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TIME FLIES WHEN YOU DELIVER CARE: AN INTERNATIONAL INVENTORY OF PROMISING, INNOVATIVE ROUTES TOWARDS MORE EFFICIENCY IN HEALTH CARE

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The workload in nursing is high, with nurses reporting that they omit or delay crucial nursing activities due to a lack of time. In this study a wide search for innovations that can save time was conducted, and international experts were surveyed on potential time savers. Time savers are also relevant because the business case for safe patient handling and mobility programs becomes stronger once other outcome variables besides sick leave and health claims are included. Time is an important and common key variable in outcome variables. A range of innovations that claim to reduce time was found. However, the evidence is often minimal, research naturally lags behind the introduction of innovations, and results are difficult to interpret due to a lack of detail and standardization. Experts in health care acknowledge this. They mention partly similar time savers, but also focus on solving the opposite: time wasters. A more alert research agenda and standardization of measurements may stimulate awareness of the impact of innovations, allow reliable and valid comparisons of the effects, and help to face the current and future challenges in health care.

Key Words: efficiency, ergonomics, time, missed nursing care, safe patient handling

INTRODUCTION

Time is precious in health care. Nurses seem to have a permanent lack of time. Their workload is high, both physically and psychosocially. This increases the need for prioritizing and the risk of having to make undesirable decisions. Cartaxo recently presented the results of a survey carried out in Austria, in which 84% of nurses reported that in the last 2 weeks at least one nursing activity was often or very often omitted or carried out with a delay that was detrimental to patient safety.[1] She calls this "missed nursing care." In 2014 similar results were reported for English hospitals.[2] 86% of the nurses reported that one or more care activity had been left undone due to lack of time on their last shift. They report frequencies of 2.4–7.8 activities per shift not completed. Most frequently left undone were: comforting patients (66%), educating patients (52%), and developing/updating nursing care plans (47%). Other publications point to similar issues of care left undone, missed care, or unfinished nursing care due to a high workload and staff shortages.[3]

Given these urgent situations, a strong focus on the influence of time, the shortage of time, and efficiency is inescapable to prevent further deterioration in the future. The first reflex is often to employ more nurses to work in health care. In some countries it is increasingly difficult, if not impossible, to find more nurses to do the work now and in the future.[4] Demographic changes further complicate this option. Therefore it becomes increasingly important to find innovations that are able to increase efficiency and reduce the time pressure for nurses without compromising the quality of care.

From a financial perspective, innovations can make investments worthwhile, especially if more than one benefit is added to the equation of costs and benefits. This also holds true for ergonomic innovations as part of a safe patient handling and mobility (SPHM) program. In the Netherlands, Knibbe et al. demonstrated that patient handling equipment was effective in reducing sick leave due to back pain in elderly care, but for a positive business case it was essential to include other variables, and especially benefits, in terms of time and quality of care (pressure injuries, continence care, falls reduction) in the financial equation.[5] These outcome variables have a strong relationship with nursing time. In 2009, Schuurman et al. found, for example, that nursing time was the most important cost element in pressure ulcer care.[6] They compared different policies and approaches Pressure ulcer prevention through an innovative, predominantly equipment-oriented approach resulted in as similar an incidence rate as prevention through a predominantly

conservative approach with a strong focus on time. However, the equipment strategy was considerably less expensive due to the high costs of labor in the other approach.

Dang et al. (2022) also demonstrated similar conclusions for the use of SPHM equipment in acute care.[7] They concluded that for a positive return on investment (ROI) for SPHM in the ICU the economic benefits of, for example, the reduction of length of stay might be more important than the reduction of occupational health problems and the associated costs.

Therefore, time and efficiency seem to play a crucial role from different perspectives and may influence the acceptance and financial outcomes of ergonomic and other workload reduction policies in health care.

RESEARCH QUESTIONS AND METHODS

For these reasons, it seemed relevant to 1) perform a wide search for relevant innovations that have an impact on nursing time and 2) survey international experts on their views on this topic. This paper presents an overview of the results and will hopefully pave the way for more in-depth studies. Given the open nature of our study, we used a very general definition of innovations: equipment, aids, or working techniques that are new in health care in the sense that their use is not considered common yet.

