



ABUSE OF PRESCRIPTION DRUG METRONIDAZOLE IN DIARRHEA BY LAYMEN POPULATION OF KARACHI

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ABSTRACT

Background: The abuse of prescription drugs are increasing day by day because of lack of knowledge and lack of counseling. This is a significant social problem which has to be minimized by developing awareness regarding prescription drugs in different Medical communities and laymen and establishing community pharmacies.

Objective: Metronidazole is the drug which is used in diarrhea, in our study we have focused on its abuse by layman and unawareness in Medical communities regarding it being a prescription drug. **Methodology:** A survey based study of N=200 laymen population including both male and female aged 18-55 were carried out. We also targeted N=100 Physicians and N=100 Retail drug sellers in order to observe prescription and dispensing pattern.

Result and Discussion: From our results we found that 65% laymen self medicate in diarrhea and use combination of ORS and metronidazole which was prescribed by physician once in life. 86% physician where as 91% retail drug sellers consider it as over the counter (OTC) medicine. 57% laymen take metronidazole depending on number of stool passed regardless of frequency which should be followed. **Conclusion:** From our study we came to conclude that Metronidazole is being used as over the counter drug and laymen are using it to self medicate themselves in diarrhea which can lead to its resistance and adverse effects in them. Awareness needs to be created in medical communities and laymen regarding this issue.

KEY WORDS: Prescription drugs, Over the counter drugs, community pharmacy, metronidazole, flagyl.

INTRODUCTION

The mechanisms by which individuals can obtain medicines include not only their traditional prescribing by doctors, but also the ability to purchase medicines directly. The most obvious example of this is the retail pharmacy, community and out patient pharmacy, where prescription medicines as well as over-the-counter drugs are dispensed.

There has been a tendency for the public to perceive OTC medicines to be safer than prescription medicines.^[1] The purchase of over-the-counter (OTC) medicines for a wide variety of minor ailments, such as headaches, colds and indigestion is a trend now a day.^[2] Also, the retail shops often mislead the public.^[3] But it has been recognized that OTC medicines have the potential for harm as well as benefit.^[4] This may result in what has been variously referred to as the misuse or abuse of OTC medicines and their potential to cause addiction and dependency.^[4]

Diarrhea is a common problem which can occur due to variety of reasons for which people seek medical advice.^[5] It can range from being a mild, usually temporary condition, to one that can be life threatening.

Diarrhea should not be confused with the frequent passing of stools of normal consistency. Diarrhea is characterized by abnormally loose or watery stools.^[6] It is the reversal of the normal net absorptive status of water and electrolyte absorption to secretion.^[7] This may be caused by incomplete breakdown or mal-absorption of nutrients in the small intestine allowing a larger and more liquid mass to enter the colon.^[8] The impaired digestion of fats is due to low pancreatic enzyme levels and due to small bowel disease.^[9]

Diarrhea lasting less than 2 weeks is considered acute.^[10] Chronic diarrhea, on the other hand, lasts longer than four weeks.^[11] Secretory diarrhea occurs when there is an increase in the amount of fluid being drawn into the lumen of the bowel such that the ability of the intestines to reabsorb is overwhelmed.^[11] Osmotic diarrhea occurs when there is a dysfunction in the ability of the intestine to reabsorb fluid as it flows through the lumen.^[12]

Associated symptoms can include abdominal cramps fever, nausea, vomiting, fatigue and urgency. Chronic diarrhea can be accompanied by weight loss, malnutrition, abdominal pain or other symptoms of the

underling illness.^[9] For all cases of diarrhea, the first goal in treatment is to rehydrate.^{[13][14]}

Most cases of acute, watery diarrhea are caused by viruses (viral gastroenteritis). Anti-diarrheal drug therapy can be helpful to control severe symptoms.^[9] A recent study from Nigeria showed a high rate of the misuse of metronidazole for childhood diarrhea by the mothers.^[15] Metronidazole is an antiprotozoal and antibacterial medication.^[16] It was synthesized by France's Rhone-Poulenc laboratories and introduced in the mid-1950s under the brand name Flagyl. It was the first member of the group of drugs that are now called nitroimidazoles.^[17] Metronidazole is one of the mainstay drugs for the treatment of anaerobic infections and is the treatment of choice for most patients with mild to moderate *Clostridium difficile*-associated diarrhea. It is approved by the US Food and Drug Administration (FDA) for the treatment of anaerobic and protozoal infections. Metronidazole exerts its antimicrobial effects through the production of free radicals that are toxic to the microbe.^[18]

