

Handling of hazardous drugs – Effect of an innovative teaching session for nursing students



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ABSTRACT

Background: Imparting knowledge and practical skills in hazardous drug handling in nursing students' education is essential to prevent hazardous exposure and to preserve nurses' health.

Objectives: This study aimed at comparing routine nursing education with an additional innovative teaching session. **Design:** A prospective controlled study in nursing students was conducted in two study periods: (i) a status-quo period (routine education on handling hazardous drugs) followed by (ii) an intervention period (additional innovative teaching session on handling hazardous drugs).

Settings/Participants: Nursing students at a vocational school were invited to participate voluntarily.

Methods: In both study periods (i) and (ii), the following factors were analysed: (a) knowledge of hazardous drug handling by questionnaire, (b) practical skills in hazardous drug handling (e.g. cleaning) by a simulated handling scenario, (c) contamination with drug residuals on the work surface by fluorescent imaging.

Results: Fifty-three nursing students were enrolled. (a) Median knowledge improved from status-quo (39% right answers) to intervention (65%, $p < 0.001$), (b) practical skills improved from status-quo (53% of all participants cleaned the work surface) to intervention (92%, $p < 0.001$). (c) Median number of particles/m² decreased from status-quo to intervention (932/97, $p < 0.001$).

Conclusions: Compared with routine education, knowledge and practical skills in hazardous drug handling were significantly improved after an innovative teaching session. Additionally, the amount of residuals on the work surface decreased. This indicates a lower risk for hazardous drug exposure.

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1. Introduction

Substances that are organ toxic, carcinogenic, mutagenic, or toxic for reproduction were defined as hazardous drugs (HD) by the National Institute for Occupational Safety and Health (NIOSH, 2004). Therefore, handling these drugs is associated with risk for occupational exposure. Even low doses of these drugs pose a risk to the health of the person handling them if safety standards and handling recommendations are not accurately followed (Valanis et al., 1993). This applies particularly to the increasing number of oral antineoplastic drugs (Weingart et al., 2008).

Nurses have to be aware of these hazards. Accordingly, they have to be taught about risk and safety measures to appropriately protect themselves and others. Knowledge of handling HD and practical skills (hereinafter referred to as HD handling competence) are crucial from the very beginning of their professional careers since the side effects may occur with a delay of years after exposure. Hence, it is necessary to address the topic “HD handling” during nursing students' education. Education on HD in the current curriculum, however, is sparse. This indicates that the current education does not sufficiently sensitise nursing students for exposure risk. Lacking awareness becomes obvious in practice, since many nurses do not consider oral antineoplastic drugs hazardous and do not adequately adhere to self-protection recommendations (Johnson et al., 2008; Labuhn et al., 1998). Therefore, current nursing education needs to be evaluated for its impact on HD handling competence. In cases in which students tend to ignore important factors, education should be intensified and targeted strategies should be implemented to improve knowledge and practical skills. Multimodal presentation of information has shown to be an effective teaching method

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(Smart et al., 2010). Multimodal strategies combine verbal, visual, and auditory stimuli to deliver theoretical and practical information.

1.1. Objective

This study aimed at comparing the effect of routine nursing education with an additional innovative teaching session on obtaining HD handling competence. The impact of competence on occupational safety in both study periods is demonstrated by fluorescent imaging of work area contamination.

2. Methods

2.1. Setting and Educational Structure

The study was conducted at one vocational school for nurses in Germany between January and March 2015. The school principal was informed and gave his consent to the realisation of the project. All students from all three training years were invited to take part in the

study without exception. Participation was voluntary for all invited nursing students.

Nursing education in Germany is divided into theoretical and practical education regulated by a framework curriculum. Theoretical education is provided by teachers at vocational schools. Working in hospitals or nursing homes is part of the practical education in all three years of training. The practical education is provided by senior nurses and practice educators. Handling oral medication is part of the practical education.

