

Household Knowledge and Perceptions on Disposal Practices of Unused Medicines in Kenya

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Abstract

Medicines constitute a key factor in all health care delivery systems and are now said to contribute highly towards many households' recurrent expenditure. As access to medicines increase, bulks of medicines become unused and are kept at home. This has resulted into accumulation of unused medicines at home mainly due to lack of adequate knowledge on procedures for their safe disposal – which potentially can expose households to risks related to diversion, accidental overdose and use by children. An understanding of people's knowledge and perceptions on their disposal patterns therefore becomes fundamental in tackling this issue. It is against this backdrop that this study intended not only to bridge the knowledge gap in this discipline, but also to explore households' perceptions and practices of disposal patterns of unused medicines in Nairobi City – the capital of Kenya. The study found out that household's knowledge on disposal practices of unused medicines is relatively weak attributed to by lack of public outreach and awareness campaigns, laxity on the side of medical and healthcare professionals to provide disposal guidance at hospitals and pharmacies, unclear disposal instructions on medicines packages and negligence to read the disposal instructions.

Keywords: Unused medicines, knowledge, perceptions, disposal practices

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1. Introduction

Medicines constitute a key factor in all health care delivery systems and are now said to contribute highly towards many households' recurrent expenditure. In Kenya, it has been estimated by Kenya Medical Supplies Agency (KEMSA's) that about 30% of all purchases comprise of prescription drugs. An estimate of the Kenyan pharmaceutical market by Business Monitor International (BMI) indicate that expenditure on prescription medicines constitutes about 68.7% of the total healthcare market share (BMI, 2010). This may have been attributed to improved access to and availability of healthcare facilities, the dire need for healthy living and economic status of individuals (MMS & MPHS, 2009).

As access to medicines increase, bulks of medicines become unused and are kept at home. However, when they are no longer needed, they should be disposed of safely. Unsafe drug disposal can have a direct impact on public safety, the environment, and the health care services. Accidental use of unused medicines is often associated with adverse effects and other drug-related problems that can generate increased health care costs, including a need for new consultations with other health care professionals, use of additional drugs, need for more laboratory tests, hospitalization, permanent disability and even death.

While the disposal of unused medicines has evolved to become a health concern, unfortunately programs advocating for safe disposal practices of unused medicines are still limited in Kenya. Disposal of unused medicines has evolved to become a health concern. Unfortunately programs advocating for safer disposal patterns of unused medicines are limited in Kenya (UNIDO, 2010).

2. Global Patterns in Disposal Practices of Unused Medicines

Proper disposal of unused prescription drugs has become an important public health issue all over the world as rates of prescription drug abuse, accidental poisoning, and the incidence of drugs found in the drinking water have become quite prevalent (CDC, 2007). Consequently, safe disposal of unused medicines has become a global challenge and confronts policy makers, health professionals, pharmaceuticals companies and the general public.

Many developed countries have elaborate disposal programs of unused medicines. In Australia and Canada's there has been the National Return & Disposal of Unwanted Medicines Project since 1998 fully supported by the government and pharmaceutical industry (Sharon *et al.*, 2010). Pharmacy take-back programs are more abundant in the UK (Tong *et al.*, 2011:296). Additionally, the UK has long since practiced the precautionary principle when it comes to protecting the environment, often setting precedent with pollution prevention programs such as pharmacy take-back programs. For example, the Royal Pharmaceutical Society of Great Britain promoted safe medicine disposal campaigns throughout the 1990s, advocating that patients should return any unused or expired medications to pharmacies for proper disposal (Tong *et al.*, 2011:296).

In Africa unused medicines disposal management appears to be more critical as reports from around the continent (Mozambique, South Africa, Kenya and Swaziland) indicate unsafe disposal practices characterized by unregulated, illegal and indiscriminate disposal of unused medicines (Manyele *et al.*, 2003; Manyele, 2004:30).

In Metropolitan Lagos, Nigeria, basic education on appropriate disposal of unused medicines was reported to be lacking and unused medicines were not returned to pharmacies for appropriate disposal as obtainable in developed countries (Auta *et al.*, 2011 & Longe & William, 2006:133)..

