

Determination of Knowledge, Attitudes and Behaviors of Healthcare Service Providers on Sorting of Biomedical Wastes

Sağlık Hizmet Sunucularının Tıbbi Atık Konusunda Bilgi, Tutum ve Davranışlarının Tesbiti

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Abstract

Detecting knowledge and behavioral approaches of all health care providers involved in the process of biomedical waste sorting and reduction and exposing their weaknesses in the process can facilitate the planning of more effective corrective methods. A total of 757 participants (368 professional health care workers, 389 5th and 6th grades biomedical students) received a questionnaire with a total of 35 questions aimed at identifying attitudes and behaviors regarding both theoretical knowledge and separation of biomedical wastes. The data obtained were analyzed using descriptive statistical methods. The rate of education on the subject was over 85% in both groups. Likewise, the positive response to the need for separation and reduction of biomedical wastes at their sources was over 95% in both groups. However, the current results indicated that 85.4% of professional health workers but only 57% of biomedical students were involved in the separation process of biomedical wastes. While the participants were strongest in separation of "biomedical wastes", they were weakest in separation of "hazardous wastes". When they were hesitant to separate the wastes, they preferred to dispose of all the wastes as "biomedical wastes". The present results suggest that regardless of professional health workers or biomedical students, everyone involved in waste production should receive continued and updated education regarding waste to ensure required change in behavior of participants toward waste separation. Practical application processes must be supervised and measurable according to certain standards. Assessments of these measurements can help plan corrective approaches.

Keywords: Biomedical waste, Healthcare professionals, Biomedical students,

Özet

Üçüncü basamak hastanelerde tıbbi atık sürecinin izlenmesi ve uyumun ölçülmesi süreklilik gerektirir. Sürece dahil olan tüm sağlık hizmet sunucularının konu ile ilgili bilgilerinin ve davranışlarının tesbit edilmesi ile sürecin zayıf yönlerinin açığa çıkarılmasını sağlayarak gerekli, iyileştirici faaliyetlerin planlanmasına yardımcı olabilir. 757 kişide (368 profesyonel sağlık bakım çalışanı, 389 tıp fakültesi 5-6 sınıf öğrencisi) tıbbi atıklar konusunda hem teorik bilgi düzeyine hem de ayrıştırılmasına yönelik tutum ve davranışlarının tesbitini amaçlayan toplam 35 soruluk bir anket formu kullanılmıştır. Elde edilen veriler tanımlayıcı istatistiksel yöntemler kullanılarak analiz edilmiştir. Konu ile ilgili eğitim alma oranı her iki grupta da %85 in üzerinde bulundu. Tıbbi atıkların kaynağında ayrıştırılması gerekliliğine olumlu cevap her iki grupta da %95 in üzerinde idi. Ancak Atıkların ayrıştırılması konusunda profesyonel Sağlık çalışanlarının %85.4'ü, öğrencilerin ise sadece %57 sinin gayret ettiği anlaşılmıştır. Ayrıştırma becerisi olarak en güçlü oldukları grup "tıbbi atık" olurken en zayıf oldukları grup "tehlikeli atıklar" olmuştur. Ayrıştırma konusunda profesyonel sağlık çalışanlarının öğrencilerden relatif daha iyi oldukları belirlenmiştir. Atıkların ayrıştırılması hususunda tereddüte düşüklerinde tüm atıkları "tıbbi Atık" olarak bertaraf etmeyi tercih etmişlerdir. Atık üretiminde rol alan herkesin profesyonel sağlık çalışanı yada öğrenci olmasına bakılmaksızın eğitimlerin pratik uygulamadaki davranış değişikliğini sağlayabilecek nitelikte yapılması ve sürekli olarak güncellenmesi gereklidir. Pratik uygulama süreçleri mutlaka denetlenmeli ve belli standartlara göre ölçülebilir olmalıdır. Bu ölçümlerin değerlendirmeleri ise iyileştirici faaliyetlerin planlanmasına yardımcı olabilir.

Anahtar Kelimeler: Sağlık çalışanı, Tıp fakültesi öğrencisi, Tıbbi atık, Ayrıştırma

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1. Introduction

The wastes resulting from the provision of health care are generated during the procedures performed in hospitals. They are classified as household, biomedical (infectious, pathological, sharp), hazardous and radioactive wastes. Biomedical wastes pose a danger to health of both employees and community. Therefore, they must be properly sorted and reduced in their sources where they are produced and cautiously disposed. Health service providers are expected to have sufficient knowledge of biomedical wastes at this point and to be reflected in their behaviors in practices (1, 2).

