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Drug Utilization Pattern Among Indoor Patients Treated Under CMAAY/PMJAY Insurance Schemes at Tertiary Care Hospital in Arunachal Pradesh, North East India

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Drug utilization pattern helps to understand the current trend of the drug used in various conditions by healthcare providers. It also helps in rationalizing budget expenditure on the medication cost. The Chief Minister Arogya Arunachal Yojana/Pradhan Mantri Jan Arogya Yojana (CMAAY/PMJAY) is a cashless scheme run by Govt of Arunachal Pradesh and Govt of India where the surgeries, medicines/surgical items cost are borne by the government. Present study assessed the drug utilization pattern among indoor patients treated under these insurance schemes. Retrospective cross-sectional study was conducted at Tomo Riba institute of Health and Medical Sciences (TRIHMS) in Arunachal Pradesh, North East India. Prescriptions of around 960 patients were analyzed who were treated from June 2020 to December 2020 (for 7 months) under above mentioned insurance schemes. Data was collected through the review of case sheets. For patients who have undergone surgery, the prescription on the post-operative day and for the patients managed conservatively, the prescription on the day of admission was analyzed. Information regarding Name, Age, Gender, Antimicrobial agents, Analgesics, Antiulcer drugs and other drugs given to the patients were collected. A total of 960 patients were treated. 359 patients got benefitted in the insurance scheme by department of General surgery, 383 patients by dept of Obstetrics and Gynecology, 68 patients by orthopedics department, 65 patients by ENT dept, 85 patients by medicine department. Most common antimicrobial agent used were ceftriaxone (54.1%) followed by cefuroxime (17.5%) ,metronidazole (10%) and cefoperazone(7.5%). Some other antimicrobial agents preferred were piperacillin, tinidazole and amikacin. Most common antiulcer drug used was proton pump inhibitor pantoprazole (76.25%). The analgesics commonly used were diclofenac sodium (53.3%) followed by tramadol (30.6%), pentazocine (23.3%) and paracetamol (20.2%). Other drugs commonly used were ondansetron, butrophase and tranexemic acid. From our study, a conclusion can be withdrawn that if few of the antibiotics, analgesic, antiulcer drugs can be made available in the Govt set up through Govt procurement then the institute can work in more cost-effective and economical way.

Keywords: Analgesics; Antiulcer drugs; Antimicrobial agents; Drug utilization study; Insurance schemes; Prescribing pattern.

World health organization in 1977 described drug utilization research as "study of marketing, distribution, prescription and use of drugs in society, with special emphasis on the resulting medical, social and economic consequences."[1] The indicators of prescription help to evaluate the performance of health care provider. Further the studies help in economic, socio medical decision making. [2,3.] Thus, drug utilization studies support in rationalizing budget expenditure on the medication cost. As the disease nature changes over a period of time, the drug utilization among different countries, even in different health sector varies.[4] Various drug utilization studies have been conducted in various settings in our country and worldwide.[5,6,7]

Drug utilization pattern according to current recommendation or guidelines helps to design policies for the drug use.[8] Rational drug prescribing is concerned with the use of the least number of drugs to obtain the best possible effect in the shortest time and in cost effective way with reasonable cost.[9,10]

Prescription pattern analysis is part of drug utilization study, it improves the quality of prescription, reduces the adverse effects and enhances the rational use of drugs. The quality of the prescription can be improved, the adverse effects can be narrowed down, the rational drugs use can be enhanced by the prescription pattern analysis.[11,12,13]

The drug utilization for various treatments helps the Govt to form various policies concerned with the rationality of the drugs and providing patients evidence-based medicines. Further the evaluation of the drugs prescribing trends help hospital to provide patients cost effective and efficient treatment. After knowing the various drugs used in various treatments like antimicrobial agents, analgesics, antiulcer drugs and others the hospital can design the policy that what are the maximum drugs which are used and for which patients, arranging those and hence working in an efficient way.

