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## Knowledge of Blood Transfusion among Nurses at Hospital Pulau Pinang: Nursing Responsibilities and Patient Management Related to Transfusion Reactions

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### ABSTRACT

**Introduction:** Nurses are generally trained on the procedures of blood transfusion during their years of service. However, the level of knowledge varies among individuals and healthcare centres. Thus, this study addresses a knowledge gap regarding nurses' knowledge and transfusion safety in the local clinical setting. **Objectives:** This study aimed to determine nurses' level of knowledge of various phases of blood transfusion and associate this knowledge with their socio-professional details. **Methods:** This was a cross-sectional, quantitative study. The target population was in-patient ward nurses at Hospital Pulau Pinang. The systematic random sampling method was used to select 185 nurses to participate in this study. Data were collected using a validated research questionnaire that consisted of 31 items (9 items related to socio-professional factors and 22 knowledge items). Data were analysed using descriptive and inferential analyses. **Results:** The overall knowledge score was moderate (mean = 70.44%, SD = 11.35). None of the nurses was able to answer all of the knowledge questions correctly. Of the participants, 72.29%, 71.75%, and 67.14% exhibited knowledge of blood bag collection and patient preparation; pre-transfusion nursing activities; and during and post-transfusion nursing responsibilities and management of transfusion reactions, respectively. Factors such as age, years of service, department, and availability of the transfusion policy in the ward significantly affected the mean knowledge scores. **Conclusion:** Nurses' knowledge of blood transfusion at Hospital Pulau Pinang was moderate. More training and courses should be provided to improve their knowledge.

**Keywords:** *Knowledge, Blood transfusion, Patient management, Transfusion reaction*

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### INTRODUCTION

Since its establishment in the early twentieth century, blood transfusion, whereby blood or its constituents are infused to individuals through intravenous administration, has been one of the most common procedures

administered to hospitalised individuals (1). The transfusion of blood products is essential for restoring the body's oxygen transport capacity or replenishing lost or depleted blood components (2). However, blood transfusion has certain risks to recipients, including transmission

of transfusion-transmitted infections, acute or delayed transfusion reactions, alloimmunisation and immunomodulation (3). Extensive research and efforts have been focused on preventing these undesired events.

Errors in blood transfusion can lead to severe morbidity or even mortality of recipients (4). Serious Hazards of Transfusion reported that approximately one wrong blood transfusion occurred in every 13,000 transfusions (5). Most transfusion errors are due to human factors, which are preventable through training and revision of transfusion protocols (6). Hence, healthcare workers who play a part in blood transfusion service must always be competent and cautious to do no harm and to provide safe and beneficial transfusion therapy to the patients.

Hijji et al. described administration of blood products as consisting of five phasic procedures: decision to transfuse, patient preparation before collecting blood units from the storage site, blood bag collection, pre-transfusion activities, and post-transfusion activities and monitoring (7). While decisions to transfuse are determined by physicians, other phases are controlled by the operators and nursing staff (8). All phases need to be monitored and safeguarded by multiple parties to ensure efficacy and efficiency of the transfusion. Safe blood administration must be accompanied by proper documentation of related tasks, especially of reasons, time, duration, and operators, to ensure traceability and to facilitate look back procedures (4).

Nurses are generally trained on the procedures of blood transfusion during their years of service. However, the level of knowledge varies among individuals and healthcare centres. Although studies to evaluate nurses' knowledge of blood transfusion have been conducted in other countries (7–12), few have taken place in Malaysia. Thus, this study addresses a knowledge gap regarding nurses' knowledge

and transfusion safety in the local clinical setting. Nurses' knowledge at various stages of blood transfusion was assessed and the data were used to identify areas in need of improvement. Policy makers can use the results of this study to make adjustments and outline strategies to improve the quality of blood transfusion service in their healthcare facilities.

## METHODS

### Design and Sample

This was a cross-sectional, quantitative study conducted at Hospital Pulau Pinang, Malaysia. The target population was registered nurses based in in-patient wards with at least three months of experience in adult blood transfusion prior to the data collection period. Paediatric and neonatal ward nurses were excluded from this study. With reference to Hijji et al., sample size was calculated using the Power and Sample Size Program (version 3.0) (7). Assuming a 95% confidence interval and power of the study at 80%, the minimum sample size was 185 nurses. Nurses from a total of 23 wards, including the accident and emergency unit, cardiology ward, critical care unit, intensive care unit (ICU), medical wards, neurology-ICU, neurology-surgical ward, obstetrics and gynaecology ward, orthopaedic wards, and surgical wards, participated in this study.

### Ethical Consideration

This study was approved by the Human Research Ethics Committee at Universiti Sains Malaysia and the Medical Research and Ethics Committee. Approval to carry out this research at the study location was obtained from the hospital director, head of nursing, and Clinical Research Centre. Every subject was given an information sheet and was required to sign an informed consent form prior to participation. Anonymity and confidentiality of responses were guaranteed.

## Research Tool

Following a thorough literature review on blood transfusion and nursing responsibilities including research articles and nursing guidelines, the questionnaire was designed, based on the study by Hijji et al. (8). The adopted questions were modified in correspondence to the local clinical policies and settings.

The questionnaire consisted of four sections containing a total of 31 items: Section 1 consisted of nine items regarding “socio-professional factors”; Section 2 contained seven items related to “blood bag collection from blood bank and patient preparation before transfusion”; Section 3 was made up of eight items regarding “pre-transfusion nursing responsibilities”; Section 4 had seven items related to “during and post-transfusion nursing responsibilities and management of adverse reactions”. The research tool was tested previously for its content validity, face validity, and reliability.

## Data Collection

Data were collected from May to June 2016. Subject selection was conducted via the systematic random sampling method as follows: nurses whose names were listed with odd numbers on the ward duty rosters were included, whereas even-numbered names were excluded. A briefing session with fellow matrons from every participating in-patient ward was held. Standardised verbal and written instructions were given to the matrons before they distributed the questionnaire to the selected nurses.

## Data Analysis

Data entry and analysis were done using the statistical software Statistical Package for Social Sciences (SPSS, version 22.0). The data were analysed using descriptive and inferential analyses. Descriptive analysis was used to analyse the socio-

professional factors and individual items in each section. For Sections 2–4, one point was assigned to a correct response while no point was given to an incorrect answer. The knowledge items summed to a total score of 22, and correct answers were converted to a percentage for easy interpretation. Measures of central tendency and dispersion were calculated from the knowledge score. Inferential statistics were used to analyse the association between each socio-professional factor and the knowledge score. To analyse relationships between categorical variables and knowledge score, the independent *t*-test was used for dichotomous variable, whereas one-way analysis of variance (ANOVA) was used if variable had more than two categories. Pearson’s correlation coefficient was used for continuous data.

## RESULTS

### Subjects’ Socio-Professional Characteristics

A total of 185 nurses participated in this study, and 96.2% of participants were female. The mean age of subjects was 30.93 years old (SD = 7.49; range = 23 to 59). Sixty percent (60%) of nurses were between 21 to 30 years old. The mean years of service was 7.41. Years of service ranged from 8 months to 23 years (mean = 7.41, SD = 7.06) years. Most of the nurses (93.5%) had a basic qualification in nursing (either a nursing certificate or diploma). Half of the nurses stated that they performed blood transfusion only once a month. Participating wards were further divided into 11 different departments. Nurses from the medical and surgical wards, where blood transfusion is actively performed, constituted more than one-third of the total sample. Eighty-five percent of nurses were aware that the policy related to administration of blood is available to them in their respective ward, whereas ~12% were unsure (refer Table 1).