



SITUATION ANALYSIS OF WASTE MEDICINE THROUGH HOSPITALS AND PHARMACY AND TO EVOLVE STRATEGIES AND GUIDELINES FOR SOUND MANAGEMENT OF WASTE MEDICINE: AN EXPLORATORY STUDY.

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ABSTRACT

Introduction: Unused medicines can be utilized to reduce the wasteful spending on the healthcare expenditure and this study was therefore planned with the aim to estimate the volumes of waste medicines and its costs in private hospitals and Health professional and patient's knowledge, attitude and practice about the medicine wastage and its management. **Material and Methods:** The current study was an observational, cross sectional, questionnaire-based study conducted in private hospitals among 1200 participants, in Indore Madhya Pradesh, India. The knowledge, attitude, and practice of patient and health care professional regarding the unused medicines disposal and reuse were evaluated using a pre validated investigator administered questionnaire. **Results:** About 28 % of the prescribed medicine were unused while 20 % were expired and 43 % of the prescribed medicine were used and 9 % of the participants were not aware about the status. About 38 % of the non-prescribed medicine were unused while 26 % were expired and 29 % of the non-prescribed medicine were used and 7 % of the participants were not aware about the status. About 10 % of the participants agree that doctors and healthcare professionals do provide advice on safe disposal of unused and expired household medicines, 15 % are neutral about it and 74% disagree about it. About 40 % of the participants agree that take back programs of unused and expired medicines should be mandatory, 8 % were neutral about it and 52 % disagree about it. **Conclusion:** The healthcare system and the professionals need to play a crucial role in educating and guiding the general public in regards to unused medicine. It is also recommended that governments and policy makers should take a positive step in initiating and executing drug take-back programs and also implement measures to raise awareness regarding the same in the general public.

KEYWORDS : Unused Medicine, Medical Wastage, Patients, Health Care Professional

INTRODUCTION

In both good and bad economic times, decreasing unnecessary spending in health is an important objective. Properly targeting wasteful spending in health care can help ensure that cost-containment efforts do not compromise quality and outcomes in an economic downturn, thus contributing to the health system's resilience. In better times, reducing wasteful spending in health is increasingly seen as a sound quality improvement strategy. Resources can be better targeted to improving the system's accessibility through it. In other words, reducing waste can be contributed to improve health system performance along with several dimensions.¹

The European Waste Framework Directive (2008) defines 'waste' as being 'any substance or object the holder discards, intends to discard or is required to discard'²

Estimates of the share of household medication becoming waste vary from 3% to as high as 50%.³ Even as the Ministry of Consumer Affairs is working on a proposal to ensure consumers buy only the quantity of medicines prescribed/desired and not the entire blister pack, a recent survey reveals otherwise. A survey conducted on over 33,000 respondents by LocalCircles says people throw away anything between 10 per cent and 70 per cent of the medicines bought/prescribed. It shows 36 per cent of respondents discard up to 10 per cent of the medicines purchased; 27 per cent end up throwing out up to 10-30 per cent; 6 per cent dispose of 30-50 per cent of the medicines unused; and about 6 per cent scrap anything between 50 per cent and 70 per cent of the medicines acquired.³

The Indian pharmaceutical (pharma) market is estimated to be about Rs 1.8 trillion. About Rs 270 crore worth of medicines are wasted once they are past their shelf life.⁴ There is an urgent need for proper awareness, education and guidance of patients and their families about storage and disposal practices regarding unused and expired medications.⁵

A questionnaire based survey among the students of dentistry from the Indian sub-continent showed that about 70% of the dental students stored up to five expired medications at home, and their predominant method of disposal was through household trash.⁶

A study from North India assessed the attitude and practices of among 300 healthcare professionals (HCPs) regarding the disposal of unwanted or expired medicines.⁷

There are various sets of international guidelines already existed on the

appropriate methods of healthcare waste management, but these are either not properly extrapolated for general public use or the public is almost totally unaware of these international guidelines.⁸

As per our knowledge, there is no study conducted regarding in the volumes of waste medicines and its costs in private hospitals and Health professional and patient's knowledge, attitude and practice about the medicine wastage and its management in Madhya Pradesh. Literature also shows a lack of availability of public data about the safe and effective disposal knowledge and practices towards expired medication. This study was therefore planned with the aim to estimate the volumes of waste medicines and its costs in private hospitals and Health professional and patient's knowledge , attitude and practice about the medicine wastage and its management.

