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2021 is the year of hope with many vaccines being made available for COVID-19!

Wish all SAAP fraternity a wonderful new year, filled with good health, joy, love and peace

In this issue

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*Website:*https://saapphysiologists.webs.com/*E mail:* physiology.ac@gmail.com

From Editor's Desk

Professor Piyusha Atapattu

2021 is finally here, and brings us hope and promise of the COVID vaccines and better things to come! The SAAP Bulletin has reached its first year since Professor Arif Siddiqui decided to revive it, and though he is sadly not around to celebrate this milestone, he would certainly have been proud of the SAAP members, and their combined efforts on making the SAAP Bulletin a success. I thank all SAAP members and invited personals for their active contribution to the only publication of SAAP.

2020 saw numerous unanticipated changes globally, and the world reluctantly but resolutely accepted that we have to adjust to the new normal, and make deliberate and consistent attempts to adapt.

Physiologists have certainly done this, and ample evidence is available in the current issue of the SAAP Bulletin, as well as the past 2 issues. Following the sudden demise of Professor Arif Siddiqui, an enormous loss to the SAAP, Professor Muhammad Aslam was appointed the President SAAP for the remaining period 2018-2020. SAAP member countries could not have the planned activities, as gatherings were prohibited due to the rapid surge in COVID-19. Most universities were forced to embrace online delivery of the curricula, an clinically-related teaching and research were severely interrupted. However, physiologists rapidly adapted and are doing very well in diverse areas.

We wish you a happy 2021, with joy, peace and good health to all!!

Professor Piyusha Atapattu
Department of Physiology, Faculty of Medicine
University of Colombo, Sri Lanka
E-mail: piyushaa@physiol.cmb.ac.lk

Transforming preclinical medical education during pandemic: a Bangladesh perspective

Dr. Shams Ruhani Islam
MBBS MD

Lecturer
Department of Physiology
Shaheed Suhrawardy Medical College

Novel Corona virus emerged from Chinese city of Wuhan in December 2019 and rapidly transitioned into a global pandemic. Implementation of social distancing and suspension of educational facilities have been made with a hope of mitigation of viral transmission. Compulsory closure of academic institutions during COVID-19 pandemic, has compelled us to utilize these innovative concepts of online learning in a faster pace. Examinations have also transitioned to online formats.

In the recent years, the teaching-learning process is undergoing a paradigm shift in from "Sage on the stage" to "Guide on the side" approach, where teacher's role is to facilitate students. The blending of traditional learning with innovative online learning is the ideal method but during pandemic this holistic

approach of learning disrupts and left us a sole option to continue learning via online learning.

Considerable debate arises over the merits of online education against that of traditional teaching. Some people thinks that innovative technologies in education further accelerate it and online education will utimately turn into an essential part of medical education.

Covid 19 catastrophe showed us lucrative side of online learning where we can teach a large number of students at any time and in any part of the world. However, others think that spontaneous and unplanned online learning with little arrangement and insufficient bandwidth will bring about poor user experience in medical education.

Distance learning affected whole medical sector including preclinical departments like Anatomy and Physiology. Preclinical subjects are

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considered as core components of medical education for building solid foundation of trained doctor. Technology-based education is more feasible in preclinical teaching.

Transition of campus settings to home environments results in conducting course delivery and assessment in a remote environment. It has given opportunity for teachers and staff to acquire skill on innovative online technologies. Technology provides innovative and resilient methods at times of crisis to prevent disruption in course progression and helps to work virtually by maintaining social distancing.

In Bangladesh, the IT sectors are rapidly growing. Most of the students have internet connectivity even in the remote villages of the country and participate in the online class attentively. Online exams during COVID-19 show benefits of digital assessment with active participation of students. Less time consuming, flexibility and cost effectiveness are the major advantages of online learning.