In Africa, Ghana is one of the counties where increased awareness amongst the people and the government with regards to safe disposal of unused medicines has matured. The government in Ghana has introduced a programme that sensitizes people on the need to take back unused medicines to hospitals and chemists through the Disposal of Unused Medicines Programme (DUMP) (Manyele *et al.*, 2003). In Kenya, there are no national policies that govern the disposal of unused medicines and the general public awareness on issues related to storage and disposal of unused medicines is also lacking (Manyele *et al.*, 2003).

3. Theoretical Framework

This study focused on factors that influence intentions and behaviour as well as those outside the individual's control including the absence of resources or skills and impediments to behavioural performance. The theoretical framework adopted for the study had to support an understanding of the variables that influence the knowledge and disposal practices of unused medicines. As such the Theory of Reasoned Action (TRA) and Theory of Planned Behaviour (TPB) were chosen as these theories have found application in health related behavioral research and have improved the predictability of health-related intentions (John *et al.*, 1999:275).

These theories, especially TPB, helped in examining how people's perceptions and actions are determined by intentions of their behaviour and in exploring and understanding the households' perceptions and outcomes.

They also provided a framework for analysing, understanding and interpreting the meanings people attach to their actions, while at the same time helped in determining whether households know, perceive and understand the consequences of unsafe disposal practices.

4. Research Design and Study Population

This study utilized a cross-sectional research design that involved both quantitative and qualitative methods of data collection in order to attain in-depth information to enable a better understanding of the phenomenon under investigation. Priority was given to a range of dimensions like the importance attached to expressing causal connections between variables and understanding households' practices and perceptions with regard to disposal of unused medicines. With cross-sectional design, it was possible to examine relationships between variables however this did not necessarily determine causal relationships.

For instance, a relationship between a person's perceptions and the need to dispose unused medicines safely might be established however this may necessarily not mean that disposal practices were dependent on people's perceptions. Both quantitative and qualitative data was collected through semi-structured interviews. The study population consisted of households within South C area in Nairobi City as it comprises of both formal and informal settlements. Sampling was done so as to draw a representative population and comprised of two distinctive groups of households. These were households within the formal settlement (middle-class) and informal settlement (lower-class) areas. The formal settlement comprised of households that are gated and organized into a residential estate while the informal settlement comprised of slums.

The determination of the appropriate sample size for the study utilized a statistical formula that accounted for the Confidence Level (CL), a Margin of Error (ME) and a Standard Deviation (SD) that was desired. A sample size of 164 households comprising of 82 households each within the formal and informal settlements respectively were selected for the data collection. Descriptive statistical analysis was used to analyze and draw conclusions of facts from the collected data by deriving simple summaries on the observations that were made and also explores the policy options and strategies for enhancing safe disposal practices for unused medicines in Kenya. The demographic profile of the respondents is provided in Table 1.

Table 1: Demographic Profile of Respondents

Group	Attribute	Formal Settlement		Informal Settlement	
		Number	Percentage	Number	Percentage
Gender	Male	10	12	18	22
	Female	72	88	64	78
Age	20 and under	6	7	14	17
	21 - 30	15	18	20	24
	31 - 40	23	28	36	44
	Above 40	38	46	12	15
Marital Status	Married	74	90	68	83
	Unmarried	8	10	14	17
Children	With children	78	95	60	88
	Without children	4	5	8	12
Number of Children	1	15	19	11	16
	2	21	27	16	24
	3	32	41	23	34
	4	6	8	14	21
	Above 4	4	4	4	6
Children below 18yrs	1	15	19	13	19
	2	26	33	32	47
	3	21	27	16	24
	4	12	15	4	6
	Above 4	4	5	3	4
Education Level	Primary	6	7	28	34
	Secondary	34	41	49	60
	Tertiary	42	51	5	6
Employment Status	Unemployed	12	15	38	46
	Employed	26	32	11	13
	Self-employed	37	45	6	7
	Unskilled	7	9	27	33

5. Findings

5.1. Perceptions on Unused Medicines

The study (Table 2) revealed that a majority (31.77%) of respondents “strongly agreed” regarding the extent to which they believe that unused medicines present potential risks and or negative consequences at home. Further 32.32% of the respondents also “strongly agreed” that children are more at danger with unused medicines while 89.02% of the respondents also “strongly agreed” that lack of adequate information on safe disposal practices are a precursor to the risks and negative consequences of unused medicines.

