Sustained reduction in needlestick and sharp injuries among nursing students: An initiative educational program

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ABSTRACT

Needlestick and sharp injuries are frequent and important cause of morbidity and mortality in nursing students as other health care workers who come into contact with patient blood and body fluids. Researchers identified education as an important aspect in reducing the needlestick and sharp objects injuries among health care workers, and indicated the need for comprehensive educational program which clearly links theory with practice rather than programs which emphasized only on the knowledge part of infection control. This study determined the impact of a comprehensive infection control initiative educational program on the reduction and sustainability of lower rate of needlestick and sharp injuries among the nursing students participated in the program. The comprehensive infection control initiative educational program was provided to associate nursing students. The program aimed to increase the nursing students’ awareness of the rate and risk of needlestick and sharp injuries, through establishing common improvement goals, training on hand and environment care, wear protective measures, appropriate handling and dispose of needles and sharp objects. Active teaching learning strategies such as audiovisual aid presentation, focus group discussion and reflection were utilized. Incidents reports of needlestick and sharp injuries among the nursing students over one semester before implementing the program established the baseline data for the present study, indicated that the needlestick and sharp injuries among the nursing students had been significantly declined as a result of their participation in the program which sustained for two followed semesters. The comprehensive infection control initiative educational program stimulates the participants to take an active part in defining their own problems, establishing their goals, developing their solutions. It progressively reduced and sustained reduction in needlestick and sharp injuries among the participants.

Keywords: Active teaching-learning strategies, associate nursing students, infection control initiative educational program, infection control practices.

INTRODUCTION

Nursing Students as other health care workers who come into contact with patient blood and body fluids may be exposed to fatal infections as they perform their clinical activities in the hospital (Ayranci and Kosgeroglu, 2004; Yang et al., 2004; Smith and Leggat, 2005). They are exposed to infections by pathogens, such as HIV, hepatitis B and hepatitis C, from needlesticks, sharp objects injuries and contacts with deep body fluids. The risk of being infected following a single needlestick from a source-patient with blood borne infection ranges from
as low as 0.3% for human immunodeficiency virus (HIV), and 3% to 10% for hepatitis C to as high as 40% for hepatitis B (Rpararini et al., 2007). The risk increases if we know that 92.0% of needlestick and sharp injuries among nursing students are unreported (Lukianskyte et al., 2011).

Although infection control and management was a pre requisite course for the nursing students for entering the clinical practice placement, we have not been successful in making the students aware of their individual responsibility regarding their compliance with infection control practices. Infection control and management is an essential component of the associate nursing curriculum, and it is a prerequisite course for admitting nursing student to the clinical area, after which a repeated incident of needlestick and sharp injuries among nursing students were reported. This raised the need to improve the nursing students' orientation to and compliance with infection control practices, in order to reduce and sustained reduction in the needlestick and sharp injuries rate among the nursing students the main focus of the present study.

Researchers identified education as an important factor in decreasing the incidents of needlestick and sharp injuries among health care workers, and indicated the need for more comprehensive infection control educational programs which clearly links theory with practice rather than programs which emphasized only the theoretical part of infection control and management (Wisniewski et al., 2007; Yang et al., 2007). Consequently, this study sought to determine if comprehensive infection control initiative educational program can reduce and sustain lower rate of needlestick and sharp objects injuries among the nursing students participated in the program.

METHODS

This longitudinal, interventional study was conducted at Al-Balqa Applied University/ Zarka College in the middle of Jordan, with an approximate total enrolment of 3500 students. The comprehensive infection control initiative educational program had been reviewed and approved by the Institutional Review Board. The entire program was divided into three phases. The first phase constituted an analysis of the incidents reports documented the needlestick and sharp injuries experienced by the nursing students over one semester (16 – week period), which help identify infection control practices and procedures of the clinical practice area and the sources of deficits. This time period (one semester) was considered representative of the needlestick and sharp injuries happened among the associate nursing students.

The researchers identified target areas for improvement which were validated by the hospital infection control staff; the quality management staff and the supervisors of nursing students in their clinical practice. Four target areas for improvement were approved by the experts; they are (1) Maximum compliance with infection control practices, (2) hands and environment care, (3) appropriate handling and disposing of needles and sharp objects, and (4) wearing protective measures.

The second phase included implementing the comprehensive infection control initiative educational program. Nursing students at a pre-planned meeting were informed, oriented, and invited to participate in the program. Then they received the program plan, and were asked to facilitate the program through their participation. Their participation was one mean of fulfilling the clinical practice requirements according to which they were evaluated for their compliance with infection control practices.