Home-based online learning results in stress, reduced activity with peers, lack of concentration and interference in family affairs can be monotonous. Some students complain of eye strain and headache due to prolonged use of digital screen. Suspension of practical classes and lack of hands-on training are leading to some challenges in short course period of basic sciences. A very few students cannot avail internet facility properly and this disrupts their online sessions. Compared with traditional learning, during online learning, students felt less satisfied.

A Bangladeshi medical student is attending online class from her home.

It is too early to comment on whether online learning can replace traditional learning but their integration can be effective. Distance learning may not be the perfect solution, but it is better than no learning at all.

Conception of a humanistic society

Professor HR Ahmad
Professor of Physiology at SIUT and AKU

"What lies before us is the opportunity to build a more just and equitable way of life for all mankind". .... Al Gore

Truly, one is born twice: biologically when one enters this world and intellectually when one enters the alma mater. Thus, the enabling environment of institutions should discover and nurture faculty and students' creative intellect through research, learning, and public service. Not surprisingly, in today's world we wonder whether many countries are richly endowed because their universities are intellectually and creatively rich.

It means that universities, communities and the state of a republic are well looped and functioning. How can we introduce such a model in a country where the role of a university as a sensor of a society is not functioning? What are the challenges and opportunities to place the system on the constructive path for public service? Should a university provide us the road map for the evolution of a humanistic society?

In this context, let us invite Noam Chomsky to introduce Bertrand Russell. His humanistic conception should be understood in context of a gardener nurturing a young tree. It will develop into an admirable form, given proper soil, water, air and light. This analogy refers to an individual's growth which for too many seems to be difficult. This is because the soil and the freedom, required for it, are immeasurably difficult to find or provide.

The solution may lie in Bertrand Russell's libertarian concepts of education. He defines education as an activity directed towards the world that we want our efforts to create. It should not aim at passive awareness of dead facts. Its goal should be to elicit and fortify whatever creative energy a human possesses. In the modern world, the principle of growth in most of us is hampered by tradition imbibed by laws of the simpler age and institutions built around it.

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Therefore, the reconstruction of a society must search for ways to liberate the creative energy but not to establish new forms of authority. Russell would have agreed with Wilhelm von Humboldt that "to inquire and to create" are the centres around which all human pursuits more or less directly revolve.

What type of enabling environment should be looked for that can unfold the creative energy of humans to protect them from susceptibility to casual thinking. It is known that alienation leads to unawareness of the coupling of self to the environment. It incapacitates the individual for performing with resourceful human energies but leads merely to mechanical exactness.

In order to overcome self-alienation, one should proceed to conceive social forms enabling human action to grow from inner motivation. The libertarian ideas demand that work should not be boring, being a purely commercial activity, a soulless and joyless thing. In such a situation, human nature and social organization might provide the soil for free and healthy growth by providing enabling environment. Can the solution be an ecofriendly industrial civilization? Can it free human beings from the worst form of servitude by liberating the creative energy leading to social reconstruction? Industrial civilisation can challenge the old bonds of authority and liberate human beings from outdated rituals and customs. It has a capacity to enable a population to enjoy variety from basics to luxuries depending on the nature of the guardian of the state.

The institution-faculty-relationship might provide a road map for a humanistic society where science could grow from the soil of arts. It may help the society then to nurture a guardian of a republic as a "mother" who could provide education, health and infrastructure for all citizens as children. In turn, they provide resources to the republic to sustain the loop of public service.

For this to achieve, we need an integration of domains of humanity, natural and social sciences in the form of an integrated new curriculum. It should lie at the centre of the academic pursuits of the university to provide a holistic research based education. This model of education should replace the prevailing colonial compartmentalized training systems. Education should be preferred because it liberates mankind to recognise oneself and enables to conceive a new society.

Social sciences and humanities can save us from the onslaught of self-alienation, casual thinking and intolerance. This may help us to come out of the current frames of thinking for a better human civil society using a bottom up approach of egalitarian means of wealth and income leading to education and jobs based life style.