None of the respondents “strongly agreed” that there is adequate advice by doctors and healthcare professional on safe disposal practices with only 29.88% strongly agreeing that mandatory take back programs as a disposal practice can help in addressing the potential risks and dangers associated with keeping unused medicines at home. Contrarily, there were respondents (21.34%) who “strongly disagreed” that unused medicines present potential risks at home with a further 19.51% and 31.10% “strongly disagreeing that children are more vulnerable to the risks of unused medicines and mandatory take back programs as a disposal practice should be initiated” respectively.

Table 2: Household Perceptions on Unused Medicines

Perception	SD	D	N	A	SA
Unused medicines present potential risks at home?	35	29	1	47	52
Percentage	21.34	17.68	0.61	28.66	31.71
Children are more vulnerable?	32	16	6	54	53
Percentage	19.51	9.76	3.66	32.93	32.32
Lack of adequate information on safe disposal	0	0	1	17	146
Percentage	0.00	0.00	0.61	10.37	89.02
Advise by doctors and healthcare professionals?	154	8	2	0	0
Percentage	93.90	4.88	1.22	0.00	0.00
Mandatory take back programs of unused medicines?	51	17	5	42	49
Percentage	31.10	10.37	3.05	25.61	29.88

SD-Strongly Disagree, D-Disagree, N-Neutral, A-Agree, SA-Strongly Agree

5.2. Factors Influencing Keeping and Disposal Decisions of Unused Medicines

As shown in Table 3 The most prominent factor that influence decisions on keeping unused medicines at home was related to knowingly keeping unused medicines with an intention to share with other family members in case of need while 62.80% of the respondents also indicated that once they got better, they stopped the dosage and kept the rest. A sizeable percentage of respondents (54.27% and 47.56%) respectively, keep the unused medicines once they finish the dosage or are actually not sure on how to dispose of the unused medicines.

There is a group of respondents (51.83%) who just buy medicines and keep at home just in case they fall sick while side effects (42.07%) also featured as a prominent factor. Other factors with varied degree of influences included the following: difficulty to follow instructions or unclear disposal instructions, some did not want to use them, change of prescription, traveling, while some of the respondents stated that they keep unused medicines donated to them by Non-Governmental Organizations (NGO's).

Table 3: Factors Influencing Keeping Unused Medicines at Home

Factors for keeping unused medicines	Score	Percentage
Give to family members and neighbors when sick	126	76.83
Finished the dose and remained	89	54.27
Side effects made me stop	69	42.07
Change of prescription	62	37.80
Bought and kept just in case	85	51.83
I became better and stopped	103	62.80
Donated by NGO	28	17.07
I travelled and forgot	21	12.80
Passed expiry date	67	40.85
Did not want to use them	54	32.93
Not sure how to dispose them	78	47.56
Difficulty to follow instructions	52	31.71
Labels had unclear instructions	48	29.27

On the other hand, the study found a mixed response as to what factors influence the disposal decisions of unused medicines. As presented in Table 4, slightly more than three quarters (78.05%) of the respondents argued that economic factors such as lack of money to buy medicines, influences their decisions while 21.99% indicated lack of disposal programs and awareness as the main influencing factors.

On the contrary, a sizeable (40.24%) proportion of the respondents indicated that the fear of unused medicines being poisonous can influence their decisions to dispose of them. Other factors included wrongful use of unused medicines by children (31.71%) and potential side effects (21.95%). Further, 6.10% of the respondents also indicated cultural factors specifically; the taboo of using unused medicines that were meant for treatment of particular ailments which could lead to one contracting the same disease.