In Turkey, biomedical waste management is carried out according to the Regulation of Biomedical Waste Control of the Ministry of Health. Proper separation and reduction of biomedical wastes at their sources, recycling if possible and reintroducing them to the economy are both institutional and national objectives. On the other hand, the cost of disposal of biomedical wastes is also a heavy economic burden on health care service providers (1). Currently, biomedical wastes have reached very large volumes owing to technological developments, widespread and discrete health care services. The separation of these wastes in high capacity hospitals requires a professional and competent service. Moreover, largely health care personnel properly decompose and reduce biomedical wastes in hospitals at their sources according to Biomedical Waste Management. Although training on sorting and reduction of biomedical wastes are offered, effective sorting and reduction of them at their sources at hospitals are unfortunately incomplete due to prolonged time required, close attention, insufficient supply of equipment and human sources. However, there is no single method to measure the effectiveness of the application on sorting of biomedical wastes. One of these measurement parameters is the evaluation regarding knowledge and attitudes of health care providers. Necessary regulatory and remedial activities can help to identifying weaknesses in the process.

2. Methods and materials

Our institution is a third step health care organization with biomedical education and has been implementing an in unit Biomedical Waste Management Plan since 2011 with a special team established for this purpose. Health care workers receive regular theoretical and practical training at least twice a year as well as problem-based face-to-face training with smaller groups. Regular inspections and feedback are executed and visual-written records are kept. Besides, third- year biomedical school students receive theoretical and practical training during their course of vocational training skills. Posters on Biomedical Waste Management are also posted around the compound and a call center with 7 days 24 hours service is available as well.

The wastes produced in our health care facility were separated in bags of different colors that could be easily distinguished from each other. Household wastes were stored in black bags, recyclables wastes such as glasses and paper carton boxes were collected in blue bags and biomedical wastes were collected in red bags. On the other hand, sharp devices such as needles, scalpels, broken glass, and broken capillary tubes were collected in yellow boxes. Pharmaceutical wastes were collected in special dark navy hazardous waste bins. Moreover, biomedical waste units were placed in easily accessible areas. In the present study, we aimed to design regulatory and helpful approaches regarding the separation and reduction of biomedical wastes generated during health care provisions through determining the informed attitudes and behaviors of health care workers in addition to 5th and 6th grades biomedical school students, who are the most active elements on the separation and reduction of biomedical waste.

After obtaining the required approval of institutional Ethics Committee, the participants were given a written

questionnaire containing 35 questions on the separation and reduction of biomedical wastes on a voluntary basis and the participants were allowed to complete questionnaire for 20 minutes. Questionnaire comprised questions aimed to determine level of general theoretical knowledge, and its reflection in attitudes and behaviors of participants in practices of the separation and reduction of biomedical wastes. The data obtained were analyzed using descriptive statistical methods.

3. Findings

The present study was completed with a total of 757 people, including 389 students and 368 biomedical personnel (77.5% of them were nurses).

Findings about levels of knowledge on biomedical wastes:

87% of the health care workers and 86% of the students stated that they received education at least once regarding Biomedical Waste Management.

28.8% of the health care workers and 34.4% of the students identified all wastes in the hospital as biomedical wastes when they were asked to define biomedical waste.

In the evaluation of the knowledge about the need for separate collection and special disposal of biomedical waste, while 67.9% the health workers and 87.9% of the students indicated that biomedical wastes should be sorted, 61.1% the health workers and 79.4% of the students stated that biomedical wastes should be disposed separately.

95.7% of the health care worker and 97.7% of the students stated that biomedical wastes should be separated at source where they are produced.

While 85.4% of the health care workers stated that they were aware of putting special effort on sorting biomedical wastes, it was only 57% among the students.

51.9% of the health care worker and 59% of the students stated that they had contact with biomedical waste contact at least once.

46.7% of the biomedical staff and 17.7% of the students were able to correctly answer all the questions related to the identification of the contact with biomedical wastes.

Findings about reflection in attitudes and behaviors of participants in practices of the separation and reduction of biomedical wastes showed in Table 1.