The Chief Minister Arogya Arunachal Yojana/Pradhan Mantri Jan Arogya Yojana (CMAAY/PMJAY) is a cashless scheme run by Govt of Arunachal Pradesh and Govt of India where the surgeries, medicines/surgical items cost is borne by the government. As far as the surgical items and medicines required to treat patients is concerned, first preference is given to free pharmacy store of the hospital, second to the Jan Aushadhi store, the third to the hospital empanelled pharmacy.

The present study was planned to analyze Drug utilization patter among indoor patients treated under CMAAY/PMJAY insurance schemes at Tomo Riba institute of Health and Medical Sciences (TRIHMS) in Arunachal Pradesh, North East India. The main objectives of our study was to analyze the drug utilization pattern among indoor patients admitted under department of General Surgery, Obstetrics & Gynecology. ENT, orthopedics and General Medicine and benefitted under insurance scheme (CMAAY/PMJAY) and to categorize drug utilization pattern and to identify priority areas for further improvement in patients care.

MATERIALS AND METHODS

A retrospective cross-sectional study was carried out among indoor patients admitted under department of General Surgery, Obstetrics & Gynecology, ENT, orthopedics and General Medicine and benefitted under insurance scheme (CMAAY/PMJAY) at Tomo Riba institute of health & medical sciences (TRIHMS), Naharlagun, Arunachal Pradesh. The case records of all the indoor patients who were treated from June 2020 to December 2020 under Chief Minister Arogya Arunachal Yojana/Pradhan Mantri Jan Arogya Yojana (CMAAY/PMJAY) insurance scheme were collected from the Medical record Department in TRIHMS, Naharlagun, Arunachal Pradesh. The prescriptions written on the day of the admission for all cases who were managed conservatively and for all those patients who underwent surgical procedure, the prescriptions written post operatively (only the prescription followed immediately after surgery, not the subsequent prescriptions) were analyzed. The i.v fluids /parenteral nutrition given were not taken into consideration.

A total of 960 case sheets belonging to patients who were admitted from June 2020 to December 2020 (7 months duration) were collected from Medical Record section of TRIHMS. Information regarding Name, Age, Gender,

diagnosis, average stay in hospital, Antimicrobial agents, Analgesics, Antiulcer drugs and other drugs prescribed to the patients were collected.

As it was long list to write down all the diagnosis of 960 patients which we collected from the discharge paper; broad separation of the cases was done. The total no of cases and the percentage of cases were written. For the diagnosis, which could not be grouped together and as it was long list to mention each, they were clubbed together in others category.

Statistical analysis

Data was expressed as mean ± SD, numbers and percentages. Collected data was entered into Microsoft_Excel_2019 and subsequently statistical analysis was done using the same.

Ethics Committee Permission

Ethical permission to conduct the hospital-based study was obtained from Institution Ethical Committee before commencement of the study (IHECTRIHMS/ETHICS/01/2019-20). Data confidentiality was maintained during and after data collection.

RESULTS

There were a total 960 indoor patients who got treatment under five departments out of which 359 (37.4%) treated under General surgery department, 383 (39.9%) under Obstetrics and Gynecology department, 65 (6.8%) under ENT department, 68 (7.1%) under orthopedics department and 85 (8.9%) under General medicine department. Female beneficiaries (70%) were more than the male beneficiaries (30 %). Among the total no of cases admitted in General surgery 46.2% were male, 53.8% female and the mean age was 35.7 years. Among the cases in ENT, 50.7% were male, 49.3% were female and the mean age of the patient was 28.05 years. Among the cases in orthopedics, 64.7% were male, 35.3% were female and the mean age of the patient was 32 years. Among the cases in medicine 51.7% were male and 48.3% were female and the mean age of the patient was 45 years. (Table 1)

Average number of days stayed was maximum under department of Medicine (9.4 days) followed by orthopedics (8.7 days), General surgery (6.5 days), ENT (3.78 days) and least was under obstetrics and gynecology (3.73 days). (Table 2)

Out of 359 indoor patients treated under the department of General Surgery, maximum no of Surgeries done were cholecystectomy (25.63%), followed by appendix surgeries (13.65%), excision (10.86%), hernia/hydrocele (10.03%) and hemorrhoidectomy (7.80%) related surgeries. (Table 3)

