6th ESNO CONGRESS

Nursing staff, work-related stress, workloads, and Surgical Site Infection:

A structural equational model

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Concept

25.7% of hospitalisations for HAIs are due Surgical Site Infections (ECDC, 2024)

Surgical Site Infections (SSIs) may occur at or adjacent to the incision site within 30 days or 90 days post-surgery if the prosthetic material is implanted.

Prevention of SSIs is a complex and multidimensional process influenced by:

Clinical condition of the patient and the type of surgery

Staff education and training

Organisational context variables and team well-being

(ECDC, 2022; WHO, 2016; Mengistu et al., 2023; Tvedt et al., 2017)

HAIs are influenced by contextual variables


Journal of Infection Prevention

Review

Does a hospital culture influence adherence to infection prevention and control and rates of healthcare associated infection? A literature review

Journal of Infection Prevention
2019, Vol. 20(1) 5–17
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Adriana van Buijtene[1] and Dona Foster[2]


The Joint Commission Journal on Quality and Patient Safety 2018; 44:613–622

Hospital Staffing and Health Care–Associated Infections: A Systematic Review of the Literature

Brett G. Mitchell, PhD, MAdvPrac; Anne Gardner, PhD; Patricia W. Stone, PhD, RN, FAAN; Lisa Hall, PhD; Monika Pogorzelska-Maziarz, PhD

Hospital organisation, management, and structure for prevention of health-care-associated infection: a systematic review and expert consensus

*Walter Zingg, Alison Holmes, Markus Dettenkofer, Tim Goetting, Federica Secci, Lauren Clack, Benedetta Allegranzi, Anna-Pelagia Magiorakos, Didier Pittet, for the systematic review and evidence-based guidance on organization of hospital infection control programmes (SIGHT) study group**


Impact of organizations on healthcare-associated infections

Journal of Hospital Infection

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- level of nursing staffing
- workload
- stress demands
- job satisfaction
- nursing leadership style
- technological innovation
- care models and work organisation

(Mitchel, 2018; Al-Tawfiq, 2014; Zingg,2015; Zaghini, 2020; Aiken, 2024; Cummings, 2018; Castro-Sánchez, 2015; Fiorini, 2022; van Buijten, 2019)

Objective

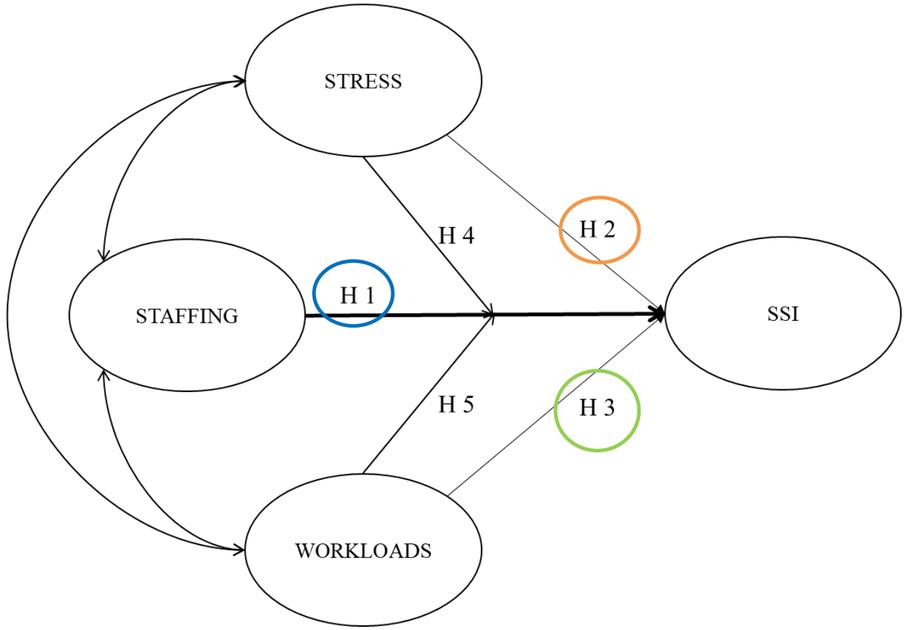
To test a multidimensional model to understand the relationships between some organisational context variables such as staffing, stress demands and workloads and the prevalence of Surgical Site Infections (SSIs).

H1 *There is a relationship between staffing levels (patient-nurse) and SSIs.*

H2 *there is a relationship between the demands from the organization (demands), the well-being of the nurses, and the SSIs*

H3 *There is a relationship between nurse workload and SSIs*

Model multi dimensional of study variables



Note: SSI = Surgical Site Infection.

Metodology

A single-center observational study was conducted in Italy

A sample of nurses working in different wards was enrolled

Instruments (two tools)

- *Nurse Questionnaire* was a web survey
- *Outcomes Form* to collected for 30 consecutive days:
    1. SSI prevalence
    2. level staffing

Statistical analysis

- descriptive statistics
- correlations among the variables and linear regression
- a structural equation model

Instruments

Validates Scales and form

Quantitative Work Index

to investigate perceived workloads (Cronbach's alpha is 0.82)

Scales Health Safety Executive Indicator tool

to investigate perceived work-related stress.

