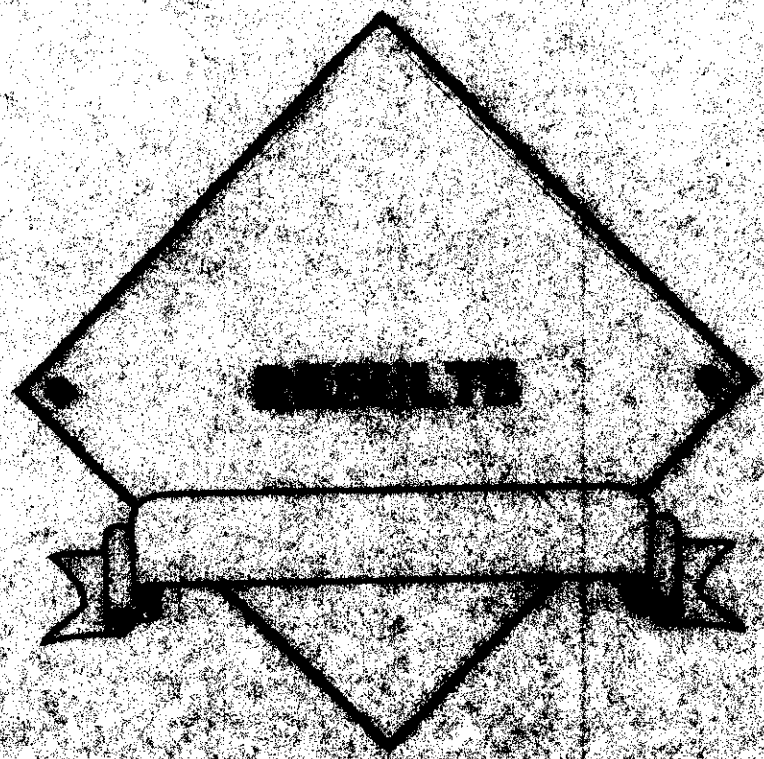

RESULTS

During the period of study which extend for one year, 228 isolates of staphylococci isolated from 300 samples collected from patients, nurses and doctors from different departments and from multiple sites of the body.

From these 228 isolates of staphylococci there were 145 isolates of coagulase negative staphylococci and 83 isolates of coagulase positive staphylococci (Fig. 1).

These 83 strains of *Staphylococcus aureus* were collected as follow; (27) strains from General Surgery Department, (21) from Neonate Unit, (12) from Burn Unit, (13) from E.N.T. Department, and (10) from Ophthalmology Department (Fig. 2, Table 5). This table also shows the number of MRSA and MVRSA isolated in each department.

Of these 83 isolates of *Staphylococcus aureus*, there were 26 strains (31.33%) sensitive to methicillin and 57 strains (68.67%) resistant to methicillin (Fig. 1).

There is twenty six strains between 57 MRSA strains were resistant to both methicillin and vancomycin.

Table 6, Fig. 3 show *Staphylococcus aureus* isolated from different sites of the body. The highest percent was from surgical wounds and Abscess (50%) and the lowest from throat swabs. The table also shows the number of MRSA and MVRSA from each site of the body separatly.

Tables 7,8,9 and Fig. (4-11) show the number and percentage of *Staphylococcus aureus* isolated from doctors, nurses and patients respectively. There is neither MRSA nor MVRSA strains detected in samples collected from doctors, but it is present in both nurses and patients with variable percentages.

Antibiotic resistance of MSSA were tabulated in (Table 10). It shows the highest percentage of resistance to tetracycline (92.3%) and other antibiotics with variable degrees of resistance, (69.2%) to gentamycin, (53.8%) to both cephalexin and erythromycin, (46.1%) to clindamycin, (38.5%) to both ampicillin and rifampin, (23%) to fucidic acid and the lowest resistance was (7.7%) to vancomycin. No resistance can be detected to ofloxacin Fig. 12.

As regards antibiotic resistance of MRSA strains, table 11 shows the highest resistance to clindamycin (94.7%), resistance was (87.7%) to erythromycin, (84.2%) to ampicillin, (70.1%) to cephalexin, (66.7%) to tetracycline, (64.9%) to fucidic acid, (56.1%) to gentamycin, (45.6%) to vancomycin, with the lowest percentage of resistance to rifampin (19.3%) and no resistance at all detected to ofloxacin (Tarivid) Fig. 13.

Table 12 shows different resistant degree of antibiotics to MVRSA strains. It shows the highest degree of resistance (100%) to both fucidic acid and clindamycin, and variable degrees of resistance other antibiotics, (88.5%) to erythromycin, (73%) to both cephalexin and gentamycin, (65.4%) to ampicillin, with the lowest degree of resistance to tetracycline

(42.3%). No resistance was detected to both ofloxacin and rifampin Fig. 14.

Table 13 shows antibiotic sensitivity of MRSA isolates, with the highest sensitivity to ofloxacin (100%), rifampin (80%), vancomycin (56.39%), gentamycin (43.86%), fucidic acid (35.09%), tetracycline (33.33%). cefalexin (29.82%), ampicillin (15.79%), erythromycin (12.28%) and clindamycin (5.26%) Fig. 15.

Table 14 shows variable pattern of resistance of MSSA strains to different antibiotics.

Table 15 shows the antibiotic resistance pattern of MRSA strains, the table shows that, MRSA are multi-resistant strains, from 57 MRSA strains isolated in our study 17.5% (10 from 57) strains show the same pattern to ampicillin (Amp), cephalexin (Cl), clindamycin (DA), erythromycin (E) and tetracyclin (TE).

8.7% (5 from 57) strains has the same resistance pattern, to the following: Ampicillin (Amp), cephalexin (Cl), clindamycin (DA), erythromycin (E), fucidic acid (FD) and vancomycin (VA).

Other groups of MRSA strains were resistant to many antibiotics with variable patterns of resistance.

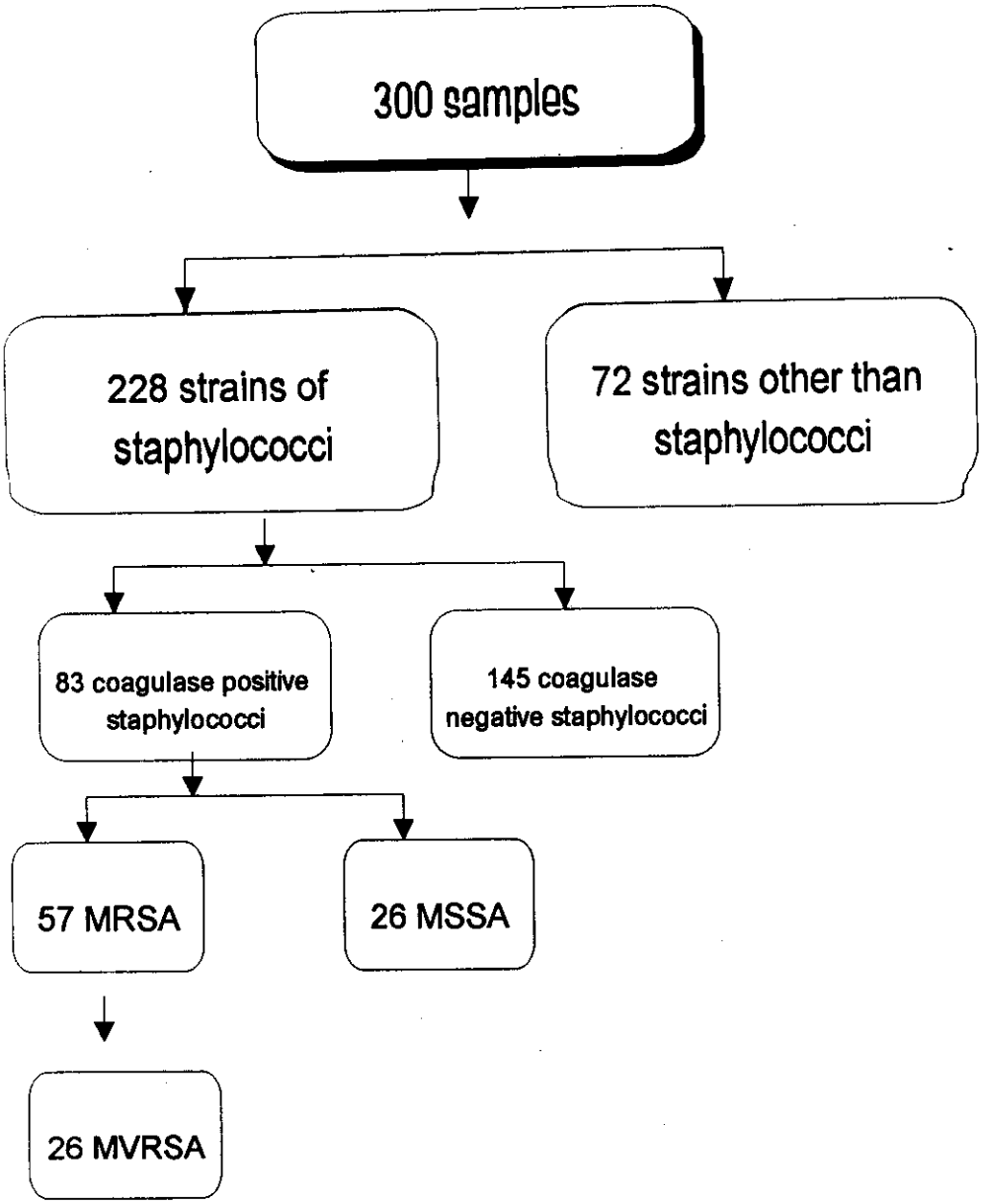
300 samples
228 strains of staphylococci
72 strains other than staphylococci
83 coagulase positive staphylococci
145 coagulase negative staphylococci
57 MRSA
26 MSSA
26 MVRSA