In summary, we should work on a developmental agenda so that the journey from primary to university education could chart a road map to lift us from conditions that support stagnation, elitism and nepotism. This enlightened pathway will nurture the conception of a humanistic civil society for all children of the mother state.

Dedicated to the fond memories of two friends Justice Fakhruddin Ebrahim and Barrister Syed Iqbal Ahmad for being the voice of an egalitarian society.

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The writer is a professor of Physiology at SIUT and AKU.[hrahmad.alrazi@gmail.com]

Am I fit to fly? The respiratory effects of high altitude exposure and the basis of assessment of fitness to fly in patients with chronic respiratory disease

Dr Lakmali Amarasiri (MBBS, PhD)

Senior Lecturer Department of Physiology, Faculty of Medicine, University of Colombo

Air travel is common, and as a result many people in the older category and those with disease are seen to use air travel increasingly nowadays. Air travel exposes an individual to a low oxygen and high pressure environment, with the most significant effect being a reduction in the partial pressure of oxygen (PO2). Normal subjects and the majority of respiratory patients can tolerate this reduction in PO2 without experiencing any respiratory distress. However, patients with chronic respiratory disease, with or without coexistent cardiac disease are at risk of developing hypoxia or worsening of pre-existing hypoxia. Hence, patients with preexisting pulmonary disease are now being subject to preflight medical screenings.

Preflight screening evaluation of patients with chronic respiratory disease include; a thorough medical history and physical examination to detect underlying comorbidities, a spirometry assessment in the absence of any contraindication, pulse oximetry / arterial blood gas at rest and a hypoxic inhalation challenge test. Certain patients with pulmonary disease should be instructed not to fly. These include patients who pose risk to others such as those with active infectious diseases such as tuberculosis or influenza, those with haemoptysis, unresolved pneumothorax, and those who require supplemental oxygen excess of 4 L/minute at sea level. In other patients with chronic respiratory disease, the likelihood to desaturate must be assessed to determine whether they are fit to fly or not. These tests expose patients to the conditions they are likely to encounter during air travel or use sea-level arterial blood gas analysis.

The first part of this article highlights the physiological adaptations of the respiratory system to high altitude and then describes the basis of assessment of likelihood to desaturate

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in patients with chronic respiratory disease, when cruising at high altitude.

The barometric pressure falls as altitude or vertical height above sea level increases. The percentage of oxygen in the atmosphere remains constant (20.9%), and so, as the barometric pressure decreases, the partial pressure of oxygen in inspired air (PiO2) decreases proportionately. This condition is referred to as hypobaric hypoxia.

Acute ascent rapidly to extreme heights results in acute mountain sickness, with pulmonary and cerebral oedema in unacclimatized individuals, and can be fatal. However, if the body is gradually exposed to increasing altitude, it can adapt and survive. This process called acclimatization involves beneficial adaptive physiological changes to restore oxygen delivery towards sea-level values. However, even in some susceptible acclimatized individuals, long term exposure to hypoxaemia and tissue hypoxia may lead to detrimental effects such as excessive production of red blood cells, hypoxic pulmonary vasoconstriction leading to pulmonary hypertension and congestive heart failure.

Reduced atmospheric PO2 and humidification of air as it travels through the air passages leads to a further decrease in the PO2 by the time the air reaches the alveoli. The alveolar partial pressure of oxygen (PAO2) is predicted by the alveolar gas equation PAO2 = PiO2/ (PACO2 /R) and accordingly, due to presence of CO2 in alveoli, the partial pressure of oxygen in alveoli is further reduced. This leads to subsequent reduction in arterial PO2 and an initial reduction in oxygen delivery to the tissues, resulting in increase in alveolar ventilation. At sea-level, hypoxia where the arterial PO2 is above 60 mmHg, does not cause an appreciable increase in alveolar ventilation, because central chemoreceptor inhibition by reduced cerebral extracellular PCO2 cancels out the hypoxic stimulation of peripheral chemoreceptors. However, during acclimatization there is an increase in alveolar ventilation for any given partial pressure of oxygen in arterial blood. This is thought to be due to a decrease in cerebrospinal fluid bicarbonate levels and increase in hydrogen ion stimulation of central chemoreceptors. As change in arterial PCO2 is inversely proportional to alveolar ventilation, the increase in alveolar ventilation results in increased removal of carbon dioxide and produces a respiratory alkalosis, which is metabolically compensated for by renal loss of bicarbonate ions.

