

Drug Utilization In A Rural Community- A Longitudinal Study

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Abstracts: Background & objectives: Around 50% of all medicines are prescribed, dispensed or sold inappropriately while 50% of patients fail to take their medicines appropriately. The optimum efficacy of a drug requires the firm compliance from the patient and honest co-operation from both the patient and their families. With this background this study was conducted to find out the pattern of drug utilization in a rural community of Maharashtra, to detect the magnitude of drug failure and to find out its associates. **Methods:** A Community based longitudinal study was conducted in a village (Jaulgaon), in Maharashtra (Central India), belonging to the field practice area of Mahatma Gandhi Institute of Medical Sciences Sewagram among 256 persons of all age groups. Monthly house to house visits were conducted in the selected households using a predesigned pretested schedule following WHO guidelines for 12 months. Variables studied are disease type, disease episode, doctor consulted (Allopathic system), drugs used, mode of preservation of prescription and drugs, compliance to doctor's advice, adverse drug reactions and outcome. **Results:** 203(79.3%) persons suffered from some illness. Total illness episodes were 446 (1.74 per person per year). A doctor was consulted for 330 episodes (74%). Anti-microbials top the list of prescribed drugs. About 15% of the episodes had adverse reactions. Non-compliance to drug use was 18.5%. Adverse outcome (Drug failure & Death) was seen in 28.5%. Drug failure was very significantly associated with Non-compliance and adverse reaction. **Interpretation & conclusion.** There were drug failures among 27.87% of the study population amounting to 35.39% of the total expenditure for health-care. Present study highlights the importance of community awareness for compliance to drug use. [Bera T NJIRM 2012; 3(3) : 95-100]

Key Words: Rural area, Drug utilization, Drug failure.

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Introduction: Medicines are often used incorrectly; around 50% of all medicines are prescribed, dispensed or sold inappropriately while 50% of patients fail to take their medicines appropriately¹. Drug Utilization study has been defined by World Health Organization as "The marketing, distribution, prescription and use of drug in a society, with special emphasis on the resulting medical, social and economic consequences"². It is evident that the irrational use of drugs is a common occurrence throughout the world³ in both developed and developing countries. It is also known that drugs are frequently not used to their full potential, not according to their generally accepted criteria⁴.

Whenever a drug fails to respond to a disease, or in the event of adverse drug reactions, public usually blames the doctor. The doctors and sometimes the public also blame the manufacturers, whole-sellers and retailers of drugs. But the optimum efficacy of a drug

requires the firm compliance from the patient and honest co-operation from both the patient and their families.

Many studies of 'Prescription Audit' have been done earlier. Quite a few studies on 'Good Manufacturing Practice' by the manufacturers and the method of preservation of drugs and the sale of over the counter (OTC) products by the whole-seller and retailer have also been studied. But the drug failure in the society due to faults of the patients and their families have been very poorly studied so far particularly in rural areas where majority of the Indian population reside.

So, it was thought of importance to study drug utilization in a rural population to find out the possible causes of drug failure in the society. The study was conducted to find out the pattern of drug utilization in a rural community of Maharashtra, to detect the magnitude of drug failure and to find out its associates.

Material and Methods: This longitudinal observational study was conducted in a village, named Jaulgaon, in Central India (state Maharashtra), about 75 km away from Nagpur over a period of 12 months (from March 2004 to February 2005) after taking permission from the institutional ethical committee. This conveniently selected village belongs to the field practice area of Mahatma Gandhi Institute of Medical Sciences [MGIMS], Sewagram, a tertiary care hospital from which, it is about 15 km away. It had a total population of 594 residing in 140 houses. All the persons of all age groups permanently residing in the village constitute the study population with exclusion of any guests and temporary visitors of the village. Sample size was determined by following the WHO guidelines for field work⁴ with the formula $4pq/L^2$. With an estimated drug use prevalence of 40%⁵ and an allowable error of 20%, the minimum sample size came to be 150. With an allowable non-response of 20%, the final minimum sample size was 180.

An interview schedule was prepared and pre-tested following WHO guidelines for investigating the medicine use by the consumers⁶. A prior approval from the Institutional Ethical Committee of MGIMS and consent from village head was taken. A systematic random sampling of the houses of the village was done and every alternate house was selected for study. All the members of the selected 70 families, consisting of 265 persons, were investigated with the pre-designed and pre-tested schedule. Information regarding the children was obtained from their parents/guardians.

