Using data to show the impact of nursing work on patient outcomes

In this article...

- Why high-quality data is essential to demonstrate the impact of nursing
- The limitations of current nursing activity data
- How data could be used to improve patient outcomes

Key points

- Reliable data showing the impact of nursing activity on outcomes is vital for workforce modelling and has huge potential to improve care
- Data on nursing activity is rarely captured accurately, and does not reflect its complexity
- Oversimplification of nurses’ work means workloads are consistently underestimated
- It is possible to use routinely collected datasets to demonstrate the impact of nurses’ work
- Nurses need to ensure that data captured reflects the real work of nursing, particularly in relation to patient safety

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Abstract
A recent independent study using data from Public Health England linking patient data with lung cancer nurse specialists’ activity showed patients whose care was managed by a nurse specialist had better outcomes. This illustrates how high-quality data can be used to understand the impact of nursing activity. However, nursing activity is not accurately captured in routine healthcare data, which does not reflect the complexity of care. Using data to better understand the activity of nursing has huge potential to improve care. It can tell us how many nurses we need, where best to use nursing expertise and the impact of nursing activity on patient outcomes. However, poor data can lead to false assumptions about nursing that can be detrimental to patient care. Nurses need to take a more influential role in the development and use of healthcare data to ensure it reflects the work of nursing and its impact on patient care.

Citation

In July, Nursing Times reported on a study showing the impact of specialist nurses on ‘life and death’ outcomes for cancer patients (Ford, 2018; Stephenson, 2018). The research, of which I was a co-author, revealed that patients with lung cancer lived longer, avoided unnecessary hospitals admissions and coped better with treatment when cared for by lung cancer nurse specialists (Stewart et al, 2018). This was especially true if specialist nurses started working with lung cancer patients as soon as they were diagnosed, or if they managed the diagnostic pathway.

Our research team, from the University of Nottingham and London South Bank University, used anonymised patient healthcare records available from Public Health England and a nationwide activity analysis of lung cancer nurse specialists to analyse over 100,000 people with lung cancer and the work of more than 200 nurses across England (Thome, 2018). By linking this data, we were able to show that receiving care from a lung cancer nurse specialist was fundamental to better outcomes for patients and families. For example, patients receiving radiotherapy who were assessed by a lung cancer specialist nurse were 17% less likely to die in the first year than those not cared for by a nurse specialist.

This study shows how we can use high-quality data to understand the contribution and value of nursing practice. Given current shortages of specialist nurses working in cancer, the findings are particularly important as they could provide vital intelligence to inform workforce policy linked to the government’s cancer strategy. This type of intelligence becomes increasingly important as a shortage of qualified nurses and rising healthcare costs lead to an increase in assistant level posts replacing registered nurses and some specialist nurses being redeployed into general nursing roles.
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However, our research was only made possible by the high quality of the national cancer dataset. By high-quality data, we mean data that can answer the increasingly complex questions that we ask of it. Collecting nurse- and patient-sensitive data has huge potential to improve care. It can be used to:
- Calculate nurse workloads and decide on optimum staffing;
- Show the value of nursing activity and where best to use nursing expertise;
- Tell us how to make patient care better and safer – for example, by combining data on staffing, vital signs and safety (Leary et al, 2016).

“There appears to be an assumption that nursing consists of a linear series of tasks, rather than a set of inter-related activities”

Unfortunately, the poor quality of routinely collected nursing data has proved a challenge for researchers in examining the contribution of nursing activity. Nursing work, despite being the largest proportion of contact time with patients, is rarely collected as routine, and even when it is, the data is massively oversimplified and does not reflect the complexity of nursing care (Box 1).

Complexity of care
There appears to be an assumption that nursing consists of a linear series of tasks, rather than a set of inter-related activities. This has caused it to be subjected to activity analysis such as time and motion studies; however, such methods do not capture complex work well (Leary et al, 2016).

Nursing work contains other components that are less easily captured, such as the management of care, vigilance and psychological care. Safety is currently defined more by its absence than its presence and registered nursing practices that ensure patient safety – primarily due to vigilance and rescue from deterioration – are rarely captured in the data. It is only when this safety practice is absent that issues are recognised (Leary et al, 2016).

Difficulty in quantifying such activities means the workload of nurses is consistently underestimated.

Capturing nurses’ work
A study I was involved in to work out how many community nurses were needed in a particular area of England revealed that the databases they used were capturing only a fraction of what they did – only 15% of their workload.

Quite simply, these databases were not designed to capture nursing work; they only recorded broad lists of tasks, not the multiple interventions needed. This meant that while nurses were doing on average six interventions per visit, the system only captured one. We therefore had to develop an alternative method of collecting data that reflected the ‘real world’ of nursing (Jackson et al, 2015).

Problem data
Poor data leads to poor intelligence. This can cause decision makers to make false assumptions when it comes to key decisions such as staffing, patient safety and the risks associated with cost-efficiency measures. It is crucial therefore that nurse managers are aware of the limitations of this data. The National Institute for Health and Care Excellence has identified gaps in evidence on the relationship between staffing factors and patient outcomes; it concludes that insufficient evidence is available about the effects of nursing staff numbers, skill mix and shift patterns on nursing care, patient safety and satisfaction-related outcomes (NICE, 2014). Studies suggest that a failure to match staffing with patient needs is associated with increases in patient mortality (Needleman et al, 2011).