The physiological response to acute hypobaric hypoxia also includes increase in cardiac output, increasing oxygen delivery to tissues and increase in haemoglobin concentration, increasing the oxygen content in blood. The increase in haemoglobin occurs as a result of initial reduction in plasma volume and over time with increase in secretion of erythropoietin.

The initial hyperventilation and respiratory alkalosis shifts the oxygen haemoglobin dissociation curve to the left, increasing affinity of haemoglobin for oxygen. Over a period of days to a week, an increase in 2,3-

diphosphoglycerate shifts the curve to the right, favoring unloading of oxygen in the tissues and with time restores the curve to the sea-level position in fully acclimatized individuals. Individuals at altitude are frequently on the steep segment of the oxygen haemoglobin dissociation curve, where a small increase in arterial PO2 leads to a significant increase in oxygen saturation.

Cruising altitudes of commercial aircraft typically range from approximately 30,000 to 40,000 feet, and most aircraft cabins are usually pressurized to increase the partial pressure of oxygen of inspired air (PiO2) to approximately 15.1% of that at sea level, equivalent to that if an altitude of around 5,000-8,000 ft. This results in a partial pressure of inspired oxygen of 100–105 mm Hg and PaO2 of approximately 60–70 mm Hg in healthy individuals, assuming a normal PaCO2 and a respiratory quotient of 0.8

It is not possible to increase the PiO2 to that of at sea level, as increasing the pressure beyond this limit would have adverse effects. As the aircraft ascends, the decreasing cabin air pressure results in in a temporary increase in the volume of any trapped gas within body cavities as the pressure slowly equalises with the cabin pressure. This is the reason for the "popping" sensation experienced in the ears during ascent. This may be of significance in patients with either cystic or bullous disease, where the increase in the volume of the trapped gas could compress adjacent healthy tissue affecting lung mechanics. Hence, unresolved pneumothorax, is an absolute contraindication to air travel because air trapped in the pleural space will expand at altitude.

A hypobaric environment is also associated with a decrease in the FEV1 and FVC and increase in residual volume, functional residual capacity, and the total lung capacity in both normal individuals and those with COPD. Detection of clinically significant hyperinflation before air travel may therefore be relevant in some patients with obstructive lung disease.

The sigmoid shape of the oxygen dissociation curve (figure 1) allows healthy individuals to ascend to normal altitude of cruising in commercial airplanes without any appreciable hypoxaemia.

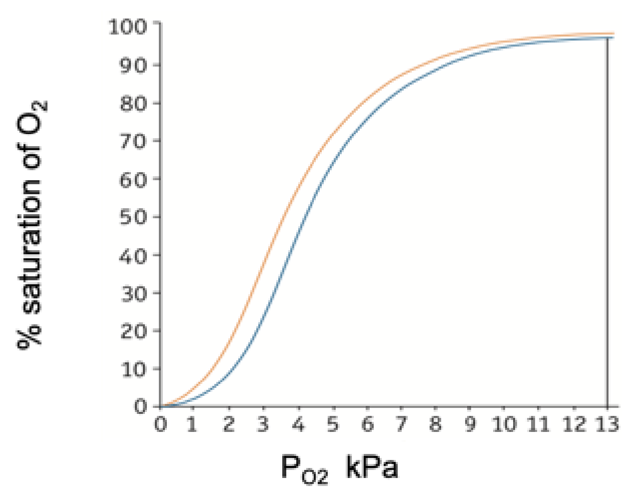

Figure 1
This diagram shows the oxygen haemoglobin dissociation curve in a healthy individual (red curve) and a patient with chronic respiratory disease (blue). Reproduced from A.G. Robson J.A. Innes. Breathe, 2006, Volume 3, No 2, 141-146