Informed consent was obtained. Participants' confidentiality and anonymity were maintained by assigning random pseudonyms A, B, C, D and ........Z, which were written on the questionnaire form. They enabled the researchers to link the pre and post program data. Potential participants required to pass copy of needlestick or sharp object injury to the researchers and assured that they could withdraw without prejudice at any time.

Pre-intervention a covering letter that explains the purpose of the study followed by the demographic questionnaire in which the potential participant indicates personal information about his/her age, total academic average, total income of the family, medical insurance, personal and family medical and surgical history of hepatitis B vaccine and needlestick and sharp injuries.

Participants attended the first 8 hours workshop which was divided into two days to gain the students tolerance and collaboration. Reviewing of the infection control practices, the importance of maximum compliance with infection control practices, hands and environment care, appropriate handling and disposing of needles and sharp objects, and wear protective measures were strengthened in this workshop. All nursing students regardless of their decision to participate in the study or not were allowed to attend the comprehensive infection control educational program. The first educational day was initiated through audiovisual presentations. In the second day workshop, small and large focus group discussions were utilized. Focus group discussions were selected to stimulate the participants to take an active part in defining their own problems, establishing their goals, developing their solutions. The focus group discussions as a strategy to capture the participants' concerns and to describe their experiences had been emphasized by many researchers (Parker and Tritter, 2006; Murray and King, 2010).

Toward the end of the workshop, potential participants were asked to submit one or more pages reflecting on one or more personal events of needlestick
and/or sharp injuries. Student’s reflective writing was guided by group of questions derived from the work of (Ruth-Sahd, 2003) which includes:
- What did I do?
- What should I have done that I did not?
- How would I act differently, what would I do next time?

Reflection as a teaching learning strategy was driven by issues and concerns rose by authors. Some authors discussed the pervasive exercise of power that may be inherent with reflection (Gilbert, 2001). While other authors raised concerns about the importance of sharing private thoughts (Bradbury-Jones et al., 2008), and the importance of confidentiality and safe environment in relation to reflection (Chirema, 2007). Thus, nursing students were permitted to deliver the individual reflective journals with the same pseudonyms which were written on the demographic questionnaire. After participating in the comprehensive infection control initiative educational program, potential participants were asked to submit a copy of any personal needlestick or sharp injury occurred after their involvement in the program to the researchers. Also, a copy of hepatitis B vaccine document either if it is an initial or a follow up dose should be given to the researchers. Excellent participation in the educational activities was rewarded by different forms of small gifts donated from the researchers.

Four months after the first workshop, the second workshop the same as the first workshop program was conducted for all nursing students including the potential participants before they returned to clinical practice for the final pre-graduate semester. The researchers thought that the repetition of the workshop will allow the nursing students to exchange their experience and emphasize the importance of maximum compliance with infection control practices, hands and environment care, appropriate handling and disposing of needles and sharp objects, and wear protective measures. Both workshops were planned, facilitated and coordinated by the researchers.

Phase three: Evaluation of the impact of implementing the comprehensive infection control initiative educational program in the needlestick, sharp injuries rate and the hepatitis B vaccine coverage.

### RESULTS

Needlestick and sharp injury were defined as the occurrence of one or more needlestick, or sharp injuries with used needle, or contaminated sharp object. Hepatitis B vaccine coverage used as an indicator for the nursing student’s compliance with infection control practices. During the entire study period, daily feedback on needlestick and sharp injuries incidents was given to the researcher – corresponding author - by the hospital infection control staff to validate the participant’s report.

All the second year nursing students committed completely to the comprehensive infection control initiative educational program and the study requirements, 36 students of them were female and 6 students were male. The average age of the participants was 20 years (SD = 3.2), and their academic average was 65% (SD = 7.5). The needlesticks, sharp injuries and hepatitis B vaccine information for the potential participants toward the end of the first clinical semester period was considered as a baseline rate. The comprehensive infection control initiative educational program was implemented before the nursing students admitted to the second clinical semester. The post intervention period was the period extended over the second and third clinical semesters. The third clinical semester is the final pre-graduate semester for the associate nursing students. The data were analyzed with SPSS statistical package. Descriptive statistics were also examined. An alpha level of 0.05 was used for all statistical tests.

The needlestick and sharp injuries rate during the baseline period was 57%, which was significantly decreased by 24% in the second period reading with \( P < .001 \) (Table 1).

In the third reading (second follow up period), there was further reduction in needlestick and sharp injuries rate to 2%, a fall of 55% from baseline reading with \( P < .001 \) (Table 2).

