COMMENTARY

THE STEALTHY CRISIS IN MEDICAL EDUCATION IN PAKISTAN

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The quality of education is a cause for concern in Pakistan with a 6% pass rate in postgraduates taking the entrance examination for a public service career. There is worldwide dissatisfaction with university degrees as preparation for real life jobs offered by potential employers[1]. The days of a higher salary and better career prospects for university graduates are long gone particularly for low-quality degrees. Low and middle-income countries such as Pakistan have extra problems like limited finances, neglect of healthcare and education by politicians, a fragile social infrastructure and low Human Development Index[2] and a youth bulge as looming disruptions despite some improvement in the gross domestic product (GDP). These factors also affect medical education, the quality of which is a more complex assessment. The quality of medical degrees of MBBS doctors is not ensured as it is regulated by the now obsolete "old boy network" of consultants from other universities in examinations. This has led to ongoing modification of the 100+ year-old Flexner[3,4] framework both in curricular content and scope of medical practice in society in the 21st century as it affects a wide range of social mechanisms[5-7].

It is clear that 21st century graduates have a major requirement for social integration rather than simply technical competence[8] and this is incorporated in many changes in medical training and practice as well as the role of doctors expected by the UN and WHO[9-11]. Worldwide alterations are taking place in the medical curriculum and practical medicine with Canada playing a leading role[12-22]. These are the problems that are realized and dealt with, which are not apparent in Pakistan. Foremost of these is the realization that medical training requires recertification in view of the avalanche of medical advances[23]. This has started in Pakistan by the PMDC at a very low level which largely reflects refresher courses rather than Professional Development which incorporates up to date integrated knowledge. No one remains an expert for more than 10 years as pointed out by David Sackett, the guiding force of evidence-based medicine. According to him, the already trained needs to be retrained[24]. Professional development has replaced continuing medical education as a lifelong requirement and is far advanced in rich countries[25,26]. Even more disturbing for Pakistan is the open discussion of observerships – when degrees are considered suboptimal and registered with the WHO, unpaid observerships of years in duration may be prescribed prior to writing entrance examinations to developed countries.

With regard to the broader social implications of medical training, the health outcomes and impact of medical practice reflect on the quality of medical education in a country. In the development of the UN (1990–2015) goals, Pakistan performed badly compared to more deprived regional countries[8] such as Nepal and even Afghanistan[27]. Pakistan has the highest stillbirth rate in the world – a good overall measure of the quality of healthcare. Even countries harboring genocide and internal conflict have succeeded in these goals better than Pakistan[28].

The advent of the Sustainable Development Goals (SDGs) of the UN (2016–2030) with a much broader embracing agenda[10] has begun and realized health insurance for all in Pakistan which is praiseworthy. However, Pakistan has learned nothing from the outcomes of the Millennium Development Goals (MDGs) as it is merely upgrading the failed processes of 1990–2015. There appears to be no coherent planning or leader acting in Pakistan's nonpolitical interests. For instance, a golden opportunity was

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lost in the ongoing census for assessing maternal death ratios – a longstanding problem and starting point of registration for improvement.

With the above information, a consideration of the quality of medical education in Pakistan is long overdue. It appears to be directionless although highly regulated and administered – headed for disaster with the SDGs of the UN which emphasize education and prevention in the 21st century rather than hospital and practitioner centered pathological guidelines orientated organ diseases of the 20th century. Improvements are not expensive but require a change in the medical mindset which is long overdue and will probably take a generation. These will be discussed as follows:

1. FAILURE OF TRANSITION TO 21ST CENTURY MEDICAL PRACTICE

Abraham Flexner closed 50% of US medical universities as substandard and laid the foundation of medical education on a scientific basis in 1910[29]. Two years of basic sciences were followed by a year of pathology and pharmacology and completed with 2 to 3 years of clinical apprenticeship. He also strongly suggested clinical research to advance knowledge and education of the public but these were generally not included in curriculums and these failures came back to haunt present-day medical practice. Flexner completed a similar process in Europe in 1912 and in those colonial days 'the Flexner curriculum' spread worldwide to become the framework of medical education. Those were the days of hope, as bacteria[16] had just been discovered and it was confidently expected that all diseases would soon be controlled with pathological investigation and dominance.

