REUSE API (ACTIVE PHARMACEUTICAL INGREDIENTS) FROM EXPIRED DOSAGE FORM

Mr. Mohit Sharma[1] Mr. Arvind Kumar[2]

mohit.ms922@gmail.com

ABSTRACT

Drugs plays important role in our day today activities in order to prevent diseases and their treatment. A mythology is famous among people that drugs become toxic and dangerous after expire date but actually it's not like that, there is simple decrease in the therapeutic effectiveness of drug dosage forms. But after expire date we cannot use them and throw them without knowing that these drugs have lethal side effects on living organisms present around us. Reuse of expired drugs that are present around us because these drugs are not safe for living organisms. I design a procedure through which we can extract API from expired drugs and reuse to synthesize such chemicals or compounds which are useful as disinfectants. In this I extract aspirin from expired drug and further this converted into salicylic acid which further undergo decarboxylation to give phenol which is an effective bacteriostatic and bactericidal. Through this we design a proper disposal method for expired aspirin tablets. Aspirin tablets when triturates and react with 0/1 M solution of fe(NO3)3 it gives brick red color .Where acetyl salicylic acid react with 0.1 M Fe(NO3)3 it gives yellow color. In another hand when we react salicylic acid with same reagent it gives purple color. These identification tests help me to know that my project is in right track.(1)

KEYWORDS: bacteriostatic; decarboxylation; disinfectants; lethal

INTRODUCTION:

ASPIRIN is well known ANALGESIC DRUG which can we use in plants in order to promotes the growth of roots of plant, and aspirin also help the flowers to survive for longer period of time even in harsh conditions after detached from the parent body of plants.

Experimentally it was found that higher dosage of ACETAMINOPHEN can cause death of cats and dogs. And in humans it causes gastric irritation and vomiting. Drugs effects also depends upon the BMI (Body

Mass Index), hence action of drugs may sever in lower living organisms that might we responsible for extinction of living organisms.

Nature works on simple law that what actions we do that always result in similar and opposite reaction. Some API has potency to cause Geneotoxicity which may further cause modification of genetic information in humans and living organisms.

So it is effective step to prevent non-beneficial and undesirable activities of expired drugs. In this case we simply try to extract API and use it in the synthesis of various drug derivatives for study purpose in laboratory which is found to be quite economical. We simply try to recycle that percentage of drug in educational purposes that we discard without knowing their effects on our surroundings. By designing economical extraction methods, we can extract wide range of drugs from their corresponding dosage forms.

This reused quantity of drugs helps us to decrease the chemical pollution to fewer extents. This approach is effective against medical waste management. Extraction procedures can be modified according to the nature and type of dosage forms or the API (Active Pharmaceutical Ingredient) present in dosage forms.

Recently it was found that aspirin is used to revive tropical fishes from shock. But sometime these activity leads to worse when amount or concentration of API is increased in natural habitats.

Synthesis of dosage forms or new active pharmaceutical ingredients should be done by using principles of green chemistry, green chemistry approach is a way to reduce lethal effect on nature, because procedures we use during synthesis of drugs are long chemical processes and quantity of waste materials formed are very high and yield is very low.

Green chemistry opens the doors to design eco friendly reaction procedures and synthesis in which we can reduce the formation of waste materials and increase the yield of reaction procedures. Microwave assisted reaction also helpful in order to decrease reaction time in which reaction completed.

WHO manual provides a practical guide to the methods that can be used to?

• investigate the use of medicines by patient to highlight problems.

• Action taken to improve a medical disorder.

• Measure fluctuations.

Health workers undergo training for proper use and distribution of drugs in community, heath representatives, pharmacists and nurses should take care of these things which are related to the drug use in communities. A long term exposures of drugs not good; mainly due to self medications. Dependency on drugs have lethal damages on vital organs of human beings, excess production of these medicines have direct impact on our surroundings which due to excess abuse of medicines. [2].

