Nurses successfully delegate tasks to the robot Buddy

Bispebjerg Hospital, founded in 1913, is an emergency hospital located in Copenhagen, Denmark. This hospital is renowned for its wide range of medical specialties, catering to complex patient cases and a diverse population.

Within the hospital, the Neurologic Department N10a stands out for its dedicated efforts in patient care and innovation. With 17 patients under its care, this department operates with a dynamic team of 37 nurses.

DESCRIPTION OF THE PILOT TEST

From May to mid-August 2023, nurses at the Neurological Department of Bispebjerg Hospital tested Yuman's robot, Buddy.

When the Neurological Department tested Buddy, it was the first time that Buddy was tested in the healthcare system. After the end of the test period, the department continued the collaboration with Yuman.

Buddy is an autonomous and intelligent mobile robot that is self-driving and can transport various remedies that nurses daily use in connection with care situations. Buddy has a modular design that makes it possible to transport various remedies such as medical equipment (PIVC, blood samples, medicine, food, patient clothes, or laundry), depending on the department's needs.

PURPOSE OF THE TEST AND TEST METHODOLOGIES

The purpose of the test course has been to investigate, whether a robot can be used to help nurses with transport tasks in the neurological department. A total of 37 nurses participated in the pilot test through workshops, status meetings, departmental meetings, observations, interviews, and by using the robot. Finally, 5 interviews were held with nurses.

The pilot test has focused on the measurement parameters:
- interaction between nurses and the robot
- functionality and ease of use
- workflow.

The pilot test has been divided into a non-clinical test period and a clinical test period.

MAIN CONCLUSIONS

- Buddy creates more focused nursing time with the patient and more fluent patient contact, which leads to a good dialogue between nurses and patients.

- Buddy allows nurses to take 2000 steps less per shift (out of between 5000 - 10,000).

- Buddy is very user-friendly and easy to use, after a short introduction, and also easy to integrate into the workflow, although some nurses need more time to fully integrate Buddy into their workflow.

INTERACTION BETWEEN NURSES AND THE ROBOT

Through observations, interviews, and participation in meetings, it has become clear that nurses can largely identify and delegate relevant tasks to Buddy. The tasks where Buddy has been found particularly relevant to call in are the following: PIVC, blood tests, oral care, patient clothes, and sheets, monitoring with telemetry and electrodes, mobilization with slides, and blood pressure cuffs. These tasks require a number of remedies that nurses feel are lacking, in which case they have to interrupt and leave the patient in the middle of a dialogue or procedure.

Buddy allows the nurses to stay with the patients and delegate transport tasks to Buddy. This generally results in a better interaction between the nurse and the patient. Patients also find Buddy very interesting because it fosters interesting dialogues between nurses and patients.

A nurse is estimated to walk between 5000-10,000 steps in one shift, of which around 2,000 steps can be delegated to Buddy.

> *Admitting patients is now easier with everything right beside me. Before, I had to carry everything to the room before onboarding a patient. Now, I have a Buddy – I tell it to go to the patient's room ahead of me. Then I have time to receive my patient. It makes the onboarding process smoother, without walking back and forth.*

> *We get fewer interruptions because I am with the patient all the time, and because I don't need to leave the room and get things it makes the patient flow more fluent. I can easily forget something when I go to the patient, and for the patient does not look professional that we forget things.*

Overall, nurses can to a great extent both identify and delegate relevant transport tasks to Buddy. There is still a need to investigate in more detail which specific transport tasks can relieve staff the most when using Buddy.

FUNCTIONALITY AND EASE OF USE

Through observations, informal and formal interviews, and workshops, the nurses have assessed Buddy's functionality and ease of use.

Buddy has been received positively by patients and during the test period Buddy has met many new patients who have contributed with humor and curiosity about the robot and its possibilities. During the test period, nurses wanted to give Buddy a stronger personality, and based on feedback from patients and their relatives, Buddy has changed color from white to light green, as it symbolizes hope and health.

Buddy has been adapted during the test in terms of navigating around the staff, beds, and patients as well as its actual position while driving. Buddy's location and pace are also essential for porters so that they do not experience hard braking with beds.

5 out of 5 of the interviewed nurses indicate that the design of Buddy is very appealing, in addition to the fact that Buddy is quiet, has a good size, and is very user-friendly.

> *It's actually coming quite quickly when you need it – or when you take it with you – it has a nice speed. It's also intuitive how you call it – you don't have to think about it. It's one click and it comes.*
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> *It is quite cute when you see it driving down the hallway, I actually get happy when I see it driving in the corridor.*

Overall, Buddy has become very user-friendly and easy to use by nurses after a short introduction. Buddy is experienced with a large degree of functionality, and there is a need to use it for additional transport tasks, e.g. water glasses and food items.

WORKFLOW

Through observations, interviews, and participation in meetings, various elements have been assessed that are relevant for the robot to be integrated into the nurses' workflow.

Buddy is able to park both outside and inside the patient rooms. Through Buddy's tracking system, it was mapped that over 80% of Buddy's tasks Buddy take place inside the patient rooms.

During the test, it was investigated how summoning Buddy can best be integrated into the workflow. At the beginning of the test course, three phones were given to call Buddy. This was not ideal as on some shifts there could be up to 10 nurses but only 3 phones were available. In addition, the nurses go ahead with several devices, and an extra phone is considered unsustainable, as the number of devices becomes too heavy for the nurses to carry around.

Later in the test course, the phones were removed, and tablets were set up in the patient rooms so that several nurses could access the same unit. 5 out of 5 interviewed nurses indicate that tablets in patient rooms are very intuitive, as well as the application for summoning Buddy, which scores highly in terms of use.

Nurses emphasize that with a single click, they can summon Buddy. Sometimes they can do it as easily as without looking at a tablet while maintaining contact with patients.

Overall, 5 out of 5 nurses estimate that Buddy can be integrated into their workflow, but the focus must still be on becoming familiar with the use and possibilities of Buddy. The assessment, after examining various methods, is that Buddy must be called from tablets in the patients' rooms, or integrated into the nurses' Zebra phones.

3 out of the 5 interviewed nurses estimate that it has been easy to integrate Buddy into the workflow, while the last 2 find it more demanding to use new technology on the ward. The head nurse has been very involved in the test process and ensured that the department has been supported in the use of Buddy.

> *I have been here so long, I have my habits and know how to do things. For me to learn to use it, I need to have time and get inspired by my colleagues. The new nurses have no habits and routines, so this inspires me and makes me think about opportunities of Buddy.*
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> *I like the idea of robots, and I can see what they can do to help us, easily, I think that this is the future, and I have to remind myself.*

> *I don't know where things are, I just know what is in Buddy's drawers, so it's just perfect for me because I am new – and it is easy to call because of the tablets in the rooms. I know I can call and everything I need will be there.*

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MAIN CONCLUSIONS

One of the main conclusions is that nurses can largely identify and delegate relevant transport tasks to Buddy, but that there is still a need to investigate which tasks free up the most time for the staff. However, the nurses strongly agree that Buddy is a great help, especially to avoid interruptions in procedures and to maintain good patient contact.

Buddy is user-friendly and easy to use after a short introduction and has most of the necessary functions but has also been adapted during the testing process to meet the needs of the department and patients so that the robot is even more accessible and satisfactory for staff and patients.

The nurses on the ward estimate that Buddy can be integrated into the department, but some nurses need more time to fully adapt their workflow to Buddy.

The department has thus also chosen to continue the collaboration and further development of Buddy so that Buddy is even more targeted at the nurses' needs for delegating transport tasks.

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