Table 42: Factors Influencing Disposal of Unused Medicines

Factors that influence disposal decisions	Score	Percentage
Poisonous	66	40.24
Wrongful used by children	52	31.71
Side effects	36	21.95
Cultural	10	6.10
Economic (no money to buy when need arises)	128	78.05
Lack of programs	36	21.95

All the respondents stated that they do keep prescribed and over the counter unused medicines at home, for varied durations. For the unused prescribed medicines, 27.44% of the respondents do keep them for more than one year, with 21.95% keeping them for between 9-12 months' period. 18.29% and 17.07% keep them for between 6-9 months and 3-6 months, respectively with only 15.24% keeping them for less than 3 months.

On the contrary, a high percentage (42.07%) of respondents do keep unused self-prescribed over the counter medicines for less than 3 months with only 5.49% keeping them for more than one year. 27.44% and 10.98% of the respondents keep them for between 3-6 months and 6-9 months respectively with only 14.02% who do keep them for between 9-12 months. As to whether respondents keep unused medicines past their expiry dates, a significant number of respondents (84.76%) agreed that they do keep them while only a meagre 15.24% dispose of expired unused medicines. However, when questioned for how long unused medicines past expiry date are kept, 35.97% stated that they keep them for less than 3 months while 12.23% keep them for more than 1 year. Further, 17.27% and 15.11% of the respondents respectively keep expired unused medicines for between 3-6 months and 6-9 months with only 19.42% keeping them between 9-12 months

5.3. Perceptions on Safe Disposal Practices

Participants also gave mixed responses regarding their perceptions on what they would consider as safe disposal practice of unused medicines. As shown in Table 5, the most preferred disposal practice was throwing in garbage bins, followed by flushing in the toilets, disposal in special garbage bins while the least indicated that they would respectively burry and burn unused medicines. A meager percentage of respondents thought that returning them to the hospitals or pharmacies would be a safer option.

Table 5: Perceptions on Safe Disposal Practices

Preferred Disposal Practices	Number	Percentage
Flush in toilet	41	25.00
Throw in garbage bins	47	28.66
Take-back programs	8	4.88
Burn	16	9.76
Burry	23	14.02
Special garbage bins	29	17.68

While take back programs was the least favored, the survey participants gave an almost evenly divided opinion with 58.54% of the respondents in favour while 41.46% were not in favour. Of those in favour, all supported the take back program citing safety and health risks associated with unused medicines while 69.79% cited risks associated with water pollution. On the contrary, the respondents who were not in favour of the take back program cited reasons associated with medicines being expensive and no need to dispose if they can help when in need (83.82%), while 35.29% of the respondents had a reservation of the potential of unused medicines being resold and 23.53% were of the opinion that special bins would expose street boys to the dangers associated with unused medicines.

There were respondents (14.63%) who had reservations about people getting to know what ailments they had when they take back unused medicines. The survey further confirmed that the main obstacles to safe disposal practices of unused medicines are related to the absence of programs (34.15%) and lack of awareness of the dangers of unused medicines (29.27%). Economic factors (23.78%) and inadequate interest from medical practitioners (12.80%) also feature as hindrances to safe disposal practices of unused medicines.

5.4. Expectations on Safe Disposal of Unused Medicines

As presented in Table 6, the survey participants registered varied opinions with regards to their expectations and or perceptions on safe disposal practices. Notably, most of their expectations were related to factors that they thought hinder and what they consider should be appropriate measures to ensure compliance with safe disposal programs.

About 43.90% of the respondents believed that the subject has not been accorded much attention with 32.93% of the respondents considered it as a community health problem that should be taken seriously with only a few of the respondents (20.73%) considering it an issue to be left to the healthcare professionals only. A majority of respondents (76.83%) believed that outreach and awareness programs should be initiated to sensitize people on safe disposal practices and on the dangers of unused medicines in addition to the take back programs (54.27%). Further, 34.76% of the respondents considered economic status of individuals as a factor that may hinder willingness to dispose of unused medicines.

