

Ward and shift level nurse staffing, vital signs observations and patient outcomes: observational study using routinely collected data

Submission date 03/06/2015	Recruitment status No longer recruiting	☒ Prospectively registered ☐ Protocol
Registration date 11/06/2015	Overall study status Completed	☐ Statistical analysis plan ☒ Results
Last Edited 10/07/2023	Condition category Other	☐ Individual participant data

Plain English summary of protocol

Background and study aims

The NHS in England, like many other healthcare systems, is facing intense pressure to maintain the quality and safety of care provided in hospitals at the same or less cost than in previous years. The quality of nursing care - and the potential for inadequate nursing care to do patients great harm - has emerged as a factor in several reports into failings in NHS hospitals. These reports have often noted that failing to ensure adequate nurse staffing was an important issue that was associated with poor care and preventable deaths. This is consistent with research showing associations between low levels of nurse staffing and increased death rates in hospitals. However, because nurse staffing is only one factor affecting a patient's death, it is difficult to use these studies to directly show the effects of low staffing on nursing care delivery and to help decide the best staffing levels. Recently studies have begun to explore "missed nursing care", defined as nursing care that was needed but not done, as a key factor leading to negative patient outcomes. Missed opportunities to observe and act on deterioration of the patient's condition are thought to be important factors in preventable hospital deaths. Previous studies on missed nursing care have relied on nurses to report the care they missed. This may not be entirely accurate.

This study aims to explore how nurse staffing levels are related to missed or delayed vital signs observation (that is, measurements of blood pressure, pulse and respirations) using direct measures of the timing of observations recorded in a clinical information system. The study will also look at the relationship between staffing levels and possible consequences of missed observations in terms of cardiac arrest calls, unanticipated admission to intensive care and death.

Who can participate?

This is an observational study using information from all adult inpatients in general wards of Portsmouth Hospitals NHS Trust (PHT), from approximately 100,000 nursing shifts.

What does the study involve?

This study will use information about ward and shift level nurse staffing, vital signs observations

and patient outcomes that are routinely recorded in a hospital. Relationships between registered nurse and health care assistant staffing levels and outcomes will be explored using statistical models which can give a picture of relationships showing, for example, how much the risk of missing a set of observations is increased for every additional patient cared for by a nurse. These estimates will be used to estimate staffing required on different wards to achieve satisfactory levels of compliance with vital signs observations. We will look at the costs and consequences of different levels and mix of nursing staff to achieve this consistently. The study will give guidance on the relative importance and costs of different nursing skill mixes and staffing levels in achieving consistent observations and safe care.

What are the possible benefits and risks of participating?

Observational study – not applicable.

Where is the study run from?

Portsmouth Hospitals NHS Trust (PHT), UK

When is the study starting and how long is it expected to run for?

June 2015 to May 2017

Who is funding the study?

NIHR Health Services and Delivery Research (HS&DR) Programme (UK)

Who is the main contact?

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Contact information

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Additional identifiers**Protocol serial number**

Version 1, 08-04-14

Study information**Scientific Title**

Nurse staffing levels, missed vital signs observations and mortality in hospital wards: modelling the consequences and costs of variations in nurse staffing and skill mix. Retrospective observational study using routinely collected data

Study objectives

This study is a retrospective observational study that will use data derived from clinical and workforce databases to explore the relationship between staffing levels on hospital wards and vital signs observations taken by nurses and care assistants. Previous studies on missed nursing care have relied on nurses to report the care they missed. This may not be entirely accurate. This study aims to explore how nurse staffing levels are related to missed or delayed vital signs recording using direct measures of the timing of observations recorded in a clinical information system. The study will also look at the relationship between staffing levels and possible consequences of missed observations in terms of cardiac arrest calls, unanticipated admission to intensive care and death.

Ethics approval required

Old ethics approval format

Ethics approval(s)

NRES Committee East Midlands, 24/02/2015, Northampton REC reference: 15/EM/0099

Primary study design

Observational

Study design

Single centre retrospective observational study

Study type(s)

Other

Health condition(s) or problem(s) studied

Adult inpatient general wards in a large acute care hospital trust

Interventions

This is a retrospective observational study using routinely collected data on ward and shift level nurse staffing, vital signs observation and patient outcomes.

Intervention Type

Other

Primary outcome(s)

Missed vital signs observations. A missed observation is defined as an observation that is not performed before the next observation is due. The planned frequency of observations is determined from a national protocol based on NEWS values, which identifies risk of adverse outcome.

Key secondary outcome(s)

1. Rate of missed observations in high risk sub-groups, defined by elevated NEWS score
2. Absolute delay (time from observation becoming due until an observation is taken)
3. Relative delay (time from observation becoming due until an observation is taken expressed as a proportion of the scheduled observation frequency in minutes)
4. Deaths
5. Cardiac arrests
6. Unanticipated ICU admissions
7. Records of other assessments in electronic vital signs system

Completion date

31/05/2017

Eligibility

Key inclusion criteria

All adult inpatients in general wards of a large acute care hospital within a period of 6 months will be included.

Data for the study will be derived from a database of records made using the VitalPAC system, which enables nurses to record clinical data on hand held devices at the bedside. We will also use data from the Patient Administration System (PAS) and hospital laboratory records to determine rates of mortality and to adjust for patient level variation in risk. E-rostering (available from 2012 onwards) will provide workforce data from approximately 100,000 shifts available for the study.

Participant type(s)

Mixed

Healthy volunteers allowed

No

Age group

Adult

Sex

All

Key exclusion criteria

All adult inpatients in general wards will be included. ITU, maternity and paediatric units are not considered.

Date of first enrolment

01/09/2015

Date of final enrolment

31/03/2016

Locations**Countries of recruitment**

United Kingdom

England

Study participating centre

Portsmouth Hospital NHS Trust

Trust Headquarters

Queen Alexandra Hospital

Southwick Hill Road

Portsmouth, Hampshire

United Kingdom

PO6 3LY

Sponsor information**Organisation**

University of Southampton

ROR

<https://ror.org/01ryk1543>

Funder(s)**Funder type**

Government

Funder Name

Health Services and Delivery Research (HS&DR) Programme

Alternative Name(s)

Health Services and Delivery Research (HS&DR) Programme, NIHR Health Services and Delivery Research (HS&DR) Programme, NIHR Health Services and Delivery Research Programme, HS&DR Programme, HS&DR

Funding Body Type

Government organisation

Funding Body Subtype

National government

Location

United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan**IPD sharing plan summary**

Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	27/09/2019	01/10/2019	Yes	No
Results article		01/11/2018	10/07/2023	Yes	No
HRA research summary			28/06/2023	No	No
Other publications		01/01/2019	10/07/2023	Yes	No
Other publications		21/11/2018	10/07/2023	Yes	No
Other publications		01/02/2019	10/07/2023	Yes	No