MATERIAL AND METHODS

This study was carried in Indore city, divided into four zones and five private hospitals were selected from each zones using stratified random sampling method. This study had completed in four phrases:

1. Estimating the volumes of waste medicines that are prescribing in private hospital at household level through telephonic survey. An interview guide will be developed. This guide is based on the content of the original OPCS (Office of Population and Census Survey) research⁹, although some additional questions were also included.
2. Anticipating the Cost of the medicine wastage.
3. Professional's knowledge , attitude and belief about the medicine wastage.
4. Patient's knowledge, attitude and belief about the medicine wastage.

Data was collected from the patients visiting Out patient Department and health care professionals of selected private Hospitals in Indore city, Madhya Pradesh.

Ethical Clearance and Informed Consent

Ethical clearance was obtained by the institutional review board of Pacific Dental College & Hospital, Udaipur, Rajasthan. All study participants were explained about the purpose and nature of the study design. An verbal informed consent was obtained from all the study participants.

Training and calibration of interviewer was done in the Department of Public Health Dentistry. Based on the previous research the estimated sample size is about 1200 participants. The data were collected from the period of October 2022 to July 2023. Data were transferred into

Microsoft Excel and subsequently into SPSS 23.0 to permit further analysis.

RESULTS

Table No. 1. Demographic Details Of The Participants:

Variable	N (%)	Pvalue
Gender		
Male	645 (52.9)	0.006
Female	573 (47)	
Age Group		
18-24 years	124 (9.1)	0.008
25-34 years	185 (15.1)	
35-44 years	187 (15.3)	
45-54 years	263 (21.5)	
55-64 years	223 (18.3)	
65-74 years	152 (12.4)	
75+ years	84 (6.8)	
Marital status		
Married	494 (40.5)	0.009
Single	145 (12)	
Divorced	148 (12.1)	
Widower	203 (16.6)	
Widow	187 (15.3)	
Unknown	41 (3.3)	
Educational level		
Primary	132 (10.8)	0.005*
Secondary	390 (32)	
College level	465 (38.1)	
Illterate	231 (19)	
Insurance status		
Insured	187 (15.3)	0.007
Uninsured	530 (43.5)	
Don't know	501 (41.1)	
Total	1218 (100)	

Table No 2 Description Of Waste Or Expired Medicine Among The Study Participants:

Items	N (%)	Pvalue
Number of waste medicine		
None	509 (41.7)	.004
1 to 2	317(26)	
3 to 4	133 (10.9)	
5 to 6	150 (12.3)	
7 to 8	109 (8.9)	
Category of unused medicine		
Respiratory	170 (13.9)	0.007
Cardiovascular system	105 (8.6)	
Central nervous system	155 (12.7)	
Infections	345 (28.3)	
Pain	219 (17.9)	
Git disease	142 (11.6)	
Others	82 (6.7)	
Name of medicine wasted/unused/expired		
Antipyretic	209 (17.1)	0.006
Analgesic	563 (46.2)	
Multivitamin	171 (14)	
Antibiotics	193 (15.8)	
Anti-allergy drugs	37 (3)	
Anti-diabetic drugs	45 (3.6)	
When was the unused medicines prescribed		
In the last 6 months	611 (50.1)	0.009
1 year	114 (9.35)	
2 years	108 (8.8)	
3 years	79 (6.4)	
5 years	61 (5)	
Unknown	245 (20.1)	
How much of the medicine remains unused?		
Almost gone	419 (34.4)	0.005
Half remaining	333 (27.3)	
More than half	153 (12.5)	
Never used	104 (8.5)	
Unknown	209 (17.1)	
Reasons for not completing the course of medicines		
Symptoms disappeared	313 (25.6)	0.001