Waste drugs, from doctor's prescription, self medication and over the-counter medicines for human and veterinary use, are now widely spread in surface water, groundwater and seawater worldwide. Traces of these drugs in water is major health and environmental concern that is very likely to worsen, expected increase in the use of pharmaceuticals due to higher standards of living worldwide, a growing and aging world population, and the correlated increase in animal farming. So far, more than 150 different pharmaceutical substances and metabolites have been found in various water bodies in Europe, including in drinking water supplies. Clofibric acid is an herbicide; it functions as a plant growth regulator against the plant

Here the list of medicines recommended by food and drug administration U.S. that you should flush when they are no longer needed, In other words these drugs are recommended for disposal by flushing.

Benzhydrocodone /Acetaminophen Apadaz Buprenorphine Belbuca, Bunavail, Butrans, Suboxone, Subutex, Zubsolv Fentanyl Abstral, Actiq, Duragesic, Fentora, Onsolis Diazepam Diastat/DiastatAcuDial rectal gel Hydrocodone Anexsia, Hysingla ER, Lortab, Norco, Reprexain, Vicodin, Vicoprofen, Zohydro ER Hydromorphone Dilaudid,Exalgo Meperidine Demerol Methadone Dolophine, Methadose Methylphenidate Daytrana transdermal patch system Morphine Arymo ER, Embeda, Kadian, Morphabond ER, MS Contin, Avinza Oxycodone Combunox, Oxaydo (formerly Oxecta), OxyContin, Percocet, Percodan, Roxicet, Roxicodone, Roxybond, Targiniq ER, Xartemis XR, Xtampza ER Oxymorphone Opana, Opana ER Tapentadol Nucynta, Nucynta ER Sodium OxybateXyrem oral solution.

Safe disposal of drugs is important and we should aware regarding type of disposal

methods we are using because exposure of some drugs to living organisms might be harmful. For disposal information please visit Drugs@FDA.

In developing countries medicines are expensive every pharmaceutical companies have different retail prizes. Maximum drugs in developing countries are sold without a prescription, (SELF MEDICATION) and very little part on the basis of prescription. After a drug course when a drug user feel batter he stop using medicines, but the remaining quantity of drug no longer in use and undergo improper disposal.[1].

There a book which was reprinted 8 times by WHO, First published in 1992 is a way to investigate drug use in communities, a small but important book. Self medication by individual is not safe because sometime these drugs show lethal side effects without adjusting or calculating there dose for whole day. Self medication is more common in developing countries.

An eye sight should be kept by government health departments on use of medicines in community because abuse of these medicines is common now a day's especially in PHARM PARTIES (when a group of teenagers get together to share drugs and have a good time).

Drugs are not a simple things they might be life saving or sometimes life destroying one. Misuse of drugs especially antibiotics are more common, in which patient frequently shift their courses of medicines from one antibiotic to another which like a threat for their life, because self medication immediately develop resistance in them. A new exposure to infection makes their treatment more complicated. Consistent guidelines and advertisements in televisions, across Europe could contribute to a decrease in pharmaceutical residues in the environment. Different parameters have been used at national and international level to promote awareness of proper disposal schemes for unused pharmaceuticals and to raise the problems of pharmaceuticals in the environment (Figure 1). Most of the parameters are based on communication activities towards the general public, such as ads or media inserts, websites, brochures and posters, but have also involved training camps for doctors and pharmacists who can then provide information to patients [3].

For every country, at least one surveyor was selected to conduct the interviews. All interviewers participated in a training session that mainly focused on how to perform and document the interviews. The interviews took place during the first week

of 08/ 2013; in each city approximately 100 people were interviewed. The target group of the survey was native speakers who were residents in the country where the interviews took place and aged 18 years or older. The interviewees were spread evenly across different ages. Surveyors approached people directly on the street in their native language. At the beginning of each interview, the surveyors explained the goal of the project. Each interviewee was given a study code and the surveyor completed the interview form. No any personal data were collected.

