A Study on the Knowledge and Performance to Prevent Infection for Dental Hygiene Students

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Objective: A survey was conducted of 206 students in dental hygiene departments in some areas who experienced clinical practice to find out their knowledge and performance of infection prevention.

Methods: The general characteristics of those surveyed, the experience of stabbing the instrument during practice, knowledge of infection prevention, and practices were self-populated, and statistical analysis of the data was conducted using the IBM SPSS Statistics program.

Results: Out of 89 students (43.20%) who had been stabbed by a device during clinical practice, 40 (44.94%) were found to be the highest when cleaning the instrument after treatment, and 36 (40.45%) especially when cleaning the explorer. Wearing a mask at all times was the highest for dental care at 76.21% (p < 0.05), and 63.59% for school experience in prevention of infection (p < 0.05). The highest rates were 72.33% for washing hands after treatment, 72.81% for wearing new gloves every time a patient changed, and 73.79% for always wearing gloves when cleaning a device, but it has no significance.

Conclusion: Recognizing the importance of education in dental hygiene and infection management of students, further development of programs that can improve the performance of wearing personal protective gear and preventing infection in clinical practice is deemed necessary.

Keywords: cross infection, microorganism, dental health education

Introduction

As dental technology develops, infection control is essential, a good quality of medical services are needed, and the importance of infection control for both patients and healthcare workers must be emphasized.

Dental clinics are exposed to a variety of pathogenic microorganisms, and due to the nature of dental care, they are much more at risk than other health care workers by treating them with exposed to body fluids including blood and by use of sharp instruments.

It can be transmitted through stabbing or exposed body wounds during dental care or through various channels in aerosol form. About 50 to 200 microbes are found in the mouth [1] and can be a medium for infection if the room is contaminated by various filth, such as blood, saliva, and bodily fluids of the patient [2]. It is also important to keep the operat-
ing room, the waiting room, the desk, and the treatment room clean [3] because pollution-caused conditions mean dirty or dangerous [4].

Treatment by dental clinics does not occur in facilities equipped with anti-infection facilities such as tooth extraction and hemorrhagic care, especially surgical rooms, but in general clinics with relatively poor anti-infection facilities, thus placing the dental hygienists in a much higher probability of infection exposure [5].

Some protection measures against infectious diseases are best to be immune to the disease, and dental workers are particularly encouraged to take vaccines such as hepatitis B, influenza, measles and rubella [6,7].

However, for infectious diseases (HIV, etc.) that cannot be immunized, care must be taken to prevent infection to protect against occupational hazards, and also prevent the spread of infectious diseases through dental care [8].

The dental clinic is a place where patients and healthcare workers meet and where cross-infection occurs frequently.

Since cross infection occurs from patient to dentist, from dentist to patient, from patient to family, the practical way to protect dental health workers and patients from infection is to prevent exposure and spread of pathogenic microorganisms [9] and sterilization, and wearing a personal protective gear.

Since 2006, the Ministry of Health and Welfare has prepared standards to prevent infection in dental clinics and conducted a survey on infection control, referring to the use of personal protective equipment [10].

In order to prevent dental workers from being infected by infectious diseases during the dental treatment, thorough sterilization and disinfection of dental medical equipment and various equipments are required, and thorough infection control is required to prevent cross infection by wearing personal protective equipment.

In particular, it is deemed that knowledge and performance of prevention of infection are very important because dental hygienists are more at risk of infection than other health care workers.

This study conducted a survey of dental hygiene students in some areas to find out the knowledge and performance required to prevent infection, and since it can also increase the probability of infection from diseases due to injury to equipment or lack of protective equipment during practice, I have prepared the basic data for prevention of cross infection through clinical thorough infection control after graduation.

Materials and Methods

1. Research subjects and methods

This study was conducted from June 2019 to July 2019 on students who experienced clinical practice from first to fourth grades in dental hygiene in some areas. The questionnaire was self-entered and used as the final analysis data for 206 fully filled students among the retrieved questionnaire. The research method was conducted as a survey method, with the general characteristics of the surveyed persons, their experience of being stabbed by the apparatus during practice, their knowledge of infection prevention, and their practices.

2. Analysis method

Statistical analysis used the IBM SPSS Statistics program (ver. 23.0; IBM Corp., Armonk, NY, USA) and the percentage of the subject’s school year, regional characteristics, experience of stab wounds to the instrument, and the timing and type of material. In the knowledge and practice of infection prevention, the relationship between wearing masks, teaching experience of infection prevention, washing hands after treatment, wearing new gloves, and wearing gloves when cleaning equipment was analyzed using ANOVA.

Results

1. General characteristics for subjects

The general characteristics of the subjects were analyzed by grade level: It was shown that 11 first graders (5.33%), 21 sec-

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<th>Table 1. Grade characteristics of the subject</th>
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The subject’s experience of being stabbed with instruments and materials

The subject’s experience of stabbing an instrument during the exercise was investigated; a number of 89 students (43.20%) were found to have been stabbed, 117 students (56.80%) more often were not stabbed (Table 3).

