Viewpoint Article

Suicide among medical students: The need for an Ignaz Semmelweiss insight

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The medical education system in India is currently one of the largest in the world and houses a rapidly expanding private medical education consortium [1]. While the number of medical educational institutions in the public sector grew by only 36% from 1970 to 2005, the number of private colleges multiplied by a staggering 1,120% [2]. As per the Medical Council of India, there are now 194 private medical colleges and 161 government medical colleges offering medical undergraduate courses [3]. Undergraduate medical education comprises of strenuous study and training for 5.5 years. The rigorous demands of training might adversely affect the student's physical and mental health. The subject matter of depression and burnout among medical students is now well known and gaining traction. At an individual and institutional level, the medical fraternity has been trying to face up to this issue for some time now. Medical students encounter multiple psychological changes in their metamorphosis from young insecure students to proficient doctors and somewhere along the way, some of these brightest minds- our future doctors, are somehow lost in translation.

The Million Deaths Study reports that suicide is the second most common cause of death in people aged 15-29 years [4]. Studies further report that suicide rate amongst medical students is considerably higher compared to the general population or other academic groups [5-6] A meta-analysis found that the prevalence of depression in medical students was 27.2%, with only 15.7% seeking psychiatric help. Furthermore, suicidal ideation was found in 11.1% [7]. To the best of our knowledge, similar studies in the Indian context are lacking, but it is possible that the rates may be comparable or higher, considering that India has significantly higher suicide rates compared to the rest of the world [8]. These sobering statistics raise concerns as to why this particular population subset appears to be more susceptible, than what the common denominators which predispose them to depression and suicide are.

The embryology of the problem is multifactorial and there are a few established risk factors, such as how entering the medical profession can itself be extremely stressful. The highly competitive entrance exams call for a great deal of dedication, with lakhs competing for just a few thousand seats. These students invariably undergo a long grind to qualify in these exams, and it is not at all uncommon to see that some of them are likely to be perfectionists and are extremely vulnerable to become discouraged if the lofty expectations they ascribe to are not met. Owing to the tense competition among peers, the bulk of academic material and amount of clinical skills that need to be acquired in a short time frame, they may feel that everyone else is better, and if others are able to cope, they should be able to too. The stress of being around illness and death on a daily basis can be overwhelming, especially in the first few months of clinical posting. In addition, the high workloads, lack of sleep, along with decreased leisure or down-time can take a severe emotional toll, increase anxiety, depression and burnout [9]. Burnout soon descends into despair and some may even turn to suicide. Sources of support that they could rely upon previously might not be available now as many

medical students are in a medical school which is not in the same city as their families and for some, it might even be the question of exhaustive travel schedules to regions that have poor connectivity. Medical education conditions students to push themselves to their limits; "I should be capable of handling everything" is the motto every student imbibes by default. This mindset, although enabling students to manage difficult situations in clinical settings, can prove counter-productive when it comes to their own well-being. Left inadequately addressed, this can contribute to detrimental psychological and physical conditions even later in their careers [10-11]. These are all, for most parts student related and extrinsic factors, but there just might be one intrinsic problem that often slips under the radar and that problem might be us-the medical professional and the medical education system as a whole.

A comparable situation arose around 300 years ago, when doctors refused to acknowledge their implicit responsibility in causing a problem. The 18th and 19th century's puerperal fever affected on an average, 6 to 9 women in every 1000 deliveries, killing 2 to 3 of them with peritonitis or septicaemia. It was the single most common cause of maternal mortality, accounting for about half of all deaths related to childbirth, and was second only to tuberculosis in killing women of childbearing age. It was described as an aspect of the natural world that felt almost deliberately evil. What caused it? Some thought "a failure of uterine discharge"; others called it "milk metastasis," noting that the internal organs of the women who died seemed covered in 'milk'. Eventually it was accepted that this fluid was pus. But how did the pus come? In the meantime, doctors were puzzled, blaming puerperal fever on a host of different causes: mists, sewage, poor ventilation, cold, ethnicity, or vague putrid tendencies. Lot of money, time and manpower was spent in investigating these possible environmental aetiologies.