The respondents were asked several questions that covered demographic characteristics (age group and sex), behaviour and opinions in relation to the proper disposal of unused drugs, the collection system implemented in their country and the level of awareness of the problem of pharmaceuticals in the environment. Closed and open-ended questions (Question that simply reply by saying yes or no) were used. The open-ended questions were used to try to obtain truthful answers and avoid people feeling pressed to give answers that they thought the surveyor might want to hear [4].

EXPERIMENTAL DATA :

Improper disposal has several possible consequences such has childhood poisoning, environmental pollution, a negative impact on wildlife, and antibiotic resistance. Effectiveness of health care system is evaluated by measuring the drug wastage.

Most of Active Pharmaceutical compounds are polar compounds. Such API are called SMALL MOLECULES and are part of the compound called MICROPOLLUTANTS because they are often found in the mg or nag range in the aquatic environment. Pharmaceuticals for human use have serious effect on the environment due to micro pollutants released into the nature with well-known example i.e.-

1. ESTROGEN and their effects on fish.
2. DICLOFENAC and their effect on vultures.

The importance of pharmaceutical waste in the environment increased after the DICLOFENAC DISASTER. Vulture population reduced after they fed on cattle treated with diclofenac.

The FEMINIZATION (shift in gender role and sex role in society) DEMASCULISATION (remove

testicles of a male animal) of male fish are attributed estrogens which are formed as by-product in industries.

A survey conducts in the U.K. revealed unhealthy practices of 400 households where they disposed unused and expired pharmaceuticals either as household waste or via the sink or toilet. Unused prescription drugs are sometimes brought to PILL PARTIES (also called PHARM or SKITTLES parties) where aldocents experiment with pills they select from the pool of medication brought by partygoers.

With opioids, in particular, some product contains enough API in a single tablet to cause death in a patient, especially if mixed with other sedatives or alcohols.

To minimize the adverse impact of pharmaceutical compounds on the environment as well as the dangersous onsequences like abuse, addiction and also death for these unused and expired medicines need to be addressed.

Fig (a) Showing meaning of a PHARM PARTIES

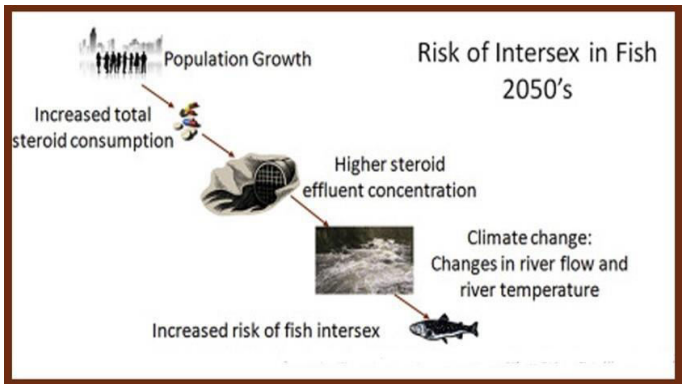

Fig (b) Showing Increased Risk of Fish Intersex Due to increased Steroid Consumption.

Highlights

- Pharmaceutical waste disposal practices of unused and expired pharmaceuticals among general public in Kabul, Afghanistan
- We survey the knowledge and practices towards unused and expired pharmaceutical among general public

- Rectification of future medication waste disposal among families
- Giving information on safe and effective disposal of drugs.
- Data generated during these surveys helps the policymaker to take firm steps to encourage standard pharmaceutical waste management.
- Training camps for doctors in order to prescribe medicines according to the conditions not for business purposes.

Gaps in medication during drugs therapies can also cause storage of left over medicines at home. According to WHO about 50% of patients fail to take medicine correctly [8]. This block medication can save thousands lives before their expiration but people remain active for the submission of these drugs to their near pharmacy centers. [9].

When there is a matter of unused and expired medication storage, patients and family members must require clear guidance about its disposal [5]. The presence of unused and expired medications in boxes and cupboards is a potential threat and can be harmful to humans, environment and wildlife [10, 12]. Specifically, the presence of discarded medicines in water and drinking water is a serious and lethal issue that has gained national and international attention with the public, lawmakers, and regulators [13].

