



# Knowledge-Attitude-Practice of Medical Students on Expired Drugs

Lou Pengyu, Wang Wei, Li Yunwei\*

College of Public Health and Management, Weifang Medical University, Weifang, China

## Email address:

loupy@wfmc.edu.cn (Lou Pengyu), wang\_w2006@126.com (Wang Wei), liyunwei1982@126.com (Li Yunwei)

\*Corresponding author

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**Abstract:** Purpose this study provides reference for solving the problem of drug waste and reforming medical education. Methods Stratified random sampling was employed to recruit 998 Senior students of three medical colleges. The questionnaire included 12 items of basic knowledge of expired drugs, 4 items of attitude towards expired drugs and 3 items of behavior on reducing expired drugs. Results The valid rate of all questionnaires was 83.17%. 43.29% of students knew a large number of expired drugs produced in China every year. Among the basic knowledge items of expired drugs, the awareness rate of toxicity hazards of expired drugs was the highest, and the awareness rate of recycling knowledge of expired drugs was the lowest. 62.52% agreed that the production of expired drugs was inevitable, 74.35% were willing to regulate their own behavior after knowing the harm of expired drugs. The sources of expired drug knowledge were internet (35.57%), university-related courses (30.86%), health education materials (28.96%), TV/radio (28.56%), internship teachers (12.42%), internship unit training (8.52%) and family members (7.52%). Conclusion Three medical college students had low awareness of expired drugs, so it is necessary to adjust the content and mode of pharmaceutical teaching, strengthen the training of social responsibility in the period of internship, introduce service learning theory into social practice activities.

**Keywords:** Medical Students, Expired Drugs, Pharmaceutical Education

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## 1. Introduction

According to the White Paper on the Recovery of Expired Drugs in Chinese Families (2004-2014), published in 2014, about 78.6% of families in China had small medicine boxes [1]. Affected by social development and medication habits, the stockpile of small medicine boxes in families was increasing. there were 215 grains of expired medicines in every household in China. The expired medicines caused 15,000 tons waste every year. The waste of medicines had become a growing concern of the public [2]. To alleviate or solve this problem, the society, doctors and patients need to work together. Medical workers who provide medical and pharmaceutical services for patients will undoubtedly play an important role. Most students in medical colleges will be engaged in the work closely related to drug use after graduation. Their knowledge, concept and professional standards of drug use will affect patients' cognitive level of drug use and drug purchasing behavior. Their cognition,

attitude and behavior towards expired drugs will affect the time and extent of solving drug waste problems in the future. In order to understand the knowledge, attitude and behavior of medical students towards expired drugs, and provide reference for alleviating drug waste and improving pharmaceutical education, a survey was conducted in three medical colleges in Shandong Province from October to December 2016.

## 2. Object and Methods

### 2.1. Object

Using stratified random sampling method, three universities including Qingdao University Medical Department, Weifang Medical College and Binzhou Medical College, were selected among which senior medical students and pharmaceutical students who had drug use experience were chosen. 1,200 questionnaires were distributed, and 998 questionnaires were effectively returned, with a valid rate of

83.17%. Among them, 290 (29.06%) were in the Medical Department of Qingdao University, 372 (37.27%) in Weifang Medical College, 336 (33.67%) in Binzhou Medical College, 748 (74.95%) in clinical specialty, 147 (14.73%) in pharmacy and 103 (10.32%) in pharmaceutical marketing.

## 2.2. Methods

Combining with the research objectives, using the methods of literature review and historical data analysis, the research group designed the questionnaire by itself. The content of the survey mainly includes the demographic variables of the respondents, the cognition of expired drugs (knowledge, identification, harm caused by improper disposal, treatment, etc.), the attitude towards expired drugs, and the influence of expired drugs on their professional behavior. The questionnaire was filled out anonymously on the basis of informed consent of the respondents. The questionnaires that lacked basic information and did not answer completely (more than 3 missing items) were used as the criteria for evaluating the invalid questionnaires to screen the returned questionnaires.