The rest of the 20th century saw many advances which had to be accommodated in an increasingly overcrowded curriculum. These advances included immunization, antibiotics, genetics, genomics the magic bullet stage of biochemistry and endocrinology, efficient and expensive advances in visualization techniques far beyond X rays, community medicine, nutrition, family medicine, IT, increasingly demanding statistics and data analysis, as well as advances in cure rates, particularly childhood cancer. This is by no means a comprehensive list and prepared the doctor for a clinical encounter where both the patient and the doctor expected an instant cure.

The examination of competence to practice also underwent changes towards computer-based examination from the time-consuming case examination by senior doctors which was shown to be subject to errors and bias. It should be emphasized that certification is set at the lowest acceptable level and not the highest level of competence with no control by provosts in Pakistan to ensure quality. Teaching methods also changed most notably problem-based learning[30] which improved student participation and served the necessary function of integration of knowledge rather than being considered as a (flawed) new method of teaching. This was dominated by the undeclared religion of psychology from the days of Freud, Jung, Piaget, and Montessori despite the efforts of Donald Hebb[31]. This tumult of input into medical education led to a vicarious suboptimal outcome. Specialization in organ pathology developed, which coped poorly with the multi-morbidity in increasingly older patients. Pathologically based diagnosis resulted in end-stage rarely curable disease is the focus of practice rather than the cure of the patient. This was compounded by patients' reluctance to seek expensive medical assistance. Hospital centering and focus was the basis of medical care, which resulted in further distortion and expense. In developing countries, a fragile infrastructure and lack of a social system to provide continuing care further decreased better outcomes to diseases which were not recorded.

The avalanche of knowledge resulted in a statistically determined guideline-based practice which provided one size fits all management – a shortcut long predicted by Bertrand Russell and confirmed personally recently by Dr. Atta ur Rahman[32] with many guidelines of little relevance to Pakistan[33]. The background of medical care provision was centralized by bureaucrats on an organizational

certification basis which largely was unsuccessful for deprived rural people. The research was of low quality and rigidly entrained in publications even at the level of Ph.D. rather than advancing knowledge and progress[34-38]. The teaching of students was very traditional and deficient and it is a major indictment that second-year university students congregate at the roadside to rote learn for class biochemistry tests! They clearly have not transitioned into university students and do not understand what a university education demands of them.

Many other developments disrupted the hopes of Flexnerian medicine. Doctors treated symptoms rather than causes, aided and abetted by the pharmaceutical industry. Unlicensed pharmaceutical vendors originally favored by poor governments to keep costs down have led inter alia to antibiotic resistance as a major problem. Patients only take 50% of prescribed medicines but more than 50% of US citizens take multivitamins with little if any improvement in health outcomes. The pharmaceutical industry by manipulating 'normal' produces 'illnesses' such as vitamin D and calcium deficiency without an increase in disease. In the case of calcium, two big surveys in the USA and UK demonstrated a 20–40% increase in calcium-dependent coronary artery diseases because only 0.3% is deposited in slow turnover bone – but everybody is an expert[39].

As regards medicine, several disciplines have lagged into the 21st century such as obstetrics and gynecology, nutrition, community care of deprived people, magic bullets in biochemistry, neurology, pulmonology, and even general medicine. This is the stealthy crisis in medical education and practice in Pakistan. Compounded by over-centralization and political interference but fundamentally lying with the universities who have totally ignored the changes in medicine in the 21st century in responding to the changes in disease and society. Although deprivation produces a double disease load in Pakistan, the majority of deaths are now due to noninfectious chronic diseases and increased survival with multiple morbidities and ill health related to lifestyle. The organ disease model of the 20th century deals poorly with this and has been replaced by systems biology[24], the first new faculty at Harvard for 20 years[40]. Systems biology is based on the wisdom of the body of Walter Cannon homeostasis of the whole individual patient with central nervous system dominance in the human. It has been stated that failure to adopt systems biology will result in an intellectual underclass within a decade[41-43]. Systems biology is absent in Pakistan literature, publications, and teaching.

