

Original Research Article

## Study to evaluate the prescribing pattern of antimicrobials in government sector and private sector

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**Abstract:** Monitoring of prescriptions and drugs utilization studies could identify the associated problems and provide feedback to the prescribers, so as to create awareness about the irrational use of drugs. This study was conducted to evaluate the prescribing pattern of antimicrobials in government sector and private sector. This prospective study was designed to obtain statistical data on the prescribing pattern of antimicrobials in patients visiting either in the outpatient department or outside the hospital or clinics and also the patient admitted in the various specialties of S.V.B.P. hospital Meerut and other associated hospital/ clinics in the vicinity over a period of one year. The total study sample size was of 614 prescriptions. Out of these 439 prescriptions were from government sector, 175 prescriptions from private sectors. Instructions regarding substitution of the drug, percussion or warning were not mentioned on any of the prescription. 16.2% of the prescriptions were not signed by the doctors in government sectors and 7.6% of prescriptions were not signed in private sector. Average number of antimicrobials per prescription was found to be 0.33, & 1.66 in government, & private sectors respectively. Average number of antimicrobials prescribed was highest 1.36 in the OBG & Gyne and 2.4 in the Gen. Surgery in government and private sectors respectively. Average number of antimicrobials prescribed was lowest 0.19 in Endocrinology and 0.72 in cardiology in government and private sectors respectively. There is a considerable scope for improving the prescribing pattern of antimicrobials and minimizing the use of antimicrobials agents. This would be facilitated by providing feedback by educators, prescribers and other interventions like introduction of hospital formulary or control by institutional regularly authorities.

**Keywords:** Evaluation, antimicrobials, prescription, pattern, Tertiary care teaching Hospital, private sector

### INTRODUCTION

During the past several years there had been great concern by the government as well as public regarding safe, effective and rational use of drugs. Now-a-days the prescribing pattern is changing and it has become just an indication of medicine with some instructions of doses without considering its rationality [1]. Monitoring of prescriptions and drugs utilization studies could identify the associated problems and provide feedback to the prescribers, so as to create awareness about the irrational use of drugs [2]. Effort to

reduce the number of drug related adverse events due to misinterpretation, medical error, inappropriate or patient noncompliance could result in substantial saving and, more important improved patient health [3].

The study of prescribing pattern is a component of medical audit, which seeks monitoring, evaluation and necessary modification in the prescribing practices of prescribers to achieve rational and cost effective medical care. Quality life can be improved by enhancing the standard of medical

treatment at all levels of health care delivery system. The present study indicates a considerable scope for improving the prescribing pattern of drugs and minimizing the misuse of antimicrobials. This can be facilitated by various interventions, strategies like improving feedback, prescriber education, and introduction of hospital formulary and control of institutional regulatory authorities.

### **MATERIAL AND METHODS**

This prospective study has been designed to obtain statistical data on the prescribing pattern of antimicrobials in patients visiting either in the outpatient department or outside the hospital or clinics and also the patient admitted in the various specialties of S.V.B.P. hospital Meerut and other associated hospital/ clinics in the vicinity over a period of one year. It was tried to collect the possible record from various specialty of MEDICINE:- Including- Cardiology, Gastroenterology, Resp. Medicine, Endocrinology, and Skin. SURGERY: - Including - Gen. Surgery, Ophthalmology, Otorhinolaryngology, and Orthopedics, Obstetrics and Gynecology and Pediatrics.

The data consisted of photocopies of prescriptions. The total study sample size was of 614 prescriptions. Out of these 439 prescriptions were from government sector, 175 prescriptions from private sectors.

The data was evaluated for the prescription format for its appropriateness and basic drug-use indicators. The prescription format consists of information [4]. Patient demographics :( Name/age/sex/address/profession), patient medical history: (if any), sign and symptoms or complaints diagnosis, investigations or any other remark.

Following drug-use indicators (core-indicators) were used in the study [5].

- Distribution of prescriptions.
- Average number of antimicrobials per patient.
- Percentage of prescriptions contains antimicrobials.
- Percentage of prescribing frequency of antimicrobials.

For the study of drugs prescribing pattern, each drug was counted once per patient. Prescribing indicators :( Core Indicators WHO 1993)[6] were calculated as follows:

1. Average number of antimicrobials per patient was calculated by dividing the total number of antimicrobials prescribed by the number of patient surveyed.
2. Percentage of prescriptions with antimicrobials was determined by dividing the number of prescriptions

with antimicrobials by total number of prescription multiplies by 100.