Hepatitis B vaccine coverage among the participants significantly increased from 33% in the baseline reading to 67% \( P < .001 \) in the second period reading (Table 3). In the third reading 100% of the participants reported that they have received the full series of hepatitis B vaccine with \( P < .001 \) (Table 4).

### Table 1

<table>
<thead>
<tr>
<th>Have you been Exposed to Needlestick or sharps object injuries</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24</td>
<td>18</td>
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<tr>
<td></td>
<td>57%</td>
<td>43%</td>
</tr>
</tbody>
</table>

### Table 2

<table>
<thead>
<tr>
<th>Needlestick and sharp injury rate during the baseline period was 57%</th>
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</table>
Table 2. Participants Exposure to needlestick and other sharp object injuries 36 week post participation in the educational program comparative reading (N = 42)

<table>
<thead>
<tr>
<th>Have you been Exposed to Needlestick or sharps object injuries</th>
<th>Baseline survey</th>
<th>36 wks post participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>24</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>57%</td>
<td>43%</td>
<td>2%</td>
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<td></td>
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<td>98%</td>
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(P < .001)

Table 3. Hepatitis B vaccine coverage among the participants Baseline survey (N = 42)

<table>
<thead>
<tr>
<th>Have you been received the full hepatitis B vaccine series</th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td></td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>33%</td>
<td>43%</td>
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</tbody>
</table>

Table 4. Hepatitis B vaccine coverage among the participants 36 week post participation in the educational program comparative reading (N = 42)

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<th>Baseline survey</th>
<th>36 wks post participation</th>
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<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>18</td>
</tr>
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<td></td>
<td>33%</td>
<td>43%</td>
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(P < .001)

DISCUSSION

The overall findings of this study provided evidence to the potential value of the comprehensive infection control initiative educational program in reducing the rate of needlestick and sharp injuries among the participants. The incidents of needlestick and sharp injuries declined from 57% to 33% among the participants after 16 weeks of implementing the program, and further decline in the rate of the incidents to reach 2% among the participants. This total significant decline in the rate of needlestick and sharp injuries, and the sustainability of progressive significant decline which reached 55% with only one incident of needlestick among the participants over 16 week toward the end of the follow up period highlighted the importance of moving from the traditional didactic methods to more interactive approaches which match the findings of Mikkelsen et al., 2007; Reime, 2008.

The study findings clarified that there is still insufficient attention paid to the prevention of needlestick and sharp injuries for nursing students during their training in hospitals. This was indicated by the number of needlesticks, sharp injuries and the coverage of hepatitis B vaccine in the baseline survey of this study. It also indicated that more attention should be paid to culture, attitudes and practices in the clinical practice environment among the clinical nursing staff and other health care workers, which was emphasized and recommended by Schelonka, 2006. The findings highlighted the importance to use the medical devices as one of the most important steps to reduce and prevent needlestick and sharp injuries, which was recommended by Adams and Elliott, 2006; Lamontagne et al., 2007. The study findings also indicated that hepatitis B vaccination series should be recommended to be obligatory pre-requisite for admitting the nursing students to clinical practice areas in order to protect them from the risk of their or their colleagues’ malpractices.

The limitations of this study include the small sample, lack of control group, and the purposive convenience sample selection which could prohibit the generalization of the study findings. Although, the study results depend on the students self report of needlestick and sharp injuries. Validity and reliability of the results could be
higher if mixed method as observation either by the clinical teacher or the students’ preceptors used for identifying the needlestick and sharp injuries to overcome any unreported cases. The use of needlesticks, sharp injuries and hepatitis B vaccination only as indicators for the impact of the comprehensive infection control initiative educational program may limit observing other effects of the program, such as compliance with infection control practices and procedures which could have indirect effect on the reduction of needlestick and sharp injuries rate reported in this study findings. However, the outcomes of this study provide evidence that the comprehensive infection control initiative educational program which utilized different interactive teaching learning strategies helped nursing students learn from their own experiences and improve their own practices.

Taking into account that reduction of needlestick and sharp injuries among the participants minimizes their risk for hospital infection, collaborative effort including the academicians and hospital administrators is needed to plan, implement, and evaluate hospital based programs to increase compliance with standard precautions and reduce the hospital infection rate. Faculty members of nursing colleges need to consider ways in which they can contribute to affect positive change in clinical settings.

In conclusion, further studies which rely on mixed method approaches, interdisciplinary collaboration, and involve all of the health care workers are highly recommended.

REFERENCES


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