Doctor changed medicine	154 (12.6)	
Side effects	225 (18.4)	
Difficult to take	93 (7.6)	
Forgot to take	61 (5)	
Take as needed	165 (13.5)	
Found not helpful	207 (16.9)	
Reasons for keeping the unused medicine		
Use again	513 (42.1)	0.007
Forgot to throw out	245 (20.1)	
Don't know	189 (15.5)	
Intends to dispose it	271 (22.2)	

Table No: 3 Knowledge Among The Study Participant Regarding The Medication Waste.

Items	N (%)	Pvalue
What do you understand by the expiry of medicines?		
Loss of Shelf life	240 (19.7)	0.006
Producing toxins	310 (25.4)	
Loss of effect/treatment failure	520 (42.6)	
All of the above	148 (12.1)	
Do you know about medication waste		
Yes	508 (41.7)	0.004
No	710 (58.2)	
Do you ever read medicine disposal instructions		
Yes	210 (17.2)	0.007
No	1008 (82.7)	
Do you know about drug take back system		
Yes	300 (24.6)	0.003
No	918 (75.3)	
Do you know that misused/repeated change or failing to complete antibiotics may cause drug resistance?		
Yes	101 (8.2)	0.001
No	1117 (91.7)	
Improper disposal of unused and expired medicines can affect the environment and health?		
Yes	438 (35.9)	0.005
No	780 (64)	
Do expired medicines produce adverse drug reactions?		
Yes	650 (53.3)	0.007
No	568 (46.6)	
How could be hazardous effect of unused and expired medicine minimized or controlled		
Providing proper guidance to the consumer	320 (26.2)	0.005
Prescribing in quantities and for duration that ensure patient compliance	129 (10.5)	
Lowering the number of prescribed medicine by doctor	280 (22.9)	
Donating or sharing the unused medicines	489 (40.1)	
Stakeholder for creating the awareness among community about proper disposal of unused and expired medicines		
Electronic media	246 (20.1)	0.003
Physician	490 (40.2)	
Pharmacy	312 (25.6)	
Newspaper	87 (7.14)	
All sources	83 (6.8)	
Previously educated about medication disposal		
Yes	558 (45.8)	0.007
No	660 (54)	
It is acceptable to dispose of unused or expired medications by:		
1. Rinsing down a sink		0.008
Yes	510 (41.8)	
No	280 (22.9)	
Don't know	428 (35.1)	0.003
2. Storing in the house		
Yes	628 (51.5)	
No	245 (20.1)	0.005
Don't know	345 (28.3)	
3. Returning to a pharmacy		
Yes	817 (67)	0.005
No	193 (15.8)	
Don't know	208 (17.07)	

4. Flushing down a toilet		0.002
Yes	87 (7.1)	
No	913 (74.9)	
Don't know	218 (17.8)	
5. Returning to a health care provider		0.005
Yes	840 (68.9)	
No	120 (9.8)	
Don't know	258 (21.1)	
Did you receive information concerning the correct disposal of medicines		
Yes	254 (20.8)	0.009
No	964 (79.1)	
Patient is responsible for disposal of unused medicines?		
Yes	508 (41.7)	0.002
No	710 (58.2)	

Figure No: 1 Attitude among the study participants regarding the medication wastage management

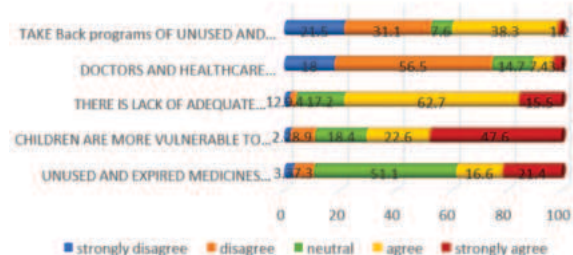


Table No: 4 Practice Among The Study Participant Regarding The Medication Waste.