1) Scan for Innovations: The Search

First of all, we performed a search in common search engines, databases, and journals. The following search engines were used: Medline, CINAHL, Cochrane Library, and DARE. But also wider, out-of-the-box scans were performed. It turned out there is not much research published so far on the exact influence of innovations on time and efficiency in nursing – the time savers. In the studies published, it was often unclear what was actually measured (for example, no precise description of the activities and no clear start and stop markers for activities to enable a uniform time registration); and what the impact (effects and side effects) was in the rest of the nursing process and onwards in the care chain and the life of the patients involved. Suppliers of innovations have more information available, but also, in this case, the evidence is limited. It often consists of an enthusiastic presentation of figures derived from cases studies. When it comes to innovations, this can be seen as natural, as thorough research takes time and will often not be ready when an innovation is launched. But it is insufficient as scientific evidence for effectiveness. We therefore continued our search by means of snowballing, in order to find more innovations, but it remained complicated, and the results were disappointing.

2) Results of the Search

When interpreting the results that we did find, we encountered further complications. There were large differences between countries regarding how saving nursing time is interpreted, handled, and what the financial value is. For example, for some innovations the time gained was transferred directly 1:1 into money; for others this was avoided with the argument that the innovation can help nurses to work under less time pressure (take their time, work more relaxedly) without any financial implications. It goes without saying that the conclusion regarding the value of innovations is fundamentally different between those cases.

Also, the effects on variables like postponing the need for care, care dependency, prevention, or days in high-end care (ICU), or even death are rarely included. Cynically, one could financially state that the cheapest patient is a dead one. After all, preventing adverse consequences may prolong the need for care and the length of stay. The associated costs may be higher, but the quality of life and care may also be higher. Weighing such variables against each other in a business case may present difficult ethical issues. This is sometimes done by means of the standardized QALYs (Quality Adjusted Life Years), but this covers only the number of life years and is less relevant for something like transfer devices.

If we want to compare different innovations and compare them across countries, it is obvious there is a further need for standardization. This is currently mainly done by measuring and calculating the (financial) impact of innovations by means of HTA (Health Technology Assessment) quantitatively and qualitatively.[8] HTAs consist of two key components: the more objective assessment, followed by the wider and more subjective appraisal. Most countries use this HTA framework, but it seems that, so far, the United States does not work with HTA, which limits the options for international comparisons with the United States.[9]

Grouping the Results

As the status of the results was so diverse, we decided to present only innovations for which at least some limited indications could be found. This first exploration is therefore no more than a starting point for further research into the most promising ones. We divided the results into 5 groups (Table 1).

A. Process innovation

There is a multitude of models and techniques in this field that claim to reduce the workload for nurses, save time, and

Table 1

Summary of the results of the search and the views of the experts	
SEARCH FOR INNOVATIONS	**VIEWS OF THE INTERNATIONAL EXPERTS**
A. Process innovation	**A. Patient handling equipment and other equipment**
B. Technical equipment and aids	**B. Record keeping, administrative issues**
C. Innovations in training and instruction	**C. Empowerment of the health care workers**
D. Logistics/routing improvements	**D. Poor communication between departments, doctors and nurses**
E. Implementation strategies	**E. Preventing MSDs among nurses**

improve patient care, for example: TCAB, Lean Six Sigma, Finnish House of Workability, Participatory Ergonomics, Mixed Planning, but also a range of less well-known models or country-specific models. They are all aimed at more effective and improved patient centered care (PCC) and often also the reduction of the administrative load for nurses by means of technology, better (digital) patient files, and improved staff planning. This range of methods and theories has similarities and presents high claims. They do possess a high face validity, but there are very different degrees of evidence.

B. Technical equipment and aids

This group contains a variety of products. Washing-without-water, or care cleansing, is seen as a method that can reduce nursing time required for washing patients considerably, with ergonomic advantages and without compromising the quality of care. Also, in this group, the special wound dressings and innovative wound care methods can be found, like the leave-on sprays that protect vulnerable skin and also reduce the frequency of necessary care for complex (cancer) wounds and therefore save time.

Pressure injury prevention systems continue to innovate with beds, mattresses, and methods. The same holds true for ceiling hoist systems (transfers, repositioning, and patients' care), but also single-use and leave-under-slings are mentioned as effective time savers.

There are ongoing developments in the 24/7 monitoring systems with sensors and beacons in beds, mattresses and floors, in rooms, in incontinence-material, and the seats of wheelchairs.

But also, in more basic daily care methods there is a continuous flow of new devices, for example, the special infrared lamps that dry the patients' complete body comfortably and safely, adaptive clothing, automated toilet flushers, stand-up toilet seats, and bladder scans. Finally, in making the most of the equipment that is available, further improvements can be found. Extra quantities of equipment limit the time needed to organize their use and prevent the lack of a hoist when you need it. Improved meticulous maintenance avoids time lost due to technical issues.

C. Training and instruction

There is an increasing support for digital learning, e-learning, and selective combinations with hands-on skill training. This may save time, depending on the exact content and type of combination.