For instance, non-steroidal anti-inflammatory drug (NSAID) diclofenac has been shown to induce renal failure in vultures, This effect on vultures due to intake of cattle meats that were treated with diclofenac, due to which a huge population of vultures are swipe out from India. This disaster termed as DICOFENAC DISASTER. The ingestion of carrion from cattle treated with diclofenac responsible for this mass elimination of vultures [14]. The improper disposal of unused and expired medication lethal for the environment for example in the USA many medicines such as acetaminophen, verapamil, and estradiol are found in waterways. [15].The trace levels of ethinyl estradiol, in water responsible for, impairs sexual development and the feminization of fish [16].Evidence shows that the availabity of antibiotics in water may lead to antibiotic resistance [17]and in long term exposures may cause genetic effects in humans and marine life [13].

In Kabul, Afghanistan, the waste product of a mass vaccination programme of 1.6 million against polio in 10/ 2008 were discarded in the local municipal waste, causing infectious injury to individuals searching waste in dump sites for reusable items. Other Pharmaceutical waste have been found lying in the open land-fills near hospitals in urban areas [18]Similarly, it has been found that more than 60 or more hospitals in Kabul do not have incineration facility (The destruction of something, especially waste material, by burning) or access to other important Health Care Waste Management (HCWM) equipments[19,20].

The Health care wastes include all the waste generated by health-care establishments, research facilities, and laboratories [21]. Pharmaceutical waste is one of the important constituent of the HCW, which contains medicines or no longer needed, contaminated items, or pharmaceuticals, which need effective and systematic disposal techniques to get rid of its hazardous effects.

WHO's European Centre for Environment and Health in France, construct an international working group to formulate a practical guide, addressing mainly the problems of HCWM in developing countries [22]. Some programs such as Disposal of Unwanted Medication Properly (DUMP) campaign was established in New Zealand [23] and in Canada ENVIRx disposal program was started. [24].

Yet some developing countries do not have official state guidelines or protocols for the proper disposal of unwanted and unused medications [25, 27]. In Afghanistan, the National Medicine Policy (NMP) emphasizes (forcely) the disposal of expired medicines by distributing one percent of the cost of all medicines to be provided in Afghanistan, for pharmaceutical product waste management activities.

The General Directorate of Pharmaceutical Affairs (GDPA) was held responsible for the effective monitoring and evaluation of drugs use and their waste management plan implementation throughout the nation [28]. Disposal of pharmaceutical wastes are no uniform in different portions of countries which shows the current disposal system is in not effective one. To overcome these inabilities of the disposal system the Ministry of Public Health (MoPH) reconstruct Comprehensive Healthcare Waste Management Plan (HCWMP) for the Enhancement of proper medical waste management, for Health Action in

Transition (SEHAT) Project [29] for the handling of pharmaceuticals waste requiring destruction [30]. But these steps in management of pharmaceutical look handicaps because these projects lack proper transportation facilities in order to collect expired or unused dugs from different locations of country [30].

In developing countries like Afghanistan, the false management of HCW is due to lack of facilities, application of legislative policies and control [31]. Thus strict and strong policies should be applicable dealing with HCW disposal; especially in developing economies is needed [9]. In addition, public awareness programs and different practical approaches are mandatory to dispose unused medications.

No study has so far been conducted regarding malpractice of drug use and disposal practices of unused and expired pharmaceuticals among the general public in Kabul. In Afghanistan, availability of data regarding disposal of pharmaceutical waste is zero, knowledge and practices towards expired medication in developing countries not up to the mark or standard. This study was therefore planned with the goal to report the current conditions and attitudes of general citizens towards disposal of unused and expired pharmaceuticals.

Methods:

Study design:

This was a detail of descriptive, cross-sectional survey, conducted through face-to-face interviews using pre-validated structured questionnaire. The study was conducted in Kabul between 01 to 03/ 2016.

The study was conducted among different ages and sex, which included students, public and private sector employees, storekeepers and population from other walks of life, above the age of 18 years, who were local residents of Kabul, regardless of cast or employment designation.