3. Percentage of antimicrobials prescribed was determined by dividing the number of antimicrobials prescribed by the total number of drugs prescribed, multiply by 100.

To analyze the data statistically test of significance of difference of proportion was used: by the following formulas;

$$SE = \sqrt{P_1 - P_2 \left[ \frac{P_1 Q_1}{n_1} + \frac{P_2 Q_2}{n_2} \right]}$$

Where: SE- Standard error

P1 and P2 – Is % of prescription and drugs

Q1 and Q2 – Is 100-P1 or P2

n1 and n2 are total no. of prescriptions of drug category in the respective sectors.

To test the significance following criteria was used:

If  $P_1 - P_2 \geq 2SE$  ( $P < 0.05$ ) – significant

If  $P_1 - P_2 \geq 3SE$  ( $P < 0.01$ ) – highly significant

If  $P_1 - P_2 \leq 3SE$  ( $P > 0.05$ ) – not significant

### **RESULTS**

Most of the prescriptions in both the sectors were incomplete with respect to the prescribing format. The prescribing error was maximum in the various department of surgery followed by medicine. Patient medical history and sign/symptoms, histories of drug allergy, or drug interaction were hardly mentioned on the prescription in any department of both the sectors. Most of the prescriptions were mentioned with various types of investigation. Superscription was replaced by word 'Adv' indicating changing pattern in 8.2% of the prescriptions. While it was not mentioned on 4.3% of the prescription but symbol Rx was incorrectly mentioned on 6.4% of the prescription. Instructions regarding substitution of the drug, percussion or warning were not mentioned on any of the prescription. 16.2% of the prescriptions were not signed by the doctors in government sectors and 7.6% of prescriptions were not signed in private sector.

Average number of antimicrobials per prescription was found to be 0.33, & 1.66 in government, & private sectors respectively (Table-2). Average number of antimicrobials prescribed was highest 1.36 in the OBG & Gyne. And 2.4 in the Gen. Surgery in government and private sectors respectively. (Table-2 and Fig.-1 & 2). Average number of antimicrobials prescribed was lowest 0.19 in Endocrinology and 0.72 in cardiology in government and private sectors respectively. (Table-2 and Fig. 1 & 2)

Percentage of prescriptions with antimicrobials were found to be 60.8, & 88 in government, & private

(Table-2) and these differences are statistically significant (Table-3).

Percentage of prescribed antimicrobials of the total drugs was 23.07, and 31.95 in government, and private respectively (Table-2) and the difference is statistically significant only in private sector in comparison to government sector (Table-3).

Anti-microbial were the most frequently prescribed drugs in ophthalmology (40.71%) and Gen. Surgery 42.85% in government and private sectors

(table-3), and Least 7.31% in Endocrinology and 12% in cardiology in government and private sector respectively.(Table-3 and Fig. 3)

As the number of the drugs per prescription increased, the prescription of anti-microbial also increased. Among the different categories of antimicrobials cephalosporins, quinolones, penicillin's, aminoglycosides and antiemetics were the most frequently prescribed antimicrobials. The result of study call for interventional strategies to promote rational drug therapy.

**Table -1: Prescription pattern of antimicrobials in government and private sectors (Specialty wise)**

Departments	Total No. of prescriptions (G.S.)	Total No. of Drugs (G.S.)	prescriptions with antimicrobials	Total no. of Antimicrobials (G.S.)	Total No. of prescriptions (P.S.)	Total No. of Drugs (P.S.)	No. of prescriptions with antimicrobials(P.S.)	Total no. of Antimicrobials (P.S.)
Cardiology	36	188	08	14	11	62	3	8
Gastroenterology	31	154	18	24	15	81	9	19
Resp. medicine	35	169	29	45	16	102	14	33
Endocrinology	31	82	04	06	0	0	0	.....
Paediatrics	34	161	28	51	25	131	19	53
Skin	48	165	30	32	16	66	12	13
Gen. Surgery	35	151	27	57	20	112	16	48
Ophthalmology	52	167	44	68	14	58	12	24
Otorhinolarygology	51	183	32	50	20	92	14	38
Orthopedics	61	266	29	36	20	113	11	24
Obs./Gyn	25	121	18	34	18	105	14	32
Total	439	1807	267	147	175	922	124	292

