Role of Biochemistry in Health Care; Progression from past to present

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'**Biochemistry**' is a relatively young scientific discipline among most of the subject disciplineswe are dealing with today, evidenced by its day by day expansion through new scientific discoveries. Biochemistry can be delineated as a holistic study of life from a chemical perspective and how living organisms arose from lifeless matter, known as biomolecules. In principle, the properties that living beings have, that distinguish them from non-living matter are concerned in Biochemistry. From that preliminary objective, discipline of Biochemistry has branched out to a vast scale, providing many subdivisions, including Animal Biochemistry, Plant Biochemistry and Clinical Biochemistry, hand in hand with other disciplines such as Microbiology, Physiology and Molecular Biology.

Biochemistry related to human health and diseases is known as Clinical Biochemistry. Its practical arm is called clinical chemistry, which mainly deals with the methodology andinterpretation of chemical investigationson body fluids and tissues, leading to assist disease diagnosis and treatments.In early ages of Clinical Biochemistry, main concern was the methodology part rather than interpretation of the test outcomes. However, current trends focus on interpretative aspects and clinical co-relations, emphasizing the professional relationship between clinical chemists who basically performs the tests and practicing clinicians who directly involve in health care management.

Under the era of development of methodologies in clinical Biochemistry, more effort was committed to develop different analytical techniques to measurevarious analytes in alarge number of patient samples, to discover the plausible ways of obtaining biological material and to establish normal ranges (reference values) for each test. More importantly scientists have paid careful attention in quality control of the developed tests. Later on the tests were performed using automated equipment, reducing their laborious nature. As a result of this whole endeavor, tests were developed to measure glucose in blood and urine, non-proteinnitrogen to assess the renal function, amino-acid nitrogen to estimate the nutritional status,plasma and urinary proteins, lipids, enzymes, electrolytes (including calcium,magnesium and phosphorus), and parameters of acid base balance. Moreover, assessinghemoglobin and iron in diagnosis of hematological (blood related) disorders as well as function of the drugs and poisons in the body were actively beingdeveloped.

With thesuccessful progression of the field of clinical chemistry, group of developed test were collectively assigned into '**test profile**'; which represent the function of a specific organ or tissue in the body. Organ and tissue profiles were established mainly for liver, pancreas, bone, muscle,heart and kidney. Most of these profiles are based on the organ specific activity of enzymes. In addition to blood and urine, other body fluids such as cerebrospinal fluid and stools are also used as specimen samples in Clinical Biochemistry. Besides, endocrine (hormonal) function is measured using respective hormones which encompasses assessment of the gonadal function, feto-placentalfunction (during pregnancy), and pregnancy.

Further development of the field was catalyzed through introduction of 'dynamic' functional tests, in which substance such as glucose is first administered to the body and then, its response is monitored in body fluids like blood plasmafor a period of time. To date, with the advancement of technology, such as, radio-immuno assays, florescence based immune assays and enzyme linked immune assays, biochemical investigations related to endocrinologyhas drastically evolved. With the discovery of different bio-markers for prognosis (forecasting on susceptibility) and diagnosis of cancers along with therapeuticdrug monitoring has changed paradigm of the field. However, the measurement of an increasing number of plasma proteins remains within the core of clinical chemistry.

From early ages to-date, gathered and updated knowledge on clinical biochemistry is currently applied inmost of the medical and surgical interventions. The focus was mainly on assessment of water and electrolyte metabolism and hydrogen atom homeostasis (hydrogen balance), leading to diagnosis and treatment of 'novel'

clinical disorders. Diagnosis and monitoring was revolutionized by introduction of glycated hemoglobin (hemoglobin bound with sugar)as a measure of time-causeglycemic (blood glucose level) control and treatment of diabetic coma. One of the critical methodological development in clinical chemistry is 'point of care testing'; in which introduction of a range of portable or small desktop analyzers and dry-reagenttest strips has shown immense contribution on low-volume emergency testing in hospital wards as well as in self-testing by patients.

With the increasing number of patients, almost all the clinical chemistry investigations are now being automated for high volume testing. Therefore issues regarding workflow management and computer system management should be properly maintained with substantial technological support. Under the platform of evidence based practice (clinical practice that relies on scientific evidence for guidance and decision-making) the field of clinical biochemistry represents a predominant position in health care sector, supporting the precisedecision making with respect to the health and diseases, via accurate disease diagnosis, and prognosis, along with monitoring of health status of an individual for a given period of time. In this regard, field of molecular diagnostics (detection and measurement of specific markers of DNA, RNA or proteins, in humans or in the case of infections in microbes) and genetic screening (investigations for systematic early detection or exclusion of a hereditary disease) play a prominent role.

Pediatric clinical biochemistry is one of the latestbranches in clinical biochemistry, which recommendsdifferent reference values from those of adults, with respect to diagnostic/prognostic tests performed for infants and children. It also deals with diagnosis of inbornerrors of metabolism.

In order to provide optimal health care for clients, accurate diagnosis and prognosis of a disease or monitoring of health condition is an essential factor. With respect to Clinical Biochemistry, there is a major role of clinicians to achieve this goal. In one hand, the management of the processof sample analysis, assurance of quality of the process and provision of guidance on the selection of tests and assessment of the significance of the results (particularly with some of the less generally familiar tests) are critical province of a clinician. On the other hand, he or she needs to involve in management of patients according to the decisions made based on the test results.

The field of Biochemistry is an ever evolving field related to patient care, which shed green light on development of health care management. The overview of the chronicle of Clinical Biochemistry with its present picture credibly evidences the brighter future of 'evidence based health care practices' which enables the prevention or early detectionand cure of most of the life threatening diseases.

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