Background Information was obtained from each member of the selected families e.g. age in completed years (grouped as <15, 15-59 and \geq 60 years), sex, per capita income (grouped as \leq Rs.1000 & $>$ Rs.1000). They were interrogated retrospectively, about the diseases they had suffered during last one month and relevant questions regarding its management e.g. disease type (acute or chronic determined by

disease/ illness persisting for more than 2 weeks at a time.), disease episode (every visit to a care provider of any system is considered as episode) doctor consulted (e.g. Allopathic system), drugs used (Categorized by the investigators themselves after looking at the prescription and unused drugs where available), mode of preservation of prescription and drugs at home (away from sunlight, moisture and direct heat was taken as proper), compliance to doctor's advice ["= Following the proper dose, frequency and duration of the drugs as advised." It was assessed by the statement of the study subjects and checking of the prescriptions and drug packages by investigators (all doctors)], any adverse drug reactions (Unwanted, unprovoked and unpleasant reaction that is not associated with the disease process was considered to be an "adverse reaction" by the opinion investigators, all of whom were doctors.) and outcome (failure or success defined as whether a 2nd consultation was needed or not for this episode. For chronic illness, relief was taken as success. The correctness of diagnosis and management is not observed by the investigators. The patients' perception of results of management was only noted.) The same procedures were continued for 12 consecutive months for every person. The data was entered in EPI-6 software and analyzed using tables, diagrams and suitable statistical tests as applicable. A probability (p) value of <0.05 was taken for statistical significance.

Result: The total study subjects were 265. During the study period, there were two births, two deaths and attrition of two families resulting in final analysis of 68 families with **256** persons who could be observed for all 12 months.

The age-sex distribution of the study subjects is depicted in Table-1. Total male and female study subjects were almost equal [132 (51.6%) vs. 124 (48.4%) with elderly persons [\geq 60 years] being 12.1% (31) of the total study subjects.

256 persons were studied once every month for 12 consecutive months. Among them, 53 persons (20.7%) did not suffer from any illness throughout the study period, but the rest 203 persons (79.3%) suffered from illnesses. The total episodes of illnesses suffered by them throughout the study period were 446 with an average episodes of illness was 1.74 per person per year.

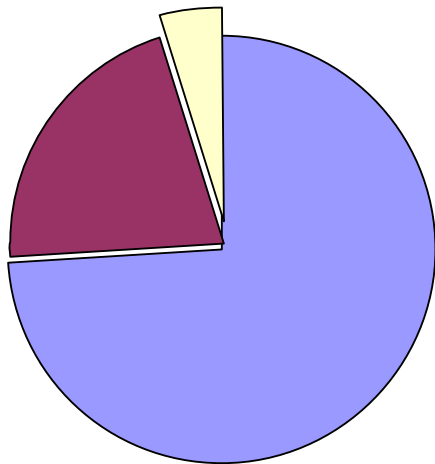
Table 1 : Distribution of the study subjects according to age and sex (N=256)

Age (yrs)	Male No (%)	Female No(%)	Total No(%)
< 15	29 (11.3)	31(12.1)	60 (23.4)
15-59	87 (34.0)	78 (30.5)	165 (64.5)
≥ 60	16 (6.3)	15 (5.8)	31 (12.1)
Total	132 (51.6)	124(48.4)	256(100.0)

(Mean age = 32.24 ± 10.1)

Out of the 446 episodes of illness, a doctor (Allopathic system) was consulted during 330 episodes (74%). For the rest 116 episodes (26%), self medication by over the counter [OTC] drugs was practiced in 95 (21.3%) episodes and a traditional healer (AYUSH) was consulted in remaining 21 episodes (4.7%). This is depicted in the Pie diagram (Figure– 1)

Figure -1: Disease Episodes and Care seeking behaviour (N=446)



The overall drug utilization pattern in the present study is shown in Table 2. Regarding

Table 2 : Distribution of the study subjects according to age and sex (N=256)

Topic		No (%)
Common drugs prescribed (Multiple response, n=664)		
	Antimicrobials	298 (44.8)
	Analgesics/Anti-inflammatory	196 (29.5)
	Anti-allergic	69 (10.4)
	Others	101 (15.2)
	[Mean drug prescribed per episode = 2.0]	
Any adverse drug reaction:		
	Present	50 (15.1)
	Absent	280 (84.9)
a. Compliance to advised drug use		
	Yes	269 (81.5)
	No	61 (18.5)
b. Causes of non-compliance (Multiple responses; n=61)		
	Wrong drug	7 (11.5)
	Wrong dose	10 (16.4)
	Wrong frequency	30 (51.2)
	Wrong duration	30 (51.2)
	Economic reason	20 (32.8)
Outcome of doctor consultation		
	Cured/Relieved-	236 (71.5)
	Not Cured/Relieved	92 (27.9)
	Died	2 (0.6)
Preservation of drugs:		
	Proper	78 (84.2)
	Improper	52 (15.8)
Preserved the prescriptions:		
	Proper	205 (62.1)
	Improper	125 (37.9)

the drugs prescribed by the Doctors, Anti-microbials top the list followed by Analgesics and Anti-allergics. About 15% (50) of the illness episodes had some adverse drug reaction. Non-compliance to drug use was observed to be

18.5% (61), the principal reasons (overlapping) being wrong frequency, wrong duration and poverty. Adverse outcome (Drug failure & Death) was noted to be 28.5% (94). Among the doctor consulted illness episodes, improper preservation of drugs was about 16% (52) whereas the improper preservation of prescriptions was 38% (125). Association of Drug failure with certain pertinent variables were depicted in Table -3

