

8-1-1998

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V. Wiwanitkit

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Recommended Citation

Wiwanitkit, V. (1998) "Accidental exposure to blood-borne pathogen during medical training among pre-clinical year medical students of the Faculty of Medicine, Chulalongkorn University," *Chulalongkorn Medical Journal*: Vol. 42: Iss. 8, Article 2.

Available at: <https://digital.car.chula.ac.th/clmjjournal/vol42/iss8/2>

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Accidental exposure to blood-borne pathogen during medical training among pre-clinical year medical students of the Faculty of Medicine, Chulalongkorn University

Viroj Wiwanitkit*

Wiwanitkit V. Accidental exposure to blood-borne pathogen during medical training among pre-clinical year medical students of the Faculty of Medicine, Chulalongkorn University. Chula Med J1998 Aug; 42(8): 609-18

- Objective** : *To study accidental exposure during medical training among pre-clinical year medical students of the Faculty of Medicine, Chulalongkorn University*
- Setting** : *Department of Laboratory Medicine, Faculty of Medicine, Chulalongkorn University*
- Design** : *Retrospective descriptive study*
- Subjects** : *Third year medical students of the Faculty of Medicine, Chulalongkorn University in academic year 1998*
- Method** : *Questionnaire survey and interviewing of pre-clinical year medical students in the academic year 1998*
- Results** : *No one interviewed could describe correct post-exposure management. But 95.92% of the medical students believed that they would report to others if they had an accidental exposure. In this study we found that only 3 students revealed that they had ever had accidental exposure since they started in pre-clinical year medical study. We found that each episode of exposure was different in the details.*

Conclusion : *Although the universal precautions are taught in many subjects, we also found that accidental exposures still occur. Not only prevention of accidents but also post-exposure management should be frequently reiterated to the medical students at every level. Any medical practice of students should be under supervisor control.*

Key words : *Accidental exposure, Pre-clinical year medical student, Post-exposure management.*

Reprint request : Wiwanitkit V. Department of Laboratory Medicine, Faculty of Medicine,
Chulalongkorn University, Bangkok 10330, Thailand.

Received for publication. May 20, 1998.

วิโรจน์ ไววานิชกิจ. อุบัติเหตุจากการเรียนปฏิบัติงานทางการแพทย์ในนิสิตแพทย์ชั้นก่อนคลินิก
คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย. จุฬาลงกรณ์เวชสาร 2541 ๘.๘: 609-18

- วัตถุประสงค์ : เพื่อศึกษาการเกิดอุบัติเหตุจากการเรียนปฏิบัติงานทางการแพทย์ในนิสิต
แพทย์ชั้นก่อนคลินิก คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
- สถานที่ทำการศึกษา : ภาควิชาเวชศาสตร์ชั้นสูตร คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
- รูปแบบการศึกษา : การศึกษาเชิงพรรณนา ชนิดย้อนหลัง
- ประชากรที่ศึกษา : นิสิตแพทย์ชั้นปีที่ 3 คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย ในปีการ
ศึกษา 2541 จำนวน 175 คน
- วิธีการศึกษา : การสำรวจโดยใช้แบบสอบถามและการสัมภาษณ์
- ผลการศึกษา : พบว่าไม่มีนิสิตแพทย์ที่สามารถอธิบายถึงขั้นตอนที่ถูกต้องที่ต้องปฏิบัติ
หลังจากการเกิดอุบัติเหตุ แต่พบว่ามีนิสิต 95.92% มีความคิดที่จะเล่าถึงการเกิด
อุบัติเหตุ นั้นแก่ผู้อื่น จากการศึกษาพบนิสิตเพียง 3 ราย ที่เกิดอุบัติเหตุ
จากการฝึกปฏิบัติงานในช่วงเวลาตั้งแต่เริ่มเรียนในชั้นก่อนคลินิกพบว่า
รายละเอียดของการเกิดอุบัติเหตุแต่ละครั้ง มีความแตกต่างกัน
- บทสรุป : แม้ว่าจะมีการสอนเนื้อหาวิชาเกี่ยวกับการระมัดระวังแบบครบวงจรใน
หลายรายวิชาแต่ยังคงมีอุบัติเหตุจากการทำงานเกิดขึ้นจึงควร
เน้นย้ำให้นิสิตแพทย์ในทุกระดับชั้นเห็นความสำคัญและเข้าใจถึงการ
ป้องกันและการปฏิบัติตนหลังจากการเกิดอุบัติเหตุนอกจากนี้การฝึกปฏิบัติ
งานทุกครั้งควรอยู่ภายใต้การควบคุมดูแลของผู้เชี่ยวชาญเสมอ
- คำสำคัญ : การเกิดอุบัติเหตุ, นิสิตแพทย์ชั้นก่อนคลินิก, การปฏิบัติตนหลังเกิดอุบัติเหตุ