Table 6: Expectations/Perceptions on Safe Disposal of Unused Medicines

Expectations/perceptions on safe disposal of unused medicines	Number	%
It's a community health problem and should be taken seriously	54	32.93
It has not been considered as a real issue	72	43.90
Take back programs should be initiated	89	54.27
Healthcare professional should be at the forefront	34	20.73
Outreach and awareness programs should be initiated	126	76.83
Economics can hinder any initiatives for safe disposal	57	34.76

Some of the identified barriers to safe disposal practices of unused medicines were those related to lack of adequate information on safe disposal practices, no government efforts and a lack of regulations and policies. The key stakeholders such as hospitals and pharmacies and even pharmaceutical companies have also not shown interest. Minimal media coverage on the issue was also cited as a barrier. Economic conditions were also highlighted as a barrier as well as the mushrooming over the counter outlets, lots of natural and vitamins available which allow people to hoard medicines at their homes.

The perception that unused medicines are poisonous and could be accidentally used by children significantly influences the respondents' decision to dispose of them safely. The study did not identify much of cultural factors that influenced households' disposal decisions and disposal practices. However, lack of adequate information on safe disposal practices has quite a significant influence on households' attitude towards safe disposal practices. For instance, lack of proper advice from medical practitioners had an effect on households' attitude on safe disposal practices. Households with more positive attitudes toward disposal practices of unused medicines had stronger intentions to do it. The more positive participants' attitudes about health risks of unused medicines were, the greater their intention to dispose of them.

The greater the perception that health professionals give much more information and the availability of disposal programs, the higher their adherence to safe disposal practices.

The study also revealed that the government (39.02%) should be at the forefront in taking responsibility in ensuring that individuals are made aware of the dangers of unused medicines and safe disposal practices. Slightly more than a quarter (28.05%) of respondents believed that the buck lies with the hospitals while 20.73% were of the opinion that being a community health issue, individuals should take the responsibility. Only 12.20% of the respondents believed that pharmacies should take the responsibility.

6. Discussion

6.1 Knowledge on Disposal Practices of Unused Medicines

Studies on household disposal practices of unused medicines, frequently supplemented by an investigation exploring the reasons for keeping unused medicines at homes are available in other countries but limited in Kenya (Tong et al., 2011) This study therefore provides evidence to an under-researched area in Kenya.

The respondents and the key informants reported that they were not satisfied with the level of information received regarding disposal of unused medicines. This key observation is similar to those of previous studies (Cook et al., 2012), who concluded that lack of information reaching the general public on the optimal approach to the disposal of unused influence their decisions. There was a general agreement amongst the study's key respondents that there is no adequate legislative and regulatory to address this issue.

The legal framework and information policies are likely to impact medicines disposal behavior (Seehusen & Edwards, 2006). In Austria for example, unused medicines are required to be returned to pharmacies, or to public collection points, which are, for instance, offered by the municipalities (Vollmer, 2010). However, there are no sanctions for wrongful disposal; as there is no information available for people to believe that some forms of disposal are preferred

A greater proportion of respondents (76.83%) indicated that they knowingly keep unused medicines with an intention to share with other family members in case of need, while 62.80% of the respondents also indicated that they once they get better, they stop the dosage and keep the rest. A sizeable percentage of respondents (54.27% and 47.56%) respectively keep the unused medicines once they finish the dosage for they actually are sure on how to dispose of them.

The outcome of this study has some similarities in pattern with the findings of other studies as reported in the surveys with patients keeping unused medicines at home in other high-income countries (Morgan, 2001; Braund et al., 2009). Evidence of unused medicines hoarding amongst participating households resulting from retention of discontinued medication, change in prescription, patient's health improving before finishing medicine, were also contributory factors that influenced households' need to not dispose of them for future use or sharing (Abahussain & Ball, 2007).

6.2 Perceptions on Disposal Practices of Unused Medicines

A majority of the respondents (53.05%) indicated that they do not dispose of unused medicines and just keep them at home and 19.51% share with others while none of the households return unused medicines to the hospitals or pharmacies.

For the households who dispose of their unused medicines (27.44%), the predominant disposal practice was throwing in garbage bins (12.80%) while 7.32% of the respondents flush unused medicines in toilets and 7.32% of the respondents dispose in kitchen and hand wash sinks. A significant number of respondents do keep them at home while only 15.24% dispose their unused medicines. However, when questioned for how long unused medicines past expiry date are kept, 35.97% stated that they keep them for less than 3 months while 12.23% keep them for more than 1 year. Further, 17.27% and 15.11% of the respondents respectively keep expired unused medicines for between 3-6 months and 6-9 months with only 19.42% keeping them between 9-12 months.