There are also more body-worn devices and sensors that can provide direct feedback to the user to improve skill and promote safety. QR coding of equipment helps to provide quick and on-the-spot support to improve skills and safety.

D. Logistics and routing

This field is traditionally strong with input from other industries. Shorter routes, and more efficient design, powered transportation, or completely automated routing are examples of saving time. Medication delivery systems are currently faster, more efficient, and appear to reduce medication mistakes. Success also depends on the architectural design of a facility, which may enable or limit these opportunities.

E. Implementation

Finally, the technique of implementation of programs is in-

novating. As a rule of thumb, 30% of the investment in innovation is related to the success of implementation in real nursing practice.

2. VIEWS OF EXPERTS

In the second part of this exploration, we tried to identify promising innovations by asking experts from a range of countries, by means of a short survey by e-mail to name their personal top 3 timesavers, plus a substantiation of their list. In the invitation to participate in this study, we underlined the open, out-of-the-box nature of this study: all and any ideas and experiences in all fields of health care and in all countries were of interest to us.

We invited 20 experts to share their views. 16 respondents from 14 different countries (Austria, Australia, Belgium, Canada, Denmark, Finland, France, Ireland, Netherlands, Portugal, Spain, Sweden, United Kingdom and United States) accepted the invitation to join the study. These experts had a variety of backgrounds: OH&S experts, hospital managers, scientists, inspectorate workers, and social partner representatives (at national and European level) from both employers' and employees' sides.

Results of the survey

Because of the strong variation in background, profession, and experience of the 16 professionals, it is not surprising that a wide range of potential timesavers was mentioned for health care practice. Still, it was apparent that 5 common themes could be distilled from their replies (Table 1).

A. First, full-room-coverage ceiling lifts are mentioned several times as interesting and more or less proven timesavers. The newer designs can be seen as innovative, since they allow more care activities to be performed besides the transfers. Additionally, the use of optimal incontinence pads and adaptive clothing is mentioned as a possible source of saving time. But, as opposed to introducing this kind of one-dimensional solution, some interviewed underlined that an integral approach based on assessment, training, ergonomically architectural design, and equipment is required. Timesaving may also result from shifting the number of caregivers required for activities from 4 (or 2) to 1. It takes time to ask extra caregivers for assistance, interrupting performance of their duties to assist with a transfer, versus one caregiver hooking up the sling and transferring the patient.

B. Secondly, since record keeping, administration, etc. are well-known and infamous time killers ("There is more time spent recording than caring"), they are also opportunities ("if well organized") to save time and reduce frustration. Several interviewees mentioned the concept of patient-centered care (PCC): "Multidisciplinary care is organized around a patient and not according to administrative logistics." Medical devices, screens, data, and figures seem to distract health care workers from the client, his or her family, and the community as well as their focus on the healing power of personal attention. Although the priority here is not efficiency, per se, saving time is believed to be an important benefit.

C. Demands from physicians, other requirements, decisions, and managerial protocols are key determinants of the working day of most nurses and are partly seen as time wasters. This resulted in the third common thread: the empowerment of the health care workers. The core element here is trust: give nurses the trust that they are doing the right things professionally. In more and more countries, experiments with concepts of self-steering teams and the changing role of managers seem to be successful regarding quality of care and saving time. In general, also independently of whether or not there is a tendency to empower nurses, the continuing professional development (CPD) and life-long learning (LLL) of the workforce are important concepts that contribute to effectively empowering nurses and, by doing this, eventually gain time. In order to structure this continuous education in the field of patient handling, several countries are working on portfolios for individual workers to administer their training easily: the All-Wales Passport (United Kingdom), ErgoCoach Paspoort (Netherlands), and Patient Handling Card (Finland).

D. The fourth big time waster, and therefore the opposite – a chance for improvement – seems to be the poor communication between departments, doctors and nurses, etc. An important lesson learned during the COVID-19 period is the huge potential of remote screen-to-screen communication. The threshold for frequent short-term coordination has become lower and, compared to the telephone, non-verbal communication is possible to a certain extent. But also, smart usage of screen-to-screen telemonitoring between doctors and patients might improve the communication and, therefore, might reduce hospital visits, hospital days, and waiting times.

E. Finally, time can be saved by preventing MSDs among nurses, but also, in a much wider sense, by preventing diseases in the general population, hospital care and thus, costs, can be reduced, as some interviewed argue. Here again, PCC is brought up by some interviewed. Although PCC focuses on treatment, health promotion and disease prevention are the ultimate goals by having

the patient actively participate in his or her multidisciplinary treatment and care. The idea is that reducing sickness reduces costs for the health care system and will ultimately save time as less people need care.