Many laboratory procedures taught in the pre-clinical year are important subjects that graduate doctors must know and practice correctly. Pre-clinical year medical students are required to study those procedures.⁽¹⁾ In learning laboratory medicine, students have to study and practice with many types of medical specimens. But these days, any exposure to a patient's blood or other body fluids can result in the transmission of a number of pathogens.⁽²⁾ To deal with medical specimens, ones must follow the universal precautions.⁽³⁾

In studying laboratory medicine, conventional laboratory skill is obtained by classroom lectures and practice. To avoid unnecessary risks to the students due to their unskilled techniques, model training is given to every student at first and then they are allowed to get actual human training under staff supervision.

There have been many studies concerning accidental exposure during medical practice and service among many types of medical workers in Thailand.⁽⁴⁻⁸⁾ But at Chulalongkorn University there has been only one report about this topic but it discussed clinical-year medical students.⁽⁴⁾ Under the principle that pre-clinical year medical study is the basis of clinical-year and resident-year medical study, if the problems of these medical students are understood, the students can be guided in a safe direction in medical practice. With the concept that accidents can occur at any time even with the best prevention, the post-exposure management is still an important topic. Therefore, this study was about accidental exposure, especially the post-exposure aspect during medical training among pre-clinical year medical students.

Materials and methods

The population in this study were third year medical students of the Faculty of Medicine, Chulalongkorn University during the 1998 academic year. All second year medical students were excluded because of the lack of experience in medical practice and service.

A self-administered questionnaire was used to collect information about accidental exposure and the post-exposure situation. Questions in the questionnaire were explained to the students before they replied them. And whenever students reported accidental exposures were unafraid to discuss them, they were interviewed in detail about those accidents. The questions used in this study were shown as Diagram 1. Descriptive statistical analysis was carried out on the data when appropriate.

Results

From a total of 175 medical students, 98 medical students responded and returned the questionnaires. The response rate was 56.0% There were 43 males and 55 females.

Sixty-three medical students (64.29%) stated that they did not know what they would do if they had an accidental exposure. The other 35 medical students (35.71%) who stated that they knew what they would do if they had an accidental exposure could not describe the correct procedures. (Table 1)

Ninety-four medical students (95.92%) replied that they would tell others about accidental exposure. The remaining four residual medical students answer for this (4.08%) replied that they would not tell others about the accidents and there were many reasons for that feeling. (Table 2)