At sea level, in a healthy individual the PaO2 is approximately 13 kPa or 97.5 mmHg. Around 2400m, the PaO2 still remains around 9.7 kPa (or 72.7 mmHg), during which the oxygen saturation is maintained around 92%. In patients with respiratory disease there is a rightward shift in the oxygen dissociation curve due to chronic respiratory acidosis. This would lead to decreased affinity of haemoglobin for oxygen, increasing the possibility for the development of desaturation. At approximately 2400m the oxygen saturation is less than 90% and if the aircraft goes beyond this altitude, as the curve is steep, significant hypoxia would quickly develop.

Usually as a compensation for the reduced PO2, there is an increase in cardiac output and minute volume. However, in patients with cardiac or respiratory limitations, compensatory mechanisms may be poor and thus result in alveolar and tissue hypoxia. In patients with chronic respiratory disease, other mechanisms of desaturation include a blunted ventilatory response to hypoxia, either due to chemoreceptor insensitivity; airway obstruction limiting an increase in ventilation or increased shunting in the lungs.

Hypoxic challenge testing, is performed under either normobaric or hypobaric conditions to assess whether a patient has the likelihood of desaturating at cabin cruising altitudes, using a decreased fraction of inspired oxygen (FiO2) to simulate the hypoxic conditions at altitude. Hypobaric hypoxic challenge testing using hypobaric chambers or modified body plethysmograph chambers reproduces an environment most similar to that encountered during actual air travel; however, it is not widely available. Hence, assessment for hypoxia is most commonly performed using a normobaric hypoxic challenge test. The basis of the test is where the patients breathes in a hypoxic gas mixture (FiO2 to 15.1%) from a cylinder or a Douglas bag through a non-rebreathing valve or by using a 40% venturi-type oxygen mask driven by 100% N2, for 20-30 minutes, assuming that this is sufficient time for any physiological changes to take place. Studies for longer durations have found that there was an initial fall in PaO2 once the flight had reached cruising altitude, and that this was maintained throughout the flight.

Figure 2
Normobaric hypoxic challenge test

Figure 3
Hypobaric hypoxic challenge test

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The oxygen saturation (SpO2) and pulse rate are measured continuously throughout the procedure and observed for desaturation. Some laboratories perform arterial blood gases before and after the procedure. After the administration of a 15% fractional concentration of inspired oxygen for 20 minutes, a PaO2 greater than 50 mm Hg or an SpO2 of at least 90% could suggest that in-flight oxygen is not required. However, if desaturation beyond these values is observed, oxygen is administered and the test repeated to determine the oxygen requirement of the patient during flying.

Sitting values of PaO2 may differ from those during light exercise (such as walking within the aircraft), hence this test cannot predict whether a patient will desaturate at high altitude during light exercise.

Whether patients require supplemental oxygen and guidelines on disease specific management are available. The BTS guidelines suggest that those with a resting oxygen saturation >95% at sea level will be able to fly without the risk of developing significant hypoxia, those with an oxygen saturation <92% should not fly without supplemental oxygen, and patients already on long term oxygen therapy should have their usual flow rate increased by 2 litres per minute for the duration of the flight to compensate for the reduction in PO2.

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Workshop Report from University of Lahore, Pakistan

Prof. Samina Malik

Head
Department of Physiology
UCM
Lahore, Pakistan

On 29th October, 2020, an interactive workshop was organized by the Principal Professor Moghees A. Baig, University College of Dentistry (UCD), The University of Lahore (UOL), titled as “Am I present where I am”.