The breakthrough, when it eventually came in 1847, came from essential introspection rather than adventurous projections. Ignaz Semmelweis brought attention to how doctors at the time did not have the habit of sterilizing their hands prior to delivering. While working at the Vienna Lying-in Hospital, he demonstrated that the incidence of puerperal fever could be drastically reduced by appropriate hand washing by medical care-givers. Semmelweiss' hypothesis, that there was only one cause; that all that mattered was cleanliness, and that somehow the doctors themselves were responsible for all those maternal deaths was extreme at the time, and was largely rejected and ridiculed. After all, doctors were the Gods on earth who could do no wrong, weren't they? He was dismissed from the hospital, his contemporaries, including his wife, believed he was losing his mind, and in 1865, nearly twenty years after his breakthrough, he was admitted to an asylum where he died of septicaemia. More than twenty years later, Louis Pasteur's work subsequently offered a theoretical explanation for Semmelweiss' observations. For nearly 50 years we refused to accept the possibility that we might be a possible contributor to the problem that had killed many and instead adopted a stubborn futile dissection of several extrinsic causes. It would not do to repeat history, like the persecution of Semmelweiss. Instead, we need to sternly examine the medical curriculum and system that we have built for these students. Yes, undoubtedly the personality factors of the medical student, competence, his genetic vulnerability to develop depression might all be strong risk factors, but it is high time that we, the medical fraternity, acknowledged that we may not only be part of this problem, we might just be the problem itself. It is the elephant in the room that we can no longer ignore and must quickly triage.

At the very core of this intramural problem is our notion of what constitutes good medical education. We live in an era where the councils that accredit medical colleges are all placing increasing emphasis on standardization. The implicit assumption is that excellence is defined by blind allegiance to a guideline, from which every deviation becomes defined as an outlier. On finally making it to a medical college; the student has realized a lifelong dream. The harsh reality of the medical college's albatross ecology then slowly kicks in; before this, they were highly unique and considered to be the cream of the crop but now, they are joined by more than a hundred individuals as talented, as intelligent and as ambitious as them. They become devoid of the distinctiveness that once gave them so much meaning; that intrinsic drive that galvanized their academic approach is thwarted, they no longer stand out like they once did and this can lead to an acute loss of individuality and belonging. This is reinforced by our medical education system, with its narrow repertoire of marks, grades, pass and fail to define the competency of our students. Some teaching staff may even inadvertently supplement this ideal by rewarding those individuals who are most suited to this

suboptimal system and ignoring those who have a completely different set of strengths that the system does not even test for. Rote learning is most emphasised, with OSCEs (objective structured clinical examination) and clinical scenarios taking a back seat. Use of E-learning and digital technology is rarely encouraged even though the use could overcome logistical limitations and help reduce workload [12]. Competencies are usually defined by medical boards in an ad hoc manner that is easiest to evaluate, and such definitions have the potential to distort outcomes, such that only those that can be objectively measured are included for assessment. The net result is that these students feel out of place and their coping mechanism involves an attempt to be 'just like' the topper in a class, or an 'overachieving senior' or that 'perfect clinician' in the hospital that everyone talks about. They are constantly trying to be more like somebody else rather than nurturing their own uniqueness. They become pawns trying to blend in to this glitch in this didactic system. The failure to meet these demands can itself be the genesis for embarrassment, resentment and sometimes even a maintaining or an aggravating factor for depression. No case of depression is the same and no suicide is the same, but these deeply ingrained stressors of the medical milieu are probably the generic motif.

Medical students are not all cut from the same cloth, and neither are the patients they tend to. Medical education at its very best should never make students feel as though they must all fit into the same mould. In India nearly 60,000 students take up MBBS every year [13] and imagine if we had 60,000 cloned replicas each year. Medical colleges should not be akin to manufacturing plants spawning out stereotypical gizmos. Instead, they should be encouraged to draw on and develop fully their own distinctive life experiences, interests and abilities. We as doctors cater to a very diverse population, a world filled with variety and this deems a wide array of clinicians with distinct personalities and unique skill sets that can meet the divergent needs of disparate population groups. Standardization should not be the focus; instead self-growth should be an epitome. Most medical aspirants are usually under the impression that the hardest part of their professional career is entering it, and that the rest is mere formality. A few years into the course dawns the startling realisation that an MBBS degree without an MS/MD has only a modest value. This adds to the feeling of hopelessness, exacerbated by the already high academic and emotional burdens. As a coping mechanism, students then adopt a utilitarian view of medical school analogous to passengers on a shuttle service to the 'postgraduate destination'. A means to an end rather than an end in itself, they are physically in school but constantly feel disengaged from it as though they are enduring medical under-graduation rather than enjoying it.