Out of 383 indoor patients treated under department of Obstetrics and gynecology, maximum no of Surgeries done were lower segment Cesarean section (69.9%), followed by total abdominal hysterectomy (9.3%), lap Cystectomy (6.2%), myomectomy (3.3%), Diagnostic laparoscopy for infertility (2.87%) and surgeries for ectopic pregnancy (2.8%). (Table 4)

Table 1. Department wise number of benefitted indoor patients under CMAAY/PMJAY Insurance scheme

Departments	No of pts	% tage	Male	% tage	Female	% tage	Mean age (Yr)
Gen Surgery	359	37.4	166	46.2	193	53.8	35.7 ± 16.65
Obs and Gynae	383	39.9	-	-	383	100	29.6 ± 7.96
ENT	65	6.8	33	50.7	32	49.3	28.05 ± 12.61
Ortho	68	7.1	44	64.7	24	35.3	32.05 ± 17.21
Gen Medicine	85	8.9	44	51.7	41	48.3	45 ± 16.28
Total	960	100	287	29.9	673	70	33.34 ± 14.41

Table 2. Showing department wise average stay of benefitted patients under CMAAY/PMJAY Insurance scheme

Departments	Days stayed (Days)
Gen Surgery	6.5 ± 6.36
Obstetric and Gynae	3.73 ± 2.58
ENT	3.78 ± 3.30
Ortho	8.7 ± 5.54
Gen Medicine	9.4 ± 7.23

Table 3. Showing the broad classification of various diagnosis and surgeries done on indoor patients treated under department of General Surgery

Broad classification of Surgeries done by Gen Surgery Dept	Surgeries	No of Patients	Percentage
Laparoscopic cholecystectomy	Laparoscopic cholecystectomy -90, Laparoscopic cholecystectomy plus appendicectomy -2	92	25.6
Appendix related	Appendicectomy 43, conservative m/m appendicitis/ appendicular abscess -4, appendicular abscess drainage-2	49	13.6
Various excision surgeries	—	39	10.8
Hernia/Hydrocele	Hernial repair/Hernioplasty/Herniotomy-31, Hydrocele-4, hydrocele plus herniotomy-1	36	10
Hemorrhoidectomy plus others	Haemorrhoidectomy-24, Fistulectomy-3, Fissurectomy-1	28	7.7
Exploratory laparotomy	—	19	5.2
Incision and drainage	I and D / Liver abscess drainage /Psoas abscess drainage	18	5
Thyroid surgeries	Hemithyroidectomy 12, Total Thyroidectomy -1, Thyroid lobectomy-1	14	3.8
Gastric surgeries	Gastrectomy-6, Subtotal Gastrectomy -5	11	3
Ca Breast related surgeries	Ca Breast (MRM-3, Breast Ca conservative m/m -1)	4	1.1
Diabetic foot surgeries	—	3	0.8
Orchidopexy	Orchidopexy	3	0.8
Others	Others	43	11.9
Total		359	100

Out of 65 indoor patients treated under department of ENT, maximum surgeries done were Tonsillectomy/Adenotonsillectomy (53.8%), followed by Tympanoplasty (10.7%), Functional endoscopic sinus surgery (9.2%), surgeries for fracture nasal bone (9.2%) and Tympanomastoidectomy (3%). (Table 5)

Out of 68 patients treated under department of Orthopedics, maximum surgeries done were open reduction and internal fixation (54.4), followed by Spine surgeries (5.8%) and implant removal (4.4%). (Table 6)

Out of 85 patients managed under department of General Medicine, nearly one forth were suffering from respiratory illness (24.7%), followed by Cerebrovascular accident (11.7%), liver diseases (11.7%), febrile illness (9.4%), Cardiac related problems (9.4%), Tuberculosis (8.2%), Carcinoma (5.8%), Acute gastroenteritis and SLE (4.7%). (Table 7)

Most commonly used antimicrobial agent was ceftriaxone (54.1%) followed by Cefuroxime Axetil (17.5%), Cefoperazone (7.5%), Metronidazole (10%),Piperacillin (6.2%) Tinidazole (4.5%) and Amikacin (4.5%) by all departments.

