Problems in the Management of Medical Waste in Thailand

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Objectives : *To identify problems in the management of medical waste in Thailand for future development.*
Material and Method : *The study was done in 39 hospitals during June and July 2002 by interviewing medical personnel on knowledge and attitude in management of medical waste, observation of practice and checking the amount of medical waste in waste bags. Certain laboratory investigations were done in dustmen.*
Results : *The amount of medical waste was 0.41 kilogram per bed per day. Problems identified were inadequate knowledge in management, improper practices, high incidence of sharp injury at work. Laboratory tests in dustmen showed evidence of pulmonary tuberculosis in 3.4%, parasites and intestinal pathogens in stools 5.1% and positive for HBsAg in 8.5%.*
Conclusion : *Improper management of medical waste was present in all hospitals. Risks of exposure and incidence of infection related to the management were at concerned levels. Education and practice guidelines are needed.*

Keywords : *Problems, Management, Medical waste, Thailand*

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The amount of municipal waste and medical waste has increased rapidly posing rising risks of waste-related diseases and mortality[1-4]. Standard guidelines for management of medical waste have been enforced in the United States since 1988 by the US Medical Waste Tracking Act. In Thailand, guidelines on medical waste management was proposed in 1992 and regulations soon followed[5]. The management with medical waste required knowledge in and co-operation of all persons concerned and must be supported by adequate provision of equipment and budget. Management of medical wastes should be assessed and related problems be amended. The problems included minimizing the amount of medical wastes handling and disposal procedures, the knowledge and awareness of individuals involved in medical waste generation, collection, transport and disposal. Some important health impacts on dustmen are also worth exploring.

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Material and Method

The study was done from June to July 2002 involving 39 hospitals across Thailand. The study was done by :

1. Interviewing doctors, nurses including infection control nurses (ICNs), ward workers and dustmen with knowledge and practice in the management of medical waste.
2. Observation of practice of ward workers.
3. Examination of sampled waste bags for the exact amount of medical waste.
4. Laboratory investigation for infections in garbage collectors.

Descriptive statistics were used for analysis.

Results

The study on the problems of management of medical waste in Thailand was done in 39 hospitals. As shown in Table 1, hospitals of every category of hospitals were randomly enrolled, these included 3 university, 8 regional, 10 provincial, 15 district and 3 private hospitals. The numbers of doctors and nurses interviewed were 205 and 426 respectively. The knowledge and awareness of management of medical waste of these doctors and nurses were compared with 39 infection control nurses (ICNs) (Table 2). It is interesting that only 83.4% and 84.6% of doctors and nurses and ICNs knew that their hospitals had a written policy in the management of medical waste. This could be due to lack of information or in certain hospitals, and there was no written policy. More ICNs knew responsible units for medical waste management than doctors and nurses. However, two ICNs (2.6%) did not know the organization in their hospitals that was responsible for medical waste management. Knowledge in definitions of medical waste was better in ICNs than the others.

Table 3 demonstrates the amount of hospital waste over a 1 week period in the 39 hospitals. In household waste bags (usually black), 3.3% of the weight was actually medical waste. On the other hand, in medical waste bags (usually red), 15.2% were other wastes. The actual medical waste was 45,353 kg. There were 15,677 beds in these hospitals. The medical waste in the surveyed hospitals was 0.4 kg./bed/day.

Ward workers were responsible for the collection of hospital waste in the wards and for transporting the waste bags to an allocated site. Their knowledge of some medical waste is demonstrated in Table 4. Used gauze was the best known medical waste (93.3%). Used sharps, waste from laboratory, human parts and live vaccine were known as medical waste in 83.8%, 76.2%, 69.0% and 64.3% respectively. Forty two of these ward workers were observed, each for 5 times, handing hospital waste (Table 5). All of them wore gloves but only 33.3% and 77.6% wore aprons and masks respectively. Segregation of waste into different categories was done at the sources of the waste in

Table 1. Numbers and genders of doctors and nurses enrolled for interview

	Categories of Hospitals*					Total
	U	R	P	D	Pri	
No.hospitals	3	8	10	15	3	39
Doctors	30	81	54	30	10	205
Nurses	60	160	110	61	35	426
Registered	29	82	55	32	20	218
Practical	0	45	49	23	0	117
Aides	31	33	6	6	15	91
Genders						
Male	25	58	44	20	8	155
Female	65	183	120	71	37	476

U = university, R = regional, P = provincial, D = district, Pri = private

Table 2. Knowledge and awareness of management of medical waste in doctors, nurses and ICNs (%)

Knowledge/Awareness	Doctorsand Nurses (N=631)	ICNs (N=39)
Policy	83.4	84.6
Resposible unit	76.2	97.4
Categories of hospital waste	92.9	97.4
Correct understanding of medical waste- Used gauze	95.4	94.9
- Waste from labs	84.6	89.7
- Human parts	83.4	97.4
- Used sharps	82.3	97.4
- Life vaccine	49.1	92.3

96.2%. Handwashing after taking off gloves was observed in 16.7% of the occasions.