Other changes in medicine are the view that the life cycle and genomics have an important part in later disease, particularly if prevention and early detection are to be effective in assuring health as in the SDGs. Pathogenesis is becoming far more important than terminal pathology (especially in neurology, pulmonology, cancer, and the metabolic consequences of lifestyle). Blood tests are now appropriate or inappropriate not normal or abnormal and are seldom of diagnostic use. Early diagnosis is more related to receptor sensitivity and para-inflammation than blood levels although statistics is necessary, biology is not easily measured by mathematics[44] and almost all research[45] and systematic reviews are wrong[46]. Patel and Ioannidis's seminal article and follow up pointing out that there are probably 2000 potentially interfering blood chemicals to a single blood estimate making our randomized control studies very primitive[47]. In addition, as any starting point over 5 years is invalid in a rapidly changing world, Bayesian statistics are better than mathematical statistics with a Bayes value of 200 corresponding to the biological significance of $p<0.001$ rather than the mathematical $p<0.05$ for statistical rather than clinical significance[48].

A further change in the 21st century is the individualization of management. The usual management guidelines of one size fit all is clearly inappropriate but is central to certification to practice in Pakistan. This shortcut to avoid the avalanche of high-quality new knowledge was predicted long ago by Bertrand Russell, who stated that it would lead to technicians knowing only

'what is this and how is it treated' rather than the addition of 'why', which is required of the prepared mind of university graduates. Finally, participation by patients is vital rather than dictation by doctors or government in these days of IT and social media. This will be dealt with later in the section on the organization of healthcare. It is clear that none of the 21st century advances and changes in medicine have been incorporated in Pakistan, which has remained in the 20th century of medical practice and consequent outcomes.

Certainly, the mindset needs to evolve rather than persisting with centralized 20th century protocols and teaching with low-quality research based on organization and administration rather than clarifying and advancing education and healthcare in Pakistan. Building 40 new hospitals in response to the UN's SDGs of 2016, 30 will not produce the broad outcome of health for all as prevention, early detection, and public education will only be achieved by community embedding. Similarly, individual health will only be achieved by embracing systems biology rather than the obsolete organ disease based guidelines of the 20th century where one size fits all and most of which are inapplicable in Pakistan, e.g. the Strat Obstetrics and Gynecology of the Royal College of Obstetrics and Gynecology as childbearing in the UK is a largely physiological event but is a very real threat to life in Pakistan.

2. QUALITY OF EDUCATION AND HEALTHCARE

The poor performance of Pakistan in the MDG's of 1990–2015 compared to even more deprived neighbors must raise doubts about the quality of education as a component. Measuring quality is difficult and requires outcome and impact as the final step. These are absent in Pakistan and it is almost impossible to find anyone to debate and discuss recent advances and their application to Pakistan. There is no mention in Pakistani academic circles on the major conceptional advances – systems biology, iterative history taking, para-inflammation consequences, immunosuppression in septic shock, and many others[49-53]. Most publications and studies are set at the lower level of audits, which are not generalized although necessary for individual institutions. Even Ph.D.'s are rigid rather than advancing knowledge. This is a regional problem extending even as far as Iran. Postgraduate Continuing Medical Education or Evolution into professional development has been introduced at a very simple level by the PMDC is largely a points score with revision and little academic control or evaluation. Above all, it needs a twenty-first-century context of all presentations to fulfill its purpose – recertification, which is looming on the horizon together with the practice of observerships. There are no proctorships or provosts to guarantee quality in the tightly regulated teaching system. The Bologna process to assist student movement was adapted in Pakistan to ensure uniformity. The postgraduate teaching system is based on certification particularly of Ph.D.'s but there is clear evidence of a lack of quality – a major factor in the failure to transition to the 21st century.

At the individual level David Sackett, the driver of evidence-based medicine pointed out in 2002 that 33 clinical articles be read daily simply to keep up with advances[54] (up from 17 in 1996). This is simply absent in Pakistan, where keeping up with progress is viewed as a luxury even by the HEC. Students, despite project based learning, supporting involvement and integration of knowledge, still continue their successful school route learning even for class tests[55-60]. The teachers do not realize what a failure this is as elsewhere teaching is vibrant within course assessment[49] including situation awareness[61] and especially adaptive expertise[62]. The original error lies in early schooling but a bridging course is essential for any improvement until this is corrected. This has been increasingly truncated by the dead hand of backward-looking 'educators' whereas in Dublin[62] and Oxford[63] this course is one year in duration to help bright inner-city students with 3A+'s perform better at University. Quality rather than organization and administration is an urgent requirement in Pakistan if Pakistan wants to progress to the stage where good doctors develop in spite of their education, not because of it.