Sampling/sample size

A non-probability sampling technique in which researcher selects samples based on his judgments, (convenience method) was employed to reach to the representative population easily in districts of Kabul Afghanistan.

The data collectors were trained perfectly and able to explain the purpose of the study to their potential respondents prior to administering the survey questionnaire. Participation in survey was voluntary not a

type of forced survey. The questionnaire was provided in two languages (Dari and English) to make the survey more effective one. Face-to-face interview technique was used by filling up questionnaires. Use of native or local languages during surveys increases the content of information's which seems to very helpful in order to collect precious data of interest.

Data analysis

Collected questionnaires were double-checked for more accuracy and then the collected data were feed into an Excel spreadsheet Dataset. Then the processed data was transferred to Statistical Package for Social Science (SPSS) version 23(IBM software) for analysis. Descriptive statistics (descriptive, crosstab and chi-square test) were used.

Ethical considerations

Survey was conducted in consent of participants. It was a voluntary type survey that survey do not try to affect their rights in any case. Identity and personal information of candidates kept confidential. Main motive of survey is to highlight the awareness of citizens regarding their surrounding which undergo contamination due to malpractices of drugs disposal and dumping.

Results

Demographic data

In this survey the about 301 individuals agreed to participate in the study and rest of them declined to be the part of this survey. Participant's response rate was found to be 100% in which, 221 (73.4%) were men and 80 (26.6%) were women. Maximum (104; 34.6%) respondents were aged 33 years and above. One hundred and sixteen (38.6%) respondents had up to secondary education, 163 (54.2%) were complete their university graduation and 22 (7.3%) were illiterate (not able to read and write) [Table 1].

The Cronbach's alpha (coefficient alpha) which is a estimate of reliability for all items was 0.70, which means that 70% of the variance in the scores is reliable variance, therefore there is 30% is error variance

Demographics and knowledge about procuring medicines

Variables and categories	Number of responses (%)

Variables and categories	Number of responses	(%)
Gender		
Men	221	73.4%
Women	80	26.6%
Age		
18-24	103	34.2%
25-31	94	31.2%
32 – above	104	34.6%
Marital Status		
Single	160	53.2%
Married	141	46.8%

Variables and categories	Number of responses	(%)
Level of Education		
Illiterate	22	7.3%
Primary	45	15%
Secondary	71	23.6%
University	163	54.2%
Ways of Procuring Medicines		
Purchased on prescription	251	83.4%
Purchased over the counter	44	14.6%
Received from friend/ colleague	3	1%
Purchase based upon the advice of a relative or friend	3	1%

Variables and categories	Number of responses (%)	
Classes of medicine used		
NSAIDs	61	20.3%
Antibiotic	140	46.5%
Anti-hypertensive	42	14%
Anti-diabetic	23	7.6%
Other	35	11.6%
Do you check expiry date of the medicines before procuring	Don't know	5 1.3%
Yes	290	97%
No	6	1.7%

Knowledge about procuring medicines

Regarding knowledge regarding procurement of medicines, 251 (83.4%) respondents purchased medicines on the basis prescriptions and 44 (14.6%) purchased medicine over the counter these are the population mainly practices self

medication and bypass the medical persons. Most commonly purchased medicines were antibiotics ($n = 140$; 46.5%), NSAIDs ($n = 61$, 20.3%), anti-hypertensive ($n = 42$; 14%), and anti-diabetic ($n = 23$, 7.6%). The majority of people ($n = 292$; 97%) checked the expiry date of medicines, prior to purchase [Table 1]. In addition, it was observed that 142 university graduates procured medicines on prescription. Similarly, 159 university graduates checked medicine expiry date before purchase [Fig. 1].