General Surgery department used maximum ceftriaxone (42.3%) followed by

Table 4. Showing the broad classification of various surgeries done on indoor patients treated under department of Obstetrics & Gynecology

Broad Classification of Surgeries done by OBGY Dept	No of Patients	Percentage
LSCS (Lower segment Cesarean section)	268	69.9
TAH (Total Abdominal Hysterectomy)	36	9.3
Lap Cystectomy	24	6.2
Myomectomy	13	3.3
DL (Diagnostic laparoscopy) for infertility	11	2.87
Surgeries for ectopic pregnancy	11	2.8
Surgeries for UV prolapse	5	1.3
Laparotomy (Ruptured uterus plus cystectomy, Atonic PPH, Adhesiolysis, ovariotomy)	5	1.3
VH (Vaginal Hysterectomy)	2	0.5
DL (Diagnostic laparoscopy) for tubal blockage	2	0.5
Wertheim radical hysterectomy	1	0.2
Others (bilateral salpingoophorectomy, conservative m/m for wound gaping for TAH, NVD (Normal vaginal delivery), Tubal recanalization, wide resection of right vulva.	5	1.3
Total	383	100

Table 5. Showing the broad classification of various surgeries done on indoor patients treated under department of ENT

Broad classification of surgeries done by ENT Dept	No of Patients	Percentage
Tonsillectomy/Adenotonsillectomy	35	53.8
Tympanoplasty	7	10.7
FESS (Functional endoscopic sinus surgery)	6	9.2
Fracture nasal bone	6	9.2
Tympanomastoidectomy	2	3
Tracheostomy	1	1.5
Others	8	12.3
Total	65	100

Cefuroxime Axetil (21.1%), Metronidazole (20%), Cefoperazone (12.2%) and Piperacillin (10.5%). Obstetrics and gynecology department used ceftriaxone (71%) followed by Cefuroxime Axetil (16.1%), Amikacin (6.7%), Cefoperazone (6.2%) and Metronidazole & Tinidazole (both 4.6%). ENT department used ceftriaxone (76.9%) followed by Cefuroxime Axetil (12.3%). Orthopedic department used Cefuroxime Axetil (29.4%), followed by ceftriaxone (23.5%), Amikacin (14.7%), Cefoperazone (5.8%), Ceftazidime (5.8%) and Piperacillin (5.8%). General Medicine department used ceftriaxone (35.2%) followed by Piperacillin (21.1%), Azithromycin (11.7%), Cefuroxime Axetil (7%), Metronidazole (7%), and Amikacin (4.7%).

Antimicrobial agents used were more than the patient number in some cases as some patients were prescribed more than one antimicrobial agent and also there might be the change in the antimicrobial agent if the patient was not responding. (Table 8)

Most commonly used analgesic agent was Diclofenac sodium (53.3%) followed by tramadol (30.6%), pentazocine (23.3%), paracetamol (20.2%) and ketorolac (4.16%)

General Surgery department used paracetamol (38.9%) and Diclofenac Sodium (30.6%) followed by Ketorolac (11.1%) and tramadol (7.7%). Obstetrics and gynecology department used Diclofenac Sodium (86.6%) followed by tramadol (61%) and pentazocine (58.4%). ENT department used Diclofenac sodium (55.3%) and Paracetamol (40%). Orthopedics department used Tramadol (47%) followed by Diclofenac sodium (38.2%) and Paracetamol (14.7%). Medicine department used paracetamol (14.1%) followed by Diclofenac sodium (9.4%). Medicine department used analgesic in a smaller number of patients compared to other departments.