Fig.(1)

Table (5) Source of S.aureus strains

Department	Total Number of samples	Number of isolated S.aureus	No. of MRSA isolated from *S.aureus*	% of MRSA isolated from *S.aureus*	No. of MVRSA isolated from *S.aureus*	% of MVRSA isolated from *S.aureus*
Surgery	84	27	22	81.5	12	44.4
Neonate	80	21	15	71.4	6	28.6
Burn unit	32	12	9	75	4	33.3
E.N.T.	56	13	8	61.5	3	23
Ophthalmology	48	10	3	30	1	10
Total	300	83	57	68.67	26	31.3

Table (6) S.aureus isolated from different sites of the body.

Sites of samples	Total Number of samples	Number of S.aureus isolated	No. of MRSA isolated from *S.aureus*	% of MRSA isolated from *S.aureus*	No. of MVRSA isolated from *S.aureus*	% of MVRSA isolated from *S.aureus*
Finger nail	107	20	11	55	3	15
Nose	107	32	20	62.5	10	31.3
Surgical wound	10	5	4	80	2	40
Abscess	6	3	3	100	2	66.7
Throat	12	2	1	50	-	-
Perineal	15	5	4	80	2	40
Umblical stump	15	4	4	100	-	-
Burn ulcer	8	4	3	75	3	75
Ear discharge	12	5	4	80	3	60
Conjunctiva	8	3	3	100	1	33.3
Total	300	83	57	68.67	26	31.3

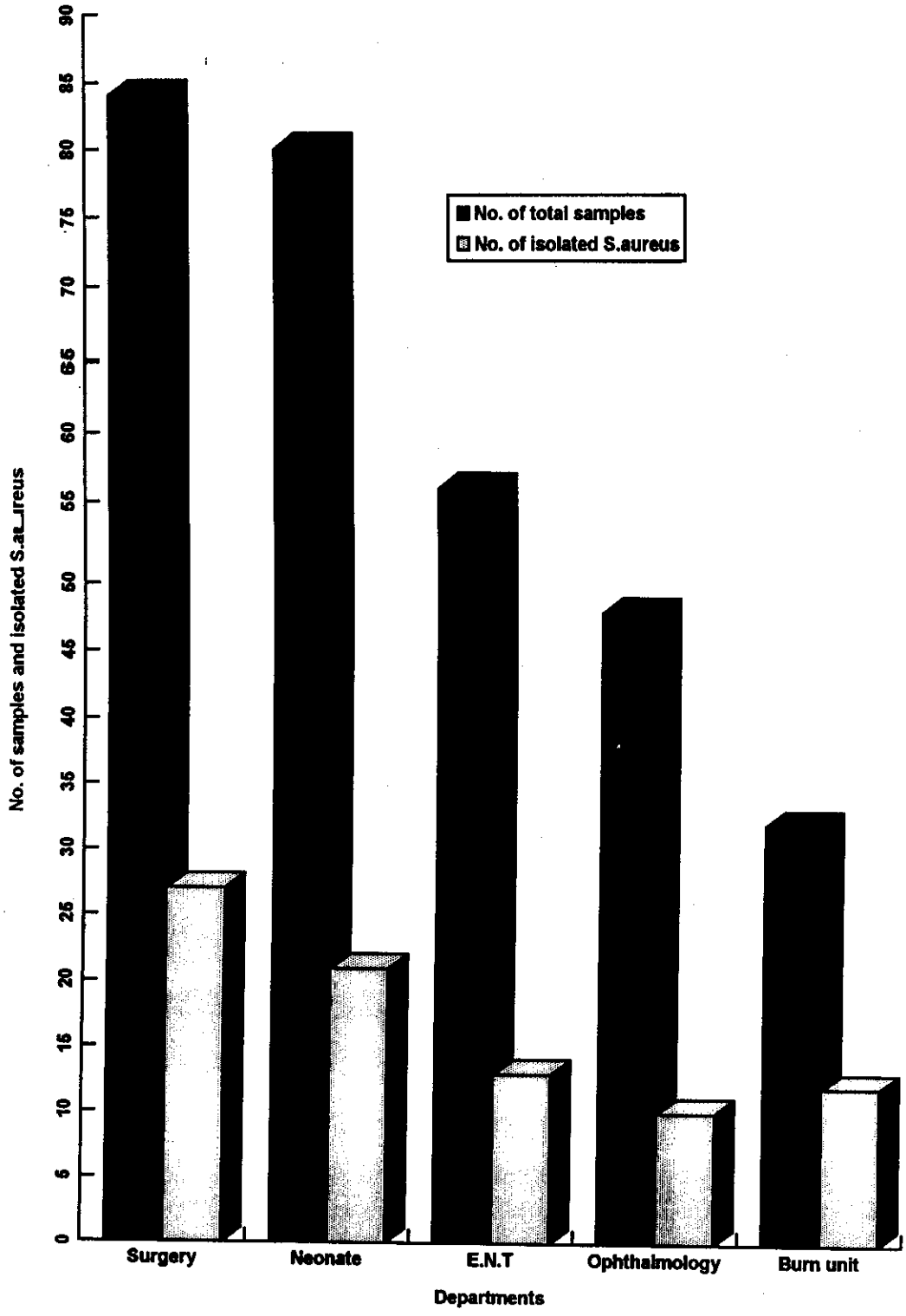

Fig. (2)
Source of S.aureus strains.