Garbage collectors were more at risk of acquiring and disseminating infection at work. By interviewing 59 garbage collectors, only 72.9% knew that hospital waste was classified into several categories (Table 6). They knew common medical waste better than ward workers. (83.1-94.9% vs 64.3-93.3%). By observation of 39 garbage collectors, each for 5 times, the use of gloves while working was as high as 100% (Table 7). Aprons and masks were used less frequently (67.2% and 88.2%). Opening waste bags for segregation of waste at storage was as high as 20.5%. Handwashing after taking off gloves was observed in 65.1% of the occasions.

Garbage collectors were at risk of exposure to certain infections at work. Table 8 shows high prevalence rates of pulmonary tuberculosis, intestinal pathogens, and hepatitis B antigen.

Table 3. Amount of medical waste (kg) in different bags

Amount	Total	Medical waste (%)
Household waste bags	210,775.5	3.3
Medical waste bags	45,280.0	84.8

Table 4. Knowledge and awareness of medical waste in ward workers (%)

Knowledge/Awareness	No	%
Ward workers	210	100
Male	54	25.7
Female	156	74.3
Categories of hospital waste	170	81.0
Knowing that the following were medical waste :		
Used gauze	196	93.3
Waste from labs	160	76.2
Human parts	145	69.0
Used sharps	176	83.8
Life vaccine	135	64.3

Table 5. Practice of ward workers by observation (N=42)

	No	%
No. practices observed	210	100
Use of gloves	210	100
Use of aprons	70	33.3
Use of masks	163	77.6
Segregation of waste at the sources	202	96.2
Proper handling of bags	185	88.1
Handwashing after taking off gloves	35	16.7

Table 6. Knowledge and awareness of medical waste in garbage collectors (%)

Knowledge/Awareness	No	%
Garbage collectors	59	100
Male	54	91.5
Female	5	8.5
Categories of hospital waste	43	72.9
Knowing that the following were medical waste :		
Used gauze	56	94.9
Waste from labs	50	84.7
Human parts	49	83.1
Used sharps	54	91.5
Live vaccine	53	89.8

Table 7. Practice of garbage collectors by observation (N=39)

	No	%
No. practices observed	195	100
Use of gloves	195	100
Use of aprons	131	67.2
Use of masks	172	88.2
Segregation of wastes at the storage	40	20.5
Proper handling of bags	167	85.6
Handwashing after taking off gloves	107	65.1

Table 8. Laboratory confirmed infections in 59 garbage collectors

Infection	No	%
Pulmonary tuberculosis	2	3.4
Intertinal parasites	3	5.1
Enteric pathogenic bacteria	3	5.1
Hepatitis B surface antigen	5	8.5

Discussion

The study on the management of medical waste in Thailand was aimed to identify problems for improving practice in the future. The hospitals were enrolled by stratified random sampling. Doctors and nurses were interviewed for their knowledge and awareness of management of medical waste in their hospitals. Interviewees were 205 doctors and 426 nurses (Table 1). It is interesting to find that up to 16.6% of doctors and nurses and 15.4% of ICNs were not aware of the policy of waste management of their hospitals (Table 2). The policy as well as practice guidelines should be better distributed to hospital personnel. Infection control nurses have direct responsibility in supervising and overseeing hospitals waste management. It was surprising to find that 2 of 39 ICNs interviewed were not aware of the responsible unit of waste management and the types of hospital waste. Whether they were newly assigned or had less experience in infection control were to be explored. Doctors and nurses are responsible in segregating hospital wastes at the sources of the waste and, thus, they need to know the definition of medical waste. As shown in Table 2, their knowledge on medical waste regarding live vaccine, used sharps, human parts and waste from clinical laboratory needs to be increased. Infection control nurses knew better than their colleagues about medical waste, however, only 89.7% knew that waste from clinical laboratory was medical waste.