In surgery cases, 40 patients were given two NSAID (both paracetamol and diclofenac sodium) and 34 patients were given one NSAID and one opioid (diclofenac sodium plus tramadol

Table 6. Showing the broad classification of various surgeries done on indoor patients treated under department of Orthopedics

Broad classification of surgeries done by Orthopedic department	No of Patients	Percentage
ORIF (Open reduction internal fixation)	37	54.4
Spine surgeries	4	5.8
Implant removal	3	4.4
Others	24	35.2
Total	68	100

Table 7. Showing the broad classification of illnesses of indoor patients treated under department of General Medicine

Broad classification of patients treated by General Medicine Dept	No of Patients	Percentage
Respiratory illness	21	24.7
CVA (Cerebrovascular accident)	10	11.7
Hepatitis/CLD (chronic liver disease)	10	11.7
Febrile illness	8	9.4
Cardiac related	8	9.4
Tuberculosis	7	8.2
Carcinoma	5	5.8
Acute Gastroenteritis	4	4.7
SLE (Systemic Lupus erythematosus)	4	4.7
Others	8	9.4
Total	85	100

Table 8. Showing use of antimicrobial agents on indoor patients treated under department of General Surgery, Obstetrics & Gynecology. ENT, orthopedics and General Medicine

Antimicrobial Agents	No of patients (Department wise)					
	Gen Surgery	OBGY	ENT	Ortho	Medicine	Total
Ceftriaxone	152 (42.3%)	272 (71%)	50 (76.9%)	16 (23.5%)	30 (35.2%)	520 (54.1%)
Cefuroxime Axetil	76 (21.1%)	62 (16.1%)	8 (12.3%)	20 (29.4%)	6 (7%)	168 (17.5%)
Cefoperazone	44 (12.2%)	24 (6.2%)	-	4 (5.8%)	-	72 (7.5%)
Amikacin	4 (1.1%)	26 (6.7%)	-	10 (14.7%)	4 (4.7%)	44 (4.5%)
Metronidazole	72 (20%)	18 (4.6%)	-	-	6 (7%)	96(10%)
Tinidazole	-	44 (4.6%)	-	-	-	44 (4.5%)
Piperacillin	38 (10.5%)	2 (0.5%)	-	4 (5.8%)	18 (21.1%)	60 (6.2%)
Cefixime plus dicloxacillin	-	14 (3.6%)	-	-	-	14 (1.4%)
Cefotaxime	4 (1.1%)	8 (2%	-	-	-	12 (1.25%)
Azithromycin	-	2 (0.5%)	-	-	10 (11.7%)	12 (1.2%)
Ceftazidime	4 (1.1%)	-	-	4 (5.8%)	-	8 (0.8%)
Amoxycillin plus clavulanic acid	6 (1.6%)	-	-	-	-	6 (0.6%)
Ofloxacin	-	2 (0.5%)	-	-	-	2 (0.2%)
Ciprofloxacin	2 (0.5%)	-	-	-	-	2 (0.2%)
Linezolid	-	-	-	2 (2.9%)	-	2 (0.2%)
Doxycycline	-	-	-	-	2 (2.3%)	2 (0.2%)
Imipenem	-	-	-	-	2 (2.3%)	2 (0.2%)
Meropenem	-	-	-	-	2 (2.3%)	2 (0.2%)
Total*	402	474	58	60	80	1024

*Total may be more than the number of patients as in some patients more than one antimicrobial agent was used.

Table 9. Showing use of analgesics on indoor patients treated under department of General Surgery, Obstetrics & Gynecology, ENT, orthopedics and General Medicine

Analgesics Used	No of patients (Department wise)					Total
	Gen Surgery	OBGY	ENT	Ortho	Gen Medicine	
Diclofenac sodium	110 (30.6%)	332 (86.6%)	36 (55.3%)	26 (38.2%)	8 (9.4%)	512 (53.3%)
Tramadol	28 (7.7%)	234 (61%)	-	32 (47%)	-	294(30.6%)
Pentazocine	-	224 (58.4%)	-	-	-	224(23.3%)
Paracetamol	140 (38.9%)	6 (1.5%)	26 (40%)	10 (14.7%)	12 (14.1%)	194(20.2%)
Ketorolac	40 (4.16%)	-	-	-	-	40(4.16%)
Total	318	796	62	68	20	1254

