**Discussion**

The aim of this study was to focused on isolation, purification and identification of microbial contamination and their resistance pattern from hospital and slaughterhouse effluents. Antibiotic have been rightly called miracle drugs but sixty years of use and measure of antibiotics has resulted in increased frequencies of resistance for most combinations of antibiotics.

Microbial resistance to antibiotics in clinical emerged soon after the first use of these agents in the treatment of infectious diseases and continues to develop significant challenge for the health care sector**.** Antimicrobial resistant is intrinsically associated with the use of antimicrobial agents. In recent years antimicrobial resistance in bacteria of animal origin and its impact on human health have drawn much attention worldwide. Antibiotic resistant is a major and well-known problem in treating infections**.** Gram negative bacteria of the *Enterobacteriaceae* family are important causes of urinary tract infections, blood stream infections, hospital and health care associated pneumonia and various intra abdominal infections and within this family; *E*. *coli* is the cause of urinary tract infection, *Klebseilla* *pneumonia* and all *Enterobacteriaceae* have been implicated in blood stream infection and other abdominal infections (Makky *et al.,* 2012). The *Staphylococci* are mainly responsible for pyogenic infection in both human and animal population with zoonotic consequence. Resistant bacteria include both pathogenic and commensal microorganisms, with the latter serving as a potential reservoir for mobile resistance elements (Tenover *et al.,* 2004).

Tetracycline resistance was the most common type of resistance observed and the most prevalent resistance in *E. coli* and *Staphylococcus* from all isolates but relatively lower resistance was observed for *Salmonella*. This finding is not surprising because tetracycline has been widely used in therapy and to promote feed efficiency in animal production systems since its approval in 1948 (Klajn and Rafal, 2007). Persistence of tetracycline resistance was reported in animal coliforms a decade after it was no longer used in feed or for treatment. A study conducted by [Ardic](http://www.sciencedirect.com/science/article/pii/S0924857905001743) *et al.,* (2005) foundthatmethicillin-resistant *Staphylococcal* hospital isolates was 57.1% resistance to tetracycline. On the other hand, multidrug-resistance in *Salmonella typhimurium* isolated from swine shown 90% resistance to tetracycline (Perron, 2008**)**. Li *et al.,* (2009) found 90.5% resistance of downstream water and upstream water isolates to tetracycline. Both findings were agreed with our present research. E. coli isolates from water sample of Cypress channel found 74.4% resistant to tetracycline (Ibekwe, *et al.* 2011).This finding was lower than the resistance level of our isolates of *E. coli*.

Generally, amoxicillin is used to treat many different types of infections caused by bacteria, such as ear infections, bladder infections, pneumonia, gonorrhea, and *E. coli* or *salmonella* infection (Howard *et al.,* 1980). Amoxicillin resistance was very common among the isolates from all study areas. [Arvanitidou](http://www.sciencedirect.com/science/article/pii/S0043135496003405) *et al.* (1997)was isolated 79 Salmonella strains from river and lake waters from northern Greece which were susceptible to amoxicillin. On the other hand, research showed that resistance develops 45% to amoxicillin-clavulanic acid and ampicillin for *Salmonella*(Molla *et al.*, 2003)andfound 21.5% resistance for *E. coli*(Danishta *et al.*, 2010)*.* These findings showed less development of resistance than our present findings. Resistance pattern for the isolates of E. coli from poultry farm fecal waste was 90% resistance to amoxicillin (Shrestha, 2013) which was similar to our findings. A study reported that, *Staphylococcus* resistance to Oxacillin, Penicillin and Ampicillin was 100% and Cephalothin was 92.4% (Bukhari *et al*., 2011)those were agreed to present findings.