Consisting of 3 dimensions (demand, control, and support). Cronbach's alpha are 0.85, 0.80 and 0.92 respectively)

Outcome form to investigate:

- number of nursing and support staff on the three daily shifts
- prevalence of SSIs to the ECDC protocol

(Spector,1998; Barbaranelli, 2013; Marcatto, 2011; ECDC, 2022)

Results (1)

Tab. 1 Socio-demographic and occupational characteristics of the sample (N – 133)

Nurse	N	%	M	SD
Clinical Setting				
Medicine	84	63%		
Surgery	28	21%		
Oncology	21	16%		
Staffing Total			0,14	0,3
Staffing Morning			0,19	0,3
Staffing Afternoon			0,13	0,3
Staffing Night			0,11	0,3
Level stress			2.78	0.78
Level workload			3.29	1.11

Tab. 2 Distribution SSIs in the ward

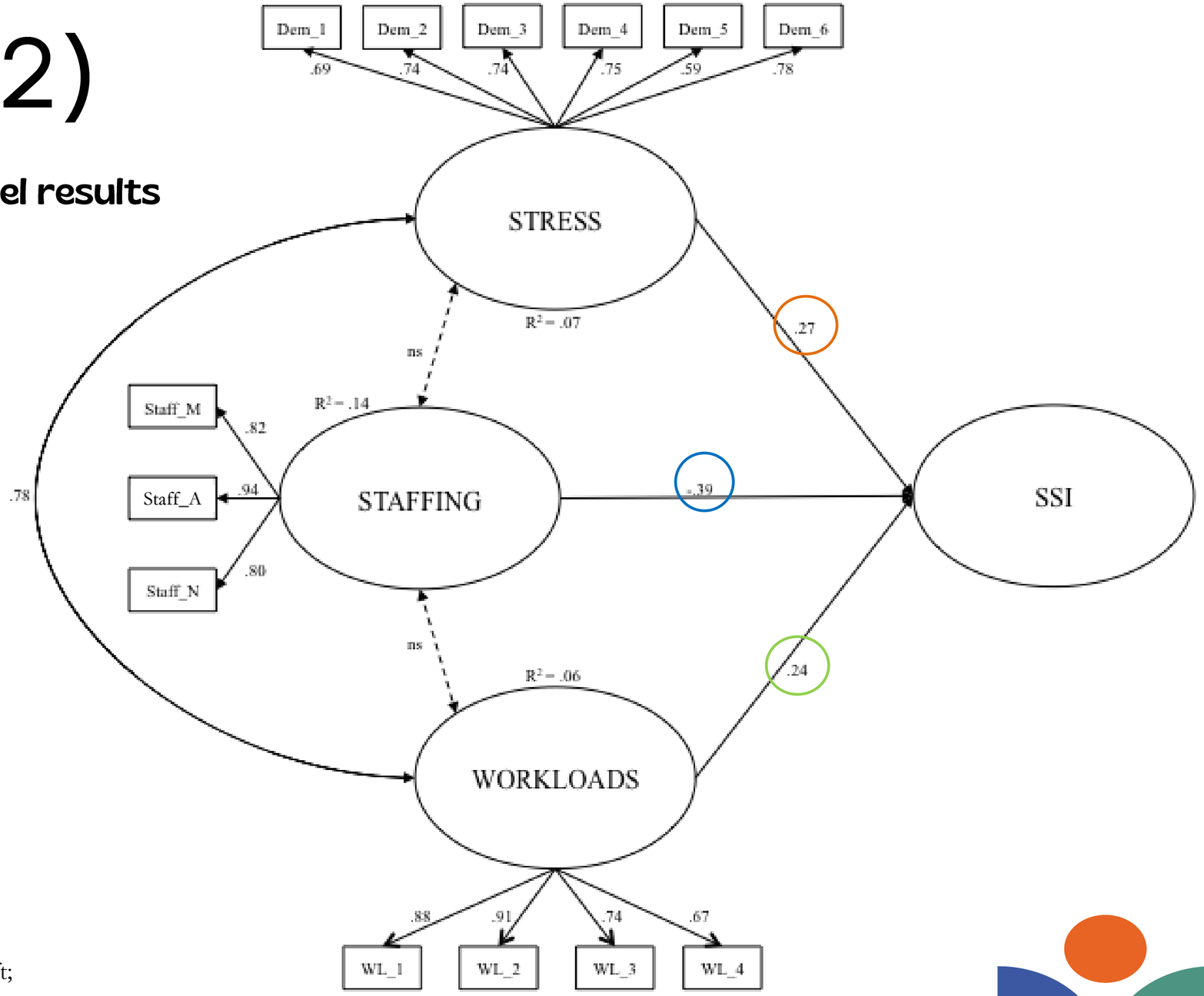
Surgical Site Infection	N	%	M	SD
SSI Prevalence	**654**			
Clinical setting				
Surgery	**284**	43,42%		
Surgery and Hepatology	162	24,77%		
Trauma center	122	18.65%		
Medicine	**217**	33,18%		
Neurology	102	15,60%		
Cardiology	50	7,65%		
Rehabilitation	43	6,57%		
Nephrology	22	3,36%		
Oncology	**153**	23.39%		

Tab. 3 Descriptive analysis, reliability and correlations among the variables in study

Variables	M	DS	α	SSI	Staffing	Stress
SSI	11,88	12,03	-			
Staffing	0,14	0,03	0,91	**-0.51****		
Stress	2,78	0,78	0,86	**0.26****	-0.05	
Workloads	3,29	1,11	0,89	**0.23****	-0.10	**0.71****

Results (2)

Structural equation model results



Notes:
Staff_M = ratio nurses/patients in morning shift;
Staff_A= ratio nurses/patients in afternoon shift;
Staff_N = ratio nurses / patients on the night shift;
SSI = surgical site infection;
Dem = work-related stress deriving from job demands.

p<0.001

Conclusions

- Higher number of staff on shift associated with reduced odds of developing Surgical Site Infections.
- A nurse experiencing organizational well-being is more motivated, satisfied, and focused on ensuring better adherence to Infection Prevention Control practices
- Nursing managers should reflect on the organisation of nurses' work within the different care settings and find a balance between the needs of the patient, the expectations of professionals and the needs of the organitation

Reference