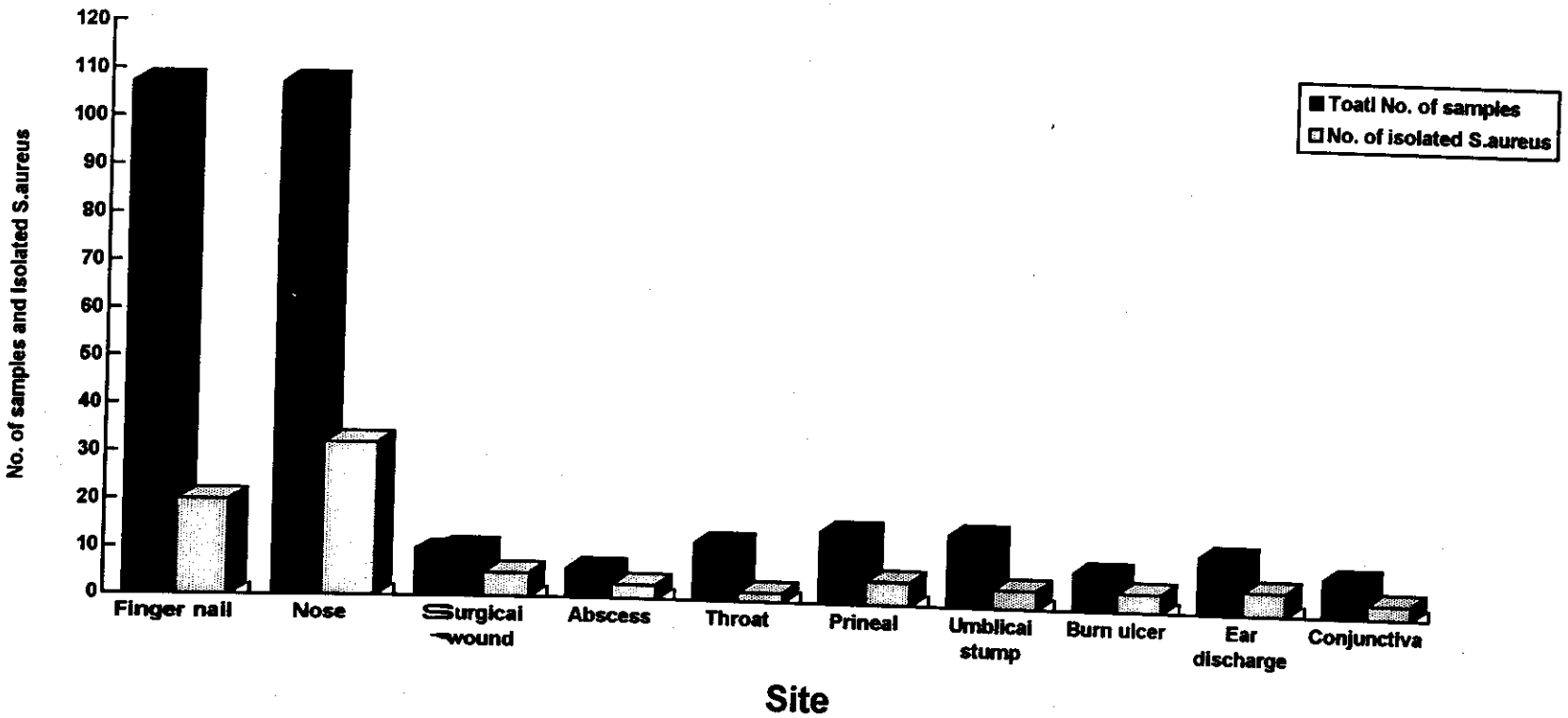

Fig. (3)
S.aureus isolated from different sites of the body.

Table (7) S.aureus isolated from doctors of different departments.

Department	Site of samples	No. of samples	No. of isolated S.aureus	%
Surgury (6)	Finger nail	6	1	16.67%
	Nose	6	1	16.67%
Neonate (4)	Finger nail	4	-	0%
	Nose	4	-	0%
E.N.T. (5)	Finger nail	5	-	0%
	Nose	5	1	20%
Ophthalmology (4)	Finger nail	4	-	0%
	Nose	4	1	25%
Total		38	4	10.53%

Table (8) S.aureus isolated from nurses of different departments.

Department	Site of samples	No. of samples	No. of isolated S.aureus	No. of MRSA isolated from *S.aureus*	% of MRSA isolated from *S.aureus*
Surgury (8)	Finger nail	8	2	1	50
	Nose	8	2	1	50
	Throat	8	1	1	100
Neonate (4)	Finger nail	4	1	-	-
	Nose	4	2	-	-
	Throat	4	1	-	-
Burn (4)	Finger nail	4	1	1	100
	Nose	4	2	1	50
E.N.T. (5)	Finger nail	5	1	-	-
	Nose	5	1	-	-
Ophthalmology (8)	Finger nail	8	1	-	-
	Nose	8	2	-	-
Total		70	17	5	29.4

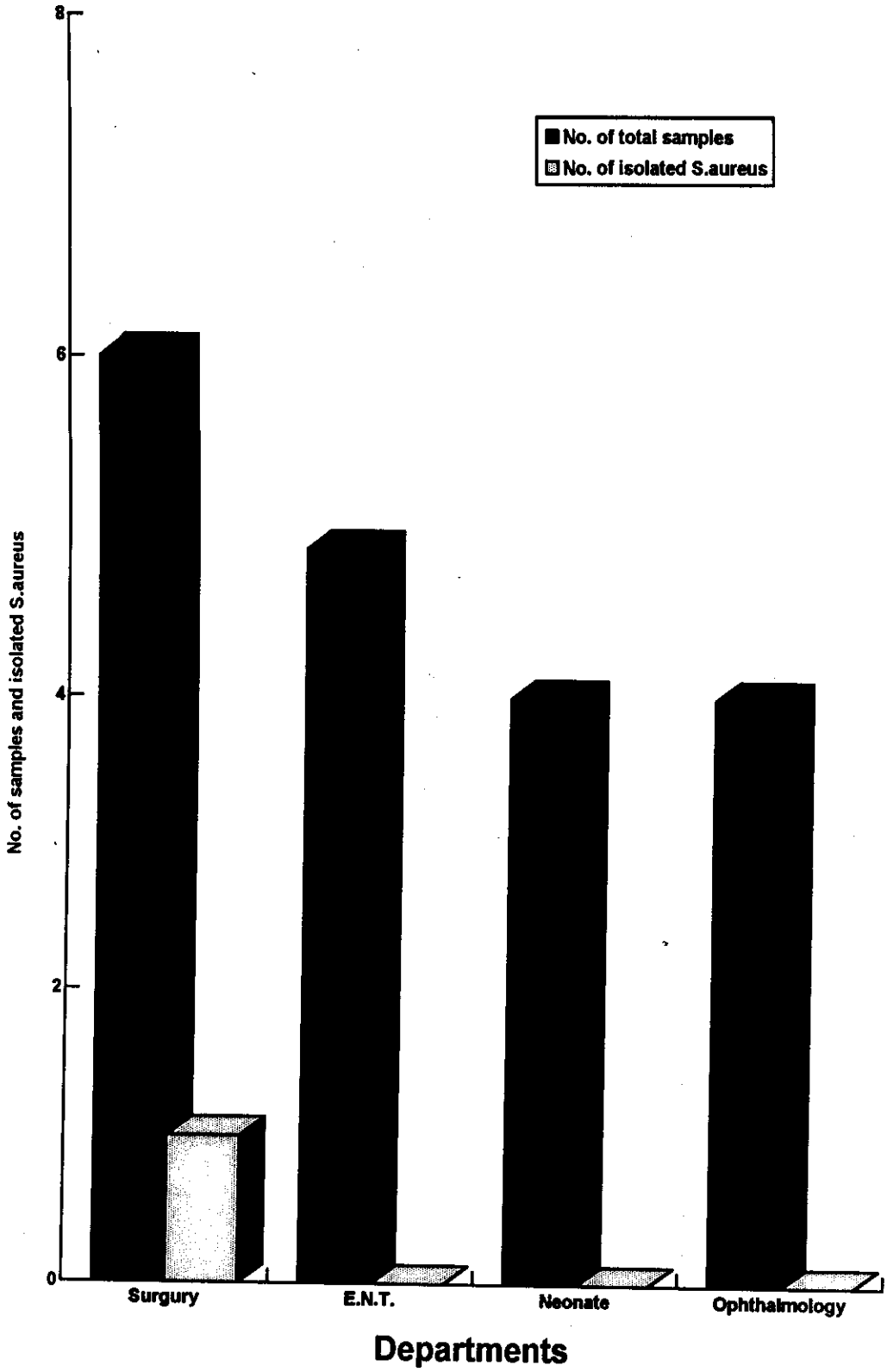

Fig. (4)
S.aureus isolated from finger nail of doctors of different departments.