Items	N (%)	Pvalue
Ways of procuring medicines		
Purchased on prescription	870 (71.4)	0.0066
Purchased over the counter	220 (18)	
Received from friend/colleague	31 (2.5)	
Purchased based upon the advice of a relative or friend	97 (7.9)	
Do you check expiry date of the medicines before procuring?		
Yes	220 (18)	0.002*
No	870 (71.5)	
Don't know	128 (10.5)	
Do you have waste medicine?		
Yes	782 (64.2)	.001
No	436 (35.7)	
What do you do with the expired medicines?		
Throw away in household garbage	440 (36.1)	0.003
Flush expired medications in toilet or sink	255 (20.9)	
Throw into fire	176 (14.4)	
Return to medical store	260 (21.3)	
Don't know	87 (7.1)	
Do you separate unused medicines before disposal		
Yes	228 (18.7)	0.005
No	990 (81.2)	
Way of discarding expired medicines		
Throw away in household garbage	528 (43.3)	0.004
Flushed in sewer water	280 (22.9)	
Burning at home	410 (33.6)	
What do you normally do with unused medicines?		
Keep for later use	408 (33.4)	0.005
Return to chemist	223 (18.3)	
Return to doctor	118 (9.6)	
Donate to hospital	87 (7.1)	
Give to friends or relatives	150 (12.3)	
Throw away in household garbage	106 (8.7)	
Don't know	126 (10.3)	

About 36.53 % of the participants have spends Rs. 501-1000 on the unused medicine, 18.78% spends Rs. 250-500, 10 % spends Rs. <8000, 8.63 % spends Rs. 20001-4000, 7% spends Rs. 31-60, 5.45 % spends Rs. 4001-8000, 5.31 % spends Rs. 61-249 and Rs. 1001-2000, 0.96% spends Rs. 0-30. The mean amount spend on antibiotics is Rs. 61.15, on anti-fungal is Rs. 23.17, on multivitamin is Rs. 8.11, on anti-

diabetic is Rs. 7.42, on GIT issues is Rs. 5.45, on anti-allergy is Rs. 5.44, on anti-pyretic is Rs. 4.51, on analgesic is Rs. 3.73, on CNS issues is Rs. 2.41 and on cardiac issues is Rs. 1.32.

Among the total health care professional (HCPs) 127, 46 were doctors , 37 were Nurses and 44 were other.

Table No : 5 Demographics Details Of HCPS:

	Doctors (46)	Nurses (37)	Others (44)	Total (127)	Fischer exact text value	P value
Age						
25-30 years	8 (17.3)	4 (10.8)	06 (13.6)	18 (14.1)	6.01	0.36
31-35 years	22 (47.8)	16 (43.24)	19 (43.1)	57 (44.8)		
35-40 years	7 (15.2)	11 (29.7)	12 (27.2)	30 (23.6)		
>40 years	9 (2.1)	06 (16.21)	07 (15.9)	22 (17.3)		
Gender						
Male	35 (76)	12 (27.2)	39 (88.63)	75 (59)	14.35	.001
Female	11 (23.9)	25 (67.5)	05 (11.3)	52 (40.9)		
Education						
Graduate	25 (54.3)	19 (51.3)	27 (61.3)	71 (55.9)	0.007	0.31
Post-graduate	21 (45.6)	18 (48.6)	17 (38.6)	56 (44)		
Experience						
0-5 years	10 (21.7)	09 (24.3)	15 (34)	34 (26.7)	2.01	0.21
5-10 years	28 (60.8)	16 (43.2)	22 (50)	66 (51.9)		
>10 years	08 (17.3)	12 (32.4)	07 (15.9)	27 (21.2)		
Any trainings received on medication waste management						
Yes	05 (10.8)	03 (8.1)	04 (9)	12 (9.4)	5.62	0.001
No	41 (89.1)	34 (91.8)	40 (90.9)	115 (90.5)		