*Total may be more than the number of patients as in some patients more than one analgesic agent was used

or paracetamol plus tramadol). In Obstetrics and Gynecology cases 310 patients were prescribed with one NSAID and one opioid. In orthopedics, ENT, Medicine cases all were given single analgesic. The use of two NSAID or one opioid and one NSAID is justified because it was given when there was severe pain in post operative patients (as and when required basis SOS). (Table 9)

General Surgery department used pantoprazole (66.2%) followed by ranitidine and rabeprazole (3.8% each). Obstetrics and gynecology department used pantoprazole (96%) followed by rabeprazole (0.5%). ENT department gave only pantoprazole (70.7%). Orthopedics used pantoprazole (73.5%) followed by rabeprazole (2.9%). Medicine department used pantoprazole (35.2%)) followed by rabeprazole (7%). All department preferred proton pump inhibitor as antiulcer drug. Medicine department used antiulcer drug in less patients compared to the other departments. (Table 10)

Other drugs used by General surgery department were tranexemic acid (18.3%) followed by ondansetron (17.2%) and butrophase (8.3%). Other drugs used by Obstetrics and gynecology department were ondansetron (48.04%) followed by promethazine (26.1%) and butrophase (21.9%). Other drugs used by ENT department were butrophase (40%) followed by ondansetron (48.04%). Orthopedic department used ondansetron (5.8%). Medicine department used deriphyllin and mannitol (21.7% each) followed by salbutamol plus ipratropium, frusemide (16.4% each), budecort (14.11%) and ondansetron (11.7%). Other drugs commonly used were ondansetron, butrophase and tranexemic acid. (Table 11)

DISCUSSION

This retrospective study was carried out in the beneficiary patients admitted under Chief Minister Arogya Arunachal Yojana/Pradhan Mantri Jan Arogya Yojana in a tertiary care Government teaching hospital in Arunachal Pradesh. The main aim of our study was to determine the drug utilization pattern among indoor patients admitted under five major departments benefitted under insurance scheme so as to know which drugs are utilized commonly. Also, the evaluation of the drugs prescribing trends by the departments help

hospital timely and cost-effective procurement of commonly used drugs which helps in efficient treatment.

Most of the patients benefitted under CMAAY/PMJAY Insurance scheme were under surgical departments. This may be because most of the patients benefitted under the scheme was from low-income group who are not financially sound to do surgeries which normally have more cost.

In our study patients admitted under CMAAY/PMJAY Insurance scheme, 70% were female and 30% were male. This was because we have included Obstetrics and gynecology admitted patients which makes the significant difference

Table 10. Showing use of antiulcer drugs on indoor patients treated under department of General Surgery, Obstetrics & Gynecology. ENT, orthopedics and General Medicine

Antiulcer Drugs	No of patients (Department wise)					
	Gen Surgery	OBGY	ENT	Ortho	Gen Medicine	Total
Pantoprazole	238 (66.2%)	368 (96%)	46 (70.7%)	50 (73.5%)	30 (35.2%)	732 (76.25%)
Rabeprazole	14 (3.8%)	2 (0.5%)	-	2 (2.9%)	6 (7%)	24 (2.5 %)
Ranitidine	14 (3.8%)	-	-	-	-	14 (1.45%)
Total	266	370	46	52	36	770

Most commonly used antiulcer agent (all departments taken together) was pantoprazole (76.25%) followed by rabeprazole (2.5%) and ranitidine (1.45%).

Table 11. Showing use of other drugs on patients treated under department of General Surgery, Obstetrics & Gynecology. ENT, orthopedics and General Medicine