3. ORGANIZATION OF HEALTHCARE

Pakistan does not seem to have learned any lessons from its poor performance in the MDGs of 1990–2015. When faced with the far broader and demanding SDGs, it has adopted the same organizational strategy with the addition of a well thought out insurance scheme for the deprived but a poorly considered increased spending on 40 big new hospitals. The lessons that are obvious from the MDG's are that successes in decreasing maternal mortality were only achieved with embedding in the community prior to any intervention. These decreased maternal mortality ratios were achieved in Nepal[64], Bangladesh[65], and Larkana in Pakistan[66]. The objective of the research was neonatal umbilical cord care and extra lady health visitors were borrowed from family planning. This demonstrates that the focus must be on the community workers and interaction rather than central planning. This is further emphasized by the success even in the presence of genocide and internal conflict.

The SDGs are even broader and it is clear that social upliftment had a 3 times greater effect on health outcomes than any healthcare intervention[56,57] although often claimed by the medical profession. It is, therefore, clear that the SDGs should be driven by a community focus, using members of the community as workers in addition to upgrading lady health workers perhaps stratified as with Chinese barefoot doctors. Education social upliftment with work provision and healthcare are inextricably interconnected. This is a unanimously international direction but has been ignored in Pakistan[67-69]. Lady health visitors were a brilliant innovation in 1986 but have languished and been maltreated since then. They require upliftment, repurposing, and development if the SDGs are to be achieved.

Central management of healthcare and medical education is well established and dominant in Pakistan following the Baldridge Victor agenda of University Education[70] but fits poorly with medicine because of different motivations and has remained unchanged in Pakistan despite 3 modifications elsewhere[71]. This rigid regimen has financial implications – 40 new independent big hospitals will bring staffing and quality problems as well as drawing on limited financial resources. A hub and spoke initiative which have been successful elsewhere in the region will be far more effective and much cheaper[72]. The final problem is medical schools[73]. Pakistan now has more medical schools than the USA, which has almost twice the population and infinitely better healthcare – although imperfect. Unless the quality is upgraded this is a certain path to disaster.

4. CONCLUSIONS ABOUT THE WAY FORWARD

The problems are well known but overall solutions are not considered. A low-quality mafia of university professors even suggested by a Vice Chancellor to retard progress[74,75]. This is a worldwide phenomenon – the destructive factor is the backward-looking low quality. It is obvious that a change of mindset is essential and urgently necessary but this may take a generation as the present mindset is broadly and deeply rooted in all areas of Pakistani society. The following steps should be taken on an emergency basis to revert the process of destruction:

i) Educating children, starting at preprimary based on increased present-day knowledge of brain function rather than obsolete psychologically based schooling paradigm.
ii) On entrance to the university, to counter the schooling problem, an effective bridging course should be essential to produce the prepared mind of Louis Pasteur. This should be the ultimate objective of any university education in the modern world. Survival of individuals and species is dependent on adaptability and not on cleverness or strength – Darwin. The alternative to training professional experts is the present default system of training rigid technicians, who are incapable of entering the 21st century and serving Pakistan adequately.
iii) Medical practice and education MUST transition to the 21st century rather than perpetuate the obsolete 20th century Flexner initiation.
iv) Quality is a major problem at all levels

particularly with the present emphasis on certification by Ph.D. The production of low-quality publications, research, and teaching of students requires overseeing. Clearly, a real provost (not necessarily a senior but someone who understands, is informed and is aware of academic and medical trends) is essential with at least similar proctors if not provosts at universities as quality is the accumulation and widespread dispersion of knowledge not rigid administrative dominance by poor quality certificate holders. The alternative suggested is high-quality international evaluators of a professional mafia.

v) The centralized dominance of healthcare organization in Pakistan circumstances is clearly unproductive and even destructive. The emphasis must shift to the community, particularly linking lady health workers and use of the community itself.

This then is the silent crisis in Pakistani medical education and practice. It requires a change in mindset which will be a long process on the road to improvement in the interests of Pakistan.

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