Like all aminoglycosides, when gentamicin is given orally, it is not systemically active. This is because it is not absorbed to any appreciable extent from the [small intestine](http://en.wikipedia.org/wiki/Small_intestine). It is administered [intravenously](http://en.wikipedia.org/wiki/Intravenous_therapy), [intramuscularly](http://en.wikipedia.org/wiki/Intramuscular_injection) or [topically](http://en.wikipedia.org/wiki/Topical) to treat infections. It appears to be completely eliminated unchanged in the urine that may contribute in development of resistance in environment (Moulds and Jeyasingham, 2010). In our study resistance to gentamicin was mainly found against *E. coli* but *Salmonella* and *Staphylococcus* were not exhibited such resistance as *E. coli*. Similarly, both resistance and susceptibility was found in *E. coli* strains against gentamicinin a research finding(Akond *et al.,* 2009).

Kanamycin resistance was not acute in our present research finding. Effectiveness was still shown against hospital isolates *Staphylococcus* but minor sensitivity was shown against slaughter house isolates. Our results support the findings of the prevalence of kanamycin resistance bacteria in drinking water from a residential area and closed to the values of resistance for isolates from college drinking water but differ from the values obtained from hospital drinking water(Samra *et al.,* 2009). The variation might be due to differ in hygienic condition varies from study area.

In veterinary practice, fluoroquinolones was also very extensively used for both therapeutic and non-therapeutic purposes. The widespread use of fluoroquinolones has contributed to the rapid emergence of resistance worldwide (Nalule, 2011). In our study the level of resistance is higher in medical hospital rather than veterinary hospitals isolates. This is might be due to relatively newer introduction of ciprofloxacin and recent introduction of perfloxacin in animal health division of Bangladesh. Fluoroquinolone resistance has increased significantly over the past decade in the United States, exceeding 25% resistance in outpatient E. coli samples in some areas (CDDEP, 2009). The resistance rate to either ciprofloxacin or to levofloxacin increased from 2.8% (1998-2003) to 11.8% (2004-2007) in clinical isolates in Taiwan and about 25% of healthy individuals living in Barcelona (Nalule, 2011*)*. In another study, the fluoroquinolone susceptibility of 499 Salmonella enterica isolates collected(Lindgren *et al.*, 2009) from travelers returning to Finland during 2003-2007. Among isolates from travelers to Thailand and Malaysia, he found reduced fluoroquinolone susceptibility decreased from 65% to 22%.

The prevalence of multidrug resistance among Gram-negative bacteria is rising at an alarming rate, rendering many antimicrobial agents ineffective. Recently, there has been much rekindled interest in using the polymyxin E (colistin) and polymyxin B for the treatment of multidrug resistance Gram-negative infections. Kwa *et al.,* (2005)conducted a study bytwenty-one patients with multidrug-resistant Acinetobacter baumannii and Pseudomonas aeruginosa pneumonia were treated with nebulized colistin. Overall clinical and microbiological response rates were 57.1% and 85.7%, respectively. Nebulized colistin may be reasonably efficacious and safe for treatment of MDR pneumonia. In our study Gram negative isolates of *E. coli* and *Salmonella* agreed with the result but Gram-positive *Staphylococcus* do not agreed this findings and shown high degree of resistance in all isolates.

The Enterobacteriaceae family has been linked to well-known antibiotic-resistant gene pools. These genes are transferred into the normal flora of humans and animals, where they exert a strong selective pressure for the emergence and spread of resistance in both pathogenic and commensal bacteria. Eventually they find their way into the environment via wastewater, manure and sewage sludge. Based on the antibiotic-resistance patterns, (Kinge *et al.,* 2010) observed that all isolates tested were resistant to tetracycline (5%-95%), ampicillin (10%-80%), chloramphenicol (5%-80%) and erythromycin (50%-100%). The multiple antibiotic resistances of *E*. *coli* demonstrated in this study accord with those found in our study. In recent years, testing of *Salmonella* isolates from different environments has shown an increasing proportion of multidrug resistant *Salmonella spp.* (Cheng *et al.,* 2004), information about antimicrobial resistance among *Salmonella* strains isolated from environmental sources and food showed a differentiated incidence rate of resistant strains among isolates obtained from developed and developing countries (FAO, 2010). Antimicrobial resistance was detected in 9% of the total of strains isolated from environmental sources and shellfish over different studies in Spain (Martinez- Urtaza *et al.,* 2004; Martinez-Urtaza and Liebana, 2005), conversely, the presence of antimicrobial resistant strains among strains isolated from the marine environment in Morocco reached 49.1% of the strains (Setti *et al.,* 2009), whereas in Mexico, 50.4% of the strains recovered from water samples showed resistance to antimicrobials (FAO, 2010). A study carried out in India, showed 82% of the strains isolated from seafood products presented antimicrobial resistance (Rakesh *et al.,* 2009), whereas in Vietnam, antimicrobial resistance was observed in 11.1% of strains (Van *et al.,* 2007). In our study *Salmonella* showed no resistance against colistin and neomycin but surprisingly shown multidrug resistance against other tested antibiotics, similar to the findings of Molla *et al.,* (2003).

