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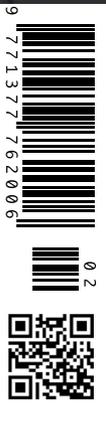
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Conception of COVID-19 Auxiliary Hospital from Nursing Management Perspective

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The following experience report describes the development of a Personnel Concept in the field of patient medical care for the operation of the COVID-19 Auxiliary Hospital at the Hannover Exhibition Centre. The focus of the challenge was the creation of a Training Concept to provide adequate staff for patient care at the hospital. For this purpose, the chronological summary of the existing theoretical measures is provided.

Key Points

- As part of Germany's COVID-19 response, an Auxiliary Hospital (BKH) was set up in the Hannover Region to provide treatment to mild COVID-19 cases.
- The operation of the BKH implies some specific functions and features. Those were adopted from the recommendations of the Robert Koch Institute for Ebola virus disease.
- To fulfil the BKH's staffing needs, over 1,000 personnel were trained and deployed. This required designing and implementing of Personnel and Training Concepts.
- The BKH project team conceptualised the training programme and established an electronic data processing system for administration and coordination.
- The training was based on a modular programme with several thematic focuses, such as basic hygiene, patient support, vital signs control and others.
- To efficiently manage the training process, a software platform was introduced with elements such as participant registry, planning tools, registration portal, etc.

The pandemic of the SARS-CoV-2 virus has put the world civilisation in a state of emergency, unprecedented in the post-war period. The virus that has spread rapidly worldwide and led to serious illnesses in humans, is referred to as COVID-19 by the World Health Organization (WHO). Measures have been and are being taken globally to combat the pandemic and ensure medical care for the population.

Construction of BKH – Unique Challenge

The uncontrolled rise in the number of infections in Germany in the spring of 2020 required the establishment of measures to deal with the pandemic in the German healthcare system. In the Hannover Region (Germany), as part of the arrangements an Auxiliary Hospital (Behelfskrankenhaus, BKH) with approximately 500 beds was set up at the

Hannover Exhibition Centre from late March to mid-April, to provide additional medical care for less seriously ill COVID-19 patients.

The establishment of the BKH was a unique challenge for everyone involved in the project. Within six weeks, five large exhibition halls were converted into a functioning hospital with all the necessary additional supply units. In addition to the logistical tasks with

regard to structure and functions, the design of corresponding administration for the BKH management was significant. For the operation of a BKH, a Personnel Concept is required, which is specifically designed for the purpose of COVID-19 patient treatment. The special feature of this Personnel Concept was the parallel need of both medically trained personnel as well as support personnel/volunteers with no training in medical care. The unclear perspectives of the pandemic development in spring necessitated an urgent need for a comprehensive draft of a viable and operational Personnel Concept.

BKH Functions and Special Features

To understand the requirements of a Personnel Concept design, it is first useful to explain the function and specifics of this BKH. According to the plans of the Hannover Region, the BKH has to provide treatment and care for less severely ill COVID-19 patients who cannot be looked after at home, but do not need intensive care treatment. The BKH (with approximately 500 beds) should only be used when 70% of the existing hospital capacity has been filled. The aim is to relieve the hospitals in the Hannover Region of the mild COVID-19 cases, so that severely ill COVID-19 patients could be cared for and other necessary hospital activities/treatments could continue.

The BKH's structure and process organisation are characterised by special features, which deviate from the requirements to regular treatment facilities. The organisational structure of the BKH is designed to meet the needs of a treatment facility that specifically provides for the care of patients requiring isolation.

The design of the institutional structure and the regulation of the content, space and time sequence of work processes at the BKH follow the framework concept of the Robert Koch Institute (RKI) for coping with the Ebola outbreak. This concept

describes requirements for treatment facilities that provide special protective measures for the staff. These requirements are analogously applied to the current COVID-19 pandemic. Therefore, trained and properly briefed staff is a prerequisite for the COVID-19 patient care. During the care process, epidemiological measures must be implemented. Protection against infection of the personnel requires wearing special personal protective equipment (PPE) as well as measures for disinfection and decontamination (Robert Koch Institut 2019). For the BKH, the proposed PPE includes a full body protective suit with headgear, mouth and nose protection, a face shield and protective gloves. The work is carried out by wearing the PPE in extreme

conditions. Nursing care activities on the patient are more complex and only possible to a limited extent.

The organisational structure of the BKH, from the nursing management perspective, comprises the hierarchical structure for the division of work and coordination of the staff, which is intended for the nursing care of the COVID-19 patients. This includes nursing staff, nursing support staff, and coordination staff in administrative, training and management functions. In this context, the operational structure covers the work processes of the staff required for optimal nursing care of the patients. In the following section, two nursing management measures are presented for organising the BKH.