Metronidazole is cytotoxic to anaerobic bacteria such as *Helicobacter pylori* and *Gardnerella vaginalis*, but the mechanism of this action is not well understood.^[19] Metronidazole is one of the rare examples of a drug developed as antiparasitic which has since gained broad use as an antibacterial agent.^[20] Currently, metronidazole is on the formulary at most hospitals for prophylaxis against anaerobic infection after bowel surgery, for treatment of wound abscess, and for treatment of antibiotic-associated colitis caused by *Clostridium difficile*. Metronidazole in combination with other agents is widely used against *Helicobacter pylori*, a major cause of gastritis and a risk factor for stomach cancer.^[21] Dizziness, headache, diarrhea, nausea, stomach pain, loss of appetite, constipation, changes in taste, and dry mouth may occur.^[22] A prolonged use of metronidazole can cause different adverse reactions, which include brain toxicities.^[23] The objective of our study was to evaluate the abuse of metronidazole by laymen population and check awareness in medical personnel regarding status of metronidazole being prescription drug. Proper frequency and indications of use were also evaluated.

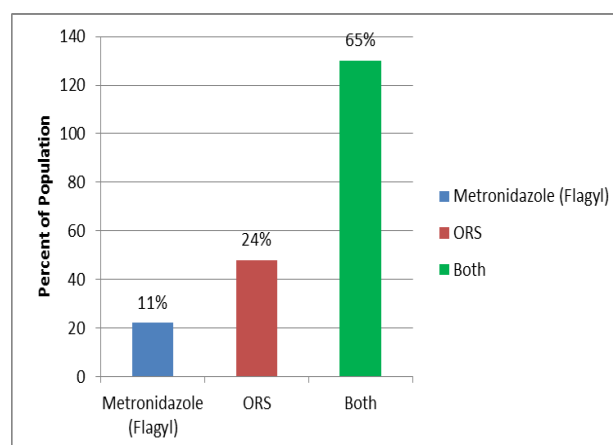
METHODOLOGY

A survey based cross sectional study was carried out consisting of questionnaire divided into three sections: lay men, physicians and pharmacy stores. N=200 laymen population including both male and female aged 18-55 were questioned. We targeted N=100 Physicians and N=100 Retail drug sellers in order to observe

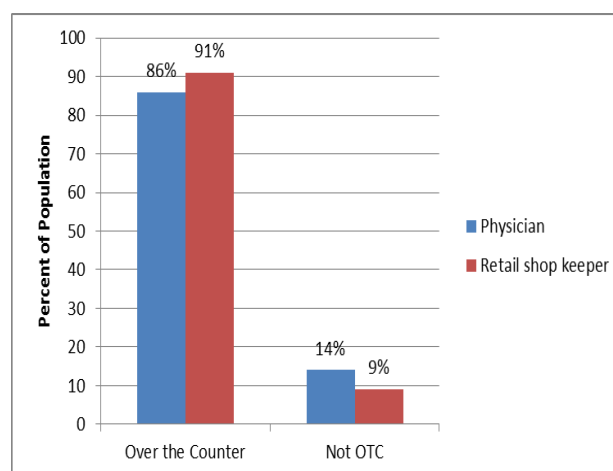
prescription and dispensing pattern. The study was carried out from July 2015- September 2015. The answers were recorded as open ended.

RESULTS

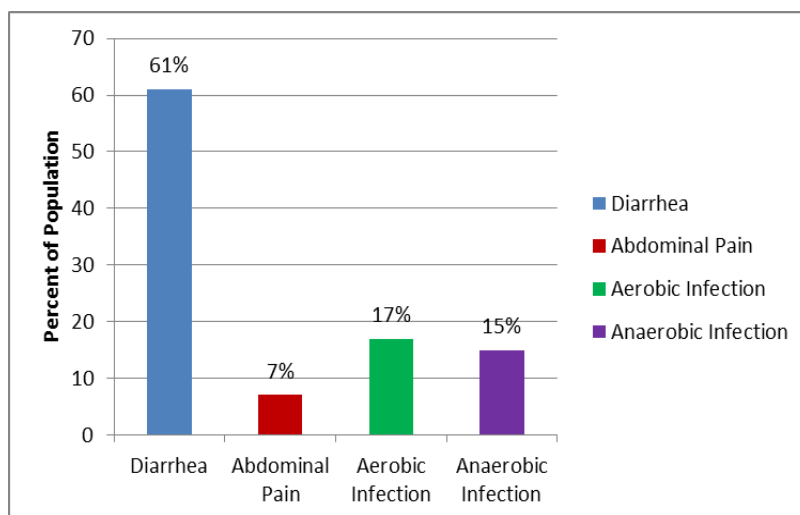
The results have been interpreted by graphical representation. SPSS 19 has been applied to evaluate the significance level of medical professionals and retail drug sellers who consider metronidazole as OTC. We applied One way Binomial to our data. P-value of 0.05 (5%) or less would be considered as statistically significant. Mean and standard deviation have also been reported.