**Table -2: Prescription pattern of antimicrobials in government and private sectors (Specialty wise)**

Departments	Average no. of Antimicrobials /prescription (GS)	Prescription (GS)	Prescribing frequency (GS)	Average no. of Antimicrobials /prescription (PS)	Prescription (PS)	Prescribing frequency (PS)
Cardiology	0.38	22.2	7.44	0.72	27.27	12
Gastroenterology	0.77	58.06	15.58	1.26	60	23.45
Resp. medicine	1.28	82.8	26.62	2.06	87.5	32.35
Endocrinology	0.19	12.9	7.31	.....	00	00
Pediatrics	1.5	73.6	31.67	2.12	76	40.45
Skin	0.66	62.5	19.39	0.81	68.75	19.69
Gen. Surgery	1.62	77	37.74	2.4	80	42.85
Ophthalmology	1.30	84.6	40.71	1.71	85.7	41.37
Otorhinolarygology	0.98	62.7	27.32	1.9	70	41.3
Orthopedics	0.59	47.5	13.53	1.2	55	21.23
Obs./Gynae	1.36	72	28.09	1.77	77.8	30.47
Total	0.33	60.8	23.07	1.66	88	31.67

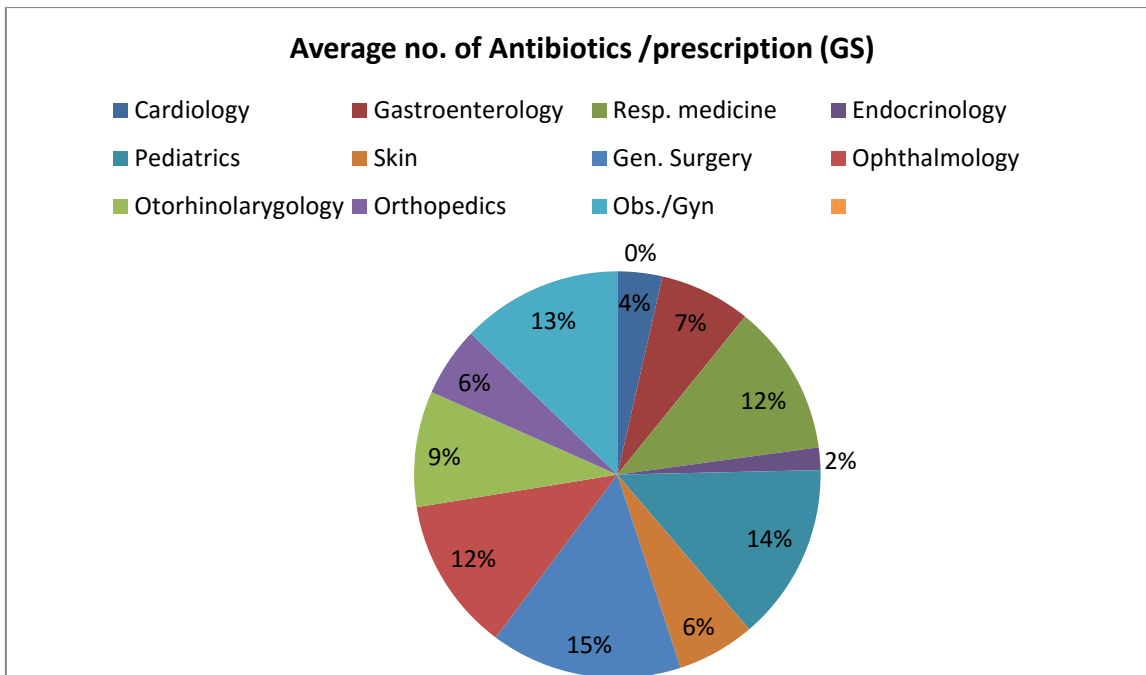
**Distribution of prescription & prescribing frequency of Antimicrobials in various Departments of Government sectors (GS) & Pvt. Sectors (PS).**

**Table-3: Statistical Significance of % of prescriptions & prescribing frequency of antimicrobials in Govt. & Private Sectors**

