RELEVANCE OF VETERINARY EPIDEMIOLOGY TO GENERAL VETERINARY PRACTICE

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Veterinary practice is the professional service delivery to animal husbandry by registered veterinary practitioners through any one or all branches of Veterinary science (and by whatever name called). Unguided and unsupervised veterinary medical attendance by para-veterinary personnel is banned by law, because it involves empirical drug delivery ignoring diagnosis, leading to misuse or abuse of drugs, delays in treatment and generates resistant strains of microbes. It can be dangerous, if continued, as it disables the identification and recording of the occurrence or possible increase of diseases, deficiency or crisis. Lack of information on disease, deficiency or crisis could perpetuate a wrong message of wellness and deprive the state the opportunity for preparedness. This is not in public interest. Analysis of the occurrence or increase of diseases, deficiency or crisis is done through epidemiology.

History

Epidemiology started with the empirical observations of epidemics and other causes of death. John Graunt (1620–1674), in London, compiled the first mortality tables on England's bills of mortality and Ignaz Semmelweiss (1818–1865) in Vienna on puerperal deaths. Alexandre Louis (1787–1872) in Paris demonstrated the power of numbers. Meticulous, logical examination of the facts and figures about cholera epidemics by John Snow (1813–1858), regarded as the founder of modern epidemiology revealed the mode of communication of this deadly disease. Until early twentieth century almost all epidemiology focused on communicable diseases.

Descriptive epidemiology provides information about the occurrence of disease and trends in the frequency of disease over time. Analytic epidemiologic studies seek to identify specific factors that increase or decrease the risk of disease and quantity such risks. Terms "incidence" and "prevalence" are often confused. Incidence is the number of new cases, events, or deaths, in a specified time and prevalence the total number of events or cases, both new and in long-term. Prevalence is expressed as a number, not rate, as there is no time dimension involved. Today the information used by epidemiologists comes from a diverse array of sources, sciences and technologies; it calls on the expertise of technologists and people engaged in many kinds of crafts

Epidemiology can help scientific planning of development as it provides the precise information regarding the type, nature and quantum of problem, socio-economic status of the owner her/ his need and relationship with animal(s). The holistic epidemiology is also useful to monitor plan implementation, its impact assessment and evaluation.

For example, when Dr. Beaver, observed that behavior problems alone lead to the deaths of 13 million dogs and cats annually in US, it was also analysed that it is 10%t of cat and dog population and the problems is more than all infectious diseases in small animals. When it was observed that," Dogs bite four million people each year in the United States, it indicated that research is needed into behavior.

Sustainable animal husbandry has perhaps more opportunity and less threat In India in the days to come. If management skills are updated with data on behaviour issues while teaching Live-stock Production and Management (LPM) in BVSc &AH Degree program (which trains vets. as generalists ie. GP's), it may enable professionals to grab the new opportunities and steer clear of the threats on sustainability.

Perhaps there is poor perception of the requirements for animal husbandry and the immense potential and possibilities of veterinary service at the helm of affairs. Information on primary requirements of animal husbandry in various micro-regions may make development plans to be non-performing. Demands for fund allocation, hi-tech farms or import of exotic breeds can be assessed scientifically for sustainability. Suggestions like "door step delivery of vety. service", "bare foot doctor" and such other 'run away' ideas arise out of lack of differentiation of diagnosis and treatment from mere drug delivery. To elicit the political will on sustainable development in Animal husbandry we have to support our administrators and public men with scientifically correct "information for action" ie. macro-epidemiological data.

Primary data (ie. observation from field level) is very important in epidemiology. These include nature, spread, the number of animals affected, local diagnosis (history, examination & clinical tests), special examinations/ tests, treatment given so far etc. Constraints exist in effectively gathering and using animal related data. These may be on Availability, Timeliness, Validity (accuracy and precision), Completeness and 'Reprsentativeness'.

Modern epidemiology provides information for action, on disease, deficiencies, crisis or any related and is useful for determining the theory of causality (problems are rarely caused by one single factor). The precipitation of disease or a health/ production related crisis is the result of the break down of harmony among host, environment and pathogen (means any offending phenomena).

Disease data and information management

The rationale for control and treatment of disease depends on the quantum of information accumulated and the ability to access that information as rapidly as possible. Blood (1982), lamented the lack of information on animal diseases, especially the assessment of response to treatment, control and the predictions on outcome of the disease and treatment. The concern of the stake holders or the state to earn a significant return on investment made on management, disease control, treatment & risk aversion adds new dimensions to the disease related data.

Data, in the context of disease/ crisis, takes the form of numbers, characters, texts, graphs, events and symbols and more elaborate structures such as sequences, lists and anything expressed at the semantic level.

Information is derived from the data and reflected in the mind of the person receiving it and is an abstract entity yielded from processing data. Now there are new tools and techniques of advanced informatics for handling of volumes of data. Some among them are:-

1. The availability of computers with "large" processing capabilities, low cost and auxiliary data storage devices (Hardware).

2. The development of sophisticated generic computer program (software) that can be adapted with relative ease to collect, process and retrieve data.

Modern science conceives Epidemiology as macro-epidemiology where the reasons (causality) of disease are considered in the backdrop of the socio-economic status of farmer, the local resources available for the animals, need of the owner etc. But in India some constraints exist in epidemiology:-

(a) There are very few trained persons who can handle epidemiology cum medical epidemiology, practically.

(b) Even though our information technology has developed fast, linking nearly 600 districts of the country with National Informatics Center (NIC) and is fortified by Geographical Information System (GIS), information from the grass root level to the district can make inferences accurate. For example,-

(i) India has draught breeds, Milch breeds, dual purpose animals. The average milk yield of cattle in India, is calculated by dividing the total milk production by the number of female animals of all breeds. But the west does not include the number of beef cattle when milk yield is calculated.