## 2.3. Statistical Analysis

EpiData2.0 was used for the double entry of database. SPSS 18 software was used for statistical processing of data. The basic information of the respondents and descriptive analysis of Knowledge-attitude-practice of expired drugs were made.

## 3. Results

### 3.1. Awareness and Access to Knowledge of Expired Drugs

The results showed that 43.29% of the students knew that a large number of expired drugs were produced in China every year. Among the basic knowledge items of expired drugs, the awareness rate of toxicity hazards of expired drugs was the highest, and the awareness rate of recycling knowledge of expired drugs was the lowest. As shown in Table 1. The sources of expired drug knowledge were internet (35.57%), university-related courses (30.86%), health education materials (28.96%), TV/radio (28.56%), internship teachers (12.42%), internship unit training (8.52%) and family members (7.52%).

Table 1. Awareness of expired drugs.

Basic Knowledge Items of Expired Drugs	Awareness num	Awareness Rate (%)
The validity period is affected by storage conditions	735	73.7
Drug expiration should be distinguished by dosage form	482	48.3
Shortened validity period after opening	585	58.6
Drugs beyond their expiry date are inferior	596	59.7
The expired drugs produced in the process of production, sale and use are hazardous wastes	493	49.4
The efficacy of expired drugs decreases and toxicity increases	969	97.1
Improper disposal of expired drugs pollutes the environment	729	73.0

Basic Knowledge Items of Expired Drugs	Awareness num	Awareness Rate (%)
Expired drugs have the risk of re-packaging and re-marketing	224	22.4
How to deal with and recover expired drugs is not stipulated in the Drug Administration Law	259	25.9
Household expired medicines should be included in specialized collection and destruction systems	301	30.2
Know how to handle different types of expired drugs	297	29.8
Know how to recycle expired drugs	157	15.7

### 3.2. Attitudes of Respondents to Expired Drugs

624 people (62.52%) agreed that the production of expired drugs was inevitable, 781 people (78.26%) agreed that a large number of expired drugs were harmful to people, and 506 people (50.71%) agreed that their occupation played a great role in reducing drug waste. As shown in Table 2.

Table 2. Attitudes of respondents to expired drugs.

Item	Num	Constituent Ratio (%)
The production of expired drugs is inevitable		
very agreeable	110	11.02
agree	514	51.50
commonly	152	15.23
disagree	161	16.13
very disagreeable	61	6.12
A large number of expired drugs do great harm to people		
very agreeable	285	28.56
agree	496	49.70
commonly	198	19.84
disagree	15	1.5
very disagreeable	4	0.4
The emergence of generous expired drugs has a great impact on the doctor-patient relationship		
very agreeable	230	23.05
agree	434	43.49
commonly	257	25.75
disagree	62	6.21
very disagreeable	15	1.5
Professional awareness of the need for knowledge about the disposal and recycling of expired drugs		
very agreeable	357	35.77
agree	435	43.59
commonly	171	17.13
disagree	26	2.61
very disagreeable	9	0.9
Occupation plays an important role in reducing drug waste		
very agreeable	126	12.63
agree	380	38.08
commonly	372	37.27
disagree	90	9.02
very disagreeable	30	3.00

### 3.3. Relevant Behavior of Respondents to Expired Drugs

742 people (74.35%) were willing to regulate their own practice after knowing the harm of expired drugs, 817 people (81.86%) were willing to actively participate in the daily health management of residents to reduce drug waste, 645 people (64.63%) were willing to actively inform patients of

expired drug knowledge to reduce drug waste. As shown in Table 3.