Departments	Drugs	Number of Patients	Percentage
General Surgery	Tranexemic acid	66	18.3
	Ondansetron	62	17.2
	Butrophase	30	8.3
	Ethamsylate	6	1.6
	Only one time prescribed drug	14	38.9
OBGY	Ondansetron	184	48.04
	Promethazine	100	26.1
	Butrophase	84	21.9
	Oxytocin	28	7.3
	Tranexemic acid	26	6.7
	Methergin	4	1
ENT	Butrophase	26	40
	Ondansetron	20	30.7
	Only one-time prescribed drug	6	9.2
Orthopaedics	Ondansetron	4	5.8
	Only one-time prescribed drug	2	2.9
General Medicine	Deriphyllin	18	21.17
	Mannitol	18	21.17
	Salbutamol plus ipratropium	14	16.4
	Frusemide	14	16.4
	Budecort	12	14.11
	Ondansetron	10	11.7
	Dexamethasone	6	7
	Salmeterol	4	4.7
	Diazepam	4	4.7
	Only one-time prescribed drug	18	21.17

otherwise after exclusion there was no significant difference in the ratio of male and female patients. Average days of stay in admitted patients was more in department of General medicine than other departments. The reason behind this may be due to the more planned surgeries under the surgical departments which require less hospital stay. Also, the patients admitted under the department of Medicine were more critical and required more days of hospital stay. We have classified the cases broadly on the basis of the diagnosis made by the surgeons and clinicians.

The patients admitted under the department of surgery were with the common surgical problems such as Appendicitis, Hernia, cholecystitis and various excision procedures for which the surgeries were done. The pattern of the surgical patients admitted were somewhat similar to the study done by *Patel et al in 2018 but only difference was it was not under any insurance scheme.*[14] Most of the patients *admitted under the* department of obstetrics and gynecology for caesarean section which is in accordance to present trend in India. Same with the department of ENT where the patients were operated for the common problems such as tonsillitis and underwent tympanoplasty procedure and orthopedics department for treatment of fractures. There was no clear trend for the patients admitted under the General Medicine department.

Antimicrobial agents were prescribed in 92.1% cases, single antibiotic in 72.1%, two antibiotics in 17.2%, three in 2.7% and 66.77% of the total prescription of antibiotics was fixed dose combination. Cephalosporin was the commonest antimicrobial group (more than 75%) used to manage the patients under CMAAY/ PMJAY Insurance scheme by all the departments cumulatively. In study conducted by Gupta et al., the frequency of prescribing penicillins and cephalosporins were 67.82%.[15]The study conducted by Zhussupova G et al showed third generation cephalosporin (44%) was commonly used.[16] In our study too, the antimicrobial agent which was most commonly prescribed in all departments were third generation cephalosporins. In the study conducted by Sharma et al, single antibiotic was prescribed to 44% of patients which was less than prescribed in our study and two antibiotics to 31% in teaching hospital and the most common antibiotics prescribed was fluroquinolones and aminoglycosides.[17]As per the study conducted by Ahmed et al, 77.66 % of prescriptions contain at least one antibiotic, however in our study it was more except medicine cases.[18] As per the study conducted by Getachew et al, ceftriaxone was used in 11.38% of cases but in our study ceftriaxone was used in higher percentage.[19] The main reasons for the use of cephalosporins might be because they are safe, cost effective, can be used in pregnancy and the bacterial resistant is less. However, in our study, most of the cases the antibiotics were used empirically without culture sensitivity. The percentage of prescription with antimicrobial agents was on higher side because of most of the cases in our study were post operative. Tinidazole, metronidazole and amikacin were other commonly used drugs, this might have been added for the treatment of severe infection.

Analgesic agents were used in about 75.3% of admitted patients. The common analgesics which were used were diclofenac (53.3%), Tramadol (30.6%), pentazocine (23.3%), paracetamol (20.2%) and ketorolac (4.16%). As per the study done by Mohammed TCH et al., diclofenac and paracetamol were the common analgesics prescribed which was same like our study.[20] As per the study done by Ogboli et al., IM injections of opioids consisting of pethidine and pentazocine were prescribed for 91.3% of patients.[21]In our study, pentazocine was used only by the obstetrics and gynecology whereas pethidine was not used by any of the departments. As per the study done by Kumarsingam et al., on the day of surgery monotherapy was prescribed for 53% patients of which Diclofenac (60%) was the most commonly prescribed drug followed by Tramadol (37%) and Pentazocin (3%) which is nearly same like our study except pentazocin use.[22] As per the study conducted by kumaldeen et al, the paracetamol was commonly used analgesic however all departments in our study also used paracetamol but not as commonly used analgesic.[23]As per the study conducted by the Jyothi et al., in the orthopedic patients aceclofenac (43%) followed by etodolac (25%),diclofenac (15%), etoricoxib (12%), and ibuprofen (5%) were commonly used NSAIDS however in our study tramadol and diclofenac were

commonly used.[24]This may be because our study was conducted on admitted patients and centrally acting analgesic was used to relieve pain.

