SUMMARY

The present study was is carried out to reveal the role of plasmid encoding multiple drug resistance on the sensitivity of enteric fever isolated strains through estimation of antibiogram of the isolated ***Salmonella*** strains , demonstration of plasmid profile , correlation between the presence of plasmids and the resistance pattern of the isolates , transferring the plasmids to other sensitive strains as E.coli K_{12} through conjugation and transformation and digestion of plasmid of donor and transconjugants by endonucleases such as Hind III and Eco R_1.

Stool samples from 300 cases aging from 2 to 60 years were collected . The cases were diagnosed clinically as typhoid fever . The cases belonging to this study were attending the out - patients clinics of *Benha and Mansoura Fever Hospitals,* 170 patients from *Benha Fever Hospital* and 130 *patients from Mansoura Fever Hospital* . A sample of stool was collected from each case . All the stool samples were screened for the presence of ***Salmonella*** . Biochemical and Serological tests were performed for identification of the isolated ***Salmonella*** species.

Salmonella strains were isolated from 100 cases out of 300 cases (33.3%) . Sixty strains from *Benha Fever Hospital* and 40 *strains* from *Mansoura Fever Hospital* .

The isolated ***Salmonella*** were tested for their susceptibility to (18) different antimicrobial agents using the disk diffusion method . The isolated ***Salmonella*** strains that had several resistant patterns, the following genetic studies were performed :-

- Isolation of plasmid DNA and estimation of their M. W. by using agarose gel electrophoresis .
- Transfer of resistant markers (plasmid) from strains which were resistant to chloramphenicol , sulfamethiazole and co-trimoxazole but sensitive to nalidixic acid to a sensitive strain of E.coil K_{12} sensitive to all antibiotics except nalidixic acid .
- Transfer of resistant marker from resistant cell to sensitive competent cells E.coli (C_{600}) by transformation .
- Digestion of the isolated plasmid from the donor and transconjugant cells by using restriction enzymes Hind III and Eco R_1 .

Salmonella typhi was the most frequent isolated (48%), followed by ***Salmonella paratyphi B*** 28 isolates (28%), then ***Salmonella paratyphi A*** 24 isolates (24%) . It was found that 25 out of 100 isolates (25%) were resistant from two to seven of the antimicrobial chemotherapeutic agents and 75 strains were sensitive to all antimicrobial agents used . From the 25 resistant ***Salmonella*** strain 12 strains were ***Salmonella typhi*** and 6 strains were ***Salmonella paratyphi A*** and 7 strains were ***Salmonella paratyphi B*** .

The antibiogram of Salmonella indicated that all 25 strains were resistant to chloramphenicol and sulfamethiazol and 21 strains were resistant to co-trimoxazol (84%) . All the strains (25) were sensitive to neomycin , kanamycin , ofloxacin and norfloxacin . Six strains showed the same resistant patteren , while the rest of the strains (19) showed different resistant patterns .

All 12 resistant strains of ***Salmonella typhi*** has from 3 to 8 plasmids, their molecular weight ranging from 1.2 to 7.1 M. d. Strains number 19 & 22 share the same resistant pattern and also the same plasmid profile . Out of seven resistant ***Salmonella paratyphi B*** strains four strains harboured plasmids . Their molecular weight ranged from 1.7 to 5.2 M. d. The other three strains were plasmidless . Out of 6 resistant strains of ***Salmonella paratyphi A*** 5 strains harboured from 1 to 4 plasmids . Their molecular weight ranged from 1.2 to 5.4 M. d. and one strain was plasmidless . Plasmid of M. d. 1.7 & 2.7 were isolated from all strains of ***Salmonella typhi*** .

The conjugation process between isolated resistant strains and the recepient sensitive E.coli K_{12} revealed that the number of transconjugantes ranged from 4 to 13 cell in plates and the transconjugation frequency ranged from $1.1x10^{-8}$ to $9x10^{-8}$. The plasmid profile indicated that the transconjugantes were resistant to sulfamethiazole ,co-trimoxazole and nalidixic acid .

The transformation process between plasmids of isolated resistant strains and the recipient sensitive E.coli C_{600} revealled that the number of transformed cells ranged from 50 to 170 and the transformation frequency ranged from 2.5×10^{-6} to 8.5×10^{-6} .

Endonuclease digestion with Hind III and Eco R_1 of donor and transconjugant revealled a similar digestion pattern .

Therefore , it appears that the antibiotic resistance plasmids of ***Salmonella typhi*** (1.7 , 2.7 M.d.) S.P.A (1.7 M.d.) & S.P.B (2.7 M.d.) are a common character of infected ***Salmonella*** strains of Egypt and may be responsible for resistance to chloramphenicol and sulfamethiazole .

The use of antibiotics must be controlled and restricted as soon as possible to avoid appearance of resistant strains and epidemics .