*Staphylococcus aureus* is recognized as a vital cause of nosocomial infections worldwide. The infections caused by multi-resistant strains of *S. aureus* represent an important problem that affects many health institutions. Due to the large number of procedures and to the diverse possibilities of contamination for existent *S. aureus* in these places, it is necessary to review the evolution of antimicrobial resistance and the therapeutic response of these bacterial strains. When analyzing the antimicrobial resistance of the *S. aureu*s samples from the hospitals and slaughter houses, high resistance levels were observed in comparison with data described by (Virdis *et al.,* 2010) that may be due to variation in environment of the study areas.

Multidrug resistance, with rates of resistance to Ampicillin, Chloramphenicol, and Trimethoprim-Sulfamethoxazole of more than 50%, has been reported in many areas of the world. Extended-spectrum Cephalosporins and Fluoroquinolones have been suggested as alternative agents in the treatment of infections caused by multidrug resistant *Salmonella* serotypes (Cheng *et al.,* 2004), these data correspond to results obtained in this study showing that the serotype isolated *S.* *typhimurium* is resistant to ampicillin, chloramphenicol, streptomycin, sulfamethoxazole/trimethoprim and tetracycline. Resistance to antimicrobial agents in bacteria is mediated by several mechanisms including changes in bacterial cell wall permeability, energy dependant removal of antimicrobial agents via membrane-bound efflux pumps, modification of the site of drug action, and destruction or inactivation of antimicrobial agents (Cheng *et al.,* 2004).

Bacteria have evolved different strategies to cope with severe effects caused by antimicrobial

drugs; intrinsically resistant species for example render their cell walls impermeable for antibiotics or express efflux systems facilitating transport of these compounds out of the cell (Schlüter *et al.,* 2007). Moreover, bacteria are able to horizontally acquire resistance via uptake of foreign DNA by means of conjugation, transduction or transformation (Thomas and Nielsen, 2005);In this context, mobile genetic elements such as plasmids, transposable elements or integron-specific gene cassettes play an important role (Toussaint and Merlin, 2002; Frost *et al.,* 2005), these elements mainly encode enzymes for modification or inactivation of antibiotics, efflux systems, or enzymes catalyzing target-site modifications (Schlüter *et al.,* 2007). Release of bacteria carrying resistance plasmids with the final effluents of the WWTP into the environment promotes dissemination and recombination of resistance determinants among environmental bacteria (Schlüter *et al.,* 2007). In our study, the slaughter house isolates *E. coli* shown more resistance than hospital isolates this is might be due to aggregation of clinically infected and carrier animal in slaughter house alone with opening and drainage of carcass after slaughtering and chance to contaminating the environment.

Some efforts have to be made to reduce the possibility of resistant bacteria entering into and spread in the environments, the most effective and direct approach is thought to be the reasonable use of antibiotics in health protection and agriculture production. The discharge of wastewater containing resistant bacteria in the environment poses a real public health problem; hence the importance of the installation and operation of treatment plants to reduce the rate of waterborne diseases have to be taken.