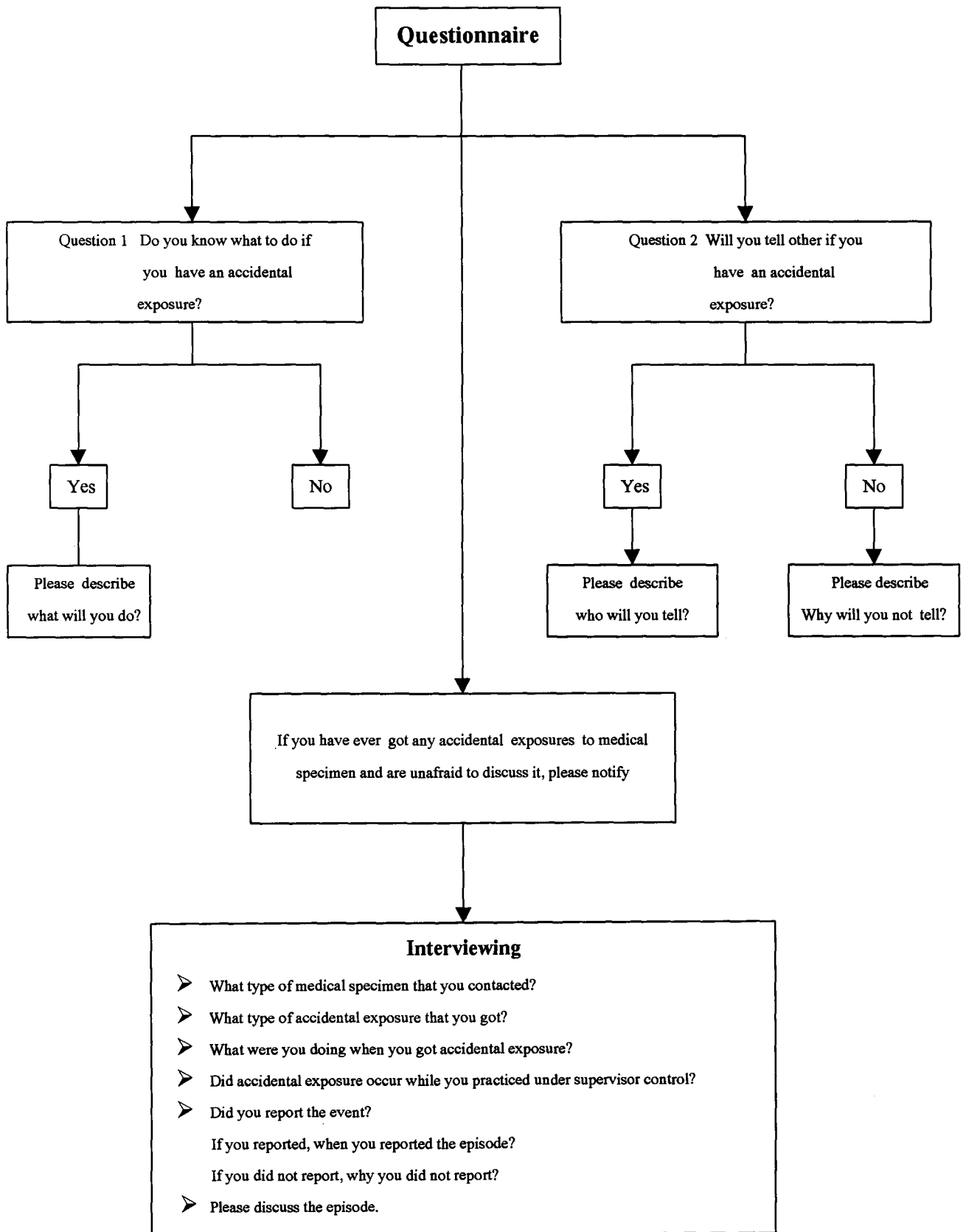


Diagram 1. Questions used in this study.

Table 1. The description for the question what will you do in case that the students know what to do if they had an accidental exposure.

Description	Number	%
Cannot describe	31	88.57
Can describe	4	11.43
• Clean wound	1	2.86
• Report the case	3	8.57
• Clean wound and report the case	0	0.00
Total	35	100

Table 2. The answer of the students to the question that they would tell others or not if they had an accidental exposure.

	Number	%
Tell	94	95.92
• Not specific person	92	93.88
• Specific person - closed friend	1	1.02
- supervisor / advisor	1	1.02
- parents	0	0.00
Not tell	4	4.08
• Belief that it is not necessary	2	2.04
• Belief that it will bring difficulty	1	1.02
• Concerning the problem of confidentiality	1	1.02
Total	98	100

Only three reported that since the time they started pre-clinical year period, they had ever had an accidental exposure. None reported more than one accidental exposure. Interviews revealed that the medical specimens they contacted in the accident were blood specimens. All of them reported the same type of accidental injuries – needle stick injuries. After the exposures, only two of the medical students reported

the episode, but not within the proper time after exposure. However, both had counseling and accepted the antiretroviral drug. The one who did not report the exposure stated that her reason for not reporting was a belief that it was not necessary as no blood had leaked from the wound. All three had their accidents during practice procedures with actual patients. Concerning the serology of the patients, we found that one of the

three had Anti HIV seropositive and the others had unknown serology. The details for each accidental exposure were different. (Table 3)

exposure. No matter how well they were taught about prevention, accidents still occur. Thus the steps after accidents are as important as the prevention. Perhaps

Table 3. Detail for each accidental exposure.

Case	Sex	Under supervisor	Type of specimen	Accident during	Report within
1	Male	No	Blood	Dispose needle	2 days
2	Male	No	Blood	Recap needle	3 days
3	Female	No	Blood	Uncap needle	no

Discussion

Compared to other studies among clinical-year medical students in Thailand, the accidental exposure rate among the pre-clinical year medical students in this study is less though this group of students had less experience in medical practice. This might be expected since there are not as many laboratory procedures that pre-clinical year medical students must practice compared to clinical-year medical students. And all practice in the pre-clinical year must be controlled by supervisors while some practices in clinical-year course do not.

Although universal precaution is taught in many subjects, none of the students in this study could describe the correct steps to follow after an accidental

this point is one of the pitfalls in teaching about universal precautions. It is very encouraging that even though they were unsure what to do after exposure, they still decided to tell others about the accident which mean something, especially something unpleasant or dangerous, that happen unexpectedly or by chance.⁽⁹⁾ Most of them stated that there wasn't any specific person that they would tell or they would not tell. Though they did not state that they would tell the medical staff as a part of report system that is better than a statement that they would not tell.

