



ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICE REGARDING DISPOSAL OF UNUSED AND EXPIRED MEDICINES

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ABSTRACT

In the last few years incidence of disease rate is increase with that for the preventing purpose medicine use is also increase. People bought the medicines but not adhere all the medicines for some various reason and got expired. Lack of knowledge regarding the proper disposal practice of expired and unused medicines it cause dangerous harm to the environment. In year of decades many researches are done in other countries. Even they developed some disposal practice for expired medicines and for unused medicines they started drug take back polices as the result of the different studies while in India there are very less studies are done. A Observational question based study was conducted for 2 different sites for 6 months. Objectives of this study was to assess knowledge, attitude and practice on safe disposal of expired medicines. To study the factors influencing keeping unused medicines at home. Study the class of the drug which remain unused. Calculate the total

cost of unused medicines. Develop the disposal practice. Data for this study was collected by questionnaire asked to the individual subject. Based on the questionnaires subject knowledge, attitude and practice review regarding disposal of unused and expired medicines. 220 participants participate in this study. Response of participants show that most common factor for keeping unused medicines at home is to give to family members and neighbours when they get need in future. Participants knowledge show that they knew about medicines not to use after expiry date but didn't knew about proper disposal practice of unused and expired medicines. They have positive attitude that improper disposal of unused and expired medicines affect the environment and health and awareness programs should be initiated for

how to dispose unused or expired medicines. In disposal practice most participants throw the medicines in trash/ garden while some of the flushed in toilets. Responses of the participants show that very less participants return medicines to the medical store which show that India have lesser implemented the take- back policy.

KEYWORDS: “Knowlegde”, “Attitude”, “Disposal Ptractice”, “Unused and Expired”, “Medicines”.

INTRODUCTION

Improper disposal of any form of waste like garbage's or medical waste is a global problem. Developed countries done sufficient researches and they all well documented it while developing countries done very less researches and they not even well documented it. Because of lesser awareness regarding medical waste it causes the environmental harm which lead to the medicine resistance, health related problems, increase the morbidity and mortality of disease and increase the use of pharmaceutical products and loss of finances.^[1]

Medical waste includes expired, split and contaminated pharmaceutical products, drugs, vaccines and sera that are no longer required and need to dispose them. In medical waste most common waste is medicine waste which is dispose improper way which is major responsible to the people's death.^[2]

According to WHO reports, globally only 50% of medicine adherence is done based on prescription for the long term conditions.^[3] Improper disposal of medicines cause severe consequences like environment harm, bacterial resistance, wild life affected and home storage of medicines cause harm to the children's. Home storage of the medicine leads to medicine wastage and cause economical loss.^[4] Home storage of medicine is common practice around global. In that most of the OTC (over- the- counter) medicines and chronic conditions medicines are stored by the people.^[5]

In present years medicine adherence is changed because of that medicine purchase pattern have changed like people purchase medicines in bulky form and stored in bulky form.^[6] Purchased in larger quantity lead to the economical waste and storage of the larger quantities of medicine lead to the childhood poisoning and harm to the family member and improper disposal lead to the harm environment. There are various to keep medicines at home like larger quantities purchased medicines, sometimes patient non-adherence, change of the prescription etc.^[7,8]

Proper disposal of unused prescription drugs reduce the risk of accidental poisoning.^[9]

MATERIALS AND METHODS

A prospective observational multi centric study was conducted for the period of six months (November 2021 to April 2022), the study was approved by KBIEC (KBIEC-157/2021) and prior permission was obtained from the relevant authorities of 2 different sites: Sector 22 and Sector 29, Gandhinagar. 250 participants included in the study to analysis of participants of knowledge, attitude and practice regarding safe disposal of unused and expired medicines. We assessed 220 participants.

Inclusion Criteria

Responsible person above 18 year old from family. Willing to participate in study.

Exclusion Criteria

Patient with cognitive and communication problem were excluded.

Predesigned study materials were used for data collection and analysis. Subject's enrolment done according to inclusion and exclusion criteria and statistical analysis was performed using MS Office Excel 2016 (v16.0).

RESULTS

The presented study aimed to assessment of knowledge, attitude and practice regarding safe disposal of unused and expired medicines. A total of 220 subject data were collected and analyzed. The result of our demographic shows that female participants involved in the study and most of the participants are educated and most of housewife participants present in this study. In that table number 2 show that most affecting factor for keeping unused medicines at home was that kept medicines to give to family member and neighbours when they get sick in future. Apart of that some of them kept in case they get sick in future and other reason was they kept till pass expired date. Table 3 shows that they have knowledge regarding checking expired date. They know about medical waste but they don't know about proper disposal of unused medicines. Table 4 shows that they have positive attitude regarding that pharmacist, doctor or other healthcare professionals should provide proper advice on the safe dispose of unused and expired medicines. And improper disposal can affect the environment and health of wildlife's. Table 5 show that they check expired date time to time. most of medicine disposal occur by throwing medicines in garbage's or flushing in toilet. While some of people return

unused medicines at medical stores. In the table 6 show that participants at home stores the NSAIDs class of drugs followed by antidiabetic, antihistamine, antacid, antibiotics and multivitamins.