Table No : 6 Knowledge Among HCPS Regarding The Medication Waste Management:

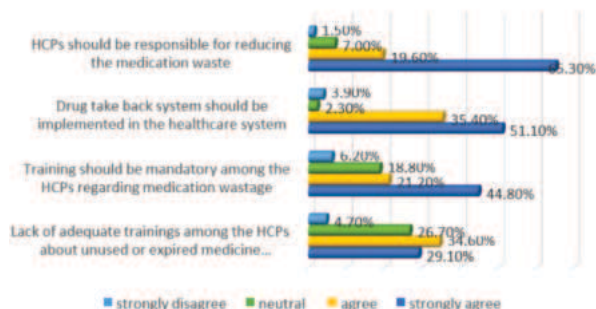
	Doctors (46)	Nurses (37)	Others (44)	Total (127)	Fischer exact text value	P value
Aware of medication waste management rules						
Yes	40 (86.9)	32 (86.4)	34 (77.2)	106 (83.4)	4.30	0.002
No	06 (13)	05 (13.5)	10 (22.7)	21 (16.5)		
Aware of drug take back system						
Yes	35 (76)	25 (67.5)	25 (56.8)	85 (66.9)	1.34	0.33
No	11 (23.9)	12 (32.4)	19 (43.1)	42 (33)		
Previously educated about the medication disposal						
Yes	39 (84.7)	27 (72.9)	23 (52.2)	89 (70)	8.89	0.12
No	07 (15.2)	10 (27)	21 (47.7)	38 (29.9)		
Responsible for disposal of waste medicine						
Yes	26 (56.5)	28 (75.6)	24 (54.5)	78 (61.4)	6.79	0.002
No	20 (43.4)	09 (24.3)	20 (45.4)	49 (38.5)		

Table No: 7 Practice Among The HCPS Regarding The Medication Waste Management:

	Doctors (46)	Nurses (37)	Others (44)	Total (127)	Fischer exact text value	P value
Do you prescribe drug only when it is mandatory						
Yes	36 (78.2)	30 (81)	28 (63.6)	94 (74)	11.78	0.009
No	10 (21.7)	07 (18.9)	16 (36.3)	33 (25.9)		

Do you educate the patient about antibiotics resistance						
Yes	17 (36.9)	06 (16.2)	09 (20.4)	32 (25.1)	9.46	0.009
No	29 (63)	31 (83.7)	35 (79.5)	95 (74.8)		
Do you discuss with the patient about the drug take back system						
Yes	05 (10.8)	05 (13.5)	02 (4.54)	12 (9.4)	7.74	0.002
No	41 (89.1)	32 (86.4)	42 (95.4)	115 (90.5)		
Do you educate the patient about checking the expiry date of the medicine						
Yes	21 (45.6)	19 (51.3)	23 (52.2)	60 (47.2)	8.46	0.001
No	25 (54.3)	18 (48.6)	21 (47.7)	67 (52.7)		

Figure No: 2 Attitude among the HCPs regarding the medication wastage management



DISCUSSION

Disposal of medications is a critical problem confronting both healthcare providers and patients alike. Educating patients on proper drug disposal is a fitting role for pharmacists because it is a role that they are in a unique position to perform adequately. Safe disposal of medicines can have a significant positive impact on public health and the environment if patients are properly counselled on how to go about it properly. Disposing of medications properly and with care can help reduce the environmental burden that drugs place on the environment.¹⁰

This study shows that there is insufficient awareness about medication disposal and inadequate knowledge of the dangers posed by incorrect medication disposal among the study population and the findings are similar to those of comparable studies.^{8,11,12,13}