DISCUSSION

It is obvious that many innovations can be found, but the evidence behind them is limited and disappointing, or studies require more time. Research naturally lags behind the introduction of innovations but remains essential. This lack or delay of presenting evidence may hamper the quick introduction of innovations in an undesirable way, given the urgency caused by the workload for nurses and the demographic challenges we are facing.

When comparing the results of the search and the interviews (Table 1), it appears that the experts seem to focus more on solving the time wasters (or "killers") they experience and look less at innovations or time savers. From their point of view, this is logical, since they are confronted with time wasters in real nursing practice. On the other side, widening their view a bit more to an out-of-the-box view may help them to see the potential of new design and innovations that may actually save time.

All 16 interviews clearly pointed out that saving time in health care starts with realizing that in health care, "Everything is connected to everything." A ceiling lift can, for example, influence and potentially reduce the prevalence of pressure ulcers, make changing incontinence pads faster, and will also save time and nurses' backs. And empowering nurses can lead to smarter decisions regarding investments of equipment and the actual use of aids, leading to a reduction of MSDs and timesaving. This interconnectedness makes it possible to take advantage of the most obvious aspects (low-hanging fruit), creating an upward spiral toward other innovations that can hopefully save time without reducing the quality of work and care and hopefully improving both.

An important goal toward (international) exchange of information, results, and experience is standardization: at least a clear and detailed description of what was studied and the way results were gathered and measured. For SPHM programs, it is important to make the most of the program to include these efficiency and time aspects in business cases for the choice of equipment and the design of the implementation strategy.

CONCLUSION

There are many innovations that claim to reduce nurses' workloads and time without compromising – and sometimes increasing – quality of care. However, the evidence is lacking, late, or difficult to interpret. Experts in health care acknowledge this and also mention time wasters, along with innovations that may save time. Improvements in research, faster research, and more standardization may stimulate the implementation of relevant innovations and help to reduce workload in nursing and protect nurses' health.

REFERENCES

1. Cartaxo A, Eberl I, Mayer H. Missed Nursing Care in Austria. HeilberufeScience; 2022;13(3-4):27-29. (2022). [Dutch] Die MISSCARE-Austria-Studie - Einführende Überlegungen: Missed Nursing Care aus der internationalen und österreichischen Perspektive. HeilberufeScience. doi: 10.1007/s16024-022-00388-w. https://www.youtube.com/watch?v=eoikNGHxxKw.
2. Ball JE, Murrells T, Rafferty AM, Morrow E, Griffiths P. 'Care left undone' during nursing shifts: associations with workload and perceived quality of care. BMJ Qual Saf. 2014;23(2):116-25. doi: 10.1136/bmjqs-2012-001767.
3. Chiappinotto S, Papastavrou E, Efstathiou G, et al. Antecedents of unfinished nursing care: a systematic review of the literature. BMC Nurs. 2022;21(1):137. doi: 10.1186/s12912-022-00890-6.
4. Knibbe NE, Knibbe JJ. Promoting effective recruitment and retention policies for health workers in the EU by ensuring access to CPD and healthy and safe workplaces supportive of patient safety and quality care (2017-2018). Report of the Social Partners' Conference on Occupational Safety and Health. "A sound mind in a sound body – Taking care of those who take care of us." Vilnius, May 23-24, 2018.
5. Knibbe JJ, Knibbe NE, Van Vught F van. Markante Marges, Businesscases in de zorg (in Dutch, business cases in health care), Innovatieplatform, Foundation of RegioPlus, The Hague, 2008-2012.
6. Schuurman JP, Schoonhoven L, Defloor T, van Engelshoven I, van Ramshorst B, Buskens E. Economic evaluation of pressure ulcer care: a cost minimization analysis of preventive strategies. Nurs Econ. 2009;27(6):390-400, 415. PMID: 20050490.
7. Dang T, Roberts D, Murray A, Wiggermann N. A return-on-investment model using clinical and economic data related to safe patient handling and mobility programs in the ICU, Int J Ind Ergon. 2022;92(11). 103372. https://doi.org/10.1016/j.ergon.2022.103372.
8. World Health Organization, Health Technology Assessment: https://www.who.int/health-topics/health-technology-assessment#tab=tab_1. Accessed December 11, 2022.
9. Mulligan K, Lakdawalla D, Goldman D, et al. Health

Technology Assessment for the U.S. Healthcare System, White paper, USC Schaeffer Center for Health Policy & Economics and the Aspen Institute, 2020.

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