The results of a survey of the time of injury or injury to the apparatus were shown that a number of 40 students (44.94%) were most common when washing the equipment after treatment, followed by 17 students (19.10%) during treatment, 10 students (11.24%) when preparing for treatment, 18 students (20.22%) when cleaning after treatment, and 4 students (4.50%) for "other" (Table 4).

3. The degree of practice and knowledge on infection prevention

According to the survey on the practice of infection prevention by field, it was shown that 76.21% (p<0.05) for ‘always wearing the mask’, 15.53% for ‘frequently’, 5.83% for ‘sometimes’, 1.46% for ‘never wear’, and 0.97% for ‘rarely’ (Table 5).

The instruments and materials that hurt were shown that a number of 36 students (40.45%) for explorer, 18 students (20.22%) for scaler tips, 11 students (12.36%) for blade, 10 students (11.24%) for needles, 7 students (7.90%) for files, 4 students (4.50%) for other, 3 students (3.37%) for bur, and most likely to be damaged when cleaning the explorer.

| Table 5. Degree of practice and knowledge on infection prevention |
|-----------------------|--------------|--------|--------|
| Category              | Frequency   | %      | p-value |
| Wearing the mask      | Always 157  | 76.21 | 0.034* |
|                       | Frequently 32 | 15.53 |        |
|                       | Sometimes 12  | 5.83  |        |
|                       | Rarely 2      | 0.97  |        |
|                       | Never 3       | 1.46  |        |
|                       | Total 206     | 100   |        |
| Education experience on infection prevention | At school 131 | 63.59 | 0.023* |
|                       | At clinic 47  | 22.82 |        |
|                       | Internet 24   | 11.65 |        |
|                       | Other media 2 | 0.97  |        |
|                       | Never 2       | 0.97  |        |
|                       | Total 206     | 100   |        |
| Washing hands after treatment | Always 149 | 72.33 | 0.327 |
|                       | Frequently 37 | 17.96 |        |
|                       | Sometimes 11  | 5.34  |        |
|                       | Rarely 6      | 2.91  |        |
|                       | Never 3       | 1.46  |        |
|                       | Total 206     | 100   |        |
| Wearing new gloves    | Always 150    | 72.81 | 0.158 |
|                       | Frequently 38 | 18.46 |        |
|                       | Sometimes 14  | 6.80  |        |
|                       | Rarely 1      | 0.48  |        |
|                       | Never 3       | 1.45  |        |
|                       | Total 206     | 100   |        |
| Wear gloves when washing the instruments | Always 152 | 73.79 | 0.495 |
|                       | Frequently 36 | 17.47 |        |
|                       | Sometimes 12  | 5.83  |        |
|                       | Rarely 2      | 0.97  |        |
|                       | Never 4       | 1.94  |        |
|                       | Total 206     | 100   |        |

*p<0.05.
In ‘washing hands after treatment’, it was shown that 72.33% for ‘always’, 17.96% for ‘frequently’, 5.34% for ‘sometimes’, 2.91% for ‘rarely’, and 1.46% for ‘never’. In ‘wearing new gloves’, it was shown that the highest rate was 72.81% for ‘always’, 18.46% for ‘frequently’, 6.80% for ‘sometimes’, 0.48% for ‘rarely’ and 1.45% for ‘never’. In ‘wear gloves when washing the instruments’, it was shown that 73.79% for ‘always’, 17.47% for ‘frequently’, 5.83% for ‘sometimes’, 0.97% for ‘rarely’, and 1.94% for ‘never’.

There was a significant difference between ‘infection control at the time of washing the instruments’ and ‘infection control knowledge for sterilization and sterilization’ (p<0.05), but there were no significant differences in ‘washing hands after treatment’, ‘wearing new gloves’, and ‘wearing gloves for cleaning equipment’.

Discussion

Dental clinics require both patients and employees to be protected from cross-infected by wearing personal protective gear, particularly during treatment, citing the fact that they often accompany bleeding, saliva, and dirt during treatment, and that the hands of dentists may be wet, and that water can splatter directly from the patient’s mouth up to a 1 meter radius [11]. Because the dental clinic is always exposed to a number of pathogenic microorganisms, the recent emergence of a deadly virus has added to the severity of the infection problem [12,13].

Dental health care workers should have knowledge of what situations an infection can occur, and based on this, they should always use methods to prevent exposure to contaminated liquids, aerosols, blood and saliva to prevent cross infections in dental clinics that can occur between dental workers and dental patients [8].

Maintaining aseptic formula is an absolute principle for preventing infection and as a process for managing health, prevention of infection can be seen as a primary means of preventing infection from disease.

Therefore, in order to practice treatment for infection prevention in the care room, sterile and disinfection control and protective equipment on instruments and materials should be worn to reduce the level of infectious microorganisms for infection control before, during, and after treatment.