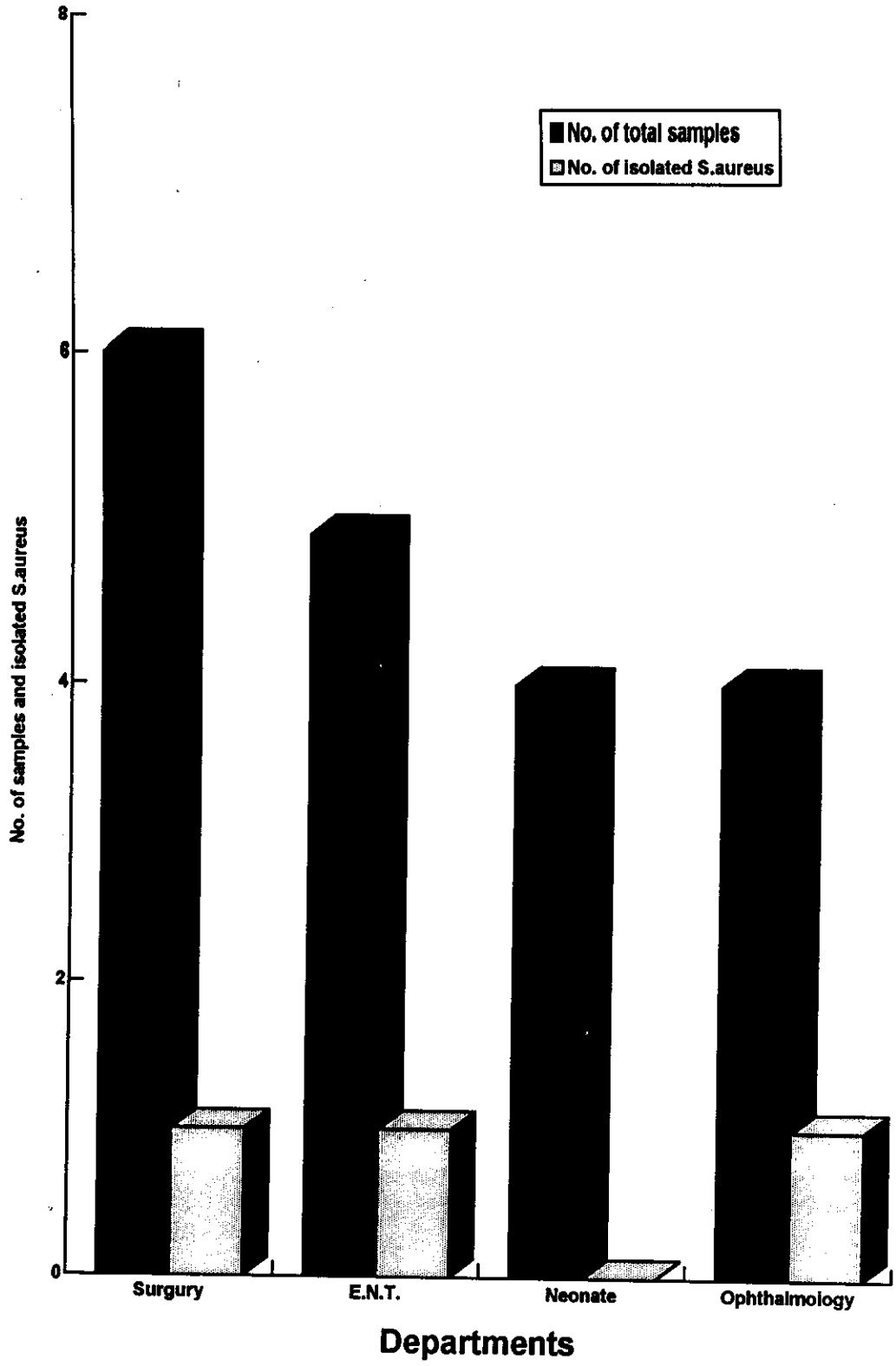

Fig. (5)
S.aureus isolated from nose of doctors of different departments.

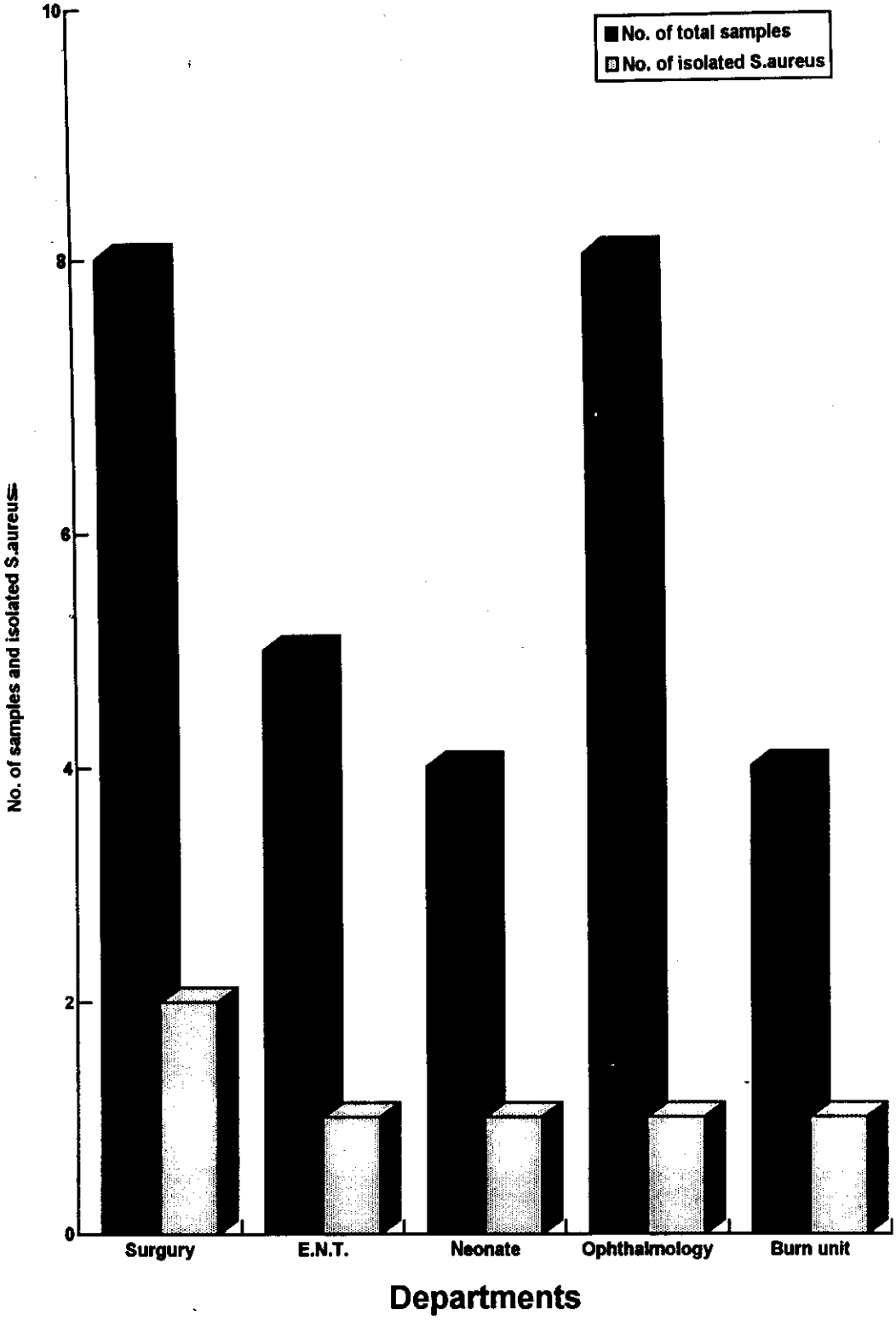

Fig. (6)
S.aureus isolated from finger nails of nurses of different departments.

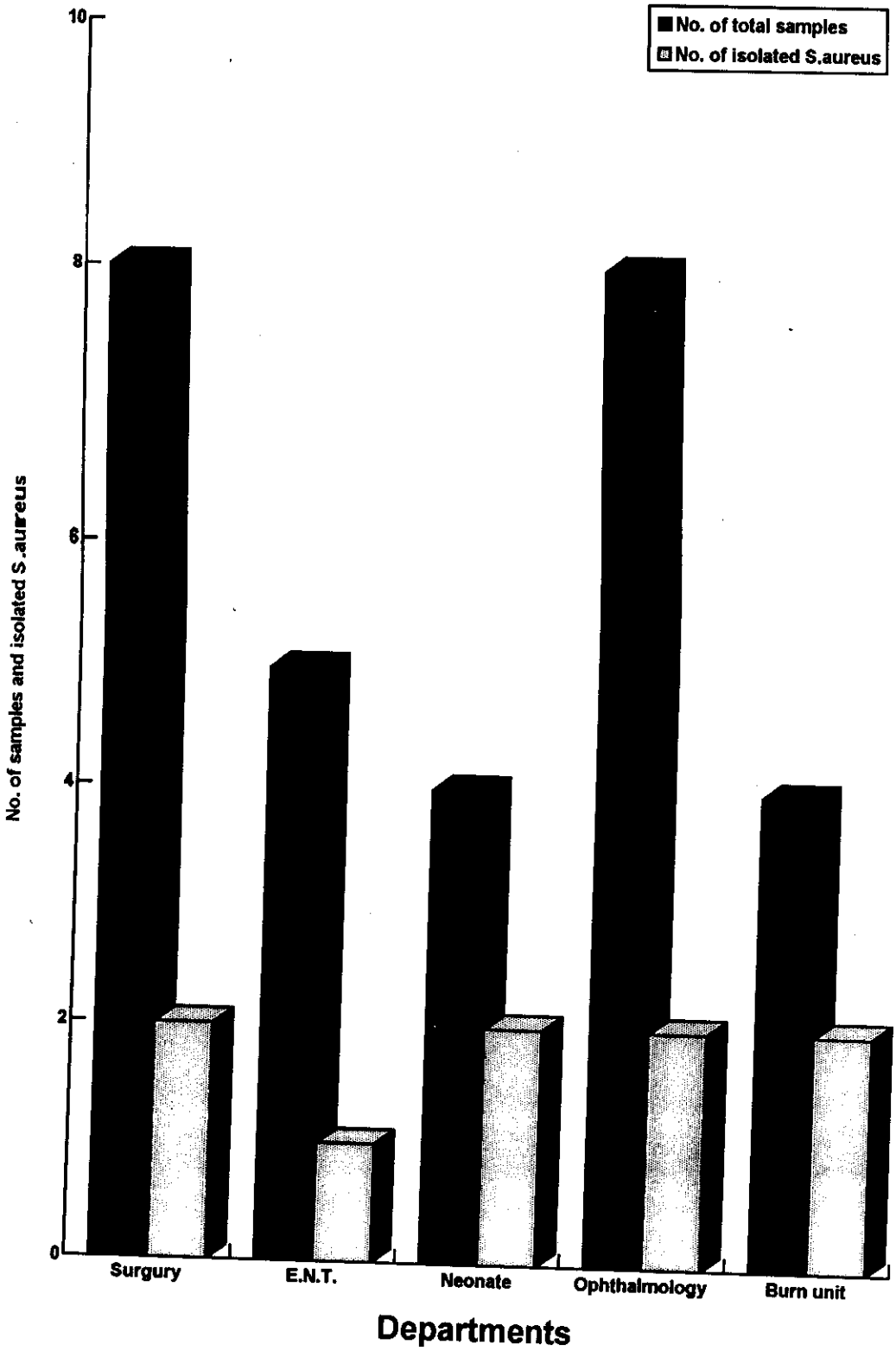

Fig. (7)
S.aureus isolated from nose of nurses of different departments.

