

## **RESEARCH IN BIOLOGICAL PSYCHIATRY IN INDIA**

**V.PALANIAPPUN**

I consider it a proud privilege and pleasure to address you as the incoming president of Indian Psychiatric Society. It is indeed an honour bestowed upon me to be the president of IPS. My first words to you are an expression of thanks for having elected me to this revered position. I am honoured by your trust and deem it a privilege to serve the society. I look forward with enthusiasm to the coming year and solicit your co-operation in the discharge of my responsibilities. Most of my honourable predecessors have delivered their presidential address on a specific theme, and I will not break the tradition.

The theme of my address is "AN OVERVIEW OF RESEARCH IN BIOLOGICAL PSYCHIATRY IN INDIA".

When historians of science turned their attention to the emergence of molecular medicine in the latter part of the twentieth century, they will undoubtedly note the peculiar position occupied throughout this period by psychiatry. In the years following World War II, medicine was transformed from a practising art into a scientific discipline based on molecular biology. During the same period psychiatry was transformed from a medical discipline into a practising therapeutic art. In the 1950s academic psychiatry transiently abandoned its roots in biology and experimental medicine and evolved into a psychoanalytically based and socially oriented discipline that was surprisingly unconcerned with the brain as an organ of mental activity.

This shift in emphasis had several causes.

In the period after World War II, academic psychiatry began to assimilate the insights of psychoanalysis. These insights provided a new window on the richness of human mental processes and created an awareness that large parts of mental life, including some sources of psychopathology, are unconscious and not readily accessible to conscious introspection. Initially, these insights were applied primarily to what were then called neurotic illnesses and to some disorders of character. It next expanded to include specific medical illnesses such as hypertension, asthma, gastric ulcers, and ulcerative colitis-diseases that did not readily respond to the pharmacological treatments available in the late 1940s. By merging the descriptive psychiatry of the period before World War II with psychoanalysis, psychiatry gained a great deal in explanatory power and clinical insight. Unfortunately, this was achieved at the cost of weakening its ties with experimental medicine and with the rest of biology.

The drift away from biology was not due simply to changes in psychiatry; it was in part due to the slow maturation of the brain sciences. The thinking about the relationship between brain and behaviour was dominated by a view that different mental functions could not be localized to specific brain regions. Researchers argued that the cerebral cortex was equipotential- all higher mental functions were presumed to be represented diffusely throughout the cortex. The most psychiatrists and even to many biologists, the

notion of the equipotentiality of the cerebral cortex made behaviour seem intractable to empirical biological analysis.

In fact, the separation of psychiatry from biology had its origins even earlier. When Sigmund Freud first explored the implications of unconscious mental processes for behaviour, he tried to adopt a neural model of behaviour in an attempt to develop a scientific psychology. Because of the immaturity of brain science at the time, he abandoned this biological model for a purely mentalistic one based on verbal reports of subjective experiences.

**To quote Freud:**

"We must recollect that all of our provisional ideas in psychology will presumably one day be based on organic substrate"

The decade of the 1960s marked a turning point in the world of psychiatry. With the serendipitous discovery of the psychopharmacological drugs new and effective methods of treatment were available. In the mid-1970s the therapeutic scene had changed so dramatically (from psychoanalysis to psychopharmacology) that psychiatry was forced to confront neural science, if only to understand how specific pharmacological treatments were working. There were three components to this progress.

First, whereas psychiatry once had the least effective therapeutic armamentarium in medicine, it now had effective treatments for the majority of the mental illness, with practical cure for most devastating diseases: depression and manic-depressive illness. Second, clinically validated and objective criteria were established for diagnosing mental illness. Third, A renewed interest in the functional imaging and molecular biology of mental illness and specifically in the genetics of schizophrenia and depression started. Thus psychiatry presents with a new and unique opportunity now. When it comes to studying mental functions biologists are badly in need of guidance. It is here that psychiatry, as a guide & tutor, can make particular contribution to brain sciences.

**Research in biological psychiatry- The Indian Scene:** In tune with the above view, the past two decades showed major breakthrough in biological psychiatry in the international arena. The Indian researchers have also responded to this challenge and made major strides in this field.

At this juncture it is prudent enough to look back at what we have contributed towards research in biological psychiatry and what the future holds for us.