The analgesic used in our study was on higher side because most of the cases in our study were post operative. The use of one NSAID and one opioid in many of the cases is not irrational because the opioid was used when there was severe pain(as and when required basis) and secondly most of the cases in surgery, gynae, ENT, ortho are post operative. For severe pain for achieving adequate analgesia one may require opioid. The most common preference for diclofenac sodium could be because of the reason of its safety profile, cost effectiveness and causing less acidity.

As per our study in about 80% of patients antiulcer drugs were used. Proton pump inhibitors were the most commonly used antiulcer drugs (more than 75% cases) and the commonest was pantoprazole. Only in few patients admitted under department of surgery ranitidine was used. The use of antiulcer agents in most of the patients may be to prevent gastric irritation due to use of more than three drugs per patients. Pantoprazole was commonest drug used as it is more acid stable. Has higher oral bioavailability and also beneficial in bleeding ulcers. As per the study conducted by Airee et al, the most common antiulcer drug used was pantoprazole in 70% of the cases and another study by Patil et al, pantoprazole was used in 68% of the cases which is not significantly different from our study.[25,26] In the study done by Weiss and Jhaveri et al ranitidine was the common antiulcer drug used. This might be because study was done in year 2004 when the use of H_2 blockers were not less than proton pump inhibitors.[27,28]

Among other drugs the main drugs utilized by the departments for surgical patients were tranexemic acid, butrophase, ethamsylate because all of them are helpful in the stoppage of bleeding and most of the cases in our study are post operative. In other drugs, Ondansetron again was utilized more commonly as it is effective antiemetic and quite safe, further in post operative patients whenever opioids are used to relieve pain, the chances of emesis increases and the antiemetic needs to be given.

The limitation of the study was, greater number of patients treated under department of surgery and obstetrics and gynecology while smaller number of patients treated under orthopedics, ENT, Medicine under the insurance scheme. So,to extrapolate the results of the study for a larger population, further studies are needed on more no of patients.

CONCLUSION

As we see the drug utilization in our study, mostly it was antibiotics, antiulcer, analgesic and some other drugs. In antibiotics, it was mainly third generation cephalosporins like ceftriaxone, cefoperazone or second-generation cephalosporin like cefuroxime which were used many a times in combination with the beta lactamase inhibitors. Some other antibiotics which were preferred were piperacillin, metronidazole, tinidazole. The antiulcer drug which was commonly used was pantoprazole and the analgesics commonly preferred were diclofenac sodium, tramadol, pentazocine, paracetamol. In other drugs, which were commonly used were ondansetron, promethazine, butrophase, tranexemic acid. In the Govt insurance scheme CMAAY/PMJAY, the medicines are available to the patients from free pharmacy store (hospital dispensary), janaushadhi store, empanelled pharmacy. From ours study, a conclusion can be withdrawn that if few of the antibiotics, analgesic, antiulcer drugs can be made available in the Govt set up through Govt procurement, then the institute can work in more cost-effective way. Secondly, to work in cost effective way one does not require many drugs, few medicines are used very commonly and any institute can work in economical way if the same is being made available.

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Data availability

The primary data gathered by the authors, which supports the finding of this study are

available from the corresponding author and can be shared if a request is being received after due permission from the Chief Medical Superintendent, Tomo Riba institute of health and medical sciences, Govt of Arunachal Pradesh and the Chief Executive officer, Chief Minister Arogya Arunachal Yojana.

Conflicts of interest

The authors declare that there are no conflicts of interest and no relationship with the industry.

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