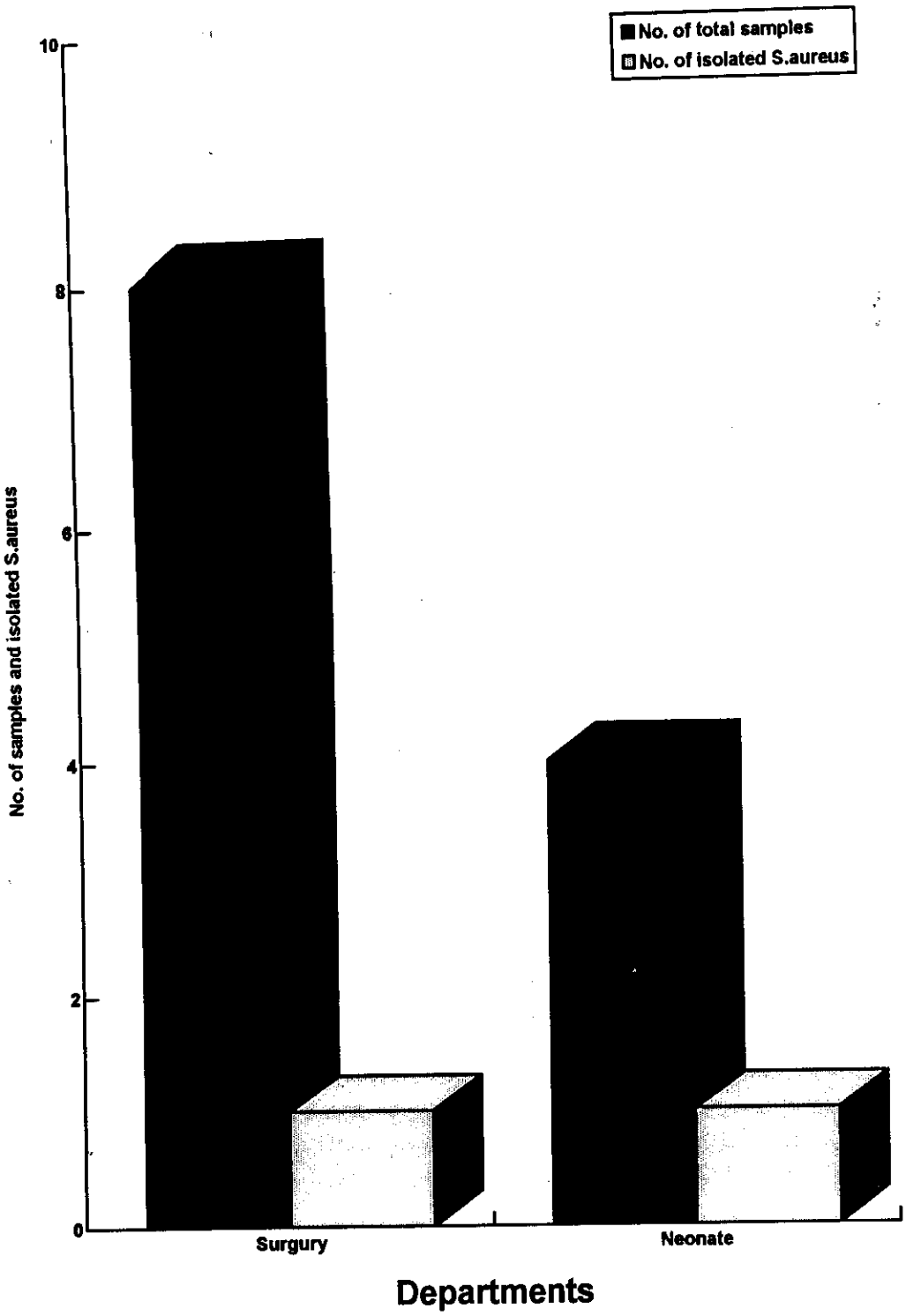

Fig. (8)
S.aureus isolated from throat of nurses of different departments.

Table (9) S.aureus isolated from patients of different departments.

Department	Site of samples	No. of samples	No. of isolated S.aureus	No. of MRSA isolated from *S.aureus*	% of MRSA isolated from *S.aureus*	No. of MVRSA isolated from *S.aureus*	% of MVRSA isolated from *S.aureus*
Surgury (16)	Finger nail	16	5	5	100	3	60
	Nose	16	7	7	100	5	71.4
	Surgical wound	10	5	4	80	2	40
	Abscess	6	3	3	100	2	66.7
Neonate (15)	Finger nail	15	3	2	66.7	-	-
	Nose	15	5	5	100	4	80
	Perineal	15	5	4	80	2	40
	Umblical	15	4	4	100	-	-
Burn (8)	Finger nail	8	2	1	50	-	-
	Nose	8	3	3	100	-	33.3
	Ulcer	8	4	3	75	3	75
E.N.T. (12)	Finger nail	12	2	1	50	-	-
	Nose	12	3	3	100	-	-
	Ear discharge	12	5	4	80	3	60
Ophthalmology (8)	Finger nail	8	1	-	-	-	-
	Nose	8	2	-	-	-	-
	Conjunctiva	8	3	3	100	1	33.3
Total		192	62	52	83.9	26	41.9

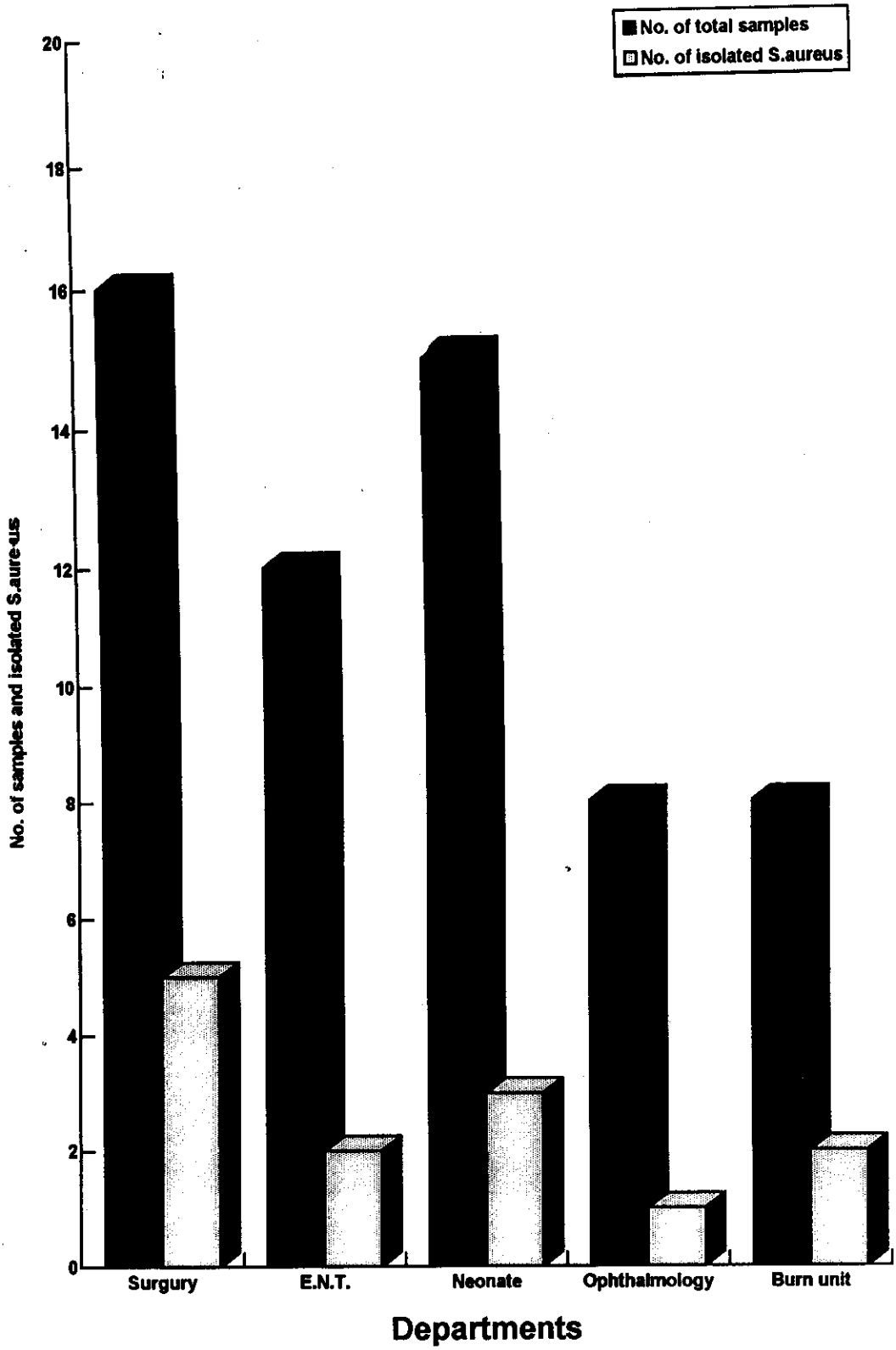

Fig. (9)
S.aureus isolated from finger nails of patients of different departments.