However, the lack of specific nurse activity data is not the only barrier to using good data to improve patient care. In the health service a huge amount of nursing time and effort is spent collecting routine data. While some of this is useful, much of it is designed to measure performance against non-evidence-based targets and so is of limited use to clinicians. It is collected for institutional purposes such as board assurance and then is warehoused, never to see the light of day. Furthermore, because frontline staff receive no feedback and are not enabled to use the data they have collected, they find it hard to engage in the process. As a result, the opportunity to use data to improve care is often missed.

A further difficulty is the way healthcare data is captured and stored (Leary et al, 2018). Advances in mathematics and computer science mean we are now able to make multiple calculations on the huge amounts of information collected in databases to look not just for the relationship between one or two things, but for many things simultaneously. These are known as ‘big data’ techniques. In other sectors such as retail and banking these techniques help us understand and even predict complex situations and what resources will be needed. However, healthcare lags woefully behind other sectors in this respect.

In 2017 we published a study that explored whether a deeper understanding of relationships between staffing and other factors such as safety could be revealed within two routinely collected national data sets (Leary et al, 2017). This revealed major inconsistencies between NHS Benchmarking Data and the UK Nursing Database, which prevented analysis when the two data sets were combined. If we are to use national data to improve patient care, future data collection must ensure that all measures and outcomes relate to the same time, patient, staff group and geography. Evidence-based improvements cannot be achieved when routine data is collected so inconsistently.

In addition, many healthcare applications allow staff to review data, but not necessarily to analyse it, which reduces its usefulness. Hospitals also tend to use

Box 1. Why is a nursing workforce hard to model?
- Poorly defined input/output
- Many levels of practice
- Demand is never modelled
- ‘Plastic’ workforce (will fill gaps left by others)
- Complex non-linear work
- Reluctance to articulate contribution or claim attribution
- Misperceptions of nursing and its function in the 21st century

15% Percentage of community nurses’ work captured on databases in one region

Quick Fact
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Discussion

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Box 2. Questions to ask about data

- What data is being collected and why?
- How will the data be used?
- How does it capture the work of nursing?
- What can we expect to see from it?

Data collection costs staff time and effort – time that could otherwise be spent on patient care – and there needs to be a return on that investment. Nurses should question the data being collected, its purpose and quality, and what it will be used for. We need to decide what data we should be collecting, but also what data we should stop collecting, to ensure the best use of resources to improve patient care.

References

Ford S (2018) Now we have evidence – specialist nurses make a difference where it matters. Nursing Times; 5 July (online) Bit.ly/NTSpecialistNurseEvidence


Fig 1. Variation in occurrence of vomiting with registered nurses

<table>
<thead>
<tr>
<th>Occurrence of vomiting (%)</th>
<th>Registered nurse establishment in post (whole-time equivalent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.025</td>
<td>10</td>
</tr>
<tr>
<td>0.020</td>
<td>15</td>
</tr>
<tr>
<td>0.015</td>
<td>20</td>
</tr>
<tr>
<td>0.010</td>
<td>25</td>
</tr>
<tr>
<td>0.005</td>
<td>30</td>
</tr>
</tbody>
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The optimum staff level is just on the second line. The gap between the two lines shows where staffing is impacting on the symptom of vomiting and nausea.

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separate data collection tools for tasks such as incident reporting, recording vital signs, pathology and medicines and patient administration. These often work differently and cannot ‘talk’ to each other, which makes it hard to combine and analyse the data to generate useful knowledge.

Establishing good databases

Some trusts have established good databases that are being used to improve patient care. In a study at University Hospitals Coventry and Warwickshire Trust we used routinely collected data from several databases to investigate nurses’ contribution to patient safety (Leary et al, 2016).

This included:

- The hospital staffing database (which told us the numbers of staff and how many patients experienced problems such as pressure ulcers and falls);
- The database containing patient data such as pulse and blood pressure and the one recording clinical incidents such as drug errors.

With the help of the manufacturers of these databases, we were able to bring all this information together and search for patterns to understand the factors that influence incidents, such as patients falling or becoming sicker and how this related to staffing.

The results showed that the number and type of nursing staff – such as registered nurses or healthcare support workers – had a direct effect on safety outcomes such as falls and the management of symptoms such as nausea and vomiting (Fig 1). When these aspects of care were delegated to unregistered nurses or healthcare support workers, an increase in patient falls was observed, leading to poorer patient outcomes. This new knowledge was fed back to the trust, which then used it in different ways to improve patient safety.

This work was made possible because the trust had collected a high-quality dataset over many years. Notably, this was the initiative of one nurse, who had decided this data should be routinely collected, and then persevered to make it happen. The techniques we developed in the study could be applied in other trusts – and even countrywide – provided we have the appropriate datasets.

The future

Because healthcare technology lags some way behind other sectors, it is still a developing field. As the largest part of the healthcare workforce, nurses need to play an influential role in its development to ensure their activity is visible in data collection, particularly in relation to patient safety. It is disappointing that the recent Topol review Preparing the Healthcare Workforce to Deliver the Digital Future, seems to have had little or no nursing input (Heath Education England, 2018).

Nurses need to claim a place at the table so they are seen as influencers rather than just enablers, or the biggest part of the workforce will have no influence over major decisions.

In trusts, nursing leaders should discuss with information technology directors, analysts or the people dealing with informatics how the data captured reflects the work of nursing, how it can be used and what it can offer. Box 2 outlines questions that nurse leaders should ask their trusts.

References