The majority of the population evaluated in this study were young and middle-aged (approximately 70%) and predominantly male gender (52.9%), this is similar to a study conducted in Delhi.¹⁴

In terms of education, around 38 % of the population were degree holders, this is very similar to a study conducted in Afghanistan and Delhi.^{14,15}

A substantial majority was literate (81%). Education and literacy play a role in understanding the concept of expiry of drugs and the importance of safe usage and disposal of unused medicines. With regards to insurance only few portion of the study population (15%) covered themselves under the health insurance, majority of them (41 %) are not aware about the insurance status, this demand for the awareness about the medical insurance.

The proportion of unused (28%) and expired (20%) medicine for prescribed medicine while for non-prescribed medicine, unused (38 %) and expired (26%). The proportion of unused (37%) and expired (12%) medicine for complementary medicine while for other medicine, unused (16%) and expired (22%).

About (26 %) of the study population have around 1 to 2 waste medicines. Majority (28%) of the waste medicine are under the category of infections. Majority (46%) of the medicine got wasted or remain unused or expired was from analgesics class. Mostly (50%), the unused medicine prescribed in the last 6 months. Around 27 % of the study population have half of the medicine prescribed remain unused.

The major reasons for not completing the courses of medicine was symptoms disappeared (26%), side effects (18%), found not helpful (17%). Majority (42%) of the population keeping the unused medicine to use again.

In the current study, the majority of the population understood the concept of expiry of medicine in terms of treatment failure (43%). About (42 %) of the study population have knowledge about the medication waste. Only about (17 %) of the study population read medicine disposal instructions. Approximately (25 %) of the study population knows about the drug take back system. Only (8 %) of the population know that misused/repeated change or failing to complete antibiotics may cause drug resistance. About (36 %) of the population have knowledge that improper disposal of unused and expired medicines can affect the environment and health.

Majority (53%) of the study population knows that expired medicines produce adverse drug reactions. Regarding "How could be hazardous effect of unused and expired medicine minimized or controlled", (26 %) Providing proper guidance to the consumer, (11 %) Prescribing in quantities and for duration that ensure patient compliance, 23 % Lowering the number of prescribed medicine by doctor, (40 %) Donating or sharing the unused medicines. With respect to "Stakeholder for creating the awareness among community about proper disposal of unused and expired medicines", (20 %) Electronic media, (40 %) Physician, (26%) Pharmacy, (7 %) Newspaper (7 %) All sources. This finding of knowledge of the possibility of expired medicines is similar to a hospital-based study conducted.^{11,14,19,20,21}

About (46 %) of the study population have been educated about the medication disposal. About (42 %) of the study population, Rinsing down a sink as accepted method of disposal. About (52 %) of the study population, storing in the house as accepted method of disposal. About (67 %) of the study population, returning to a pharmacy as accepted method of disposal. About (7 %) of the study population, Flushing down a toilet as accepted method of disposal. About (69 %) of the study population, Returning to a healthcare provider as accepted method of disposal. This findings were similar to the study conducted by the Manocha S etal.¹⁴

Around (20 %) of the study population received the information concerning the correct disposal of medicines. About (42 %) of the study population think that they are responsible for the disposal of unused medicine.

Regarding the "Unused and expired medicines present potential risks at home", (17 %) and (21 %) of the study population agree and strongly agree respectively. With respect to "Children are more vulnerable to the risks of associated with unused and expired household medicines", (23 %) and (48 %) of the study population agree and strongly agree respectively. With regards to "There is lack of adequate information on safe disposal of unused and expired household Medicines" (63 %) and (16 %) of the study population agree and strongly agree respectively. Regarding the "Doctors and healthcare professionals do provide advice on safe disposal of unused and expired household medicines" (7 %) and (3 %) of the study population agree and strongly agree respectively. With regards to "Take back programs of unused and expired medicines should be mandatory" (38 %) and (1 %) of the study population agree and strongly agree respectively. Similar findings were observed in study conducted by Manocha S et al.¹⁴