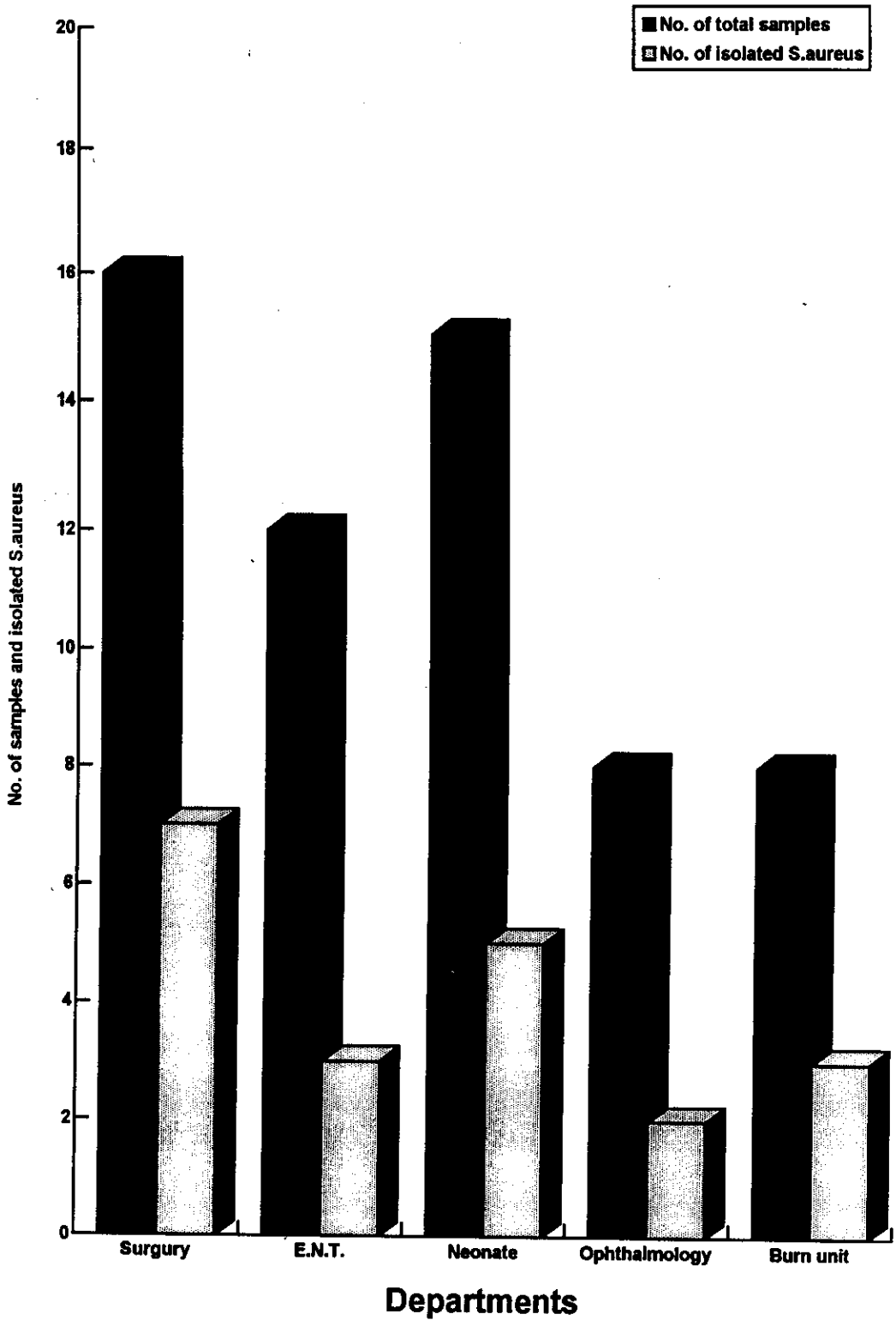

Fig. (10)
S.aureus isolated from nose of patients of different departments.

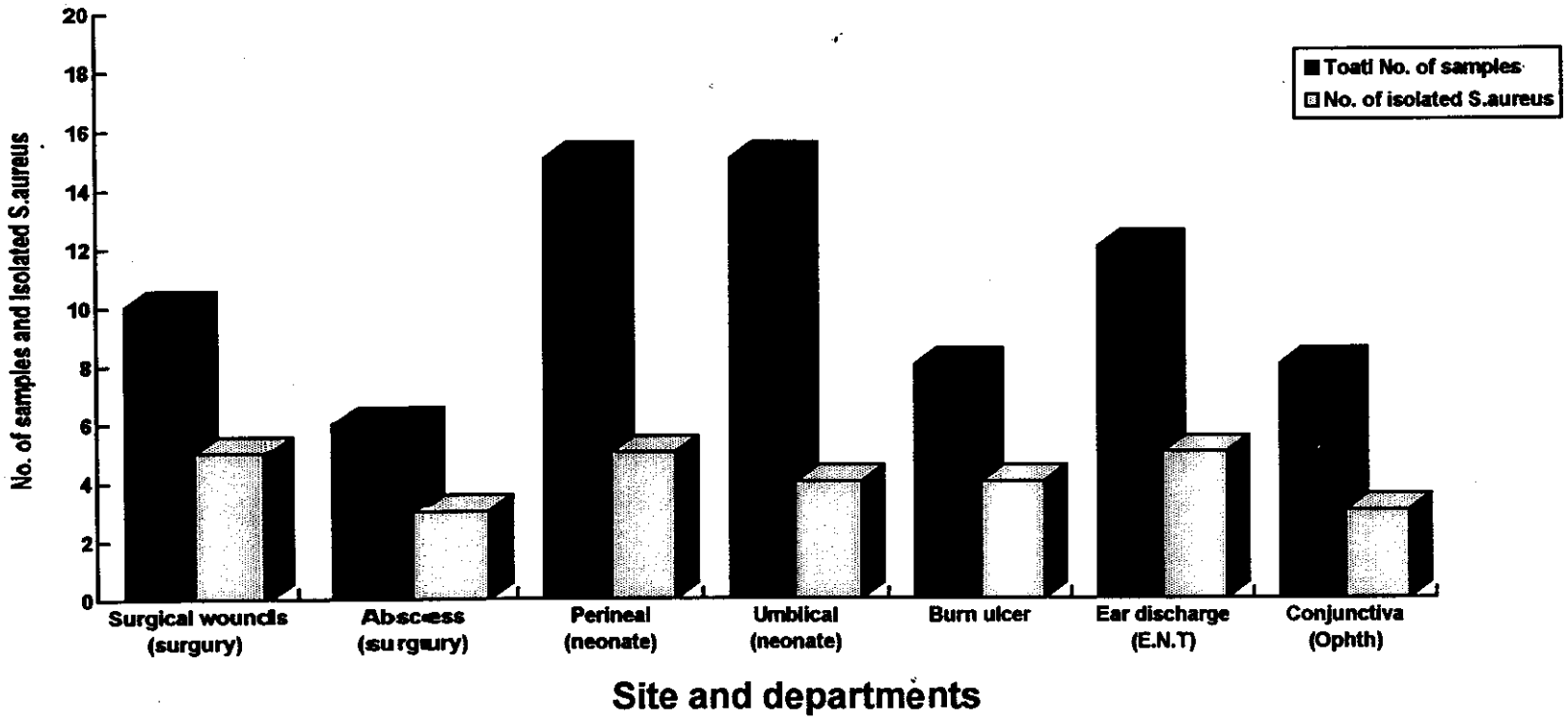

Fig (11)

S.aureus isolated from other sites of the body of patient from different departments.