Students in the Department of Dental Hygiene have little clinical practice experience required for the clinical curriculum, increasing the need to strengthen practice for infection control in post-graduate clinical trials. In this study, I have researched to prepare the basic data for preventing infection by students after graduation by identifying the knowledge and practice of wearing protective gear, experience of stabbing equipment, and prevention of infection in practice.

The study found that 43.20% of dental hygienists in nearby areas experienced stabbing in pointy or sharp instruments during clinical practice. In Lee and Cho’s study [14], 52% did not make much difference. These are mainly instruments used frequently in surgical procedures, basic care, and periodontitis treatment, so injury can be considered to have a higher risk of infection.

In cases of clinicians working for dentists, 88.7% in Cho’s study [15] and 76.6% in Yoon and Choi’s study [16], these statistics are higher than those in dental hygiene and clinical practice, making it much more likely for clinical institutions to be exposed to infections after graduation.

The period of injury was most common during post-care cleaning of apparatus, 40.45% when cleaning explorer, 20.22% when cleaning scaler tip, 12.36% when cleaning blade, 11.24% when cleaning needle, so it mainly happened when washing peaked or sharp instruments.

In the degree of knowledge and practice of infection prevention, 76.21% of students always wear masks, and it shown as statistically significant (p<0.05).

In Kim’s study [17], 46.7% of dental hygienists said they always wear masks, so they must wear masks when they frequently use ultrasonic waves, air-water injectors, high-speed and low-speed hand pieces, or spray water, blood, and body fluids in the mouth during patient care.

While in ‘education experience on infection prevention’ the highest in school was 63.59% which is also statistically significant (p<0.05), Yoon and Choi’s study [16] found that 45.3% were educated on infection control through school education, which was lower than in this study, but it was suggested that they should also receive continuous repair training in clinical practice.

In hand-washing after treatment, 72.33% of students said that they ‘always wash after treatment’, 2.91% said they ‘almost never wash’ and 1.46% ‘did not wash at all’. Later in the clinic, the most contact with patients or their guardians should be performed, the benefits and obstacles gained in performing hand washing, and the possibility of exposure to pathogenic infections by not performing hand washing should be minimized.

In wearing new gloves, ‘always wear’ was the highest with 72.81%, with no significance. On the other hand, only 18.8% of dental hygienists in Lee et al. [18] study are ‘always wear’ and Kim’s study [17] of dental hygienists are ‘always wear’ was higher than 41.4%.

In this study, the practice rate of ‘always wearing gloves’
was high for dental hygiene students, and in the study of Kang
and Choi’s study [9] also showed that 52.7% of dental hygiene
students in the health class had a lower rate of gloves than
those in clinical practice.

The reason why dental hygienists wear gloves at clinicians
are low is because it is cumbersome to use protective gear dur-
ing treatment, as in Kim’s study [17], or Choi et al.’s study [19]
also said that the reason why they do not wear gloves during
treatment is ‘uncomfortable’ or ‘not used by the director’ and
therefore aggressive infection control is required.

When there is a possibility of direct contact with the hands
of the dental health care worker with other secretions such as
saliva or blood in the dental clinic, dentists, including dentists,
should wear gloves to prevent cross infection of patients and
employees.

In this study, ‘always wear’ showed a high wear rate of
73.79% for cleaning equipment, but 0.97% for ‘little wear’
and 1.94% for ‘never wear’ require a change in perception of
infection control. As such, dental care providers in dental clin-
ics must wear personal protective gear to ensure that both pa-
tients and carers do not experience cross infections.

In this study, although limited since the study was con-
ducted on dental hygiene students in some areas, the clinical
practice after graduation should ensure that pathogenic micro-
organisms are not always widely exposed to infectious
diseases.

In particular, the need for wearing personal protective gear
and education to prevent cross-infected diseases should be
further emphasized as interest in infection problems such as
coronaviruses (COVID-19) is rising these days.

Conclusion

This study was conducted on a number of 206 students who
experienced clinical practice from 1st to 4th grade to find out
the knowledge and performance of some local dental hygiene
students to prevent infection. In this survey, I would like to
provide basic data on dental hygiene education by providing
knowledge and practice on the experience and timing of in-
festation prevention, and the following conclusions were
obtained.

1. A number of 89 students (43.20%) were found to have
been stabbed by a device during clinical practice.

2. At the time of damage, the highest rate was 44.94% when
cleaning the instrument, and the highest rate was 40.45% for
the explorers and materials with the most injury, scaler tip
20.22%, blade 12.36%, needle 11.24%, file 7.90%, and bur
3.37%.

3. Wearing a mask at all times in the dental clinic was the
highest (p<0.05) and the most significant in educational ex-
perience in prevention of infection was the highest in school ex-
perience (p<0.05).

4. After treatment, 72.33% of students wash their hands and
72.81% of them wear new gloves, 73.79% of them always
wear gloves when cleaning the equipment, but there was no
significant difference.

Conflict of Interest

No potential conflict of interest relevant to this article was
reported.

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