The amount of medical waste generated was 0.4 kg./bed/day (Table 3). The finding was consistent with those from other countries[7]. The present study involved careful examination of different types of hospital waste in different bags. The amount of hospital waste was weighed daily for 7 days of the week. Therefore, the amount of medical waste calculated should be reliable. Medial waste in household bags was dangerous because less precaution was taken for transportation and disposal of. This may lead to exposure to infection in the hospital and community. The household waste in medical waste bags amounted to 15.2% of the weight. This improper practice leads to increased cost of waste management because medical waste is generally disposed of by incineration. The process is much more expensive than land fill for household waste.

Ward workers are assigned to handle hospital waste in the ward and to transport it to a storage site. Their knowledge in medical waste has to be improved. As shown in Table 4, only 64.3% and 69.0% knew that live vaccine and human parts were medical waste. The use of gloves while handling hospital waste was highly satisfactory (100%) (Table 5). Howerver, they should be encouraged to increase the use of aprons and masks. Handling of filled medical waste bags was proper in 88.1%. Throwing and holding of bags with both hands were common mistakes. Handwashing after taking off gloves was as low as 16.7%. Education on handwashing is urgently needed.

Garbage collectors are at risk of exposure and spread infection at work. Limited instruction is given to these personnel. Less than 3 quarters of garbage collectors knew different types of hospital waste (Table 6). Their knowledge in definitions of medical waste also needs to improve. The use of personal protective equipment was satisfactory among the garbage collectors (Table 7). The use of aprons and masks should be encouraged. Up to 26.5%, of these garbage collectors opened the waste bags to segregate different types of waste. This practice risks exposure to and spread of infection and must be terminated. Improper handling of waste bags was as high as 14.4% and proper handwashing was observed in only 65.1%. The garbage collectors are usually not well educated. More supervision is needed for this group. As shown in Table 8, the prevalence rates of pulmonary tuberculosis, intestinal parasite, pathogenic bacteria in stools and hepatitis B infection were high among garbage collectors. Acquiring these infections at work is a possibility. Education on preventing infection, good practice and frequent medical examination should be offered to these less privileged workers.

Conclusion

Problems of medical waste management were identified in doctors, nurses, ICNs, ward workers and garbage collectors. Improper practices increase the risk of exposure to and spread of infection. Interventions to decrease the problems should be taken seriously.

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ปัญหาการจัดการมูลฝอยติดเชื้อในประเทศไทย

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วัตถุประสงค์ : *ศึกษาปัญหาการจัดการมูลฝอยติดเชื้อในประเทศไทยเพื่อนำไปพัฒนางานในอนาคต*
วัสดุและวิธีการ : *ศึกษาปัญหาการจัดการมูลฝอยติดเชื้อในโรงพยาบาล 39 แห่ง ระหว่างมิถุนายน พ.ศ. 2545 และกรกฎาคม พ.ศ. 2545 โดยการสัมภาษณ์บุคลากรทางการแพทย์เกี่ยวกับความรู้ ทัศนคติ และการปฏิบัติตรวจสอบมูลฝอยในถุงมูลฝอยติดเชื้อและมูลฝอยธรรมดาเพื่อหาปริมาณมูลฝอยติดเชื้อที่แท้จริง ตรวจสุขภาพคนงานเผามูลฝอยติดเชื้อโดยการตรวจทางห้องปฏิบัติการบางอย่าง*
ผลการศึกษา : *ปริมาณมูลฝอยติดเชื้อเฉลี่ย 0.41 ก.ก. ต่อเตียงต่อวัน ปัญหาที่พบคือ การขาดความรู้และการปฏิบัติไม่ถูกต้อง ขณะปฏิบัติงานถูกเข็มตำและของมีคมบาดในอัตราสูง คนงานเผามูลฝอยติดเชื้อมีรอยวัณโรคปอด 3.4%, พยาธิและเชื้อก่อโรคในอุจจาระอย่างละ 5.1% และมี HBsAg ร้อยละ 8.5*
สรุป : *การจัดการมูลฝอยติดเชื้อที่ไม่ถูกต้องพบในทุกโรงพยาบาล ความเสี่ยงและอัตราการติดโรคติดเชื้ออยู่ในอัตราน่าเป็นห่วง ควรให้การศึกษาและแนวทางปฏิบัติที่เป็นมาตรฐาน*