Table 1. Sample questions and rates of their correct answers on sorting biomedical wastes

Questions on sorting biomedical wastes	Correct answer rate of health workers	Correct answer rate of students %
Sharp tool (unused injector needles)	47	44
Sharp tool (serum kit needles)	51.9	45.2
Sharp tool (broken ampoules)	45.9	34.2
Household waste (diaper)	36.7	6,7
Household waste (ECG tapes)	15.2	11,6
Household waste (arm bandages)	13	6,9
Recycling (serum bottles with no medication added)	50.3	22.6
Biomedical waste (injector pistons)	88.9	75.8
Biomedical waste (urinary catheters)	89.9	73.5
Biomedical waste (blood sugar measuring sticks)	82.9	74.6
Pathological waste (biopsy materials)	85.3	70.2
Pathological waste (urine samples)	85.9	69.2
Pharmaceutical waste (vial of discharged drugs)	56.0	21.6
Pharmaceutical waste (expired drug vial)	32.6	14.4
Hazardous waste (formol content)	0.8	3,9
Hazardous waste (chemotherapy drug vial)	19.8	12.3

4. Discussion

In the context of Environmental Health and safety, biomedical waste-related approaches are getting more attention today. Although theoretical knowledge is generally sufficient, it has been observed that the main problem is in the implementation phase due to various reasons which differ according to the characteristics of countries and institutions. There is no single international model and more specific improvement plans are required on a national or even institutional basis to correct the problems in implementation.

Studies conducted in Turkey showed that the rates of health care workers receiving education on biomedical wastes were defined as 48.7-90.8% (3-6). In the present study, this rate was over 86% and awareness about the process of separation among the health care workers was over 95%. However, while 85.4% of the biomedical staff stated that they tried to implement procedures for sorting and reduction of the biomedical wastes, only 57% of the students stated so, indicating that awareness and application efforts did not overlap in the biomedical waste separation processes. Health care workers were found to be more diligent in executing procedures for sorting and reduction of the biomedical wastes than students, likely to be an indication of the students taking less role in active health care provision.

Sorting of biomedical wastes is an important prerequisite in the entire waste management process. One of the most important outcomes of proper separation of biomedical waste is that while sorting allows reduction of wastes at their sources, it also offers chance of recycling of materials and gaining them back into the economy. Similar to other studies, in the current study we observed that practices of sorting of biomedical wastes did not coincide with theoretical knowledge. Although the rates of education and awareness on biomedical waste sorting in both health workers and students receiving health education were over 90% in related studies, application of education and awareness was at low levels. The studies emphasized the importance of education on

biomedical waste management in biomedical schools in general and suggested that it should be part of continuing biomedical education programs (7- 13). The present study showed that the process of separating the most common biomedical wastes (injector plunger, nasogastric probe, and blood glucose meter bar) produced in daily health care practices appears to be highly comprehended. Nevertheless, awareness on the separation of pharmaceutical drugs and hazardous wastes was not satisfying.

Moreover, in the present study we determined the presence of general trends in separation and reduction of biomedical wastes. First of all, all materials that have come into contact with the patients were treated as biomedical wastes, even if they were of household wastes (ECG tape). Even though this approach does not pose a threat to human health, it was considered as a parameter that would adversely affect cost. Secondly, if health care workers were hesitant about the separation of wastes in general, they commonly preferred to separate them as "biomedical waste". This inclination was thought to be related to the confidence of the healthcare workers on proper disposal of biomedical wastes. However, it is obvious that this approach will undesirably affect recycling process.

The handling of contact with biomedical wastes can differ according to countries, institutions and professional groups. A recent study comparing the awareness, attitudes and practices of doctors, nurses and pharmacists on the management of outdated and unused drugs found that the rate of correct responses to the question of "how to dispose of these drugs" was shown to be interestingly the highest among the nurses (78%) compared to the doctors (59%) and pharmacists (70%) (14). Likewise, another study reported that doctors, nurses and lab technicians had better knowledge of Biomedical Waste Management than cleaning staff (15). On the other hand, nurses and laboratory staff were found to be more conscious regarding color coding and waste separation than doctors (15). Another related study

comparing awareness of dentists working in private sector and public sector concerning their knowledge and practices on biomedical waste sorting and reduction reported that the dentists working in private sector were less aware of them and they considered them an extra burden (16).

Exposures of health care workers to biomedical wastes are also very significant for employee safety in biomedical wastes management. In the present study, while 51.9% of the biomedical staff and 59% of the students stated that they came into contact with biomedical wastes at least once, only 46.7% of the biomedical staff and 17.7% of the students were able to correctly answer all the questions related to the identification of the contact with biomedical wastes. This finding suggests that inefficient understanding of contact with biomedical wastes may cause the biomedical staff and

the students to become uneasy while working. Recent studies conducted among 120 different health workers at a small-scale hospital stated that 52.2% of the employees reported having no contact with biomedical wastes, indicating that management of the process is more successful in small-scale hospitals (3, 14).

In conclusion, health care is a dynamic process that continues without interruption. All employees involved in waste production should contribute to this process. Training should be carried out and continuously updated to ensure the change in behavior in practical practice. Practical application processes should also be supervised and measurable according to certain standards. Assessments of these measurements can help planning of efficient approaches.

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