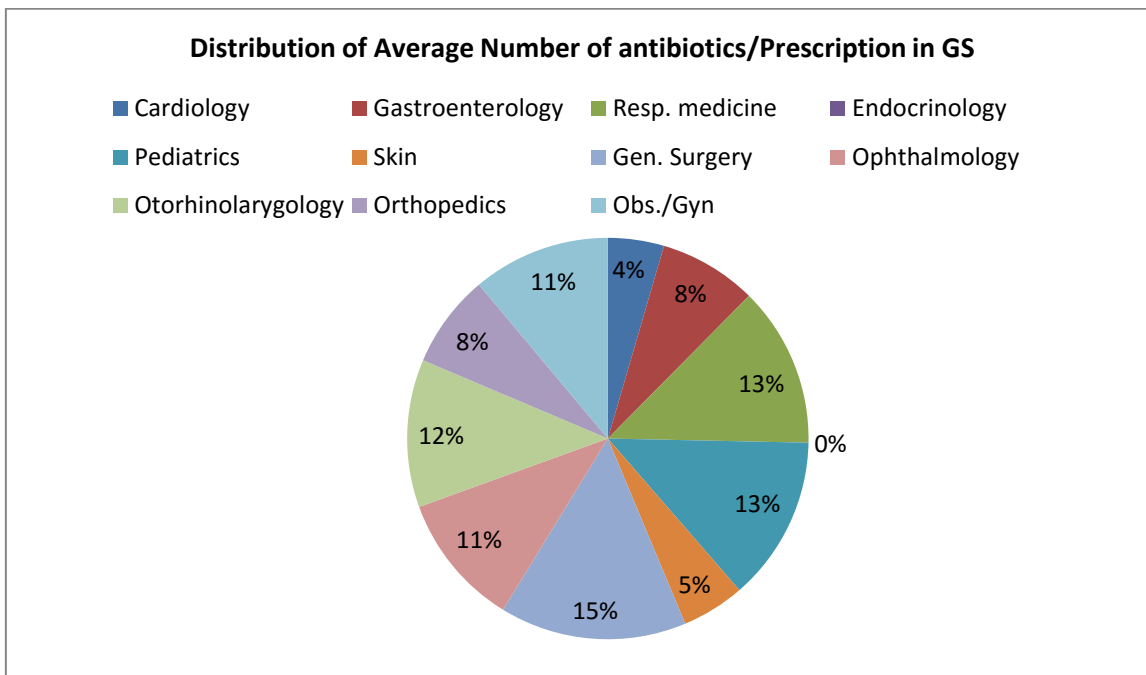
Sectors	Prescriptions	Prescribing frequency
Govt.	60.8	23.07
Private	88**	31.67*

\*P>0.05, in comparison to govt. Sector

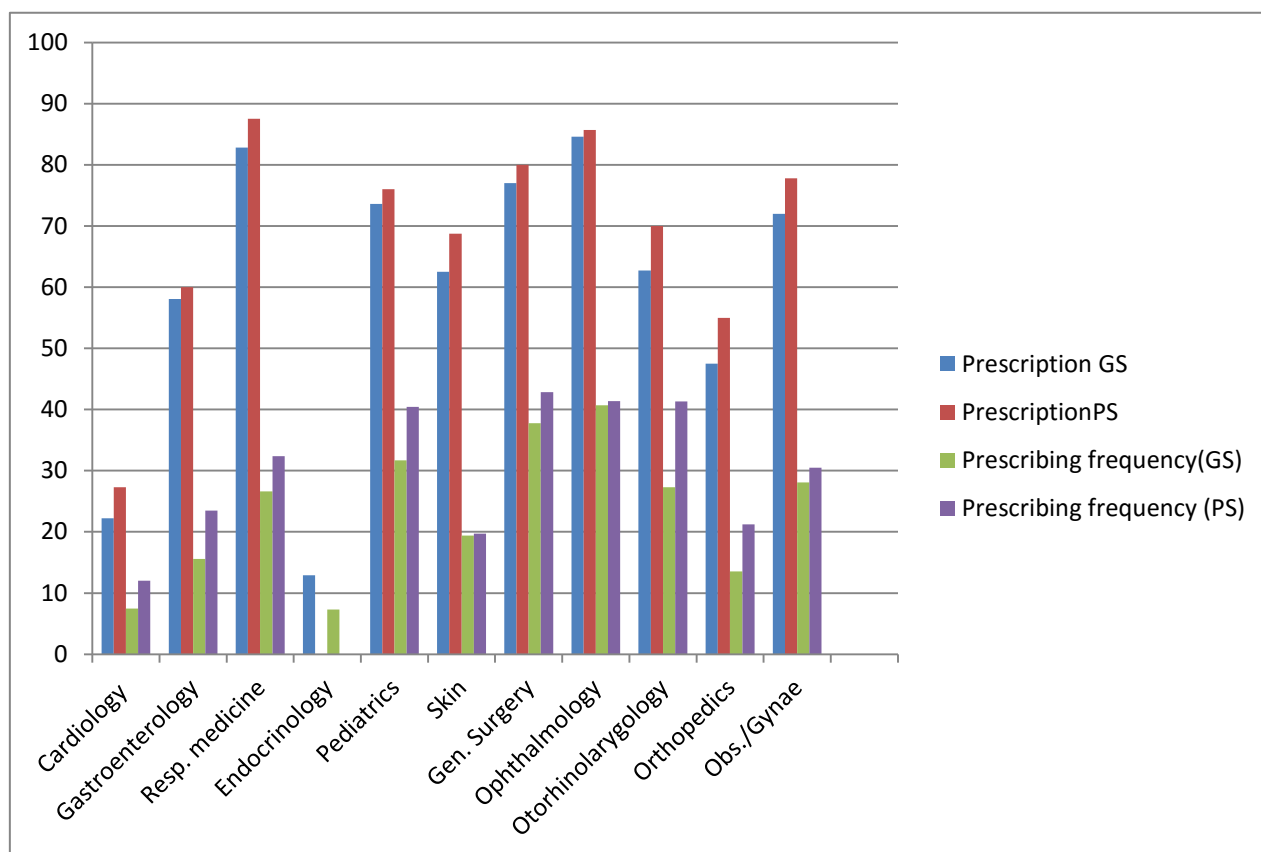
\*\*P<0.01, in comparison to govt. Sector