2.2. Study Design

A prospective controlled study was performed in two study periods: (i) a status-quo period (routine education on handling HD) followed by (ii) an intervention period (additional innovative teaching session on handling HD, Fig. 1).

In a preliminary period, the innovative teaching session and the questionnaire were developed and pretested. The handling process list, the method for contamination detection and the image analysis were validated. The data acquisition method was defined and study

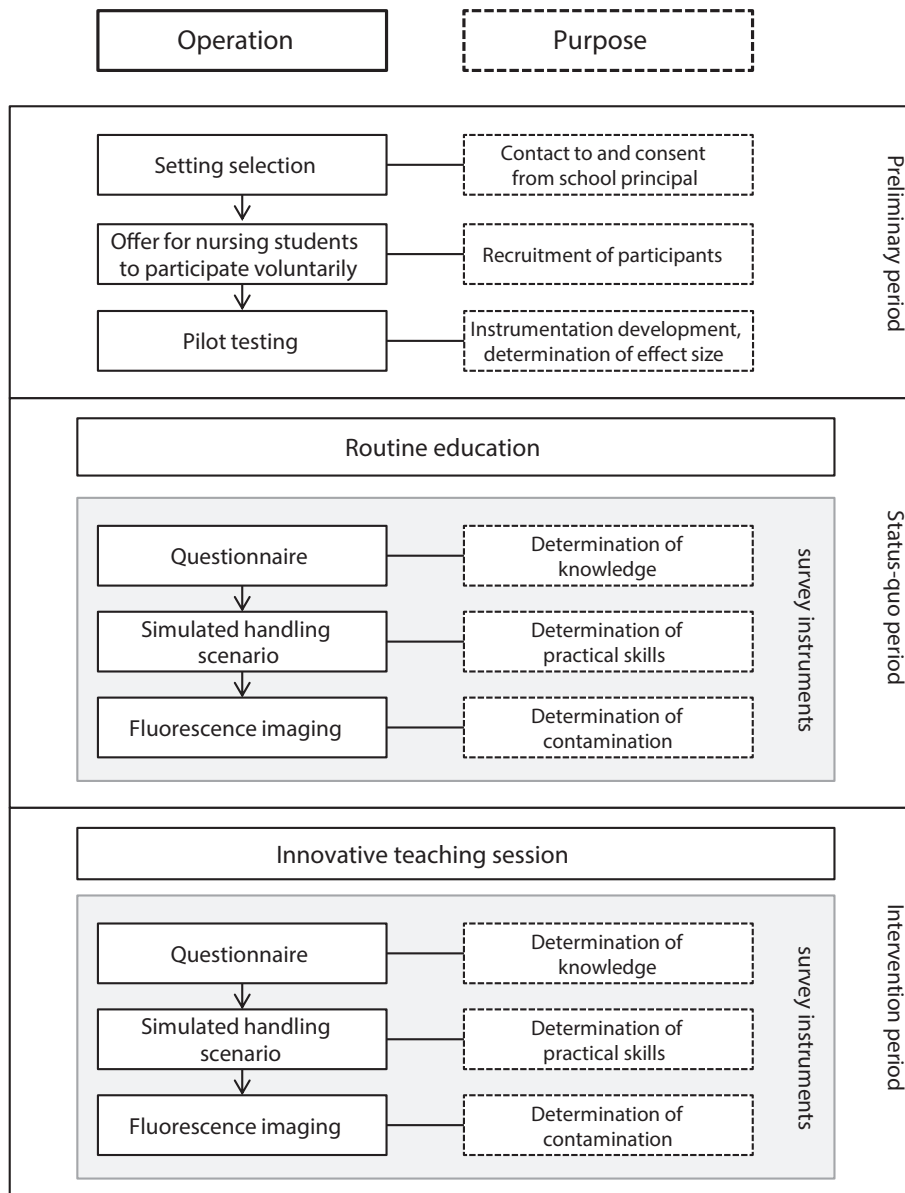


Fig. 1. Study design.

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