Medicine as a science is self-sustaining with all its specialities, sub specialities and super specialities. There is sufficient space for everyone and we can find a place for all the 'underachievers' and the 'overachievers'. But it is we who need to stop labelling and mislabelling such distinctions in medical school. Plural specialities like sports medicine, nuclear medicine, emergency medicine, hospital administration, radiotherapy, infectious diseases, transfusion medicine, clinical haematology, reproductive medicine, geriatric medicine, allergy and immunology, medical genetics, sleep medicine have now emerged [14]. None of these were in existence 20 years before, so imagine the possibilities a few decades further on. This is testament to how medical science is updating itself to sync with the evolution of medical knowledge, but the platform to all science is education. So, is medical education also updating itself concurrently or merely playing catch up? Are students encouraged to explore possibilities that stray away from conventional subjects? Medical ethos must keep pace with these winds of change and react in a flexible fashion to ensure student customization with value based motives instead of conformity. Systematic definitions of student competency should recede to the background and medical ergonomics should transcend to the forefront. Medical students share so much in common, yet they are so magnificently different; they think differently, they have contrasting and sometimes competing ideals, ambitions and motivations. If we see each of them as fundamentally adequate then we can expand the definition of scholarship beyond just stereotypical academic marks, laying the groundwork for a more humane approach to medical education, one that encourages students to become the best human beings they can be. This approach can breed a flexibility that can adsorb the intense pressure these students feel in meeting curricular norms, nurture student engagement and optimize their psychological wellbeing.

The modern era epitomizes how the medical profession has thrived over the last 200 years but at the same time we must be mindful that as a species, humans have thrived for more than 2000 years. If we long to believe that being a doctor is equivalent to a demi god status, that we are a cut above, then that is an illusion of medical science that is inflating our conceits, an illusion that should not be a lure for young students joining the course. The concept of medical celestial reflects a mistaken pipe dream of medicine. The notion here is that nature heals disease, as well as causes it, and the role of the doctor is to not fight nature to cure the disease but to assist nature in the healing process. We do not have complete control over the way a medication works or whether a diagnosis is terminal, so instead of control, we must focus on influence. We must acknowledge our role as a 'Doctor' for the privilege it brings as well as recognize its limitations. This acceptance at a vanguard can help relieve that constant pressure that pushes us towards a burnout, it is to simply state that a 'God complex' does not always imply that doctors are omniscient beings, instead it symbolizes humility, that we are not larger than life. This godhead concept is a learned and conditioned perception which students imbibe in medical colleges from the doctors they are around. Positive role modelling can have a visceral impact during the student years but it cannot occur in a vacuum, it calls for medical professionals at all levels to abandon their own 'Messiah complex' and be open to learning as a continuous lifelong process not limited by the constraints of a MD or DM. The message should be reinforced at every opportunity; be it at the bedside, lecture halls or practical labs that medical science in all its glory is still an impotent science without humility, and finding a way to foster this attitude can underscore the unrealistic absolutistic self-expectations that weigh down on these students.

It is interesting to brainstorm what expectations these students harbour before joining medical school. They have at most times outscored those students who have taken up professions such as engineering, military service, business management but yet the rates of depression and suicide in these industries are much lower than that of medicine [15]. So, is this to say that the culture of medical education itself is a standard lower than the modules in other vocations? Medical training is more rigorous than any other industry? Or could it probably be a case of faulty expectations of the students? It is difficult to imagine a person joining the army voluntarily without the expectation of rigorous training schedules, hazardous situations and the pressure of making split second decisions on the battlefront. This normalization of expectations can itself blanket them during stressful circumstances. Yes, perhaps our students may not have toned their forecasts of a life in medicine prior to joining medical school, but what barricades us from implementing a workshop/module to pigeonhole the reality once they have joined college? Instead the first week is less about this and more about the kaleidoscopic colours that a benedict reagent can make or the surface marking of the palmar carpal branch of the radial artery

While focusing on mental health issues in these students, we must also be mindful of the undercurrents of depression. Imagine the plight of that medical student whose friend is depressed, not willing to seek help or worse still if they are a suicide survivor. It must be an agonizing experience and the dilemma they must struggle with every day, what could they have done to prevent it? If they can't save their colleagues how will they save their patients in the future? Aren't they at risk for developing depression too? These are the ripples of depression in this critical population. Today hospitals have dedicated burns wards, septic wards, so imagine ten years from now where hospitals have a dedicated ward for depressed medical students /doctors. Imagine twenty years further on where the rates of depression have increased so much that policy makers find it more productive to use AI (Artificial intelligence) programmed bots to diagnose and cure rather than make room for a human doctor, who has to cope with burnout and depression and yet deliver reliable patient care. This might longitudinally just be a hyperbolic nightmare but it is also a 'gentle' reminder that if we keep doing what we are doing then we will continue to get what we are currently getting. We need to act quickly at an individual level, at an institutional level, at a national level and at a global level or the future might just arrive even before we expect it to.