**Fig-1: Distribution of Average Number of antimicrobials/Prescription in Govt. Sector**



**Fig 2: Distribution of Average Number of antimicrobials/Prescription in Private Sector**



**Fig 3: % Distribution of prescription & prescribing frequency of Antimicrobials in various Departments of Government sectors (GS) & Pvt. Sectors (PS)**

## DISCUSSION

A prescription provides an insight into a prescriber's attitude towards the disease being treated and the nature of health care delivery system in the community [7]. The average number of drug per prescription is an important index of a prescription audit. It is preferable to keep the number of drugs per prescription as low as possible to minimize the risk of drug interactions, development of bacterial resistance and hospital costs [8].

The result obtained in the present study indicates the majority of the prescribers do not adhere to the ideal pattern of prescription writing as has earlier been reported by Puthawala A.K.; Mansuri S.M [9], Budhiraja R.D [10] and these prescriptions are not explicit to their contents. Replacement of Rx sign with the word 'Advise' in a large number of prescriptions is indicative of the changing pattern of the prescription. Over prescription indicates the increasing tendency towards Polypharmacy. This tendency is more prevalent in the private sector as compared to Govt. sector is evident from greater number of medications per prescription.

Study indicates the practice of polypharmacy. The trend of polypharmacy may be due to the patient's expectation and demand for quick relief, incorrect diagnosis and the influence of lucrative promotional programmes of the drug companies.

As per the current study the mean number of antimicrobials per prescription is 0.33 and 1.66 for the government sector and Private Sectors respectively (Table -2). Antimicrobials as a group contributes significantly to the cost of drugs and are worldwide claimed to account for 15 to 30% of the total health budget [11]. It is estimated that in India, they account for over 50% of the value of all the drugs sold. This increasing overuse is associated with the development of antimicrobial resistance by organisms as well as adverse drug reactions [12]. In several situations, the rational use of antimicrobials has been reported to have reduced the emergence of resistant strains [13]. Moreover as the patients are not matched socio-economically it is not possible to draw any firm conclusions. The morbidity pattern may not be similar, as geriatric patients in developed countries suffer more frequently from problems of aging while those in developing countries suffer more from malnutrition, Infection and environmental problems.

In India the prevalence of use of antimicrobial agents varies from 24 to 67% while in Duke University Medical Center it is 34.2% [14-16]. As per Kunins criteria it was observed that 64% of the total antimicrobials prescribed were either not indicated or inappropriate in terms of drug or dosage. In many cases, antimicrobials are used without bacteriological investigations

Antimicrobials being one of the most commonly prescribed 60.8 % and 88% of prescription in Govt. and Private sectors respectively (Table-3). This is in conformity with report of victor C.G *et al.*; [17] and summers R.S [18]. Such over prescription of antimicrobials coupled with their inappropriate use is likely to result in increased incidence of resistance and adverse drug reactions to antimicrobials [12]. In addition over prescription of antimicrobials increase the total cost of therapy.

Another study, conducted by Uppal R *et al.*; [19] showed a persistent trend towards not documenting the duration of treatment, a similar result has been observed in the study also. Such documentation is much more important in the case of our patients as their daily follow up/ monitoring of them is not possible. To reduce the possibility of such omission in prescription the use of out-patient and in-patient prescription cards should be advocated.

### CONCLUSION

The result of the study indicates a considerable scope for improving the prescribing pattern of antimicrobials and minimizing the use of antimicrobials agents. This would be facilitated by providing feedback by educators, prescribers and other interventions like introduction of hospital formulary or control by institutional regularly authorities.

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