Table 3: Association of Drug failure with certain pertinent variables (n=330)

Topic		Drug failure	Significance (Z/p)
Non compliance:	Yes (n=61)	34 (55.7)	5.22/0.000 (1.76x10 ⁻⁷)
	No (n=269)	58 (21.5)	
Drug preservation	Improper (n=52)	21 (40.4)	2.03 / 0.042
	Proper (n=278)	71 (25.5)	
Prescription preservation	Improper (n=125)	38 (30.4)	0.68 / 0.497
	Proper (n=205)	54 (26.3)	
Any adverse drug reaction:	Present (n=50)	34 (68.0)	6.70 / 0.000 (2.08x10 ⁻¹¹)
	Absent (n=280)	58 (20.7)	
Per capita income	≤ Rs. 1000 (n=67)	19 (28.3)	0.00/ 1.00
	> Rs. 1000 (n=263)	73 (27.7)	
Disease type	Chronic (n=77)	29 (37.6)	2.03 / 0.042
	Acute/ Sporadic (n=253)	63 (24.9)	

Drug failure was found to be very significantly associated ($p < 0.01$) with Non-compliance and Adverse drug reaction and significantly associated ($p < 0.05$) with Improper drug

preservation and Chronic disease. Association with Poverty and Prescription preservation did not achieve statistical significance ($p > 0.05$)

Discussion: It is evident that the irrational use of drugs is a common occurrence throughout the world⁷ in both developed and developing countries. It is also known that drugs are frequently not used to their full potential, not according to their generally accepted criteria⁸. Medically inappropriate, ineffective and economically inefficient use of drugs commonly occur in health care facilities. The cost of such illogical drug use is enormous in terms of scarce resources and adverse clinical consequences that have real risk and no benefits⁹. The assessment of Drug Utilization is important for clinical, educational and economic purposes¹⁰. The present study reveals the drug utilization pattern in a rural community of Central India. Over a period of 12 months among study subjects of 256, total 446 episodes of illness were observed with an average of 1.74 per person per year. Among these, self medication was observed in 21.3% (95) cases. Similar figures (17%) for rural area was observed by Dines Kumar B. et al¹¹. Even higher figure (37%) was observed for urban areas in the same study. An exceptionally high rate was observed among rural Obstetric population in USA by Glover DD et al¹².

For the illnesses consulted by practitioners of Modern Medicine (n=330), average number drugs prescribed was 2.0. Biswas NR et al⁹ observed similar figures from two tertiary care hospitals in New Delhi e.g. Safdarjung Hospital (1.4) and AIIMS (2.4). In this point, both the Primary & Tertiary care doctors have similar behaviour.

Regarding the type of drugs used, present study observed Antibiotics (44.8%) as the main drug prescribed followed by Analgesics/Anti-inflammatory (29.5%) and Anti-allergics (10.4%). Viswanathan N et al¹⁴ also observed Antibiotics to be the main drug prescribed

(43%) in JIPMER, Pondicherry, again behaving similar to our primary care set up.

So far as Non-compliance is concerned, present study revealed a figure of 18.5% (61) among the doctor consulted illnesses. A much higher figure (40%) was noted by Viswanathan N. et al¹³ in JIPMER, Pondicherry and a similar high figure for the world (range 30-60%) is also quoted by Meichenbaun D. et al¹⁴.

Present study revealed a drug failure (Not cured, relieved & died) rate of 28.5% for the doctor consulted illness with Non-compliance, Adverse drug reaction, Chronic disease and Improper drug preservation being significantly associated with it. The role of Non-compliance and Chronic disease for drug failure was emphasized by Edworthy SM et al¹⁵ and Hardman JG et al¹⁶ Interestingly, Low earning did not achieve statistical significance with drug failure in our study, a finding similar to one observed by Buckalew et al¹⁷.

Conclusion: In most developing and transitional economies, medicine represent the second largest Government health expenditure after personnel cost.^[12] There were drug failures among 27.87% of the study population amounting to 35.39% of the total expenditure for health-care. A majority of these can be reduced by properly educating these subjects to the need of proper compliance and adherence, knowledge of properly preserving the drugs in the house-hold, consulting trained doctors as and when necessary avoiding quacks and traditional healers, limiting self-medication and use of OTC products to minimum, to consult a trained doctor as early as possible before the disease gets serious and complicated. . Our study has the following limitations: The study was done in a single village. Although it is within the field practice area of Mahatma Gandhi Institute of Medical Sciences [MGIMS], Sewagram, it may not truly reflect the actual picture regarding drug use in rural Maharashtra (Central India). A recall period of 30 days may be adequate for important illnesses but for

trivial problems, it may not reflect the true situation. A 15 days' recall might be more appropriate for all situations but could not be arranged for logistic reasons. While assessing drug failure, the correctness of diagnosis and management was not considered by the investigators. The patients' perception of results of management was only considered which may well be really due to incorrect diagnosis and management.

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