly as they had recent experience from the Covid-19 pandemic. They pointed out that it was crucial to have good and adapted tools and easily accessible help. Contact tracking related to sexual activity was experienced as more challenging. Having little knowledge about the disease monkeypox created insecurity in the role, especially among the nurses. Several believed that it would have facilitated and strengthened the work if they had teamed up with other districts. The information from the index could often be deficient and limit further infection tracing. Despite this, everyone thought it was important to contact trace as it was important information that had to be shared both ways.

Conclusions

When healthcare personnel are contact tracing new diseases, it is important to have experience, adaptive tools, knowledge, professional assistance and cooperation to do this complex task.

Masterprojekt for 1-årig masteruddannelse i medicinsk mikrobiologi, med speciale i infektionskontrol og hygiejne, 15 hp.

What evidence is there that ventilation and venting can prevent the spread of viral respiratory infection? Special focus on children and employees in day care centers.

(Structured review)

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Abstract

Background: The corona pandemic has given us a lot of new knowledge about the prevention of respiratory infections. In particular, the importance of transmission via the air has come into focus. Respiratory infections are very frequent in day-care institutions, both among children and employees, and entail considerable costs for society in the form of substitute budgets, lack of productivity, poorer service and personal costs. It seems obvious that a reduction in the concentration of infectious viruses in the indoor air will lead to fewer cases of illness, but is there solid evidence in the literature for prevention via improved ventilation and airing?

Research question: Is there evidence that ventilation and venting can reduce infection with respiratory viruses in day-care centers and comparable indoor climates such as schools and office environments?

Method: A structured literature study was carried out in PubMed and Google Scholar with the inclusion criteria: original studies that focus on whether ventilation efficiency/quality can document a change in the incidence of respiratory infections in non-health-care indoor climates. Exclusion criteria are review studies, modeling studies and studies that only look at survival, identification and spread of viruses.

Results: A total of 7 studies were found that met the inclusion criteria. Of these, 2 focused on daycare institutions, 3 with a focus on schools and 2 in office environments. Contagion was measured as sickness/sickness absence and ventilation quality through the CO₂ concentration as a proxy for the risk of viral transmission via respiration. Six of the 7 studies showed a reduction in sickness absence or illness because of improved ventilation and venting.

Conclusion All studies were subject to a certain degree of bias and no solid evidence was found that improved ventilation leads to reduced infection with respiratory viruses. However, there are extensive indications that this is the case.

An outbreak due to *Klebsiella pneumoniae* ESBL_A in a transplant surgical unit at Oslo University Hospital

Examensarbete för 1-årig Magisterutbildning i medicinsk mikrobiologi, med inriktning mot smittskydd och vårdhygien, 15 hp

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Abstract

Background

Infection control programs are important to limit and stop outbreaks in the health care sector. The surgical transplant unit in Oslo University Hospital experienced an outbreak with *Klebsiella Pneumoniae* ESBLA ST307 from 2019 to early 2021.

Aim

Describe the outbreak and find the incidence for clinical isolates in the inpatient ward during the outbreak period. In addition, identify potential risk factors for colonization with *K. Pneumoniae* ST307 in this population.

Population of the study and method

The population were all patients admitted to the ward during a defined period. Data were collected from the hospitals electronic patient journaling system, electronic medical chart and electronic laboratory system. The outbreak was described epidemiologically, and a case control study was conducted to search for risk factors for colonization of *K. Pneumoniae* ST307.

Result

The outbreak strain was identified in a total of 61 patients. 36,1 % of the positive patients were women. The average age of the case population was 58,8 (years). 75,4 % of the patients had undergone a kidney transplant.

The incidence for clinical isolates at the ward was 0,92 per 1000 bed days in the outbreak period compared to 0,55 in a comparable period previous to the outbreak.

The only significant risk factor to increase the risk of contracting *K. Pneumoniae* was the patient category.

Conclusion

This study describes one of the largest outbreaks of KP ST307 in Norway, and to our knowledge the first among solid organ transplant patients. The development in the outbreak points towards a continuous, or alternatively, intermittent source.

Implications

There are few studies on colonization and infection of solid organ transplants with *K. pneumoniae* ESBL during outbreaks. This result emphasizes the necessity of more studies, infection control guidelines and close cooperation with the Department of Microbiology preferably with the possibility of whole genome sequencing and evolutionary analysis.