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## Major Article

# Health care providers' perspectives for providing quality infection control measures at the neonatal intensive care unit, Cairo University Hospital

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## Key Words:

Qualitative  
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**Background:** Health care-associated infections are one of the major causes of morbidity and mortality in neonatal intensive care units (NICUs). This study identified health care providers' perspectives for providing quality infection control measures at a NICU.

**Methods:** A qualitative approach was adopted. Participants were selected via a purposive sampling technique. The study group was composed of 3 medical staff who held leadership positions and 10 nurses working in the NICU at Cairo University Hospital. Data were collected using semi-structured interviews.

**Results:** Responses were analyzed using a thematic content analysis. The priorities identified by the thematic analysis were suggestions and barriers for providing quality infection control measures, from the perspectives of health care providers. All interviewees cited shortage in staffing, especially nurses, lack of time to apply infection control standards, limited opportunities for infection control training, and work overload as the main barriers. All interviewees recommended on-going training and the introduction of audiovisual aids and case study approaches.

**Conclusions:** Lack of time to apply infection control standards, limited opportunities for infection control training, and work overload are the most commonly perceived barriers. The current infection control system in the NICU is likely to remain ineffective unless these underlying barriers are adequately addressed.

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## BACKGROUND

Health care-associated infections (HCAIs) have considerable health and economic consequences, including increased morbidity and mortality, prolonged length of hospital stay, and increased medical costs in neonatal intensive care units (NICUs).<sup>1</sup> The incidence of infections varies widely among NICUs depending on environmental and cultural factors and differences in clinical practice.<sup>2</sup> It occurs at an incidence of approximately 30%,<sup>3</sup> and in developing countries, there is also evidence that these infections are a major cause of neonatal morbidity and mortality.<sup>4</sup> It is estimated to cause about half of all neonatal deaths.<sup>4</sup> In Egypt, very high rates of sepsis (as high as 70%) were documented in a number of NICUs.<sup>5</sup>

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Many risk factors of HCAIs in the NICU are involved, such as the knowledge and attitude of health care providers regarding infection control,<sup>6</sup> environmental factors such as those related to sterilization of medical equipment and cleanliness of floors and walls,<sup>7</sup> and antimicrobial resistance.<sup>8</sup> Institutional factors, mainly scarce resources to fund infection control programs, also contribute to such transmission.<sup>6</sup> The excessive invasive procedures such as central venous catheter and tracheal intubation is another factor.<sup>6</sup> Also, length of hospital stay plays an important role; that is, the longer the stay, the higher the incidence of HCAIs.<sup>7</sup>

Between January and April 2001, the central infection control department of the Ministry of Health and Population conducted a baseline assessment of infection control practices in randomly selected health care facilities in Upper and Lower Egypt. Key findings from these surveys revealed a lack of the concept of infection control in most health care settings.<sup>9</sup> By 2006, a national organizational structure, infection control guidelines, and a comprehensive infection control training program had been developed.<sup>9</sup> Although overall progress has been noteworthy, quality is inconsistent, and issues remain regarding how health workers are trained and deployed as

revealed from a recent study conducted to assess the infection control program in Egypt.<sup>10</sup>

Because health care managers and nurses play an important role in patient safety and have input into the design and operationalization of quality improvement programs, they can offer a new perspective on how to improve areas of practice with which health care organizations are often struggling to improve.<sup>11</sup> Consequently, this study was conducted to explore health care providers' perspectives for providing quality infection control measures at the NICU.

## METHODS

### *Study design and setting*

An exploratory study using a qualitative approach was conducted in the NICU at Cairo University Children Hospital, a university-affiliated teaching hospital in Egypt. The included unit is located on the third floor and included 31 incubators distributed in 2 main rooms: the normal neonatal care level, which included 22 incubators, and the intermediate care level, which included 9 incubators. The study took place over 3 months' duration from September–November 2016.