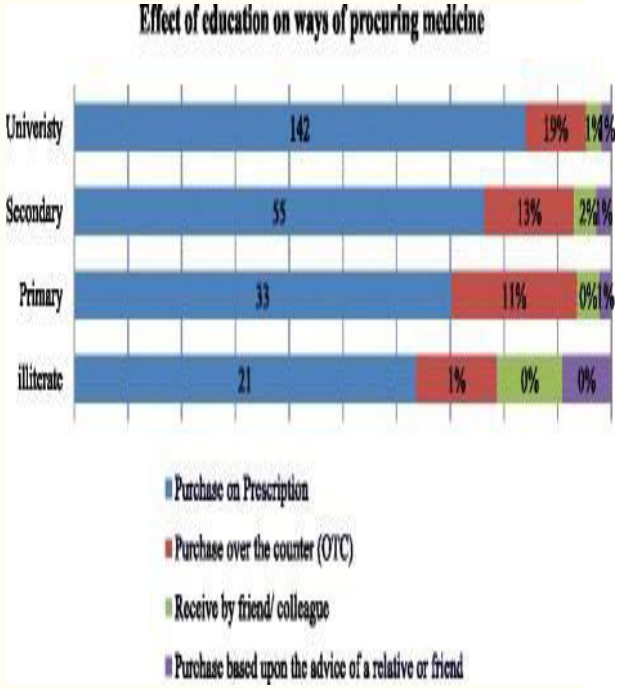

Fig (c) Effect of education on ways of procuring medicine

Table 2 shows the awareness regarding expire date among all respondent

The majority (159/301) of university graduates checked the expiry date of any medicine prior to its procurement.

Table 2. Participant's views about checking expiry date of the medicines before procuring

	Do you check expiry date of the medicines before procuring		
	Yes	**No**	**Don't know**
Illiterate	18	2	2
Primary	42	3	0
Secondary	71	0	0
University	158	3	2

	Do you check expiry date of the medicines before procuring		
	Yes	**No**	**Don't know**
Total	292	5	4

University graduates ($n = 158$) said that improper disposal of unused and expired pharmaceuticals can affect both the environment and health; it is a potential risk to nature (Table 3).

Table 3 Effect of Education on attitudes towards the effects of improper disposal of unused and expired medicines on environment and health

Level of Education	**Yes**	**Don't Know**	**Total**
Illiterate	22	0	22
Primary	43	2	45
Secondary	69	2	71
University	158	5	163
Total	290	11	301

Practices and attitudes towards unused and expired medication disposal.

Table 4 represents the responses of participants regarding the items intended to measure public practices and attitudes towards unused and expired medication disposal and its environmental impact.

When we asked the participants about the blocked stock of medicines present in their home maximum of them replied positively ($n = 287$; 95.3%). This blocked stock of drugs not in use and after some time expired, and undergoes improper disposal practices by the user of drug which have direct impact on the nature. A small majority (52.2%) of the interviewed respondents block the unused medicines at home until expired.

Maximum number of the respondents ($n = 234$; 77.7%) were throwing the expired medicine in household trash without knowing their impact on living organisms and nature. Six out of 10 (60.8%) of the respondents directly fingered towards the government; that the government was responsible to create awareness and awareness programs for proper disposal of unused and expired medicines.

Maximum number ($n = 294$; 98%) of respondents said that improper disposal of unused or expired drugs directly into nature or near water resources not a healthy practice. A large portion of respondents said that they have unused medicines in their homes, offices and these medicines were antibiotics in most cases this also highlight the self medication in people which were responsible for resistance.

Table 4

Respondents' practices and attitudes concerning unused and expired medication disposal.

Questions		N	%
Did any quantity of purchase medicine remain unused at your home?	Yes	286	95.3
	No	15	4.7
What do you do with the unused medicines?	Throw away in household garbage	42	14.3
	Donate to hospital	30	9.6
	Give to friends or relatives	5	1.3

Questions		N	%
What do you do with the expired medicines?	Return to medical stores	64	21.3
	Keep at home until expired	156	52.2
	Flush unused medications in toilet or sink	4	1.3
	Throw away in household garbage	233	77.7
	Flush expired medications in toilet or sink	37	12
	Give to friends or relatives	3	1.3
	Return to medical store	23	7.3
	Don't know	5	1.7