**Research Facilities:** Despite the fact that biological psychiatry seems to offer most scope for further enhancement of the knowledge, not very many centers have taken up the challenge earnestly. Biological psychiatry research in India have started from a humble beginning not so long ago and has made a slow and steady climb uphill to catch up with the western counterparts, thanks to handful of researchers and a couple of organizations. Various agencies like ICMR, DST, CSIR, CST, WHO, UNDP, UNICEF have done laudable work in this field.

The bulk of the work has been done by NIMHANS, Bangalore, AIIMS New Delhi, PGIMER Chandigarh, CIP Ranchi, Christian Medical College, Vellore, Institute of Mental Health, Madras, Institute of Psychiatry, Madurai, WHO centre for Research and Training in Biological Psychiatry and Psychopharmacology Department of Psychiatry, KG's Medical College, Lucknow, Centre of Psychopharmacology, KEM Medical College, Bombay and some other institutes. At this juncture it is very important to note the contributions made by the non-governmental organisations like SCARF in psychiatric research.

**Research Activities:** Biological Psychiatry in India dates back to Ayurvedic times when medications like dhatu and root of "Serpentina" plant mixed with ghee was given to psychiatric patients. The first report of successful treatment of psychoses came from India using rauwolfia serpentine extract (Reserpine) by Ganesh Sen and Karthik Bose in 1931. Unfortunately this report was ignored till 1958 when Nathan Kline confirmed this finding. The year 1952 saw a sea of change in the world of psychiatry with the introduction of

## RESEARCH IN BIOLOGICAL PSYCHIATRY IN INDIA

Chlorpromazine which revolutionized the psychopharmacological management of patients in mental hospitals.

The year 1955 can be construed as the watershed of research in biological psychiatry in India. When systematic probes into mental disorders was inchoated. (Sethi and Tiwari, 1986). But as we scan through the literature, it is very much obvious that much of the biological psychiatry in India has centered on psychopharmacological agents and the somatic modalities of treatment. The literature does not identify the difference between biological psychiatry and psychopharmacology which cannot be taken in a lighter vein.

The field of biological psychiatry when viewed closely has certain disciplines incorporated in it, which could be summarily categorized as neurochemistry & receptor studies, psychoneuroendocrinology, psychopharmacology, genetics, neurophysiology, immunology and imaging. The role of neurotransmitters and their metabolites, the mechanism of action of psychotropic drugs, toxicity studies, enzymes, neurotransmitters and behaviour abnormalities of psychoactive compounds, their structure-activity relationship and pharmacology, pharmacodynamic and pharmacokinetic studies of known drugs, and characterization and localization of neuronal and receptor systems form the bulk.

Now I will be giving the birds eye view of various research activities done in these disciplines.

**Neurochemistry & Receptor Studies:** Earlier researchers like Prof. Nandi & Ramarao looked into the liver functions of persons with Schizophrenia (Prof. D.N. Nandi, IJMR, July, 1952). Later the focus was shifted to study of biogenic amines in Schizophrenia, Depression, Obsessive compulsive disorder & substance abuse. The work related with serotonin metabolites and suicide have been effectively reviewed by Trivedi (1992), and original reports published by various authors (Palaniappan et al., 1983; Varma et al., 1987; Gulam et al., 1985).

Platelet MAO activity had been looked into by various researchers in disorders like

schizophrenia. Of late interest has been focused on areas like lipid profile in substance abuse, depression etc. Neuroreceptor studies like serotonin had been undertaken in OCD, and Depression. Second messenger system has also been studied in Depression. OCD and Schizophrenia (Sumant Khanna).

**Psychoneuroendocrinology:** The psychoneuroendocrinology has shown to have received special attention from southern parts of India with the majority of work being reported from that part. The investigators chose a wide tenor of subjects ranging from pineal response (Parvathi Devi, 1973; Hariharasubramaniam et al., 1976; Singh et al., 1980), adrenocortical hormones (Parvathi Devi, 1982), dopamine (Chatterjee, 1988), thyroid hormones (Boral et al., 1980a, 1980b) and urinary melatonin and steroids (Ghosh et al., 1981; Venkoba Rao et al., 1983).

Psychoneuroendocrinology has been the focus of research in many years. Researchers have tried to correlate the disturbances in the HPA axis with that of depression & OCD. Agarwal et al broke new ground by studying the Dexamethasone Suppression Test in post stroke depressive patients. Other hormones like growth hormone and prolactin have been studied by various authors.

