Prudent use of antimicrobials in poultry

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- “Germs are becoming stronger”- one TV advertisement. How is becoming stronger?

  Answer: By developing resistance

- “ The more we use them, the more we loose them”- What are these?

  Answer: Antibiotics

- “ If antibiotic resistance is more than the coming up- what will happen?”

  Answer : Resulting in no antibiotic for treatment

- Daily Protham Alo, 17 Oct. 2015: The efficacy of antibiotics has reduced 30% due to resistance (Referring- Lancet)

- Antibiotics (the major antimicrobials)-natural products of microorganisms or identical synthetic or semi-synthetic products.

- Bacteriocidal or bacteriostatic.

- In veterinary practice, antibiotics are used as therapeutic, prophylactic and growth promoting agents.

- Achievements are jeopardized by rapid emergence and spread of AMR bacteria.

- Scientists are concerned about emergence of “Super bugs” – resistant to standard antibiotics.

So, injudicious use of antibiotics may be threat for human beings.

WHO (2018):

- Non-prescription antibiotics is high in low – and middle income countries.
- Self medication 39%, main sources of antibiotics are pharmacies and drug stores.
- Antibiotics provided by non-qualified personnel exacerbate inappropriate use
  - not completing course
  - taking an insufficient dose
  - taking for wrong indications (viral infection and inflammation)
  - sharing antibiotics
  - motivation by financial incentives.

* Same condition prevails in poultry sector of Bangladesh.

* Quality of drugs is also questionable.

Islam *et al*. (2016):

- All of the broiler farms (73 farms) – at least one antibiotic used.
- Without prescription >60%.
- Multi-drug practice about 70%.
- Existence of residual antibiotics – 26% samples.
- Fluoroquinolones (68.4%) was the commonly used antibiotic.
- Therapeutic purpose – 43.8%
  Prophylaxis – 31.5%
  Both – 47.9%
  Growth promotion – 8.2%

Sarmina *et al.* (2016):

Detected residues of tetracycline, amoxicillin, ciprofloxacin and enrofloxacin in poultry tissues. Liver had the highest level.

Injudicious use leads to

(1) Antibiotic residues in tissues

- hypersensitivity reaction
- toxic aplastic anemia
- liver and kidney damage
- disruption of gut eco-system
- carcinogenicity, genotoxicity and teratology.

(2) Emergence of antibiotic resistance in organisms

- may spread to their progeny
  - same species of organisms
  - different species through plasmid mediated transfer.

* Entrance in food chain in dangerous.

* Antibiotics used in poultry are excreted into the environment and source of pollution.

In poultry sector antibiotics are used in two ways:

(1) As antibiotic growth promotors (AGPs) e.g. Feed Additives

Commonly used : Avilamycin, Flavomycin, Virginiomycin, Zinc bacitracin, Lincomycin, Oxytetracycline, Chlortetracycline, Amoxicillin, Tylosin, Tialin, Colistin etc.

Phase-wise avoidance is advocated.

(2) For therapeutic / prophylactic purposes.

- Diagnosis and selection of drug are important
- Choice of drug
- Route
- Dose
- Frequency
- Duration
- Multi-drug practice should be avoided as far as possible.

What is at practice?

- ❖ Routine use of antibiotics as prophylactic measures.
- ❖ Medication by
  - own decision
  - suggested by neighbor
  - medicine seller/quack
  - vets.

✓ Changing antibiotics at all stages (even same drug of different companies).

✓ Don’t complete course.

✓ Sub-therapeutic or over therapeutic dose.

✓ Multi-drug use.

✓ Change of prescription.

✓ Use of antagonist drugs even.

✓ Use of drugs of low standard.

✓ Use of unnecessary drugs etc.

WHO's classification of antibiotics :

Classification/ Group	Characters	Example
1. KEY ACCESS	• Choice for common infection. • Widely available, affordable price, appropriate formulations and assured quality. • Narrow spectrum with low AMR risk	Penicillin, cloxacillin, amoxicillin, ampicillin, cefazolin, cephalexin, cephradine, amikacin, gentamycin, neomycin, streptomycin, lincosamides, lincomycin, doxycycline, tetracycline, oxytetracycline, chloramphenicol, metronidazole, furazolidone, cefixime, ceftriaxone etc.
2. WATCH	• Have significant resistance potential. • Recommended for limited treatments. • Includes highest priority agents on the list of *critically important antimicrobials* for human medicine	Fluoroquinolones, ciprofloxacin, levofloxacin, moxifloxacin, enrofloxacin, marbofloxacin, orbifloxacin, azithromycin, erythromycin, tylosin, vancomycin, faropenem etc.
3. RESERVE	• Consider as the last resort options (MDR infections). • Have high resistance potential • Protected by national and international program • Not to be used in livestock	Cefepime, ceftaroline, colistin, polymyxin B, linezolid, aztreonam, daptomycin, tigecycline

Main Messages:

1. Use as narrow spectrum as possible against the pathogen causing infection.

2. Avoid using WATCH antibiotics as much as possible.

3. Don’t use RESERVE antibiotics .

What is the prudent use of antimicrobials?

WHO defined “usage of antimicrobials which **maximizes therapeutic** effect and **minimizes the development of antimicrobials resistance**.”

Key issues for prudent use of antibiotics are:

(i) using when are useful (ii) knowing when to stop using them (iii) knowing about P^K and P^D characteristics (iv) respecting the withdrawal period (v) knowing about their residues (vi) knowing that antibiotics are only part of the treatment of sick animals (Stephen, 2011)

Asian guide line :

1) Uses in food – producing animals should be limited to those uses that are considered necessary for assuring animal health and welfare.
2) Limited to those uses that include vet. oversight and consultation.
3) Use only those that meet the criteria of safety, quality and efficacy according to the approved and intended uses.
4) Use “as little as possible as much as necessary.”
5) All relevant stakeholders be involved.
6) Part of good veterinary and animal husbandry practices – disease prevention practice.
7) Surveillance, monitoring and the collection of reliable data provide evidence of guide policies.

By changing our attitude, with firm determination, acquiring perfect knowledge and doing good practice we can overcome the problem of injudicious use of antimicrobials.

Let us ask ourselves “if the organisms can change their genetic characters for survival, can’t we change our attitude for betterment of ourselves and the future generation?”

Thank you