Considering the students who had an accidental exposure, two-thirds of them reported the event. In comparison to the reporting rate among clinical-year medical student in previous studies⁽⁴⁻⁵⁾ (Table 4),

Table 4. Detail of studies about accidental exposure among medical students in Thailand.⁽⁴⁻⁵⁾

University	Level of students	Most common type of Accident injury	Reporting rate
1. Chiangmai	5 th -6 th year	Cutaneous exposure (82.6 %)	59.5 %
2. Chulalongkorn	4 th - 5 th -6 th year	needle stick injuries (62.0 %)	28.6 %

the reporting rate in pre-clinical year medical students in this study is higher. Why does it go on this way? Perhaps because the older reporting system was difficult and time-consuming. Or it may be that when more experience is gained, more universal precaution principles will be violated.

As expected blood was the medical specimen that students who had accidental exposures most frequently contacted. This may be because blood is the most common medical specimens used in laboratory and other procedures.⁽¹⁰⁾ Blood is one of the most dangerous medical specimens, therefore, promotion of safety procedures are still required. Concerning the types of accidental injuries, needle stick injuries are most frequent. This is different from the types of accidental injuries among clinical-year medical students in previous reports where the most common type was cutaneous or mucous membrane contact. This may be because equipment for the pre-clinical year medical students is already prepared when they practice the medical procedure. Staffs are required to check this point. In cases of accidental exposure in this study, the students practiced by themselves without supervisor control.

This study was a retrospective study so there might be some problems of information bias from memory. The population in this study is rather homogeneous because all got same experience – same period of time, same place of study and same knowledge taught. Discussion about experience of one's accidental exposures to blood specimens is sometimes a psychic trauma. We did not force the students to reply the questionnaire so there must be some who had ever got accidental exposures and mind discussing them – the actual accidental exposure rate must be higher than the

rate in this study. So the response rate seem to be rather low. But in case that we got the data, we believed that it was the useful and actual data because they were willing to tell.

From this study some suggestions relating to accidental exposure among the medical students during their training include the following:

1. Universal precaution teaching is still necessary and should be taught in every level of medical study. And there should be concern not only for topics related to prevention of accidental exposure but also topics about post-exposure management and reporting.

2. Medical staff should act as supervisors every time that medical students practice laboratory procedures. And equipment related to universal precaution (such as gloves, gowns, masks, etc.) should be sufficient and available.⁽¹¹⁾

3. In the reporting system, the counseling system should be emphasized. Guidelines for these topics should be widely taught. Every medical student should know whom they must consult and report.⁽¹²⁾

4. No matter how well the universal precaution principles are taught, if the students don't follow them, they are useless. They must be aware that neglecting the rules can bring extremely dangerous results. With the basic principle of learned delinquency behavior,⁽¹³⁾ it is suggested that every staff should use more strict training for topics relating to safety.

5. Not only medical specimens, but other items such as laboratory instruments, chemical reagents and radioactive materials are also dangerous. A complete safety program and emergency first aid training related to each topic should be provided for the students. (Table 5)⁽¹⁴⁻¹⁶⁾

6. With the principle that accident will occur

Table 5. Safety principle for laboratory procedure.⁽¹⁴⁻¹⁶⁾

Topic	Method for safety
1. pre - exposure	
1.1 Medical specimen	<ul style="list-style-type: none"> - universal precaution - isolation technique - vaccination
1.2 Medical instrument	<ul style="list-style-type: none"> - decontamination technique - safety device - flame, electricity, temperature control - laboratory setting - quality control
1.3 Chemical reagent and radioactive material	<ul style="list-style-type: none"> - shipping and packing label - housekeeping technique - personal risk monitoring
2. post - exposure	
2.1 Medical specimen	<ul style="list-style-type: none"> - cleaning technique - reporting system - counseling
2.2 Medical instrument	<ul style="list-style-type: none"> - basic life support - accidental control
2.3 Chemical reagent and radioactive material	<ul style="list-style-type: none"> - Cleaning technique - Haddon's ten countermeasure - Anaphylaxis precaution - Basic life support

when no careless behavior of human being is expressed. So accident exposure in human being is an event that can't be totally prohibited but safety principle can reduce it.

Conclusion

Accidental exposure is a totally unwanted event. To reduce the rate of such exposures the universal

precautions principle should be followed. In medical training, students should be trained under close supervision. Not only prevention of accidents but also post-exposure management should be taught. Accidental exposure among all groups of medical workers can be reduced, if practice follows the principle "safety come first."

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