**Immunology:** In 1970 antibodies against brain of schizophrenic were studied by Pandey et al which opened up the field of study of immunoglobulins. Serum immunoglobulin level have been studied in schizophrenia & Depression. The levels of immunoglobulins were assayed in schizophrenic patients and correlated with various factors but the statistical evaluation did not reveal any characteristic alterations in any of the immunoglobulins in patients as compared to controls.

Studies by Sumant Khanna showed an increase in humoral response in OCD, as measured by immunoglobulins suggesting the possibility of viral infection. Viral antibodies have been studied in depression & OCD. A study of the nature and impact of treatment on lymphocyte sub-population of the schizophrenics and depressives had also been done by Agarwal et al.

**Psychopharmacology:** Although the journals are resplendent with studies on psychopharmacology, a closer look would dispel the erroneous conclusion of a rich research, as the papers are mostly concerned with drug trials. So much so that it earned an editorial in a journal entitled "Epidemic of drug trials".

The studies have ranged from comparison studies of two drugs (Shah et al., 1991; Murthy et al., 1991; Satya et al., 1988; Vyas et al., 1989), evaluation of the therapeutic efficiency of the medication in different dosage (Singh, 1980; Sharma and Hegde, 1980; Sharma, 1981), comparison of pharmacological agents along with its use in conjunction with another drug or treatment modality (Janakiramaiah and Subbakrishna, 1981; Sethi and Bhiman, 1983), to the use of newer agents (Boral et al., 1989; Sharma, 1988; Khanna et al., 1988; Sethi, 1983; Prasad, 1983) and the study of pharmacokinetics (Bhatt et al., 1991; Pradhan et al., 1992; Khare, 1992; Pandey et al., 1981; Khandelwal, 1991).

**Lithiumology:** The large attention given by the Indian workers can be adjudged by the new term coined in English vocabulary "lithiumology". (Venkoba Rao, 1977). Its efficiency and side effects, serum levels, effects on kidney and its relationship with other ions have all received equal importance. Drug level and therapeutic response has also been studied. The rate of efflux of lithium from red blood cells was studied to assess its utility in predicting the response to lithium therapy in maniacs & salivary lithium determination for monitoring serum level were also undertaken.

**Genetics:** In this era of novel genetic engineering tools, genetic research had come a long way from the days of dermatoglyphics to the modern era of restriction fragment length polymorphism (RFLP). The fact is indisputable that a large number of reports pertaining to genetic research have been published during the last two decades, but a scrutinizing review reveals that majority are mere case reports which have seriously outnumbered well-planned prospective studies.

Family studies in schizophrenia were done by Ponnudurai wherein more than 100 families of

schizophrenic patients were studied by drawing pedigree charts. The clinical genetic studies done in families of OCD patients by Sumant Khanna revealed excess of familial cases in families of childhood but not adult probands. Genetic studies were also done in alcoholism by Sanjeev Jain. Nucleotide polymorphism was also studied in schizophrenia (Arunadhathi Saraph) and in alcohol dependence patients (Shaik).

**Electroconvulsive Therapy:** The Indian journal provides a surfeit of article on the subject with the bulk of them originating from NIMHANS, Bangalore. The workers have addressed almost all aspects of ECT including clinical effects in various disorders to the effects of ECT on brain receptors. There is considerable work related with dopaminergic system (Gangadhar, 1990, 1989, 1987). Andrade and Pradhan have also touched on the topic of alpha-2 adrenergic effects of ECT. The physical aspects of electroshock therapy have also received due attention like the unilateral and bilateral dichotomy, sinusoidal wave and brief pulse therapy and impedance measurements (Andrade, 1987, 1988; Gangadhar, 1985). The therapeutic efficacy to this form of therapy has been evaluated in trials against drugs (Gangadhar, 1982; Janakiramaiah et al., 1982). P 300 Event Related Potential in Patients receiving ECT was studied and its effect on cognition was also studied.

**Imaging Studies:** In spite of numerous constraints, few researchers have ventured into the promising field of neuroimaging. Although many of them were exact replication of studies done in the west, few researchers were able to come out with original contributions. To quote a few : Original articles like structural brain differences between never treated schizophrenics and controls was studied by padmavathi et al from SCARE. The study correlating the corpus callosum volume and soft neurological signs were also studied (Venkatasubramanian et al). Neuropsychological correlation of MRI prefrontal volume in schizophrenics was attempted (Raju).