(ii) Our per capita consumption of milk or egg would be more accurate if the milk or egg brought in from the neighboring States (and consumed) or

sent out from the State (and not consumed) is considered.

(iii) The increase in the number of animals (popuiation) need not indicate animais born in a state. The number of animal brought from neighboring states need be identified to assess real live-stock development and disease profile. Similarly poultry census can miss the number of broilers churned out and consumed in the course of one year.

(v) When we report on the occurrence of a disease or the number of animals died, the base population of the area and the occurrence of disease in animal(s) that came from other states need be identified. Duplication of record is possible when more than one agency (like CADRAD, ADMAS or state epidemiologist) report the same occurrence.

(vi) The carrying capacity of land is based on the soil type, feed available, its cost of production and the quantum that are procured from out side the state. Similarly the common property resources (CPR) or the crop residues (CR) available or generated in an area vis-a-vis the number and species of animals need be considered.

(vii) Vaccinations would be more effective (and cheaper) if the type and strain of pathogen is identified and disease forecasted.

Some relevant facts and figures

Macro epidemiological studies are essential for a holistic animal disease regulation. Instead of mathematical data on occurrence It is imperative that data like the total number of animal in the area, the economic status of the animal owner, their family income through animal, family size, man power available to look after the animal, feeding system, the animal marketing system, breeding system, the need and availability of cold chains, the diagnostic facilities available and attitude of the farmer towards animal health management are considered. An owner with commercial interest may sell his sick or old animal rather than spent on expensive treatment. A sentimental owner may treat her or his animal at any cost till it gets cured or dies.

The cost of vaccination must be lesser than the loss caused by a disease. Man has to be given a reason to look after his animals; for this she/ h must have access to timely information (and action)

90% live-stock of India is distributed in 15 o its 36 states/ UT's. India has a limited pasturelan of 11.3 Million (M) hectare (against 239.0 M i U.S.A., 400.0 M in China, 81.3 M in South Africa o 18.6 M in Brazil,). It will be interesting to study hov India with its largest live-stock population and minima pasture, manages to remain the largest milk produce in the world (>90 million tons per year).

India raises its stock mostly in small holding along with habitat and feed them mainly on cro residues (CR) and common property resource (CPR). The west has organised grain based syste that is linked with product harvesting, processin and marketing as a chain called animal productio system or animal agriculture. This system usin (coarse) grain as a major input, if adopted in Indi extensively, may end-up in our animals competin with man for food and may tilt our food balance. A the same, grains and food residues unfit for huma consumption can find use for animals.

Indian consumers prefer milk with high fa content as against the low fat, high SNF mil preferred in the west. In India the dairy animals ar usually retained till 12-15 lactations (against for 2 o 3 in the west).

In India male animals are used as draug animals. Draught Animal Power (DAP) thoug reduced considerably following green revolutio (where hi-tech mechanized agriculture production i adopted) is still a main source of energy for transpo and agriculture. There are about 100 million workin animals including draught animals (DA's), pac animals, shepherding & security animals in Indi For agriculture in small holdings, hills and fo transportation of goods in many small township semi-urban and rural areas, DAP is still the readi available source within the economic means farmers. DA's provide livelihood to nearly 44-50 households especially in rural India.

The pressures of selection imposed b climate, soil type, altitude, available food supp endemic diseases & parasites, manageme techniques and market demands have resulted

hundreds of breeds, types of strains in India , each with their own genetic make-up, and each adapted to its own specific niche.

There is a gap of information on the impact of development on the animal rearing pattern of India especially during the post-independence era. Even if data is available from some parts of the country, it is not closely studied or discussed from sustainability and productivity point of view. Agro-climatic and geophysical conditions being diverse in India information vary widely from region to region (even locality to locality or family to family). Even within the regions there are various socio-economic groups (India has 81 regions). The data will have to be analysed on the needs and the behaviour of each socio-economic sub-groups within the community and the animals of the region.

Nutritional diseases and deficiencies can be and need be identified along with the available feed resources, endemic soil deficiencies, agri-practices, soil fatigue and reflected on general performance, production and the reproductive efficiency of live-stock and other animals there. This holistic data can form part of a Regional Animal Production and Health Information System (RAPHIS), form a component of State information system (SAPHIS) or compiled into National System (NAPHIS)

Newer technologies and skills.

Possibilities are immense for use of management, marketing, diagnostics, therapy & 'in health care' in veterinary service of India. Globally newer technologies have made a dent in reproduction technology, management technology, animal product technology and diagnostic technology. With the innovation of electronics, digital technology, operating cost is reduced considerably in information Communication Technology (ICT). Each subject matter specialist in the veterinary science will have to visualize the scope and opportunities to optimally exploit the newer technologies to make veterinary service more effective and dynamic. Diagnostics now upgraded to offer a battery of autonomic function tests, have scope to assess all body systems. If one makes use of the data and converted it into information, it would be a path breaker. Scientific inroads made in the past in medical labs. using animals as primary models need not remain limited to human use. One has to reapply the same on animals; priming normal values is the major task while adopting hi-tech instruments.

Research and training to be dovetailed to service

The priorities of professional service could not implement it in India since animal resource sector has no independent existence. Though an independent department of animal husbandry had been long established at national level, the R & D is still not dovetailed to it. Therefore, the scientific priorities of the profession are not identified. Through the interaction among person from service, research and training, a research support system can be developed to study the positive aspects of conventional systems of animal management, conservation of animal genetic resources, diagnostic tools etc. By synergizing the data with modern management tools, digital data, etc. the benefits of technology one could transfer the benefits to small holder in a holistic manner.

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