Let's look at a few models from medical schools in different parts of the world designed to break monotony and enhance student engagement. The Flipped Classroom model is a design in which the tasks completed inside and outside of the classroom are opposite to what traditionally occurs in classroom. Here constitutional knowledge is gained by students through self- paced learning before the scheduled class.

Knowledge application and problem solving then occur inside the classroom through mentor- facilitated learner- centred activities, in contrast to a conventional classroom, where foundational knowledge is passively transferred to students through the medium of a lecture [16]. This broad general definition, allows for a disparate implementation of activities inside and outside the classroom. Some schools have explored "peer coaching" methods utilizing one-on-one relationships, which might provide a forum for students to discuss personal issues that they would otherwise be hesitant to disclose or seek help for [17]. Mindfulness training is still an amorphous neoteric practice at medical schools and is still largely confined to the external milieu and optional space. Amalgamating it into the medical curriculum can promote positive changes in attitudes towards self-care skills and enhance well-being [18]. The utility of remediation training for students who are consistently falling short of academic cut offs can also be piloted. Such an individualized learning module that outlines generating personalized solutions with external support could hypothetically benefit but would however require extensive resources that currently don't exist.

Most of these intervention programs are nascent, maybe their success is even serendipitous but they show early potential, and because of the length of time required for the impact of a curriculum to be felt, it cannot be expected to yield decisive results that would be universally accepted in the near future. The fact that we lack evidence today doesn't mean that we can't have the evidence required to make the policy changes necessary 10 or 20 years later. But we need to start today if we want answers then. Evidence based practices might take a decade or more to be consolidated into core medical curricula but educational programmes must take a leap into unchartered territory and explore new horizons to assist in the transposition. Despite medical education's fountainhead role in sculpting professionals that delivers care to the world's second largest population, funding for medical education research itself is conspicuously absent. As a result, we lack evidence that is essential for guiding improvements in the health and sustainability of this workforce.

Just a couple of decades back, Nokia was synonymous with mobile phones and Kodak was synonymous with photographs. Today there are more number of mobile phones than people and more number of photographs taken than we could keep track of; yet ironically both these pioneer companies are now in bankruptcy and their products obsolete. Change is inevitable and therefore adaptability to the needs of the population is critical. Diseases are evolving, needs of the patients and their caregivers are constantly changing but are medical educators teaching students to become doctors who treat the patient and not just the disease? Medical education in India is at its crossroads. The time has come to reflect whether we should still adhere to the rigid archaic curricula established over a hundred years ago or to take a fundamentally different course, guided by sovereign innovation. When the medical system is organized along these lines then in the due process we will also be serving all the patients that our students will one day serve. With depression and suicide among medical students being in the spotlight recently there is a danger of genesis of an illusion that suffering and burnout is status quo, a necessary pre-requisite to complete medical school. Imagine a popular label where being a medical student is considered a risk factor for depression; wouldn't that be a forced parody of our medical system? We must remember that these medical students are our future doctors and if issues of depression are not adequately addressed at the very 'beginning of the pipeline', we might be left with a chicken or the egg conundrum not knowing whether we are looking at a de novo depression in a doctor or a depressed student who has now become a depressed doctor. Thousands of lives were lost before Ignaz Semmelweiss's introspection, but post this logical self-examination thousands of lives was also saved. If we are a part of the problem, then there lies an opportunity to be a part of the solution too. Medical education aspires to help medical students learn to care for others as best as possible. So can't we learn to care for them too? This is a paradox we must quickly resolve; after all every doctor was once a student. Isn't this what we would have also wanted?

Definitely individual student related factors like resilience and coping skills play a more predominant role in the etiopathogenesis of depression compared to faults in the system. The insight offered here is therefore not a panacea to depression among medical students but only a subtle innuendo of our collective responsibility to accelerate the change that our medical culture warrants. Institutional changes are often in the end a summation of changes in individual attitudes and hence the onus is on each and every medical professional to facilitate this transformation. Burnout can be curbed, depression can be managed and suicide

can be prevented. Reformations in the medical education system need not be an 'antidote' or a 'vaccine' to the problem but it can still be therapeutic.

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