**Research Constraints:** The despondent picture tainted so far of the scope of biological psychiatry is not without genuine reasons which can be

## RESEARCH IN BIOLOGICAL PSYCHIATRY IN INDIA

broadly labelled into two categories, viz, paucity of the resources, and the high levels of expectations to keep pace with the advanced nations. In a country like India where the health is no numero uno on the priority list for allocation of funds, the budget for mental health is at still lower ebb. Although it is necessarily true that lower funds do generate a deprivation of Research facilities and equipment, but in last decade or so there has been an increasing number of trained psychiatrists and a for greater number of students are getting exposed at the postgraduate levels. This increase in number of trained psychiatrists which appears on the first glance is fallacious for they have little or no training at all in the discipline of biological psychiatry. The PG students have little time to spare from the burden of the clinical work, and the thesis is the only period when formal guidance is given to them. This initial lack of orientation to biological psychiatry is responsible for the paucity of interest of postgraduates further in their career to direct research into the field. Superadded on this basic problem is the ever present shortage mendacity of supporting personnel like biochemists, biophysicologists, neuroanatomists and clinical pharmacologists.

Opportunities for training and supervision in research are very limited (Okasha & Karam, 1988; Sartorius, 1998). It is estimated that only 5% of global health research funds are devoted to problems in developing countries like India, even though these account for over 90% of the " world's potential life years lost" (Mari et al., 1997). This imbalance is likely to be even greater for mental health research, given its low priority in India.

### **Conclusion/ Future Directions:**

Freud, at the turn of century, remarked: "The deficiencies in our description would probably vanish if we were already in a position to replace the psychological or chemical ones..... We may expect (physiology & chemistry) to give the most surprising information and we cannot guess what answers it will return in a few dozen years of questions we have put to it, they may be of a kind that will blow away the whole of our artificial structure of hypothesis."

Psychiatry as a biomedical discipline had its roots in Europe and is a relatively young discipline in most countries. Its history in many countries is tainted by its association with colonial-era asylums and terrible abuse of human rights. So it is high time we take the right path in this 21st century so as to treat our patients biopsychosocially and there by more humanly. In pursuit of the above goal I would like to put the following suggestions: First, and perhaps the most important step, is the need to raise skills and capacity for research. This could be achieved in a number of ways, including establishing research-oriented training programmes linked with ongoing project collaborations, facilitating research training in the form of short courses and distance education, and providing a resource for advising on research design, methodology and analysis. Multilateral agencies such as the WHO and international research institutions can play an especially influential role in this process. In this regard, it is worth noting that there is considerable variation in research capacity within different institutions and organizations (Sartorius, 1998). Established research institutions like NIMHANS should be encouraged to play a leading role in raising capacity for mental health research skills. Second, a scientist needs money to work with and this fact is especially uncompromisable when specialized area as human brain is under investigation directly or indirectly. It should be emphasized to the western countries that about 80% of the world population live in developing countries where only less than 20% of the studies are conducted. So it is very important for us to get funding from the federal agencies and do research here whereas we can provide them with the data needed.

**"What the future holds for us":** Looking back, the past five decades have been immensely fruitful, but the main battle lies ahead. The challenge will be to give Indian psychiatry a distinctive face of its own, while keeping pace with the latest research from the west, so that, in the future, Indian psychiatry will have become a force to reckon with and impossible to ignore. The biological psychiatry in India is not only a canvas

## V.PALANIAPPUN

with black and grey blotches. A glance on the past works would reveal the long and tedious but a slow and steady climb from the humble beginning biological researchers have made, keeping in mind the red tapism and convolutions existing in the country. A time therefore has come to embark upon yet unexplored areas to identify specific biological markers for Indian patients not forgetting the sociocultural and psychological factors in the process.

In the words of Laurence Miller:

*" By the deficits we may know the talents; By the exceptions, we may discern the rules; By studying pathology, we may construct model of health; And most important- from this model may evolve; The insights and tools to affect our own*

*lives; mold our own destiny; change ourselves and our society in ways that; as yet, we can only imagine".*

### REFERENCES

**CD-ROM(1983-2001)** *Indian Journal of Psychiatry.*

**J.K.Trivedi (Ancips,1994)** *Research on Biological Psychiatry in India, published in the Souvenir.*

**Wig N.N. & Akhtar (1974)** Twenty five years of psychiatric research in india.*Indian Journal of Psychiatry, 16, p-48-64.*

---

V. PALANIAPPUN, M.D.,D.P.M.,M.N.A.M.S.,Ph.D.F.A.P.A.(USA), Director I/C, Institute of Mental Health, Chennai-10, Professor of Psychiatry, Madras Medical College.