Questions		N	%
Who is responsible to create awareness for proper disposal of unused and expired medicines?	Government	182	60.8
	Pharmaceutical Industries	37	12
	Public	16	5.6
	Pharmacist	66	21.6
Improper disposal of unused and expired medicines can affect the environment and health.	Yes	294	98
	Don't Know	7	2

Discussion Today pharmaceuticals waste management and disposal become a hot topic grabbing attention at national or international level because it has been realized that improper use of drugs and their direct impact on nature not reversible one and can contaminate the environment, a drug when come in contact of water it simply dissolve because maximum drugs we are using in different medical conditions are water soluble due which contamination of water is more frequent by drugs which have direct impact on the living organisms specially aquatic. A study was conducted in different countries regarding disposal of drugs, which clears that a developing countries do not have proper resources and facilities to overcome this problem, even these countries paying zero attention towards this threat, but picture look more effective in developed countries that they have strict policies regarding the disposal of pharmaceutical wastes.

The Table 1 shows that maximum of the victims purchased drugs on prescription, which shows effective medicine purchase practices. Results from unused medication collection program in California justified that more than 51% of OTC (over the counter drugs) drugs were trash unused, compared to 46% of prescription medicines [13].Maximum amount (50%) of drugs that was procured by respondents were antibiotics which was a alarm for them and medical council, in maximum cases people uses these antibiotics in flipping manner which simply leads to resistance development. About 40% or less procured drug was NSAID which is quite common because these drugs simply work against pain. Education plays a vital role in order to understand about the risk potential of drugs which was justified by the surveys.

Taking excess dose of drugs was more common in uneducated one; they mainly undergo self medication which increases the chances of overdosing and even lethal damage to vital organs of body. But graduated persons always follow the instruction regarding the use of drugs and do not undergo malpractices regarding use of drugs for treatment purposes [37].

Interestingly, in this survey nearly all candidates checked the expiry date of medicine, before its purchase, while in another hand; in the Indian state of Gujarat many were not aware of the expiry date of medicines they simply use them without any worry [38]. It is very important is to purchase or use of any medicine, the expiry date must be checked, and otherwise it may lead to serious harmful effects [38].

The actual status of study shows that efforts towards disposal of unused and expired pharmaceutical were optimal but more than 95% of the candidates surveyed had left drugs at home and half of the interviewed candidates kept the unused medicines at home until they expired, which is a pool of potential health threat [39]. Borrowing and sharing of drugs is known to be associated with several risk factors such as skittle parties or pharm parties in which teenagers collect drugs and enjoy hallucination due to these drugs which sometimes lead to death and multiple, chronic disease [40], But such behaviour or attitude observed rarely among candidates which is good. In maximum of survey candidates accepted, that they thrown away the expired medicines in the household garbage which highlights the malpractice [27]. In Bussan city of Korea wife's

disposed unused or expired medications using the standard garbage bag which again a malpractice [41].

It was believed that best way to discard unused or expired drugs is to flush though sinks or toilets WHO itself issued a list of drugs which is safe to discard though toilets or sinks its look odd and again a mal practice Previously it was believed that proper method of unused or expired medications disposal was to flush down the toilet / drain, as opposed to discarding them in the trash, where animals or humans have to face the consequences [42]. About 10% of the candidates flushed the expired drugs down the toilet or sink, which are similar to the malpractices followed by the citizens in Kuwait, UK and USA [26, 43], where it is the best practice for disposal of liquid medications [27].

Very few candidates return the unused and expired drugs to medical stores, which is similar to people practice in the USA and Malaysia [36, 43]. In developing counties strict and strong measures leads to fruit full results such effective practices regarding disposal of unused or expired drugs plays a vital role in order to reduce the contamination rates of drugs in our environment. Pharmaceutical wastes should be transformed rather than dumping or disposing because such drugs need to detoxify properly before introducing in nature [32, 44].