The main objective of the workshop was to make the postgraduatestudent as well as the faculty members, understand the concept of mindfulness, make them learn, how to be in present and to teach some techniques to enhance focus of attention to be in present.

The workshop was facilitated by Prof. Dr. Samina Malik, Head of Physiology & Mind-Sciences expert, University College of Medicine, UOL. The workshop was coordinated by Dr. Arooj-ul-Hassan, HOD Community & Preventive Dentistry and moderated by Dr. Muhammad Hassan, HOD Sciences of Dental Material and Dr. Amina Tariq, Psychologist and PG Research Co-ordinator,UCD, UOL. The participants were seated in 2 parallel halls with audio-visual facility for social distancing and live session was also run on facebook.

Prof. Dr. Samina Malik discussed the four tips of highly effective dentists in the light of a recent research paper on Mindful Dentist written by Carmelina D’ Arro published in the International Journal of Whole Person Care, Volume 5, Number 2 in the year 2018 (ijwpc.mcgill.ca): 1. Equanimity (being calm under Strees), 2. Attentiveness, 3. Self-Awareness, 4. Empathy. She focused on stress coping strategies of mindfulness and highlighted in detail the mechanisms by which human body tries to cope with stress physically and mentally. The biggest cause of stress is the mismatch between our expectation and achievement. Stress in an individual perception and different people react to it in different ways.

She explained how to live in the present and be powerful. She recommended to cherish what we have and what we sow today, shall reap tommorrow. Positivity attracts positivity. Apply nature`s law of attraction and abundance.

She presented 12 Tips for teachers to avoid burnout at workplace:

1. Have a good start by enoying energetic breakfast before leaving for work.
2. Invest yourself as a human being by taking your teaching hat off for a day.
3. Engage yourself in a CME activity of choice to develop yourself as an amzing teacher.
4. Take a relaxing lunch-break during office time alone or with colleagues.
5. Use your casual/mental health leaves.
6. Make connection with people at campus.
7. Seek a fellow teacher outside campus to be heard wihout worrying about rumors.
8. Walk to the ground to seek sunshine.
9. Perform Mindfulness Meditation for 10 mins daily while sitting in office chair.
10. Clean your desk before you leave to feel fresh next day. Present it a green plant.
11. Driving home is your secret-space to utilize to unwind by silent reflection etc.
12. Receive inspiration from other amazing teachers around, by talking to them/ giving constructive feedback to 1

subordinate each day/ receiving your own feedback on post-it notes from dept/ faculty/ students.

She explained mindfulness as the basic human ability to be fully present, aware of where we are and what we are doing, without being overly reactive or overwhelmed by what is going on around us. Mindfulness is something we all naturally possess under normal circumstances, but it is more readily available to us when we practice on a daily basis. Whenever you bring awareness to what you're directly experiencing via your senses, or to your state of mind via your thoughts and emotions, you're being mindful. Research has provided evidence that when you train your brain to be mindful, you're actually remodeling the physical structure of your brain.

Dr. Samina Malik made the participants perform 10 minutes guided mindfulness meditation. She elaborated that it requires from us to suspend judgment and unleash our natural curiosity about the workings of the mind, approaching our experience with warmth and kindness, to ourselves and others. To practice meditation, one do not really have to sit at the corner of the room. One can practice even if one is eating, listening to music, walking or painting.

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To attract abundance, tapping technique was explained and performed. It is performed by tapping right hand over left with eyes closed and thinking "I love myself, I believe in myself, Nature has everything in abundance and Nature is giving me everything in abundance". It is followed by strong positive imagination of receiving the desired goal abundantly before opening the eyes. If we act confident our brain behaves normally. Learn to live in the moment and cherish it. The workshop concluded with question & answer session and remarks by Prof. Dr. Moghees A. Baig.

Compiled by Professor Piyusha Atapattu
Editor-in Chief, SAAP Bulletin