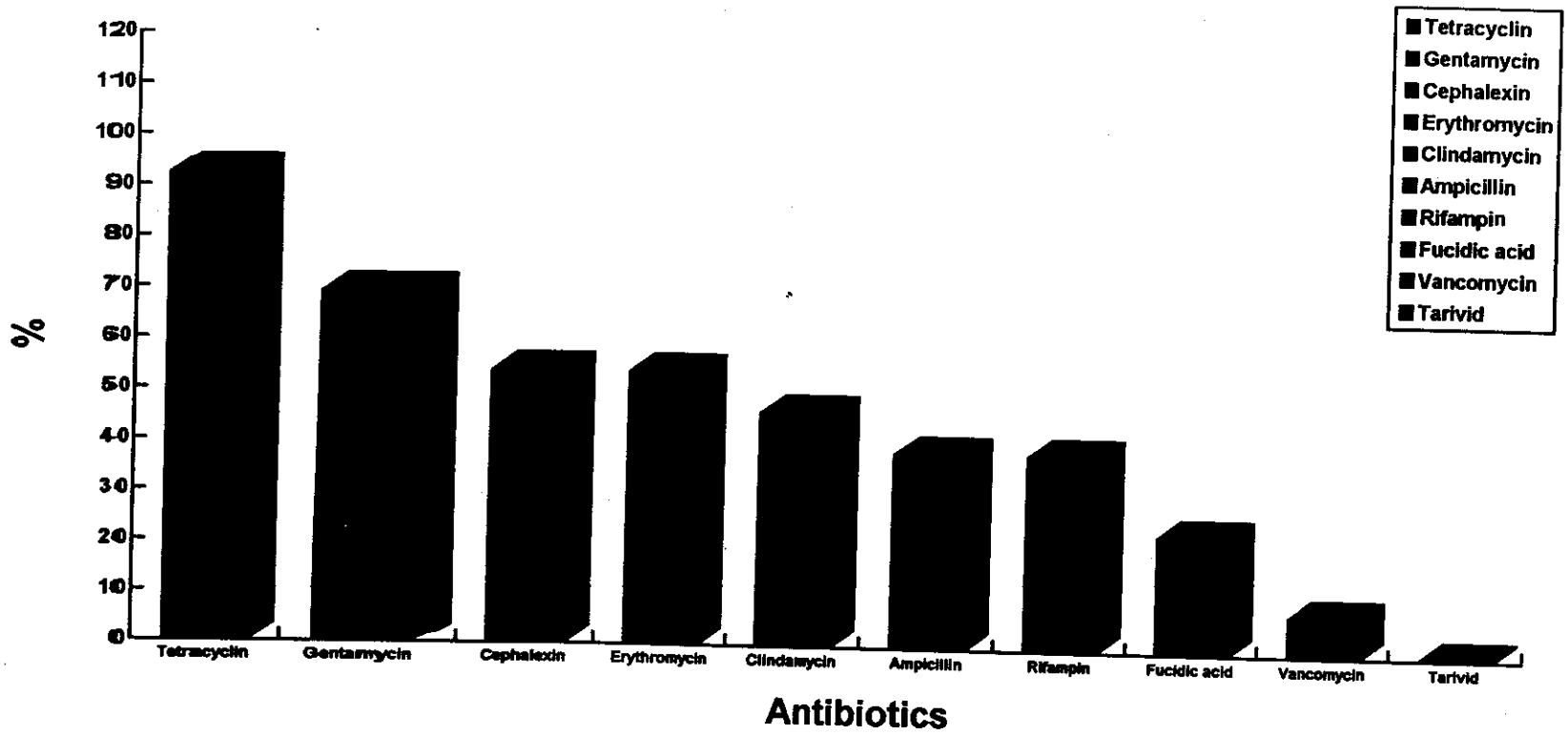

Fig. (12)
Antibiotic resistance of MSSA isolates.

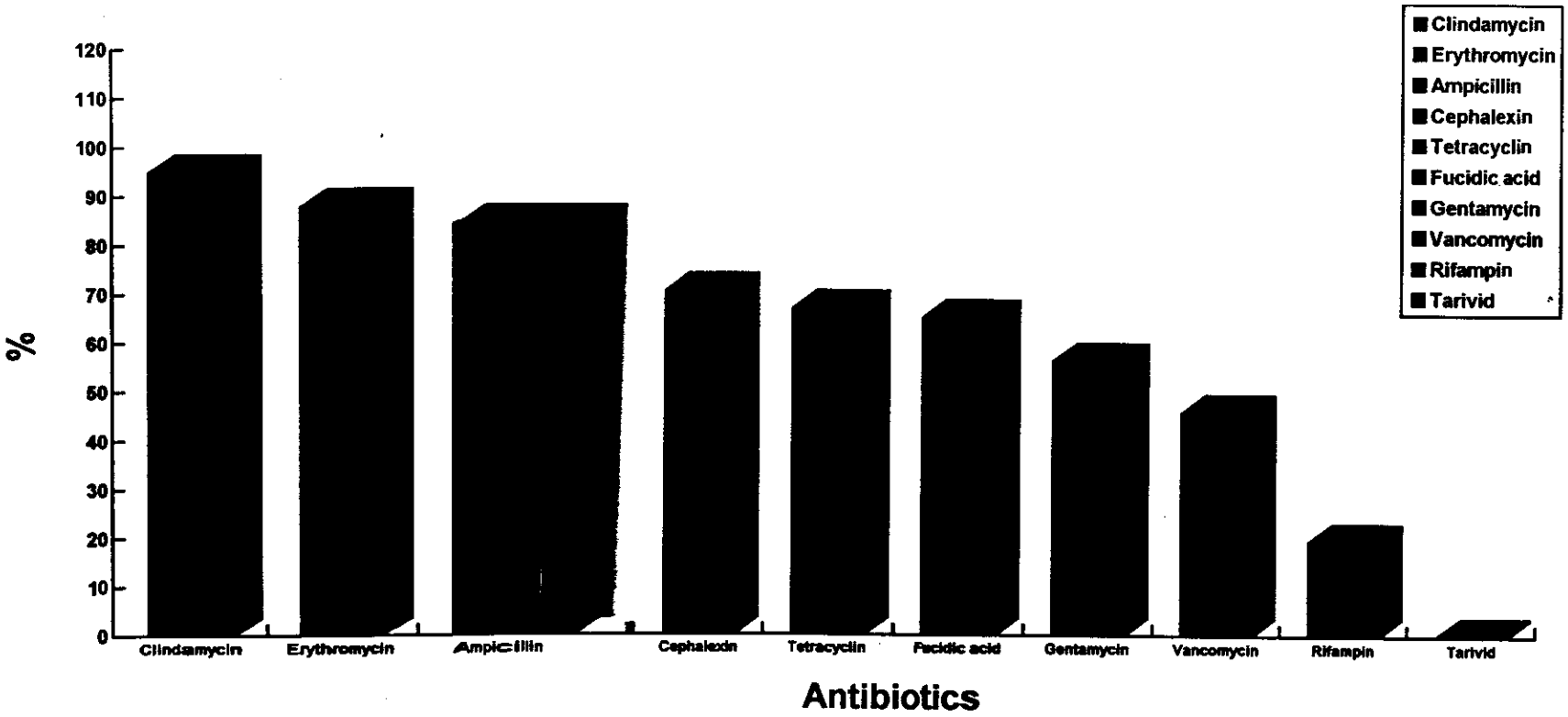

Fig. (13)
Antibiotic resistance of MRSA isolates.

Table (12) Antibiotic resistance of MVRSA.