### *Sample size and sampling technique*

In-depth interviews were conducted with health care providers until data saturation.<sup>12</sup> Participants were selected via a purposive sampling technique. The participants included 3 medical staff who held leadership positions and 10 nurses working in the NICU at Cairo University Hospitals ([Appendix Table A1](#)). Nurses were selected based on their seniority and ability to give an informed perspective on infection control. The inclusion criteria were having at least 3 months' work experience in the study setting, which is the period the nurses were supposed to acquire the policy of infection control, and those who were willing to participate in the study.

### *Data collection tools*

In-depth semi-structured audiotaped face-to-face interviews of up to 30 minutes' duration were conducted by one of the researchers. The interview guide was semi-structured and consisted of open-ended questions and was piloted with minor revisions made. Participants were invited to give their suggestions for new strategies to improve compliance with infection control measures or ideas on strengthening existing strategies and the barriers that restrict providing quality infection control measures in the NICU. Interview guides ([Appendix Table A2](#)) were developed from meetings with key informants in infection control and following systematic reviews of the literature.<sup>13,14</sup>

### *Data analysis*

The processing of the data was based on the technique of thematic content analysis, which aimed to obtain descriptions of the content of the messages through a systematic and objective procedure. This analysis involves the following stages. The first stage is preanalysis, for the organization of the materials, to facilitate the understanding of the ideas. Therefore, there were thorough and repeated readings of data transcripts. The second stage is the exploration of the material, which is the systemic administration of decisions taken previously, that is, the selection of the statements of the participants interviewed and the organization of categories. In the third stage, the results and their interpretation were processed. Participant quotes were used to illustrate the meaning in themes and summaries.

### *Ethical considerations*

Informed consent was obtained directly from the studied health care providers before data collection and after an explanation of the study objectives and importance. All procedures for data collection were treated with confidentiality according to Helsinki Declaration of biomedical ethics.<sup>15</sup> To guarantee the anonymity of the respondents, they were identified by the letter I (interviewee) followed by a number according to the chronologic order of the interviews (I01, I02, I03. . .I13). All administrative permissions were obtained from the hospital manager and from the head of the infection control unit.

## RESULTS

All who were approached accepted the invitation to participate in the study (N = 13). All study participants were women. Most of the studied participants were married and aged from 28–55 years with 3–25 years of work experience. All nurses had attended infection control courses.

Thematic analysis of the transcripts of interviews revealed the following themes that reflect the barriers to providing quality infection control measures, and the strategies that participants thought are needed, either as novel strategies or modifications, to existing programs.

### *Health workforce*

All interviewees cited shortage in staffing, especially nurses, as a barrier to meeting the infection control measures. One nurse mentioned, "The low salary and the weak potentials for financial increments increased the turnover rate of the already appointed nurses." All new nurses were hired on temporary contracts. All interviewees universally agreed that "More health care providers are needed."

### *Nonhuman resources*

Three-quarters of respondents said it was difficult to access protective equipment, such as gloves, aprons, and face protection. One nurse said, "More personal protective equipment should be available." Regarding health education materials, health care providers demarcated the scarcity of audiovisual materials, resources for demonstrations, and information booklets for health care providers regarding infection control, despite the presence of posters all over the NICU. All interviewees recommended development of health education materials to support the application of existing infection control guidelines in NICU settings. One nurse said, "Health care workers should be involved and consulted in the development of health education materials."

### *Lack of continuous training in infection control skills*

The head nurse of the NICU stated that continuing education through training programs is lacking, and the main challenge is to provide training for all workers in infection control because only nurses agree to go for training according to their schedule and workload. She mentioned that "They have good and even excellent abilities provided they have ongoing continuous training." The director of the infection control unit stated, "There seems to be some lack of clarity or misconception among some physicians regarding the role of nursing staff. Some health staff appeared to feel that dealing with infection control issues is more of an issue for nursing staff only and did not fully understand their own role in addressing these issues."

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