Table 1: Participant's demographic detail.

Variable	Frequency
Gender	
Male	105 (47.7%)
Female	115 (52.3%)
Education	
Illiterate	1 (0.5%)
Elementary and primary	17 (7.7%)
Secondary and higher secondary	40 (18.2%)
College and above	162 (73.6%)
Occupation	
Student	27 (12.3%)
Self employee	67 (30.5%)
Government employee	56 (25.5%)
House wife	70 (31.7%)

Table 2: Factor's for keeping unused medicine's at home.

1.	Give to family members and neighbors when sick in future	135 (61.4%)
2.	Passed expire date	99(45%)
3.	Bought and kept in case	94(42.7%)
4.	Finished the dose remained	52(23.6%)
5.	Change of prescription	31(14.1%)
6.	I become better and stopped	27(12.3%)
7.	Side effect made me stop	11(5%)
8.	Not sure how to dispose them	15(6.8%)
9.	I travel and forget	12(5.5%)
10.	Did not want to use them	8(3.6%)
11.	Donated by NGOs	4(1.8%)
12.	Difficulty to follow instructions	2(0.9%)
13.	Labels had unclear instructions	1(0.5%)

Table 3: Knowledge test.

Sr no.	Question	N (%)
1.	Do you know about medical waste? Yes No	146 (66.4%) 74 (33.6%)
2.	Have you ever receive any information about the safe and proper way to dispose the expired and unused medicines? Yes No	40 (18.2%) 180 (81.8%)

3.	Do you check the expiry date of your medication? Yes No	218 (99.5%) 2 (0.5%)
4.	Do you know about take back policy? Yes No	198 (90%) 22 (10%)
5.	Do you think that inappropriate unused medicine disposal can cause harm? Yes No	214 (97.3%) 6 (2.7%)
6.	How could the hazardous effect of unused and expired medicines be minimized or controlled? - Providing proper guidance - Prescribing in quantities and for duration that ensure patient compliance. - lowering the quantities of prescribed medicines at a time - Donating or sharing the unused medicines.	182 (82.7%) 11 (4.8%) 11 (4.8%) 16 (7.7%)
7.	What do you think is the possible harm associated with inappropriate medicines disposal? - it can contaminated the environment - it can kill wildlife - can cause accidental swallow by children	102 (46.6%) 59 (26.7%) 59 (26.7%)
8.	Who is the appropriate person to inform about proper disposal of unused or expired medicines? - Pharmaceutical industry - Doctor - Nurse - Pharmacist - Media - Other	11 (4.8%) 111 (50.7%) 5 (2.4%) 87 (39.7%) 3 (1%)

Table 4: Attitude test.

Sr. no.	Question	N (%)
1.	Unused and expired medicines present potential risks at home. Agree Disagree Neutral	200 (91.2%) 16 (7.4%) 4 (1.4%)
2.	Improper disposal of unused and expired medicines affect the environment and health. Agree Disagree Neutral	210 (95.3%) 3 (1.5%) 7(3.2%)
3.	Children are more vulnerable the risk associated with unused & expired household medicine. Agree Disagree Neutral	200 (91.1%) 11 (5%) 9 (3.9%)

4.	There is dearth of adequate information regarding safe disposal of unused and expired medicines. Agree Disagree Neutral	208 (94.8%) 7 (3.1%) 5 (2.1%)
5.	Outreach and awareness programs about how to dispose unused and expired medicines should be initiated. Agree Disagree Neutral	211 (95.9%) 8 (3.6%) 1 (0.5%)
6.	Pharmacist, doctors and other healthcare professionals must provide advice on the safe disposal of unused and expired household medicines. Agree Disagree Neutral	216 (98.1%) 4 (1.9%) 0 (0%)
7.	Drug take-back policy of unused and expired medicines should be introduced in the communities Agree Disagree Neutral	203 (92.2%) 13 (6%) 4 (1.8%)

Table 5: Practice test.