**Table 3.** *Relevant Behavior of expired Drugs.*

Item	Num	Constituent ratio (%)
Willing to regulate their own practice after knowing the harm of expired drugs		
very agreeable	262	26.25
agree	480	48.10
commonly	208	20.84
disagree	38	3.81
very disagreeable	10	1.00
Willing to actively participate in residents' daily health management to reduce drug waste		
very agreeable	395	39.58
agree	422	42.28
commonly	158	15.83
disagree	16	1.6
very disagreeable	7	0.71
Willing to actively inform patients about expired drug knowledge to reduce drug waste		
very agreeable	316	31.66
agree	329	32.97
commonly	242	24.25
disagree	71	7.11
very disagreeable	40	4.01

## 4. Discussion

Rich knowledge of medication is very important for guiding students to cultivate good medical ethics and rational drug prescription behavior, and it is also great significance for doctors to disseminate rational drug use behavior to patients [3]. This study showed that students' knowledge about the harmful effects of improper disposal on expired drugs was relatively inadequate, with correct rate of 43.29%. The awareness rate of producing large quantities of expired drugs in China was less than 50% annually, and the awareness rate of knowledge about the recovery of expired drugs was the lowest (15.73%). The main reason was that the curriculum of pharmacy in colleges and universities of China mainly focused on the basic course of chemical pharmacy specialty [4], ignoring the humanistic education of pharmacy. Pharmacology and clinical pharmacology accounted for too little of the total school hours of medical education [5]. Pharmaceutical care and other ethical knowledge were not paid enough attention, and the content involved less [6]. Among them, the knowledge related to expired drugs was even less. We can improve theoretical study by adjusting the teaching content of pharmacy. It is suggested that ADR and rational drug use should be included in the professional knowledge curriculum system [7], and that courses of pharmacy administration and Pharmacy Ethics should be set up to strengthen the pharmacy humanities education of medical students [8]. It is suggested that the traditional education and teaching methods should be changed, and the current policies and social hot spots related to medicine and pharmacy should be discussed in the form of class, so that students can internalize the knowledge of medical and

Pharmacy Ethics into their own quality, character and working attitude. Only when we feel the important role of humanistic knowledge and spirit in solving practical problems can we fundamentally change the traditional education concept and make the humanistic education of pharmacy adapt to the requirements of the times [9].

Correct and positive attitudes towards expired drugs play a role in promoting the standardization of occupation practices to a certain extent. This study showed that 624 people agreed the unavoidable occurrence of expired drugs, 217 people did not think that a large number of expired drugs would cause great harm to people, 334 people did not think that a large number of expired drugs would affect doctor-patient relationship, 120 people did not agree with the reduction of occupational involvement in subjective barriers. The above situation showed that some students did not pay enough attention to the problem of expired drugs and waste of drugs. The reason was that medical colleges neglected the cultivation of professional social responsibility in the process of strengthening humanistic education and promoting professional ethics [10]. It is suggested that social responsibility should be strengthened in the period of internship. Expanding the forms of humanistic quality for medical students and strengthening the standardized training of resident physicians (pharmacists) [11]. In the clinical practice stage, the teaching content is no longer limited to follow-up and case preaching, and the professional social responsibility of students is enhanced by the humanistic teaching methods of medical (pharmacist) teachers with profound humanistic knowledge and good humanistic literacy, such as medical ethics advanced deeds report conference [12-13].

Altruistic behavior and social behavior of medical students should be the focus of moral education [14]. 742 people were willing to regulate their occupation practice, 817 people were willing to participate actively in the daily health management of residents to reduce drug waste, 645 people were willing to actively inform patients of the knowledge of expired drugs to reduce drug waste. The above showed that most respondents were willing to regulate their behavior and participate actively when they were aware of their responsibilities. The introduction of service-based learning theory into social practice will increase the effect of education [15]. In order to enable medical students to contact with society and patients through multiple channels, angles and levels, and cultivate their awareness of public health services and social services, it is suggested to formulate practical objectives integrating curriculum, service and reflection, to adopt the socialized practice mode of family, school, society and government, and to design health social investigation, contact community health propaganda, and rescue vulnerable groups.

## 5. Conclusion

Medical students in the three universities had low awareness of expired drugs. At the stage of basic knowledge learning and practical learning, the knowledge of expired

drugs was less involved. In order to improve medical students' awareness of expired drugs and cultivate their professional humanistic literacy in an all-round way, higher medical education should pay enough attention to the humanistic literacy of pharmacy, carry out targeted courses, lectures, training or practical activities, and explore ways to alleviate or solve the problem of drug waste by improving the awareness of medical service providers of expired drugs in the long run.

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