The findings of this study corroborate well with other studies elsewhere. From a study carried out in New Zealand, it became evident that more than 35% of the respondents considered it acceptable to flush down unused medicines in the toilet, and more than 21% believed it acceptable to rinse them down the kitchen sink (Braund, Peake, & Sheiffelbien, 2009). Similar results were found in surveys conducted by (Bound, Kitsou, & Voulvoulis, 2006) in England where 77% of respondents never sought to know about the correct way of disposal. In a study by (Wilson, Weiss, & Malone, 2011), two-thirds of the respondents had no knowledge of any documented guidelines pertaining to proper unused medicines disposal.

Tong *et al.* (2011), also found out that the type of medication may influence the disposal practices, and that some medications should have special disposal methods. Some individuals stated that they dissolve or mix medications into the trash, so it is not picked up for non-medical uses. In another study by (Glassmeyer, et al., 2009), the researchers asked the respondents to show their opinion for each of these four disposal practices (flushing in toilet, throwing in garbage bins, burying and burning) with respect to their health risks.

The researchers found that throwing in garbage bins was perceived as the safest disposal method while burying as the most unsafe. It was evident, that most of the households were not informed about proper disposal of unused medicines and felt limited, unfortunately, certain that they were not even thinking about changing their perceptions. These findings corroborate well with other studies elsewhere. In the USA, fewer than 20% are ever given advice from a healthcare provider about medication disposal, with only 1.4% returning their medications to a pharmacy, while 54% disposing then in the garbage, 35.4% flushing unused medications down the toilet or sink, and 9.2% do not dispose of their unused medications (Sharon et al., 2010). Studies by Abahussain *et al.*, (2006) and Persson *et al.*, (2009) reported that the motivation factors that would encourage households to dispose unused medicine safely include among others making relative information available, education - especially about negative impact of unused medicines in the environment, giving knowledge about the risks of unsafe disposal and information dissemination about safe methods.

Respondents considered physicians to be the primary source for information on disposal practices of unused medicines. It was found that lack of instructions on the disposal of unused medicines inhibit adaptation to safe disposal practices. The results of this study suggest that there is a need for education of patients on proper disposal of unused medications. A majority of the participants (64.64%) mentioned that the best way to educate the public about disposal of unused medication was through hospitals and pharmacies. This resonates with a similar study that reported that extensive public awareness creation and mass-media campaigns are more effective in educating and empowering populations on safe disposal practices of unused medicines (Sharon et al., 2010).

7. Conclusions

The study concludes that household's knowledge on disposal practices of unused medicines is relatively weak. This lack of knowledge has been found to be attributed to by a lack of public outreach and awareness campaigns by the government, laxity on the side of medical and healthcare professionals to provide disposal guidance at hospitals and pharmacies, unclear disposal instructions on medicines packages and negligence to read the disposal instructions.

While there was a general acceptance amongst the respondents towards instituting organized safe disposal practices, however, there were negative perceptions as some respondents were concerned about unused medicines finding their way into the market, unused medicines being exposed to and abused by street children and stigma of others knowing an individual's ailments. Even though many households do acknowledge that unused medicines present a public health risk, a majority of households still opt to keep unused medicines at homes.

However, it emerged that the predominant existing household disposal practices include; flushing in the toilets, throwing in garbage bins and disposal in kitchen sinks. In terms of preference with regards to safe disposal practices, special garbage bins was favored to the take-back program, however, there was a consensus that take-back programs should be initiated and that healthcare professional should be at the forefront in sensitizing communities towards safe disposal practices of unused medicines.

It is therefore recommended that a coordinated and systematic public awareness campaigns on the negative and health risks of unused medicines and safe disposal practices be carried out; a program that allows for immediate disposal of unused medicines in residential settings to reduce the risk of accidental poisoning

through the provision of collection points and monthly collections events be developed, launching of take-back programs for unused medicines; and setting robust institutional and regulatory frameworks to oversee information sharing on safe disposal practices be instituted.

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