Sr no	Question	N(%)
1.	Did any quantity of purchased medicines remain unused at your home? Yes No	137 (62.2%) 83 (37.8%)
2.	Do you check the expiry date of the medicines before procuring? Yes No	215 (97.7%) 5 (2.3%)
3.	Do you separate unused medicine before disposal? Yes No	167 (75.8%) 53 (24.2%)
4.	Way of procuring medicines ? - Purchased on prescription - Purchased over the counter - Purchased upon the advice of known person - Received from friends/ other	157 (71.2%) 54 (24.7%) 9 (4.1%) 0 (0%)
5.	What do you do with the unused and unexpired medicines ? - Throw away - Donate to hospital/NGOs - Return to the medical store - Keep at home until expired	131 (59.5%) 8 (3.7%) 44 (20%) 37 (16.8%)

6.	What do you do with expired medicines ? - Return to the medical store - Flushed in sewer water - Throw away in household trash/ garden - Bury in group - Burning at home	39 (17.8%) 45 (20.5%) 109 (49.5%) 19 (8.7%) 8 (3.7%)
7.	Medicines Commonly stored by you ? - Analgesic - Antimicrobial - Antihypertensive - Antidiabetics - Other	68 (31.1%) 11 (5%) 11 (5%) 21 (9.6%) 109 (49.3%)

Table 6: Class of drug's and cost of medicines.

Sr. no.	Class of drug	Total cost (Rs)
1.	NSAIDs	14277.74
2.	Multi vitamins	4212.98
3.	Anti- diabetic	8665.50
4.	Antacid	5485.30
5.	Anti histamine	6329.40
6.	Beta blocker	988.465
7.	Calcium channel blocker	1049.76
8.	Proton pump inhibitor	388.62
9.	Relieve constipation	735.12
10.	Anti-tussive	1267.63
11.	Probiotic	242.82
12.	Insulin	8587.00
13.	Statins	1569.92
14.	Diuretics	50.76
15.	Bronchodilators	51.00
16.	Antibiotics	4911.98
	Total Cost =	58,814 Rs

DISCUSSION

This study was the first of its type to investigate the public knowledge, attitude and practice (KAP) on the medication use and safety in India.

The rationale behind the recruitment of participants by two selected methods was to identify any demographic difference and the influence of this difference on participants KAP on unused and disposal of expired medicines. The current pilot study was an observational study conducted for 220 participants.

In this study 52.3 % were female participants. As per participants education wise distribution shows 0.5% participants were illiterate. We observed that illiterate participants has poor KAP

and not know about safe disposal of medicines. In occupation wise distribution shows that 12.3% participants were students, 30.5% participants were self employee, 25.5% participants were government employee and 31.7% participants are house wife.

Numerous factors can responsible for keeping medicines at homes. We observed the various factors for keeping medicines. Most commonly observed factor for keeping medicines at home was to give to family member and neighbours when sick in future were 61.4% participants notified. Apart from that second commonest factor reported that they pass the expired date 45%. Some participants bought medicines and keep in case required to take again 42.7%. 23.6% participants are reported that they finished the dose remained. 14.1% participants report change in the prescription. 12.3% participants become batter and stop the taking medicines. 6.8% participants not know how to dispose the medicines show they store it. 5.5% participants travel and forget to take medicines. 5% participants get side effect so that made them stop to take medicines. 3.6% participants did not want to use them so they stop taking. 1.8% participants donate the medicines to the different NGOs. 0.9% participants notified that they have difficulty to follow instructions. And 0.5% participants notified that labels had unclear instructions. We observed that majority of participants keep medicines for family member so that in future if medicines required they provide them or some time remission of disease occur they take it. Were some keep till it expired. Very less participants donate the medicines in NGOs and have difficulty to follow the instruction.

The overall of knowledge was good. One of the reason for finding of good rate of knowledge related unused and expired medicines was because of the study was conducted in urban area. Here most important part is educated participants they know all about the medicines some of them work in pharmacy stores were some of them work as doctor and medicines waste were 33.6% participant not aware about medicines waste. Participants aware about medicines waste but not aware about proper disposal of medicines because we observed that 18.2% participants aware were 81.8% participants not aware of safe and way of dispose expired and unused medicines. 99.5% participants check their expired medicines some period of time.

We observed that 90% participants were aware about take back policy programme. Most of the participants around 97.3% participants has knowledge that inappropriate unused medicines disposal can cause harm. When we asked participants that what way we minimized or controlled hazardous effect of unused and expired medicines most of the participants 82.7% notified that providing proper guidance to the participants about disposal of medicines. Were

4.8% participants give their option on prescribing in quantities and for duration that ensure patient compliance and lowering the quantities of Prescribed medicine at time. Very less participants notified donating or sharing the unused medicines. When we asked participants about what they think the possible harm associated with inappropriate medicine disposal. We observed that 46.6% notified that inappropriate disposal can contaminated the environment. 26.7% participants notified it kill wildlife. 26.7%Participants reported it can cause accidental swallow by children.