 <p>Seminar 8: Grenzsituation (z. B. Verstorbene)</p> <p>Kurse COVID19</p>	 <p>Seminar 7: REA Light</p> <p>Kurse COVID19</p>	 <p>Seminar 6: Vitalzeichenkontrolle / Krankenbeobachtung</p> <p>Kurse COVID19</p>
 <p>Seminar 5: Patientenpfad, Telefon</p> <p>Kurse COVID19</p>	 <p>Seminar 4: Atmung und Luftnot, Sauerstoffgabe + GERÄTE</p> <p>Kurse COVID19</p>	 <p>Patientenhilfestellung (atemunterstützende Lagerung, Körperpflege, ...)</p> <p>Kurse COVID19</p>
 <p>Hygiene-Basisschulung</p> <p>Kurse COVID19</p>	 <p>Orientierung</p> <p>Kurse COVID19</p>	

Figure 1. The Seminars of the Training Programme. Courtesy of Iris Meyenburg-Altward



Figure 2. Soldiers of the German Army During the Training. Source: Deutsche Messe AG

Nursing Management-Related Measures

Headed by Iris Meyenburg-Altwareg, experts from various departments were involved in the organisational planning for the nursing care of COVID-19 patients at the time of the BKH establishment. The project team's tasks included conceptualising the programme for the instruction and training of the BKH staff and establishing an electronic data processing system for the administration and coordination of training.

Goal Setting

The goal was, within a few days, to train more than 1,000 potential employees who possessed vastly different qualifications, and to school them for very different tasks, so that they would be able to adequately care for the patients, work together as a team, internalise the work processes and uphold hygiene standards – in

other words, to behave in such a way that there would be no external or personal risk.

Development of a Training Concept

To prepare the staff for the nursing assignment, the first step was to develop a comprehensive Training Concept as a cornerstone. A target group-oriented design of the training content was essential. Determining the training needs of the large number of nursing support staff who, as volunteers, did not have any medical or nursing qualifications proved to be particularly difficult. For this reason, important criteria had to be taken into account when developing the training content. The training should be thematically easy to understand and limited to essential information. For safety reasons, all risks in the area of activity at the BKH should be clarified. In addition to the theoretical audiovisual

communication of information, practical exercises should also be built into the training process. The training concept planning was developed by nursing education experts in collaboration with professional nursing staff from clinical practice. Considering the different criteria to be met, the decision was made in favour of a modular training concept with the following key themes (Figure 1):

- Basic hygiene (instruction and training of personnel in epidemic hygiene measures including putting on and taking off PPE)
- Patient support
- Breathing
- Patient paths
- Vital signs control
- Resuscitation course – light
- Borderline situations in patient care
- Drug administration
- Nursing documentation and handover.

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This modular system allows to flexibly combine individual training modules to form a module complex. A requirement profile was defined for the nursing support staff, which contained the entire spectrum of training modules offered. Regardless of any existing medical or nursing qualification, basic hygiene training is mandatory for all emergency services at the BKH and includes instruction and training on epidemic measures according to the RKI recommendations. From the care management point of view, the basic hygiene training makes an essential contribution to quality assurance of the Training Concept and to transparent risk communication in the sense of responsible risk management.

In a trial run, the first draft of the Training Concept was tested on soldiers of the German Army (Bundeswehr) who were involved in setting up the BKH (Figure 2). This was followed by a constructive evaluation of the training content and continuous concept optimisation. The interdisciplinary exchange of experiences from the test run provided additional impulses and insights for the BKH process organisation. For example, donning and doffing of PPE indicated the need for longer changing times, which is very important for schedule optimisation and a round-the-clock shift model. Combining several topics into one module proved to be useful in terms of improved time management during the training, which, in turn, allowed for optimal number of training modules and use of human resources.

Digital Management of the Training Concept

To master the challenges in terms of scope, content and time, we have partnered with a Norwegian company, which already had extensive experience of Competence Management in hospitals in the Nordic countries. Due to time constraints, the solution was translated into German within a few days and configured to the BKH's requirements by a small project group from the BKH and the company. This has been an evidence of what shared motivation, trust and professional competence can achieve even under pressure.

A large number of personnel is required to treat approximately 500 patients at the BKH. The high demand also means that the staff needs quantitative training. Furthermore, both existing and new restrictions and hygiene requirements have to be taken into account. For the purposes of a Training Concept, a tool for the overview and predictability of the training courses and participants is necessary. The tool requires extensive functionality to cope with various administrative processes. Some system requirements specific to nursing management were defined for use in the BKH. A system has to record all training participants with strategically relevant personal data, such as their existing individual qualification level. These recorded personal profiles should be managed centrally in a database. The administration includes the planning of the training needs, the organisation of the training dates, the documentation and certification of the training

courses carried out, and other support services, such as access to further training content or a communication platform for the interactive exchange of news and information. A tool with a suitable infrastructure can be a software solution. With digital management of the Training Concept, administrative processes in this area could be automated and the administrative effort reduced.

The potential of training management software can be broad. The range of functions could be automated and ideally work as a self-managing system. A registration portal would be pertinent, for example, where accredited training participants could register in order to subsequently plan individual training dates and receive current information on training modules (eg, event location, lecturer, etc). Documentation for training participants can be provided using a digital signature at the training location (eg, by scanning an accreditation card). The administration software then creates a corresponding training certificate as evidence and stores it in the participant's personal profile. For nursing management, automated reports can be used to carry out control evaluations of the participants' qualification progress.

Such automated digital tool represents a flexible and transparent support for personnel management and could be extended to other management processes. For example, once the operational readiness of the participants has been measured, a service planning tool could be integrated into the system. ■