Resistant strains	Ampicillin	Cephalexin	Clindamycin	Erythromycin	Fucidic acid	Gentamycin	Tetracyclin
No.	17	19	26	23	26	19	11
%	65.38%	73.07%	100%	88.46%	100%	73.07%	42.3%

Table (13) Antibiotic sensitivity of MRSA isolates

Sensitive strains	Ampicillin (Amp)	Cephalexin (CI)	Clindomycin (DA)	Erythro-mycin (E)	Fucidic acid (FD)	Gentamycin (GN)	Rifampin (RD)	Tarivid (ofx)	Tetracycline (TE)	Vancomycin (VA)
No_2	9	17	3	7	20	25	46	57	19	31
%	15.79%	29.82%	5.26%	12.28%	35.09%	43.86%	80.7%	100%	33.33%	56.39%

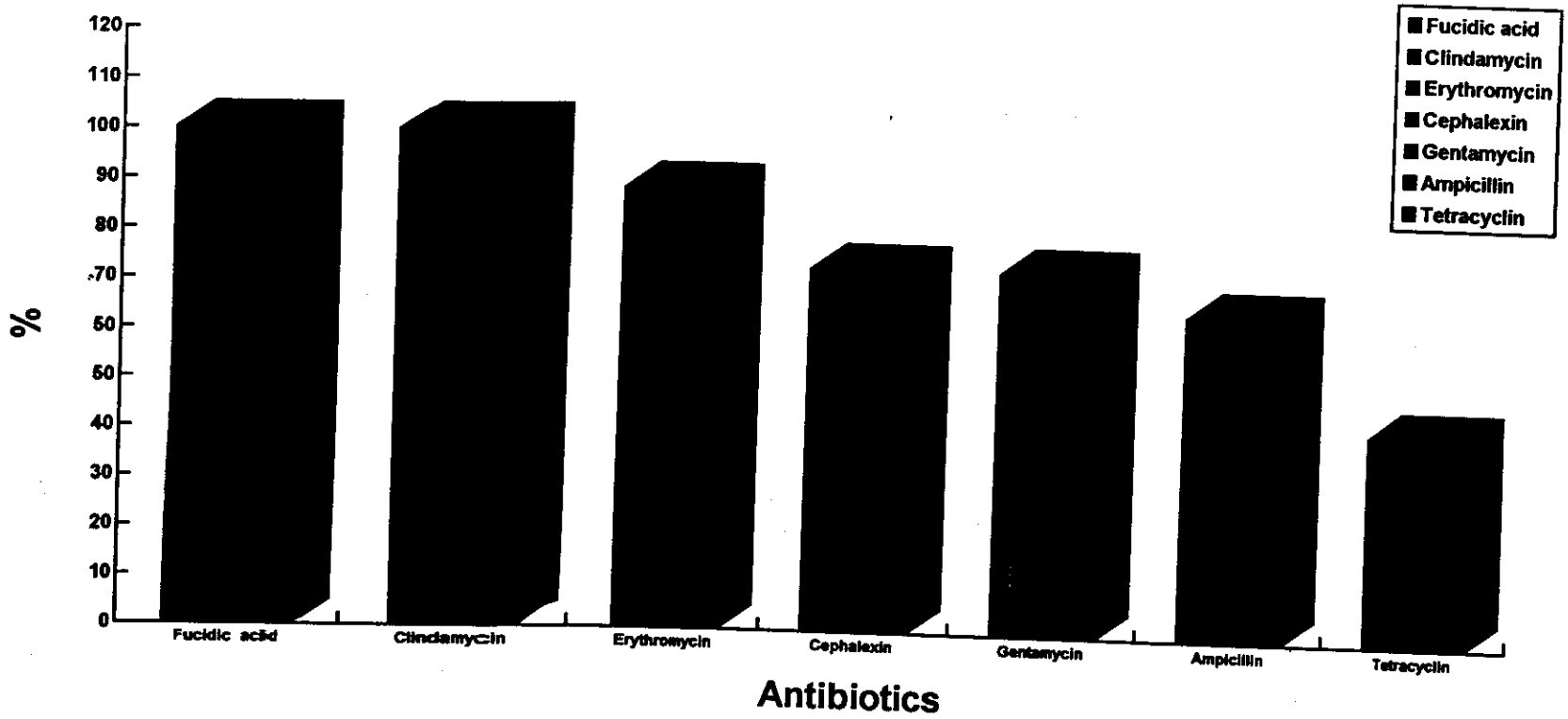

Fig. (14)
Antibiotic resistance of MVRSA isolates.

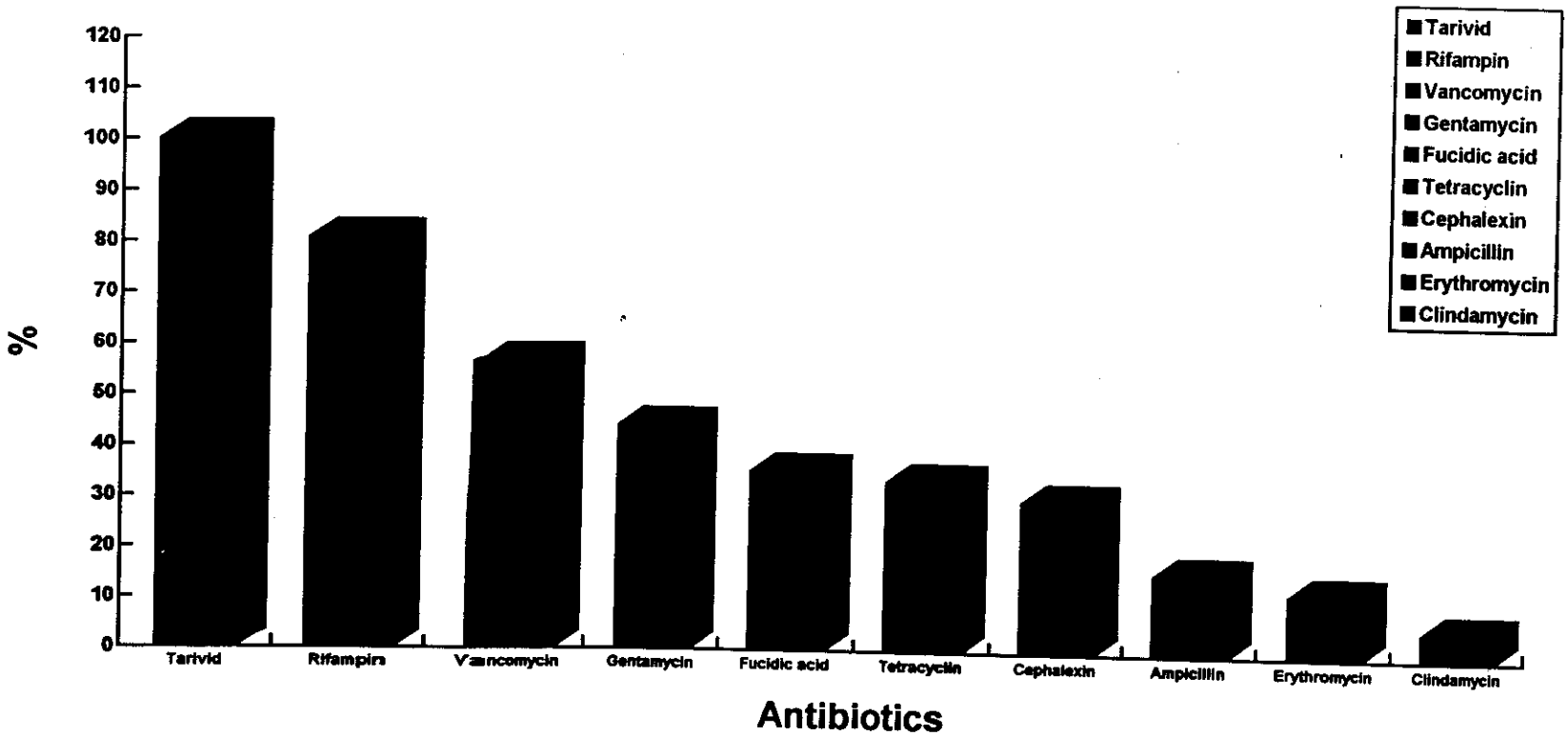

Fig. (15)
Antibiotic sensitivity of MRSA isolates.

Table (14) Antibiotic resistance of MSSA

No. of MSSA	Resistance pattern								
4	-	cl	CN	-	E	-	-	TE	-
4	-	-	CN	DA	-	-	RD	TE	-
4	-	cl	-	-	E	-	-	TE	-
2	Amp	-	CN	DA	-	FD	RD	TE	-
2	Amp	-	CN	DA	-	-	RD	TE	-
2	Amp	cl	CN	-	E	-	-	TE	-
2	Amp	cl	CN	DA	E	-	-	TE	-
2	-	cl	CN	-	E	-	RD	TE	-
2	Amp	-	-	DA	-	FD	-	TE	VA
2	-	-	-	-	-	FD	-	-	-

Table (15) Antibiotic resistance of MRSA

No. of MRSA	Resistance pattern								
10	Amp	cl	-	DA	E	-	-	TE	-
5	Amp	cl	-	DA	E	FD	-	-	VA
4	Amp	cl	CN	DA	E	-	RD	TE	-
4	Amp	-	CN	DA	-	-	RD	TE	-
4	Amp	-	-	DA	E	FD	-	-	-
4	Amp	cl	-	DA	E	FD	-	TE	-
6	-	cl	CN	DA	E	FD	-	-	VA
4	Amp	cl	CN	DA	E	FD	-	-	VA
4	Amp	cl	CN	DA	E	FD	-	TE	VA
4	Amp	-	CN	DA	E	FD	-	TE	VA
3	Amp	cl	CN	-	E	FD	RD	TE	-
2	-	-	-	DA	-	FD	-	TE	VA
2	Amp	-	CN	DA	E	-	-	TE	-
1	-	-	CN	DA	-	FD	-	TE	VA