Regarding the "Ways of procuring medicines", (71%) Purchased on prescription, (18 %) Purchased over the counter, (3 %) Received from friend/colleague, (8 %) Purchased based upon the advice of a relative or friend. Only (18 %) of the study population check expiry date of the medicines before procuring. Around (64 %) of the study population agreed that they have waste medicine. Regarding "What do you do with the expired medicines?" (36 %) Throw away in household garbage, (21 %) Flush expired medications in toilet or sink, (14 %) Throw into fire, (21%) Return to medical store and (7 %) Don't know. Only (19 %) of the study population separate unused medicines before disposal. With regards to "Way of discarding expired medicines", (43 %) Throw away in household garbage, (23 %) Flushed in sewer water and (34 %) Burning at home. With respect to "What do you normally do with unused medicines?" (33 %) Keep for later use, (18 %) Return to chemist, (10 %) Return to doctor, (7 %) Donate to hospital, (12 %) Give to friends or relatives, (9 %) Throw away in household garbage and (10 %) Don't know.

In term of the cost, the majority of money spend on mostly on

antibiotics and a substantial portion of the unused or expired medicines (36 %) causes a loss of about Rs. 500 to Rs. 1000.

Our study reported 36 % doctors, 29% nurses and rest are from other related profession. This findings were similar to study conducted by Soyam GC etal.¹⁶

A substantial proportion, 45 % of the population are under the 31-35 years age group.

Our findings reported 59 % of the HCPs are male. About 56 % of the HCPs are educated till graduate level. Around 52% of the HCPs are having 5-10 years of experience. Regarding the trainings, only 9 % of the HCPs have received trainings on medication waste management. Our study reported that 83 % had knowledge about medication waste management rules. A total of 67 % had knowledge about drug take back system. Around 70 % of the HCPs are previously educated about medication disposal. About 61 % of the HCPs think that they are responsible for disposal of waste medicine. Similar results were found in study conducted in Karimnagar and in Delhi.^{16,17}

Regarding the “Lack of adequate trainings among the HCPs about unused or expired medicine management”, 35 % and 29 % of the HCPs agree and strongly agree respectively. With respect to “Training should be mandatory among the HCPs regarding medication wastage”, 45 % and 21 % of the HCPs agree and strongly agree respectively. Regarding the “Drug take back system should be implemented in the healthcare system”, 51 % and 35 % of the HCPs agree and strongly agree respectively. With regard to “HCPs should be responsible for reducing the medication waste”, 65% and 20 % of the HCPs agree and strongly agree respectively.

The results are similar to study conducted at Karimnagar and at Delhi.^{16,17} These findings are in contrast to the compared to results of previous study carried out.¹⁸

The limitations for this study are recall bias as the participants need to recall what exactly they did with the unused medicines or for what reason they took the medicines. Selection bias can also be a limitation to this research. Also considering the design of this study was observational so there are some limitation bound to these type of research.

CONCLUSION

The current study among the patients visiting private hospitals in Indore, India sheds light on estimate the volumes of waste medicines and its costs in private hospitals and Health professional and patient's knowledge , attitude and practice about the medicine wastage and its management.

Even though the study population is aware of the fact that expired medications can be harmful and can pose a substantial risk, they are in the dark regarding what to do with these medications and how to dispose of them in a proper manner. The healthcare system and the professionals involved need to play a crucial role in educating and guiding the general public in this regard. It is also recommended that governments and policy makers should take a positive step in initiating and executing drug take-back programs and also implement measures to raise awareness regarding the same in the general public. Last but not the least, it is the duty and responsibility of every person in the society to take care of the environment and protect it from the unscrupulous exposure of any chemical substances including pharmaceuticals which can damage the ecosystem.

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