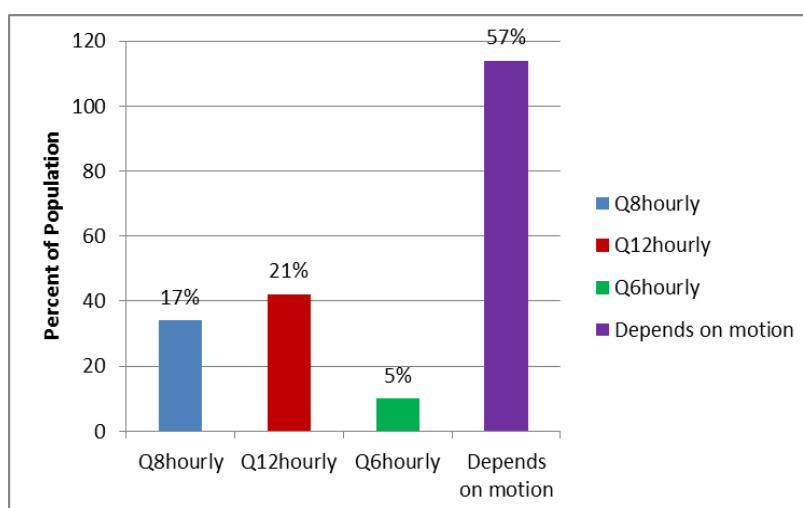
Graph 1: Self Medication taken by Laymen for Diarrhea:



Graph 2: Awareness among Physicians and Retail shopkeepers about Flagyl Not being an Over the Counter Drug



Graph 3: Prescription Pattern for Metronidazole (Flagyl)



Graph 4: Frequency of Flagyl Consumption by Laymen.

Table 1: Binomial Test

	Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Profession	Group 1 physician	100	.50	.50	1.000
	Group 2 Retail Shop Keepers	100	.50		
	Total	200	1.00		
Metronidazole a prescription drug awareness pattern	Group 1 otc	177	.89	.50	.000
	Group 2 prescription medicine	23	.11		
	Total	200	1.00		

Table 2: Group Statistics

	Profession	N	Mean	Std. Deviation	Std. Error Mean
Metronidazole a prescription drug awareness pattern	physician	100	1.86	.349	.035
	Retail Shop keepers	100	1.91	.288	.029

DISCUSSION

Rational drug use is defined as taking appropriate medication according to patients clinical condition. Irrational drug use is increasing day by day which majorly includes inappropriate prescribing and over the counter drugs.^[24] Other causes include self-medication, antibiotic prescribing, inappropriate use of medication in diarrhea and steroids.^[25] Graph 1 represents the trend of

self medication in diarrhea 65% laymen prefer to use metronidazole and Oral rehydration solution (ORS) in combination for treatment of diarrhea. Rehydration is considered beneficial in diarrhea and fluid replacement is usually suggested so use of ORS is not harmful considering there are no comorbidities involved.^[26] Metronidazole is drug of choice for treatment of anaerobic infections and C.difficile associated diarrhea.

[27] Treating diarrhea with metronidazole without knowing cause could lead to adverse effects associated with metronidazole as well as resistance to it.

Graph 2 shows the awareness among physicians and retail shop keepers regarding status of metronidazole as prescription drug or over the counter medicine. Shockingly 86% physicians and 91% retail shop keepers consider metronidazole as OTC drug. Table 1 shows highly significant results regarding knowledge of physicians and retail shop keepers. Both consider metronidazole as OTC drug. Table 2 shows means of Physician (1.86 ± 0.3) and Retail shop keepers (1.91 ± 0.288) which shows both populations nearly equally consider metronidazole as OTC. Literature studies show that metronidazole is an anti-protozoal drug and should be dispensed on prescription. [28]

Graph 3 shows the prescription pattern followed by physicians. 61% physicians prescribed metronidazole in diarrhea irrespective of cause. The surprising result was when 17% results were observed for prescription pattern in aerobic infection. Metronidazole is drug of choice for anaerobic infections. [29] This result showed us that irrational drug use of metronidazole might not only be due to self-medication but also improper prescribing pattern of physicians. Graph 4 showed the frequency at which metronidazole is consumed by laymen. Our results showed that 57% population takes metronidazole based on number of motions. Metronidazole is anti-protozoal drug and should be consumed in proper frequency so resistance does not develop. Normally for *Clostridium difficile* associated diarrhea metronidazole is prescribed 500 mg Q8 hourly. [30]

CONCLUSION

Our study showed that metronidazole is being abused by laymen population excessively. Awareness needs to be created among physician and retail shop keepers that it is not an OTC drug so they don't dispense it to patient without prescription. Besides that community pharmacies should be established to reduce abuse of prescription drugs. Awareness should be created among laymen regarding consequences that can occur as result of abuse of metronidazole mainly resistance to the drug.

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