Effective guidelines for disposal of medical in different countries lacking due to flexibility of constitution specially in India; development of nation at different levels is important but this have a negative effect on our health and surroundings which should be considered and rectify as soon as possible; development of appropriate method for disposal of pharmaceutical wastes should needed for ensuring minimal impact on nature. In USA Nebraska medication society suggested some effective ways to deal with medical wastes; which includes tempered boxes use to collect unused or expired drugs from people and further return back to nearest pharmacy center for proper processing. But disposal of unused or expired drugs is not a possible solution because dumping increases the risk of soil contamination; which may or may not leads to water contamination. Best way to get rid of such risk is to reuse medicines by developing effective extraction techniques as I do in my work where I simply convert a expired aspirin tablets into phenol ad methyl

salicylate which are only recommended to use on non living stocks. [44].

Some developed countries put a bench mark regarding returning medicines to health facilities such as Sweden and Korea; this represents that the community aware regarding the potential risk of these unused or expired drugs on their surroundings and resources [33, 41]. Such malpractices regarding the use and disposal of drugs should be rectified in developing countries; this is possible when government take strict action and draw such policies which also include fine and punishments according to the type of drugs undergo malpractice [32]. Unused or expired drugs Return Program or Take-back programs in Canada [45] and Meds Disposal in Europe [46, 47].

Lack of take –back program not possible to conduct in distance places; which should undergo replacement with proper disposal of prescribed drugs; with kitty litter, sawdust etc. in plastic bag container and disposed in the trash [48].Never dispose drugs with edible garbage because; ingestion by animals leads to serious problem. Proper disposal of expired drugs should be increased by awareness camps in community that guide people regarding proper disposal of medicinal wastes.

American pharmacist association recommended discarding drug with non edible wastes to prevent direct interaction with living organisms [49]. Health care organisation recommended five ways or methods to dispose expired or unused drugs, First one is to cross the name of patients followed by removal all labels of drug containers; mix the drug contents in water with kitty litter, spices, sawdust in order to make stinky which prevent ingestion by living organisms; use a opaque plastic bags to dispose drugs which further proper sealed and wrapped with packaging tape. Precautionary, the drugs should not be mixed with edible items because animals could accidentally ingest them. Finally; discard container in the trash [50].

Above mentioned methods to discard medicines tedious or timing consuming, the effective and better option for the safe disposal of pharmaceutical waste is incineration(burn them in fire) which requires third party interference for the collection of unwanted medicines [51]. For example, in Australia medical services runs a program in which expired or unused drugs are collected by these agencies and undergo incineration under high temperatures this

method of drug disposal is approved by USA drug authorities [27].

Knowledge regarding effective disposal of unused or expired drugs should be appropriate or accurate there is no space for mistakes because we are dealing with drugs not with garbage. In many countries pharmacy school provides good exposure for the growing pharmacists regarding disposal of medical wastes [52]. In Taiwan, a booklet was published by pharmacy council which includes the use of drugs and storage conditions, such publication plays vital role for the consumers to understand the use or abuse of drugs and also clears about their potential impact on nature [53].

Government of some countries provide free medication to patients which leads to increase in medical wastes; government have to focus on this because excess drugs have lethal effects in nature e.g. extinction of species. Drugs should be dispensed according to conditions of diseases; but now a day's dispensing of drugs in greater numbers by pharmacists become a integral part of pharma business which highlight a malpractice [54].

The study results suggest that government, pharmacist, and pharmaceutical industry are responsible to create awareness, which is consistent with the suggestions made by others [36].

Proper education regarding drug use and disposal is important in every part of world and it is only possible when educational departments of different countries introduce a particular subject of pharmacy which purely deal with use and disposal of unused or expired dugs in community [55].

Conclusion

Nature provides human beings everything but human always abuse it; in eyes of nature human is also a living organism; but human create artificial world which is full of diseases and infection which is mainly due to improper disposal of waste. Now it's time to wake up and do some effective work regarding disposal of medical wastes. In my opinion disposal not a permanent solution for this we have create such methods or techniques through which we can convert expired or unused drugs into useful chemicals. I formulated a floor cleaning agent which is termed as expirophenol, derived from expired aspirin tablets. As in case of aspirin we can transforms any expired drug in different useful chemical.

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