When we asked who is appropriate person that provide information about proper disposal of unused and expired medicines. 50.7% participants know that doctor provide proper information about disposal of unused and expired medicines. 39.70% participants notified that pharmacist provide that proper information, 4.80% participants notified that pharmaceutical industry provide that proper information, 2.40% participants notified that nurse provide that proper information. Where 1.4 % and 1% participants were notified that media and other can provide proper information about disposal of unused and expired medicines. Overall frequency of poor knowledge was less, our majority of population had basic education and can read & write properly.

Attitudes of people as a mediator between their knowledge and practices have an important role for better controlling of any hazardous effect in environment due to improper disposal of unused and expired medicines. Most of participants 91.2% believe that unused and unexpired medicines present potential risks at home. 95.3% participants believe that improper disposal of unused and unexpired medicines affect the environment and health. Apart from that most of participants believe that children are more vulnerable the risk associated with unused and unexpired household medicines. We observed that most of the participant 94.8% believe that India have dearth of adequate information regarding safe disposal of unused and unexpired household medicines. 95.9% participants believe that outreach and awareness programs about how to dispose unused and unexpired medicines should be initiated. As per the most of 98.1% participants believe that pharmacist, doctors and other healthcare professionals must provide advice on the safe disposal of unused and unexpired household medicines. 92.2% participants believe that drug take-back policy should be introduced in the communities. In many studies articles shows that many countries like Canada, Qatar, Germany, Sweden have Take - back policy programme. As compare to other countries India have less take – back policy programme. People are well aware of that programme but not apply in practice or not many

guidelines available for proper and safe disposal of unused and unexpired or expired medicines.

we observed that participants store medicines at home in that some of them check expired date before purchasing, purchase from the prescription and most of the them throw the unused and expired medicines where store most of the other medicines (nutrition and multivitamins supplements) in home. We observed that 62.2% participants home's quantity of purchased medicine remain unused were 37.8% participants home's not remain. 97.7% participants notify that they check the expired date of medicines while purchasing. 75.8% participants separate unused medicines before disposal while 24.2% didn't. 71.2% participants purchase medicines from the prescription while 24.7% participants purchased over the counter medicines and 4.1% participants purchased over the advice of the known persons. 59.5% participants throw away unused and unexpired medicines while 20% participants return to the medical store, 16.8% participants keep at home until expired and 3.7% participants donate to hospitals/NGOs. 49.3% participants throw the expired medicines in household trash/garden, 20.5% participants flushed expired medicines in sewer water, 17.8% participants return expired medicines to the medical store while 8.7% participants bury expired medicines in group and 3.7% participants burn the expired medicines at home. When we asked participants what medication they mostly stored at home at that time 49.3% participants response that they store the other medications like multivitamins, minerals and nutrition supplements. While 31.1% participants store analgesics (pain killer) medicines that their home, 9.6% participants store anti-diabetics medicines at their home while 5% participants store antimicrobial and antihypertensive medications.

We collect information about cost of unused medicines that participants keep at home. We observed among 220 participants that Rs 58,814 medicines keep at home. The unused and expired medicine were collected during visit. Total cost was Rs 58,814.

In India, there is no proper guideline for disposal of medicines. In many studies articles shows that many countries like Canada, Qatar, Germany, Sweden have adopted back policy programme. As compare to other countries India have less take back policy programme.

People are well aware of that programme but not apply in practice or not many guidelines available for proper and safe disposal of unused and unexpired or expired medicines.

We try to implement a safe practice of disposal of medicines. The facility to collect unused & expired medicine were arranged in different 5 pharmacy store via arranging disposal boxes.

The total collected medicines cost were 3.5 Kg. Collected medicines was disposed in biodegradable waste.

CONCLUSION

This study revealed that majority of participants knew about medical waste but lacked with adequate information regarding the safe disposal of unused and expired medicines. Most of community people store their unused medicines for various reason. In that one the highest reason was to give the medicine to family member. Apart from that they stored the medicines till it expired and bought and kept in case if required. They store the medicines at home although majority of the them are aware of potential risk associated to the presence it.

Majority of participants disposed unused and expired medicine in household garbage and toilet/sink. This was against the recommendations of both national and international policies and guidelines on safe and appropriate pharmaceutical waste disposal. This can be source of environmental hazards and public health problems. Participants believe that doctor and pharmacist can provide appropriate information about safe disposal of unused and expired medicines. Therefore, implementing an awareness creation campaign through an appropriate medium of communication on the appropriate medicine waste disposal method and the impact of inappropriate disposal practice is crucial to protect the public and ecosystem.

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